TOPIC 1

MAJOR CLUSTER 5.NBT.A

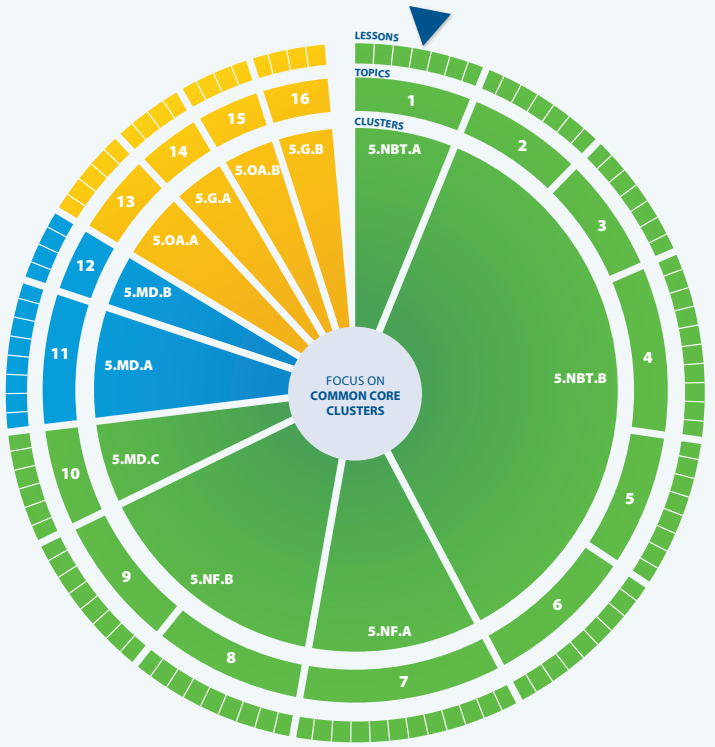
MATH BACKGROUND: FOCUS

FCR FOCUS | COHERENCE | RIGOR

MAJOR CLUSTER

SUPPORTING CLUSTER

ADDITIONAL CLUSTER



TOPIC 1 Understand Place Value

TOPIC 1 FOCUSES ON

MAJOR CLUSTER 5.NBT.A

Understand the place value system.

Content Focus in enVisionmath2.0

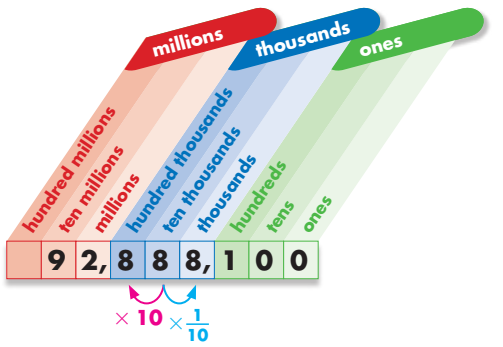
Topic 1 focuses on deepening the understanding of place value in both whole numbers and decimals.

UNDERSTAND PLACE VALUE IN WHOLE NUMBERS

- **Exponents and Powers of 10** In Lesson 1-1, students use patterns and positive exponents to write and interpret products involving powers of 10. They see that the number of zeros in the product is the same as the exponent in the power of 10. (5.NBT.A.2)

$$5 \times 10^1 = 5 \times 10 = 50$$
$$5 \times 10^2 = 5 \times 10 \times 10 = 500$$
$$5 \times 10^3 = 5 \times 10 \times 10 \times 10 = 5{,}000$$

- **Place-Value Relationships** Lesson 1-2 highlights the following base-10 place-value relationships: In a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. (5.NBT.A.1)

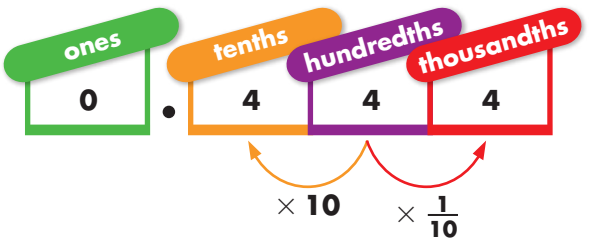


- **Use Place Value to Read and Write Whole Numbers** In Lesson 1-2, students use their understanding of place value to read and write whole numbers using words, standard form, and expanded form with exponents. (5.NBT.A.1, 5.NBT.A.2)

Content Focus in enVisionmath2.0 (continued)

UNDERSTAND PLACE VALUE IN DECIMALS

- **Place-Value Relationships in Decimals** In Lesson 1-3, students are introduced to decimals to thousandths. It is important for students to understand that the place-value relationships apply to decimals as well as whole numbers. That is, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. (5.NBT.A.1, 5.NBT.A.3a)



0.4 is 10 times as great as 0.04.
0.004 is $\frac{1}{10}$ as great as 0.04.

- **Use Place Value to Read and Write Decimals** In Lesson 1-4, students use their understanding of place value to read and write decimals using words, standard form, and expanded form with fractions ($\frac{1}{10}$, $\frac{1}{100}$, and $\frac{1}{1{,}000}$). (5.NBT.A.1, 5.NBT.A.3a)

Standard Form: 0.245

The 5 is in the thousandths place. Its value is 0.005.

Expanded Form:

$\left(2 \times \frac{1}{10}\right) + \left(4 \times \frac{1}{100}\right) + \left(5 \times \frac{1}{1{,}000}\right)$

Number Name: two hundred forty-five thousandths

Students also learn to recognize and generate equivalent decimals. For example, $1.4 = 1.40 = 1.400$.

- **Compare and Round Decimals** In Lessons 1-5 and 1-6, students compare and round decimals using procedures that are based on place value. These procedures are similar to those for whole numbers. One difference, however, is that when rounding decimals, the digit to the right of the rounding digit's place is dropped after the rounding is completed, whereas with whole numbers, it is changed to a zero. (5.NBT.A.3b, 5.NBT.A.4)

Round 2.36 to the nearest tenth.

Find the rounding place. Look at the digit to the right of the rounding place.	2.3<u>6</u>
If the digit is 5 or greater, add 1 to the rounding digit. If the digit is less than 5, leave the rounding digit alone. Since $6 > 5$, add 1 to the 3.	2.3<u>6</u> ↓↓ 2.4
Drop the digits to the right of the rounding digit.	2.36 rounds to 2.4.

Professional Development Videos Topic Overview Videos and Listen and Look For Lesson Videos present additional important information about the content of this cluster.

TOPIC 1

MAJOR CLUSTER 5.NBT.A

MATH BACKGROUND: COHERENCE

FOCUS | FCR COHERENCE | RIGOR

Content Coherence in enVisionmath2.0

Students learn best when ideas are connected in a coherent curriculum. This coherence is achieved through various types of connections including connections within clusters, across clusters, across domains, and across grades.

BIG IDEAS IN GRADES K–6

Big Ideas are the conceptual underpinnings of **enVisionmath2.0** and provide conceptual cohesion of the content. Big Ideas connect Essential Understandings throughout the program.

A Big Idea that connects most of the work in this cluster is that the base-10 numeration system is a scheme for recording numbers using digits 0–9, groups of 10, and place value.

$$26.537 = (2 \times 10) + (6 \times 1) + \left(5 \times \frac{1}{10}\right) + \left(3 \times \frac{1}{100}\right) + \left(7 \times \frac{1}{1{,}000}\right)$$

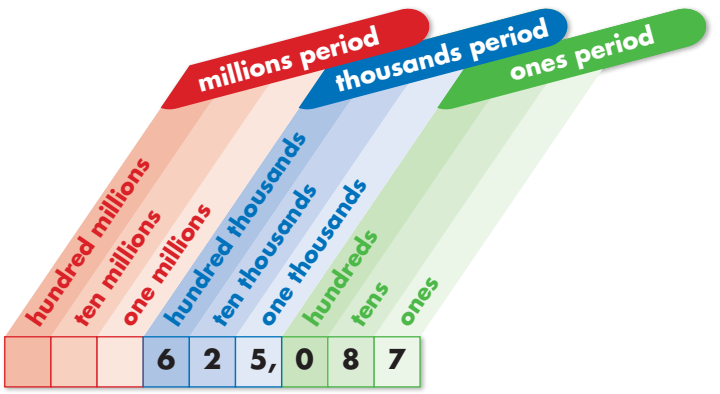
For a complete list of Big Ideas, see pages 110–111 in the *Teacher's Edition Program Overview.*

LOOK BACK

How does Topic 1 connect to what students learned earlier?

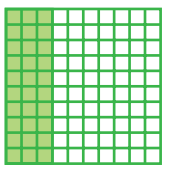
GRADE 4

- **Whole-Number Place Value** In Topic 1, students strengthened their understanding of place value for whole numbers through one million. They read and wrote multi-digit whole numbers using base-10 numerals, number names, and expanded form. They compared and rounded two multi-digit numbers. (4.NBT.A)



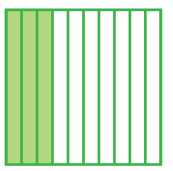
$$625{,}087 = 600{,}000 + 20{,}000 + 5{,}000 + 80 + 7$$

- **Decimal Place Value** In Topic 12, students learned how to use decimal notation, and compared decimals to hundredths by reasoning about their size. (4.NF.C)



30 parts out of 100 is 0.30.

$\frac{30}{100} = 0.30$



3 parts out of 10 is 0.3.

$\frac{3}{10} = 0.3$

TOPIC 1

How is content connected within Topic 1?

- **Exponents and Expanded Form** In Lesson 1-1, students learn to use exponents to write powers of 10. They draw on this understanding in Lesson 1-2 to write multi-digit whole numbers in expanded form with exponents. (5.NBT.A.2)

  $2{,}604{,}037 =$
  $(2 \times 10^6) + (6 \times 10^5) + (4 \times 10^3) + (3 \times 10) + (7 \times 10^0)$

- **Place-Value Relationships in Whole Numbers and Decimals** In Lesson 1-2, students see that for whole numbers, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. In Lesson 1-3, they see that this relationship applies to decimals, as well. They also see that writing decimals in expanded form is an extension of writing whole numbers in expanded form. (5.NBT.A.1, 5.NBT.A.3a)

- **Compare and Order Decimals** In Lesson 1-5, students learn to compare and order decimals by drawing on their knowledge about comparing and ordering whole numbers from earlier grades as well as their knowledge about decimal place value from Lessons 1-3 and 1-4. (5.NBT.A.3a, 5.NBT.A.3b)

  Compare 3.576 and 3.432.

Line up the decimal points. Start at the left. Compare digits of the same place value.	3.576 3.432
Find the first place where the digits are different.	3.576 3.432
Compare.	Since $5 > 4$, $0.5 > 0.4$ So, $3.576 > 3.432$.

- **Round Whole Numbers and Decimals** In Lesson 1-6, students round decimals by drawing on their knowledge about rounding whole numbers from earlier grades and decimal place value from earlier lessons in the topic. (5.NBT.A.3a, 5.NBT.A.4)

LOOK AHEAD

How does Topic 1 connect to what students will learn later?

LATER IN GRADE 5

- **Operations with Whole Numbers and Decimals** In Topics 2, 3, 4, 5, and 6, students will add, subtract, multiply, and divide multi-digit whole numbers and decimals. This work includes multiplying and dividing by powers of 10. The standard algorithms and procedures for these computations are grounded in place-value understanding. (5.NBT.A.2, 5.NBT.B)

  Find $18.5 - 7.82$.

  $18.5^{\,7\,\overset{14}{\not 4}\,10}0$ ← Annex a zero.
  $-\ 7.82$
  10.68

- **Convert Measurements** In Topic 11, students will use exponents and decimal place value to represent relationships among metric units. They will multiply and divide by powers of 10 to convert metric measurements. (5.NBT.A.2, 5.MD.A)

DATA

1 kilometer	1 hectometer	1 decameter	1 meter	1 decimeter	1 centimeter	1 millimeter
10^3 m	10^2 m	10 m	1 m	0.1 m	0.01 m	0.001 m

3 km = _____m
$3 \times 10^3 = 3{,}000$
So, 3 km = 3,000 m.

GRADE 6

- **Exponents** In Topic 1, students will write and evaluate numerical expressions involving whole-number exponents. Students will use exponents that have bases other than 10. (6.EE.A.1)

- **Whole-Number and Decimal Computation** In Topics 6 and 7, students will fluently add, subtract, multiply, and divide whole numbers and decimals. Again, students will use standard algorithms that are grounded in place-value understanding. (6.NS.B.2, 6.NS.B.3)

TOPIC 1

MAJOR CLUSTER 5.NBT.A

MATH BACKGROUND: RIGOR

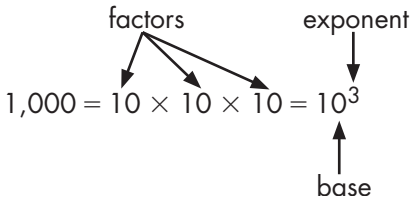
FOCUS | COHERENCE | FCR RIGOR

Content Rigor in enVisionmath2.0

A rigorous curriculum emphasizes conceptual understanding, procedural skill and fluency, and applications.

CONCEPTUAL UNDERSTANDING

- **Understand Exponents** In Lesson 1-1, students are introduced to exponents. They learn that the exponent in a power of 10 tells the number of times 10 is used as a factor. When multiplying by a power of 10, they recognize the connection between the exponent in the power of 10 and the number of zeros in the product. (5.NBT.A.2)



- **Understand the Relationship Between Adjacent Place-Value Positions** Throughout Topic 1, students extend their previous understanding of place value. They use base-10 blocks, place-value charts, and patterns to recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. (5.NBT.A.1)

- **Make Sense of Comparing Numbers** In Lesson 1-5, students use place-value concepts and representations, such as number lines, to understand decimal comparison. It is important for students to realize that the number of digits in a decimal cannot be used to determine its size. While whole numbers with more digits are greater because the values of the places increase to the left, decimals with more digits may be smaller because the values of the places decrease to the right. (5.NBT.A.3b)

$325{,}408 > 822$ $\qquad$ $325.4 > 325.048$

- **Make Sense of Round Numbers** In Lesson 1-6, students round decimals by extending their understanding of how to use place value to round whole numbers. The procedure for rounding whole numbers is based on knowing the halfway point between the nearest multiples of 10, 100, 1,000, and so on. The procedure for rounding decimals is similar. It is based on knowing the halfway point between the nearest multiples of 0.1, 0.01, and 0.001, and so on. (5.NBT.A.4)

PROCEDURAL SKILL AND FLUENCY

There are no standards in this cluster that call for fluency.

- **Use Conceptual Understanding to Write Whole Numbers in Expanded Form** In Lesson 1-1, students learn to use exponents to represent powers of 10. They then use exponents to represent multi-digit whole numbers in expanded form. (5.NBT.A.1)

- **Use Conceptual Understanding to Read and Write Decimals** In Lessons 1-3 and 1-4, students use their understanding of place-value relationships to read and write decimals, including expanded form using fractions. (5.NBT.A.3a)

Standard Form: 5.476

Expanded Form: $(5 \times 1) + \left(4 \times \frac{1}{10}\right) + \left(7 \times \frac{1}{100}\right) + \left(6 \times \frac{1}{1{,}000}\right)$

Number Name: Five and four hundred seventy-six thousandths

- **Use Conceptual Understanding to Compare and Round Decimals** In Lessons 1-5 and 1-6, students practice procedures for comparing and rounding decimals by drawing on their conceptual understanding of comparison and rounding, their understanding of place value, and previously learned procedures. (5.NBT.A.3b, 5.NBT.A.4)

8.273
8.291 Since $0.07 < 0.09$, $8.273 < 8.291$.

APPLICATIONS

- **Situations Involving Whole Numbers and Decimals** Throughout Topic 1, there are a variety of real-world situations that require students to apply their understanding of place value. These situations require students to read and write whole numbers and decimals as well as compare and round decimals. (5.NBT.A)

Solve & Share

The lengths of three ants were measured in a laboratory. The lengths were 0.521 centimeter, 0.498 centimeter, and 0.550 centimeter. Which ant was the longest? Which ant was the shortest?

MAJOR CLUSTER 5.NBT.A

MATH PRACTICES

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MP

Connecting Math Practices and Content Standards in enVisionmath2.0

Math practices and content standards are connected within all lessons including the lessons that focus on math practices.

MATH PRACTICES WITHIN LESSONS

- **MP.1 Make sense of problems and persevere in solving them.**

  Students persevere as they try to understand problems involving place value, plan how to solve them, and determine if their solution makes sense. (e.g., p. 26, Item 14)

- **MP.2 Reason abstractly and quantitatively.**

  Students use reasoning to analyze relationships between place-value positions. (e.g., p. 12, Convince Me!)

- **MP.3 Construct viable arguments and critique the reasoning of others.**

  Students construct and critique arguments to justify the values of digits in whole numbers and decimals. (e.g., p. 22, Item 23)

- **MP.4 Model with mathematics.**

  Students model with math when they use equations to represent place value in whole numbers and decimals. (e.g., p. 8, Item 21)

- **MP.5 Use appropriate tools strategically.**

  Students use tools such as place-value blocks to represent numbers and solve problems. (e.g., p. 5, Solve and Share)

- **MP.6 Attend to precision.**

  Students attend to precision when they use and explain place value. (e.g., p. 19, Item 1)

- **MP.7 Look for and make use of structure.**

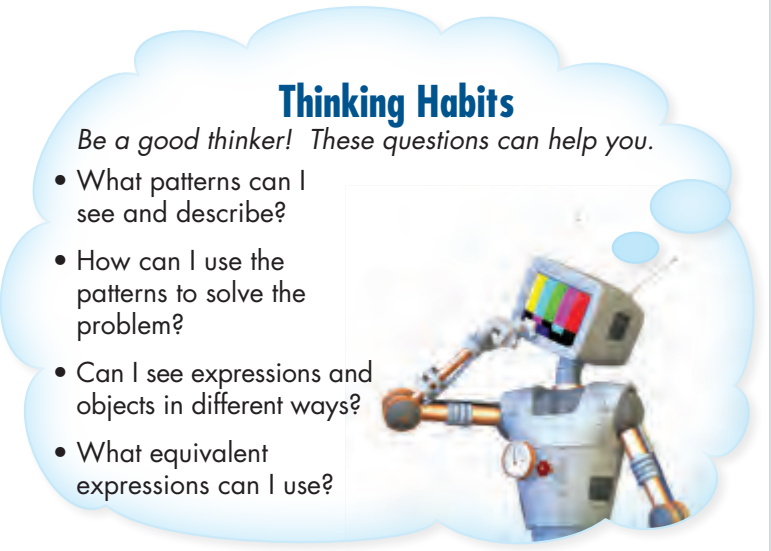
  Students use structure when they apply place-value relationships to read and write numbers. (e.g., p. 20, Item 29)

- **MP.8 Look for and express regularity in repeated reasoning.**

  Students use repeated reasoning when they generalize about decimal place value based on their understanding of whole number place value. (e.g., p. 23, Solve and Share)

LESSON THAT FOCUSES ON MATH PRACTICES

- **Lesson 1-7** This lesson focuses on MP.7. Students use the structure of the decimal place-value system to solve problems involving patterns. Students use what they know about place-value relationships to compare decimals, then find and explain patterns and make predictions.



Revisit the information about MP.7 in these other resources:

- **Math Practices and Problem Solving Handbook** before Topic 1; includes Math Practices Proficiency Rubrics.
- **Math Practices Posters** to display in your classroom.

MP **Math Practices Animations,** one for each math practice, available at PearsonRealize.com.

TOPIC 1

MAJOR CLUSTER 5.NBT.A

DIFFERENTIATED INSTRUCTION

I Intervention O On-Level A Advanced

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Learn · Practice Buddy · Tools · Assessment · Games

Ongoing Intervention

RtI 1

During the core lesson, monitor progress, reteach as needed, and extend students' thinking.

Guiding Questions

- **In the Teacher's Edition** Guiding questions are used to monitor understanding during instruction.

Learn **Online Guiding Questions** Guiding questions are also in the online Visual Learning Animation Plus.

Prevent Misconceptions

This feature in the Teacher's Edition is embedded in the guiding questions.

Error Intervention: If... then...

This feature in the Teacher's Edition is provided during Guided Practice. It spotlights common errors and gives suggestions for addressing them.

Reteaching

Reteaching sets are at the end of the topic in the Student's Edition. They provide additional examples, reminders, and practice. Use these sets as needed before students do the Independent Practice.

Higher Order Thinking

These problems require students to think more deeply about the rich, conceptual knowledge developed in the lesson.

Practice Buddy Online

Practice Buddy Online auto-scored practice is provided for each lesson. On-screen learning aids include Help Me Solve This and View an Example.

Strategic Intervention

RtI 2

At the end of the lesson, assess to identify students' strengths and needs and then provide appropriate support.

Quick Check

In the Student's Edition Assess the lesson using 3 items checked in the Teacher's Edition.

Assessment **Online Quick Check** You can also assess the lesson using 5 online, machine-scored items.

Intervention Activity I

Teachers work with struggling students.

Reteach to Build Understanding I

This is a page of guided reteaching.

Technology Center I O A

Tools **Digital Math Tools Activities** reinforce the lesson content or previously taught content using a suite of digital math tools.

Games **Online Games** provide practice on the lesson content or previously taught content.

Homework and Practice I O A

Use the leveled assignment to provide differentiated homework and practice.

Additional resources to support differentiated instruction for on-level and advanced students include:

On-Level and Advanced Activity Centers O A

- **Center Games** are provided in on-level and advanced versions.
- **Math and Science Activity** is related to the topic science theme introduced at the start of the topic.
- **Problem-Solving Reading Mat** is used with a lesson-specific activity.

Intensive Intervention

RtI 3

As needed, provide more instruction that is on or below grade level for students who are struggling.

Math Diagnosis and Intervention System 2.0

- **Diagnosis** Use the diagnostic tests in the system. Also, use the item analysis charts given with program assessments at the start of a grade or topic, or at the end of a topic, group of topics, or the year.
- **Intervention Lessons** These two-page lessons include guided instruction followed by practice. The system includes lessons below, on, and above grade level.
- **Teacher Support** Teacher Notes provide the support needed to conduct a short lesson. The lesson focuses on vocabulary, concept development, and practice. The Teacher's Guide contains individual and class record forms and correlations to Student's Edition lessons.

Resources for Fluency Success

- A variety of print and digital resources are provided to ensure success on Common Core fluency standards. See Steps to Fluency Success on pages 109E–109H.

MAJOR CLUSTER 5.NBT.A

THE LANGUAGE OF MATH

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Glossary Games

English Language Learners

Provide ELL support through visual learning throughout the program, ELL instruction in every lesson, and additional ideas in an ELL Toolkit.

Visual Learning
The visual learning that is infused in **enVision**math**2.0** provides support for English language learners. This support includes a Visual Learning Animation Plus and a Visual Learning Bridge for each lesson.

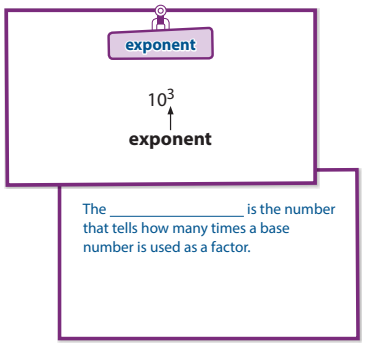
English Language Learners Instruction
Lessons provide instruction for English language learners at Beginning, Intermediate, and Advanced levels of English proficiency.

English Language Learners Toolkit
This resource provides professional development and resources for supporting English language learners.

Math Vocabulary

Build math vocabulary using the vocabulary cards, vocabulary activities, vocabulary review, and glossary plus the online glossary and vocabulary game.

My Word Cards
Vocabulary cards for a topic are provided in the Student's Edition. Students use the example on the front of the card to complete the definition on the back.



Vocabulary Activities
The Teacher's Edition provides vocabulary activities at the start of topics. These include activities for vocabulary in My Word Cards and/or activities for vocabulary in Review What You Know.

Vocabulary Review
A page of vocabulary review is provided at the end of each topic. It reviews vocabulary used in the topic.

Glossary
A glossary is provided at the back of the Student's Edition.

Animated Glossary
Glossary
An online, bilingual, animated glossary uses motion and sound to build understanding of math vocabulary.

Online Vocabulary Game
Games
An online vocabulary game is available in the Game Center.

Math and Reading

Connect reading and math using a data-filled reading mat for the topic with accompanying activity masters and guide.

Problem-Solving Reading Mats
There is a large, beautiful mat for each topic. At the start of the topic, help students become familiar with the mat and the vocabulary used by reading the mat aloud as students follow along. Use the Problem-Solving Reading Activity Guide for suggestions about how to use the mat.

Problem-Solving Reading Activity
At the end of some lessons, a Problem-Solving Reading Activity provides a page of math problems to solve by using the data on the mat.

TOPIC 1

TOPIC PLANNER

UNDERSTAND PLACE VALUE

Lesson 1-1

PATTERNS WITH EXPONENTS AND POWERS OF 10 pp. 5–10

Content Standard 5.NBT.A.2
Mathematical Practices MP.1, MP.2, MP.4, MP.5, MP.6, MP.7

Objective Use exponents to write powers of 10 and calculate products.

Essential Understanding Basic facts and place-value patterns can be used to find products when one factor is a multiple of 10, 100, or 1,000; an exponent with 10 as the base can be used to represent powers of 10.

Vocabulary Exponent, Power, Base

ELL Speaking: Speak using content area vocabulary in context.

Materials Place-value blocks (or TT 4 and TT 5), Index cards

On-Level and Advanced Activity Centers
- Math and Science Activity

Lesson 1-2

UNDERSTAND WHOLE-NUMBER PLACE VALUE pp. 11–16

Content Standard 5.NBT.A.1
Mathematical Practices MP.2, MP.3, MP.4, MP.7

Objective Read and write whole numbers using standard form, expanded form, and number names.

Essential Understanding Understanding each digit's place value in a number provides a way to understand the number's value.

Vocabulary Value, Expanded form

ELL Strategies: Use prior knowledge to understand meanings.

Materials Place-value chart (TT 3), Colored pencils

On-Level and Advanced Activity Centers
- Center Games

Lesson 1-3

DECIMALS TO THOUSANDTHS pp. 17–22

Content Standards 5.NBT.A.1, 5.NBT.A.3a
Mathematical Practices MP.2, MP.3, MP.4, MP.6, MP.7

Objective Represent decimals to thousandths as fractions and fractions with denominators of 1,000 as decimals.

Essential Understanding Our number system is based on powers of 10. Whenever we get 10 in one place value, we move to the next greater place value.

Vocabulary Thousandths

ELL Strategies: Use reading supports to enhance comprehension of written text.

Materials Place-value blocks (or TT 4 and TT 5), Decimal place-value chart (TT 6), Index cards

On-Level and Advanced Activity Centers
- Center Games

LESSON RESOURCES

Digital
- Student's Edition
- Daily Common Core Review
- Reteach to Build Understanding
- Center Games
- Math and Science Activity
- Problem-Solving Reading Mat
- Problem-Solving Reading Activity

Print

Digital
- Listen and Look For PD Lesson Video
- Student's Edition eText
- Today's Challenge
- Solve & Share
- Visual Learning Animation Plus
- Animated Glossary
- Math Tools
- Practice Buddy Online Practice
- Quick Check
- Another Look Homework Video
- Math Games

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Digital

Lesson 1-4

UNDERSTAND DECIMAL PLACE VALUE pp. 23–28

Content Standard 5.NBT.A.3a
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.7, MP.8

Objective Read and write decimals through thousandths in different ways.

Essential Understanding Each digit within a decimal number has place value that helps determine the value of the number.

Vocabulary Equivalent decimals

ELL Strategies: Use and reuse academic language in meaningful ways when speaking.

Materials Decimal place-value chart (TT 6), Decimal grids (TT 8), Markers

On-Level and Advanced Activity Centers
- Problem-Solving Reading Mat

Lesson 1-5

COMPARE DECIMALS pp. 29–34

Content Standard 5.NBT.A.3b
Mathematical Practices MP.1, MP.3, MP.4, MP.6, MP.7

Objective Use place value to compare decimals through thousandths.

Essential Understanding Place value can be used to compare and order whole numbers and decimals.

Vocabulary None

ELL Listening: Demonstrate listening comprehension by responding to a question.

Materials Decimal place-value chart (TT 6), Number lines (TT 12), Index cards, Markers

On-Level and Advanced Activity Centers
- Math and Science Activity

Lesson 1-6

ROUND DECIMALS pp. 35–40

Content Standard 5.NBT.A.4
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.6, MP.7

Objective Round decimals to different places.

Essential Understanding Rounding is a process for finding the multiple of 10, 100, and so on, or of 0.1, 0.01, and so on, closest to a given number.

Vocabulary None

ELL Listening: Learn new language structures.

Materials Decimal place-value chart (TT 6), Number Lines (TT 12), Markers

On-Level and Advanced Activity Centers
- Problem-Solving Reading Mat

TOPIC RESOURCES

Digital

Start of Topic
- Math and Science Project
- Home-School Connection
- Review What You Know
- My Word Cards

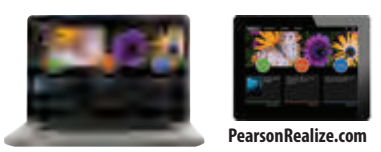
Print

End of Topic
- Fluency Practice Activity
- Vocabulary Review
- Reteaching
- Topic Assessment
- Topic Performance Assessment
- Placement Test
- Basic-Facts Timed Tests

Digital

Start of Topic
- Topic Overview PD Video

End of Topic
- Math Practices Animations
- Online Topic Assessment
- ExamView® Test Generator
- Practice Buddy Fluency Practice/Assessment



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TOPIC 1

TOPIC PLANNER

UNDERSTANDING PLACE VALUE

Lesson 1-7

MATH PRACTICES AND PROBLEM SOLVING: LOOK FOR AND USE STRUCTURE pp. 41–46

Mathematical Practices MP.7, Also MP.1, MP.6, MP.8

Content Standards 5.NBT.A.3a, 5.NBT.A.3b

Objective Use the structure of the decimal place-value system to solve problems involving patterns.

Essential Understanding Good math thinkers look for relationships in math to help solve problems.

Vocabulary None

ELL Reading: Use support from peers/teachers to enhance/confirm understanding.

Materials Decimal place-value chart (TT 6), Centimeter grid paper (TT 9)

On-Level and Advanced Activity Centers

- Center Games

Notes

TOPIC 1

TOPIC OPENER

UNDERSTAND PLACE VALUE

TOPIC ESSENTIAL QUESTION

How are whole numbers and decimals written, compared, and ordered?

Revisit the Topic Essential Question throughout the topic, and see a note about answering the question in the Teacher's Edition for the Topic Assessment.

MATH AND SCIENCE PROJECT STEM

Science Theme The science theme for this topic is **Pollinating Insects**, including crops and flowering plants that depend on them in order to produce the foods that we eat. This theme will be revisited in the Math and Science Activities in Lessons 1-1 and 1-5 and in some lesson exercises.

Have students estimate the number of insects there are for all the people in their household, for the class, and for the entire school. Help students organize and record their data in a chart.

Remind students that flowering plants and trees bear fruit and vegetables. Many flowering plants rely on insect pollination. Discuss the variety and number of foods and beverages we consume that rely on pollinating insects.

Project-Based Learning Have students work on the **Math and Science Project** over the course of several days.

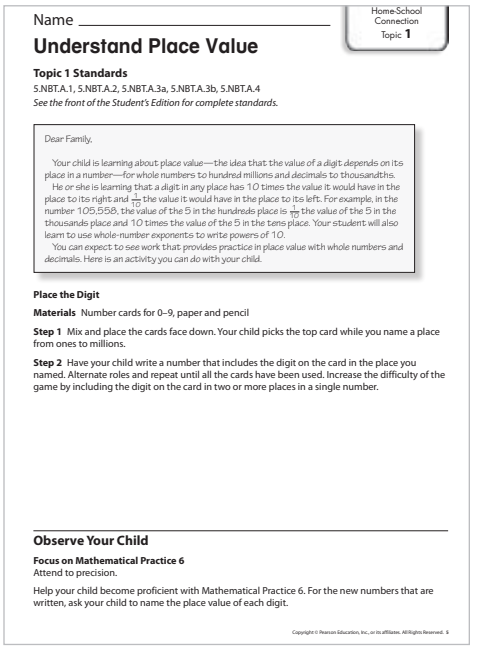
EXTENSION

Have students gather information about locally grown produce: When is local produce available? How much local produce does their family consume? What sort of produce is shipped to local supermarkets from elsewhere? How does the variety of available produce vary from season to season?

Sample Student Work for Math and Science Project

Pollinator	Types of Plants	Number of Plants
ants	black-eyed peas, cucumber, squash, peonies	over 500,000
moths	Jasmine, lavender, orchids, yucca	10,000 to 100,000

Home-School Connection


Name _____

Home-School Connection Topic 1

Understand Place Value

Topic 1 Standards

5.NBT.A.1, 5.NBT.A.2, 5.NBT.A.3a, 5.NBT.A.3b, 5.NBT.A.4

See the front of the Student's Edition for complete standards.

Dear Family,

Your child is learning about place value—the idea that the value of a digit depends on its place in a number—for whole numbers to hundred millions and decimals to thousandths.

He or she is learning that a digit in any place has 10 times the value it would have in the place to its right and $\frac{1}{10}$ the value it would have in the place to its left. For example, in the number 105,558, the value of the 5 in the hundreds place is $\frac{1}{10}$ the value of the 5 in the thousands place and 10 times the value of the 5 in the tens place. Your student will also learn to use whole-number exponents to write powers of 10.

You can expect to see work that provides practice in place value with whole numbers and decimals. Here is an activity you can do with your child.

Place the Digit

Materials Number cards for 0–9, paper and pencil

Step 1 Mix and place the cards face down. Your child picks the top card while you name a place from ones to millions.

Step 2 Have your child write a number that includes the digit on the card in the place you named. Alternate roles and repeat until all the cards have been used. Increase the difficulty of the game by including the digit on the card in two or more places in a single number.

Observe Your Child

Focus on Mathematical Practice 6
Attend to precision.

Help your child become proficient with Mathematical Practice 6. For the new numbers that are written, ask your child to name the place value of each digit.

Send this page home at the start of Topic 1 to give families an overview of the content in the topic.

Name _____

Review What You Know

Vocabulary

Choose the best term from the box. Write it on the blank.

- digits
- place value
- period
- whole numbers

1. **Digits** are the symbols used to show numbers.
2. A group of 3 digits in a number is a **period**.
3. **Place value** is the position of a digit in a number that is used to determine the value of the digit.

Comparing

Compare. Use <, >, or = for each ◯.

4. 869 < 912
5. 9,033 < 9,133
6. 1,338 < 1,388
7. 417,986 = 417,986
8. 0.25 < 0.3
9. 0.5 = 0.50
10. Kamal has 7,325 songs on his computer. Benito has 7,321 songs on his computer. Who has more songs? **Kamal**

Adding Whole Numbers

Find each sum.

11. 10,000 + 2,000 + 60 + 1
    12,061
12. 20,000 + 5,000 + 400 + 3
    25,403
13. 900,000 + 8,000 + 200 + 70 + 6
    908,276
14. 7,000,000 + 50,000 + 900 + 4
    7,050,904

Place Value

15. The largest playing card structure was made of 218,792 cards. What is the value of the digit 8 in 218,792?
    Ⓐ 80 Ⓑ 800 Ⓒ 8,000 Ⓓ 80,000
16. **MP.3 Construct Arguments** In the number 767, does the first 7 have the same value as the final 7? Why or why not?
    No. The first 7 is 7 hundreds. The final 7 is 7 ones.

Item Analysis for Diagnosis and Intervention

Item	Standard	MDIS
1–3	4.NBT.A.1	F9
4–7, 10	4.NBT.A.2	F14
8–9	4.NF.C.7	H30
11–14	4.NBT.B.4	G18
15–16	4.NBT.A.1	F12

Topic 1 Vocabulary Words Activity

Use the Topic 11 activity on p. 632 with the Topic 1 words at the right.

My Word Cards

Use the examples for each word on the front of the card to help complete the definitions on the back.

exponent

10^3
exponent

power

$1{,}000 = 10 \times 10 \times 10 = 10^3$

base

10^3
base

value

5,318
The value of the 3 is 300.

expanded form

$5 \times 10^3 + 3 \times 10^2 + 1 \times 10^1 + 8 \times 10^0$
or
$5 \times 1{,}000 + 3 \times 100 + 1 \times 10 + 8 \times 1$

thousandth

0.629
9 is in the thousandths place.

equivalent decimals

$0.7 = 0.70$

My Word Cards

Complete the definition. Extend learning by writing your own definitions.

The product that results from multiplying the same number over and over is a **power** of that number.

The **exponent** is the number that tells how many times a base number is used as a factor.

The place of a digit in a number tells you its **value**.

When a number is written using exponents, the **base** is the number that is used as a factor.

A **thousandth** is one out of 1,000 equal parts of a whole.

Expanded form is a way to write a number that shows the sum of each digit multiplied by its place value.

Decimals that name the same part of a whole are called **equivalent decimals**.

LESSON 1-1

PATTERNS WITH EXPONENTS AND POWERS OF 10

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain **5.NBT** Number and Operations in Base Ten

Cluster **5.NBT.A** Understand the place value system.

Content Standard **5.NBT.A.2** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Mathematical Practices **MP.1, MP.2, MP.4, MP.5, MP.6, MP.7**

Objective Use patterns and the properties of multiplication to calculate a product when multiplying by a product of 10; use whole-number exponents to write powers of 10.

Essential Understanding Basic facts and place-value patterns can be used to find products when one factor is a multiple of 10, 100, or 1,000; an exponent with 10 as the base can be used to represent powers of 10.

Vocabulary Exponent, Power, Base

Materials Place-value blocks (or Teaching Tools 4 and 5)

COHERENCE

In this lesson, students will learn to extend their understanding of basic multiplication facts involving 10 to identify patterns in products when a number has been multiplied by different powers of 10. Identifying these patterns will deepen students' understanding of the multiplication process before their work with the multiplication algorithm (Standard 5.NBT.B.5) in Topic 3.

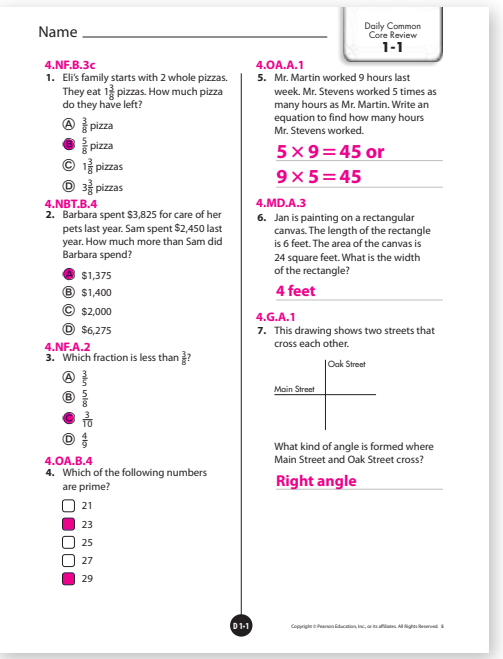
RIGOR

This lesson emphasizes **conceptual understanding** by expressing powers of 10 as exponents. This extends students' understanding of the symbolic representation of multiplication. Also, it is a notation that will be used later in this topic when students write whole numbers in expanded form using exponents.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 1-1

4.NF.B.3c
1. Eli's family starts with 2 whole pizzas. They eat $1\frac{3}{8}$ pizzas. How much pizza do they have left?
   - Ⓐ $\frac{3}{8}$ pizza
   - Ⓑ $\frac{5}{8}$ pizza
   - Ⓒ $1\frac{3}{8}$ pizzas
   - Ⓓ $3\frac{3}{8}$ pizzas

4.NBT.B.4
2. Barbara spent $3,825 for care of her pets last year. Sam spent $2,450 last year. How much more than Sam did Barbara spend?
   - Ⓐ $1,375
   - Ⓑ $1,400
   - Ⓒ $2,000
   - Ⓓ $6,275

4.NF.A.2
3. Which fraction is less than $\frac{3}{8}$?
   - Ⓐ $\frac{3}{5}$
   - Ⓑ $\frac{5}{8}$
   - Ⓒ $\frac{3}{10}$
   - Ⓓ $\frac{4}{9}$

4.OA.B.4
4. Which of the following numbers are prime?
   - ☐ 21
   - ☑ 23
   - ☐ 25
   - ☐ 27
   - ☑ 29

4.OA.A.1
5. Mr. Martin worked 9 hours last week. Mr. Stevens worked 5 times as many hours as Mr. Martin. Write an equation to find how many hours Mr. Stevens worked.

   $5 \times 9 = 45$ or $9 \times 5 = 45$

4.MD.A.3
6. Jan is painting on a rectangular canvas. The length of the rectangle is 6 feet. The area of the canvas is 24 square feet. What is the width of the rectangle?

   4 feet

4.G.A.1
7. This drawing shows two streets that cross each other.

What kind of angle is formed where Main Street and Oak Street cross?

Right angle

9-1-1

Today's Challenge

Think Use the Topic 1 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Speaking Speak using content area vocabulary in context.

Use with the Visual Learning Bridge on Student's Edition p. 6.

Have students define previously learned vocabulary: *factor*. Read Box A. Have them tell partners the horse's weight. *We will determine the horse's weight using exponents and a base.* Read Box B.

Beginning Reread Box B to students. Write: $1{,}000 = 10 \times 10 \times 10 = 10^3$. Underline 1,000. Remind students that 1,000 is the horse's weight. Circle $\textcircled{10} \times \textcircled{10} \times \textcircled{10}$. *These 10s are the factors.* Write *factors*. Ask students to read *factors*. Put a square around $\boxed{10^3}$. Point to the 10. *This number is the base.* Write *base*. Ask students to read *base*. Point to 3. *This is the exponent.* Write *exponent*. Ask students to read *exponent*. Have them identify the *factor, base,* and *exponent* in the expression.

Intermediate Reread Box B with students. Write: $\underline{1{,}000} = \textcircled{10} \times \textcircled{10} \times \textcircled{10} = \boxed{10^3}$. Point to the circled 10s. *These 10s are the factors.* Point to 10^3. *10 is the base and 3 is the exponent.* Ask students to work with partners to identify the *factor, base*, and *exponent* in the expression.

Advanced Ask students to reread Box B with partners: $1{,}000 = 10 \times 10 \times 10 = 10^3$. Have them work with partners to identify the *factor, base*, and *exponent* in the expression using complete sentences.

Summarize What are *factors, bases*, and *exponents*?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use patterns to multiply by powers of 10.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
MP.5 Use Appropriate Tools Strategically Look for students who use place-value blocks (or Teaching Tools 4 and 5) or another tool to find products of powers of 10.

2. Build Understanding
What is the problem asking you to do? [Find the product of 10 and 10 and the product of 10 and 100.] *What tools could you use?* [Sample answer: Place-value blocks or paper and pencil]

Small Group DURING

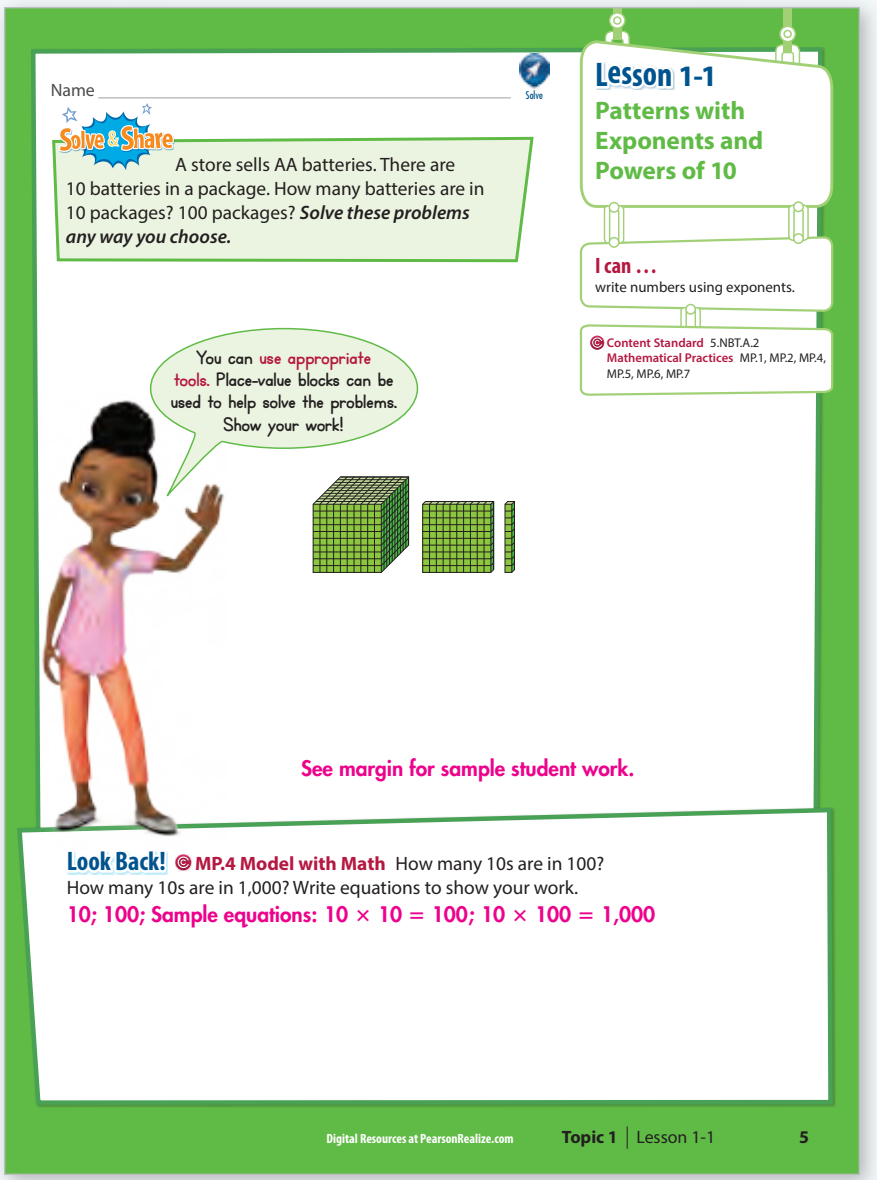
3. Ask Guiding Questions As Needed
What place-value block could you use to represent 10? To represent 100? [Ten blocks; 100s blocks] *How can you find 10 tens? 10 hundreds?* [Sample answer: Multiply 10 by 10; multiply 100 by 10.]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. Have them share the strategies used to solve the problems. If needed, project and analyze Victor's work to discuss how to find each product.

5. Transition to the Visual Learning Bridge
When multiplying by powers of 10, the number of zeros in the product is the same as the total number of zeros in the factors.

6. Extension for Early Finishers
What is the product of 4 tens? 5 tens? What do you notice about the number of zeros in each product? [Sample answer: 10,000; 100,000; The number of zeros in the product is the same as the number of 10s that I multiplied.]


Name _____ Solve

Solve & Share
A store sells AA batteries. There are 10 batteries in a package. How many batteries are in 10 packages? 100 packages? ***Solve these problems any way you choose.***

Lesson 1-1
Patterns with Exponents and Powers of 10

I can ...
write numbers using exponents.

Content Standard 5.NBT.A.2
Mathematical Practices MP.1, MP.2, MP.4, MP.5, MP.6, MP.7

You can use appropriate tools. Place-value blocks can be used to help solve the problems. Show your work!

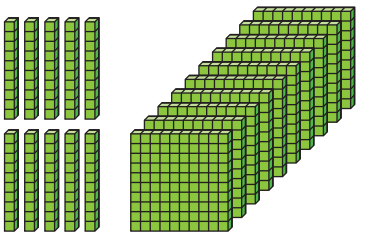
See margin for sample student work.

Look Back! MP.4 Model with Math How many 10s are in 100? How many 10s are in 1,000? Write equations to show your work.
10; 100; Sample equations: 10 × 10 = 100; 10 × 100 = 1,000

Digital Resources at PearsonRealize.com Topic 1 | Lesson 1-1 5

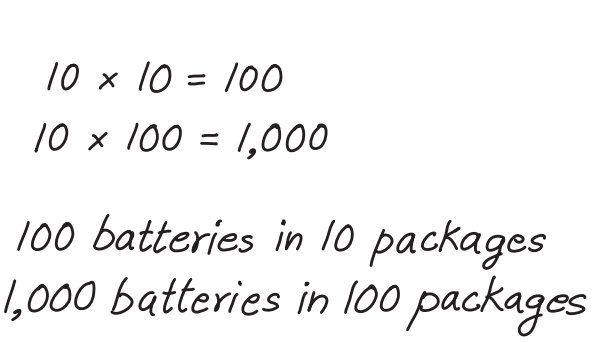
Analyze Student Work

Victor's Work



Victor finds the values using place-value blocks.

Gabrielle's work



Gabrielle writes equations to find the products.

STEP 2

DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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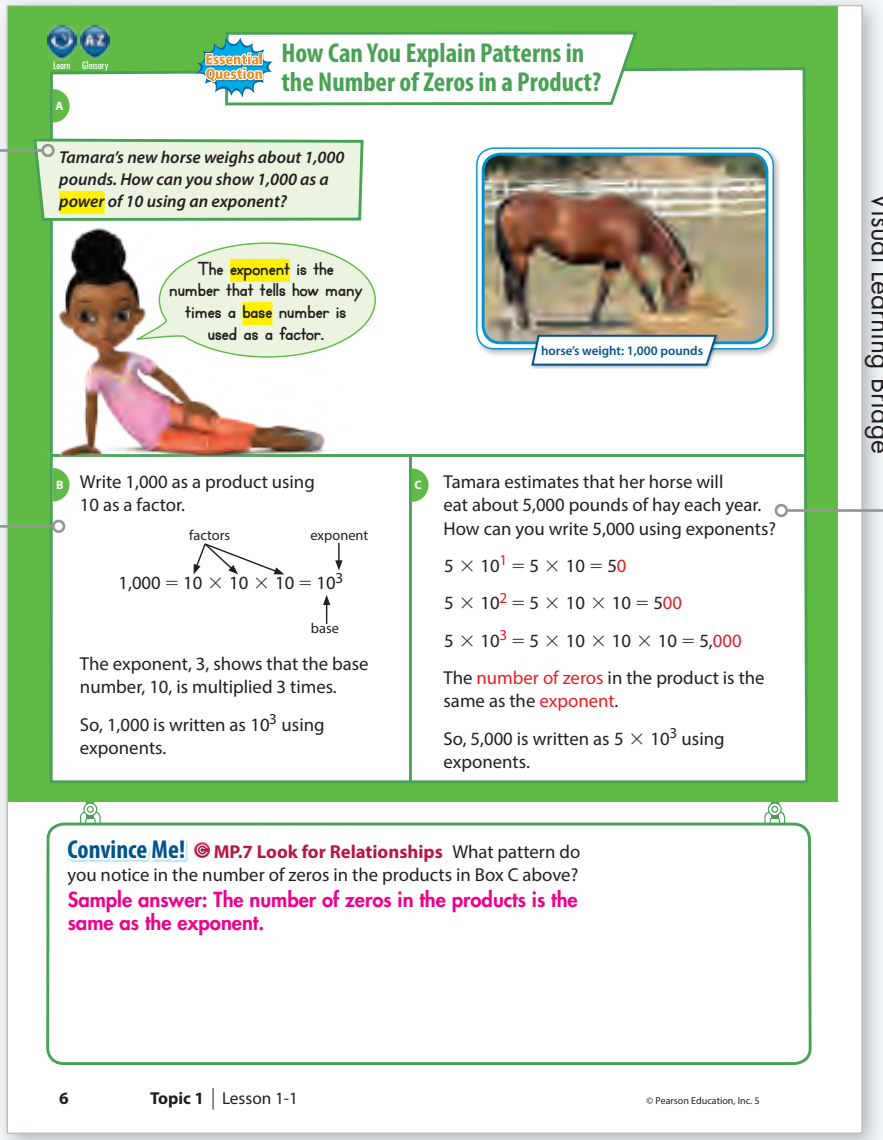
Learn Glossary

What is the weight of the horse? [1,000 pounds] *Is the weight of the horse a power of 10? Explain.* [Yes; Sample explanation: 1,000 is a power of 10 because it can be formed by multiplying 10 by itself 3 times.]

MP.3 Construct Arguments *Why would you use exponents to write the product when multiplying by a power of 10?* [Sample answer: Using exponents is a simpler and shorter way to show multiplication by powers of 10.]

Prevent Misconceptions RtI

Some students may have difficulty recognizing a number in its exponential form and may think that 10^3 means 10×3 or 30. Remind students that the exponent represents the number of times that the base number is multiplied. Have students write the factors for the exponential form, $10 \times 10 \times 10$, in order to find the standard form, 1,000.



Visual Learning Bridge

MP.7 Look for Relationships *What patterns do you notice?* [Sample answer: The number of zeros in the factors is the same as the exponent. The number of zeros in 5,000 is the same as the exponent when 5,000 is written as 5 times a power of 10.]

Convince Me! MP.7 Look for Relationships Students notice that the number of zeros in each product is the same as the exponent and that the number of zeros in the products increases by 1 each time.

Coherence In this problem, students apply their knowledge of multiplying by 10 to identify a pattern in the products of a number multiplied by different powers of 10. They discover that the number of zeros in the product increases by 1 each time 5 is multiplied by another 10. As they extend their understanding of the symbolic notation of the powers of 10 to exponents, they identify that the exponent is equal to the number of zeros in the product.

Essential Question

Revisit the Essential Question. When multiplying a number by a power of 10 written with exponents, the exponent is the same as the number of zeros in the product.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 8 and 23 are worth 1 point. Item 22 is worth 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

Do You Understand?

1. **MP.2 Reasoning** Why are there three zeros in the product of 6×10^3?
   Since the exponent on the power of 10 is 3, there are 3 zeros in the product.

2. Susan said that 10^5 is 50. What mistake did Susan make? What is the correct answer?
   Sample answer: She multiplied 10 by 5 rather than multiplying 10 five times; 100,000

Do You Know How?

In **3** and **4**, complete the pattern.

3. $10^1 =$ **10**
   $10^2 =$ **100**
   $10^3 =$ **1,000**
   $10^4 =$ **10,000**

4. $7 \times 10^1 =$ **70**
   $7 \times 10^2 =$ **700**
   $7 \times 10^3 =$ **7,000**
   $7 \times 10^4 =$ **70,000**

Independent Practice

In **5–15**, find each product. Use patterns to help.

5. $3 \times 10^1 =$ **30**
   $3 \times 10^2 =$ **300**
   $3 \times 10^3 =$ **3,000**
   $3 \times 10^4 =$ **30,000**

6. $2 \times 10 =$ **20**
   $2 \times 100 =$ **200**
   $2 \times 1{,}000 =$ **2,000**
   $2 \times 10{,}000 =$ **20,000**

7. $9 \times 10^1 =$ **90**
   $9 \times 10^2 =$ **900**
   $9 \times 10^3 =$ **9,000**
   $9 \times 10^4 =$ **90,000**

8. 8×10^4 **80,000**
9. $4 \times 1{,}000$ **4,000**
10. 5×10^2 **500**
11. $6 \times 10{,}000$ **60,000**
12. 4×10^1 **40**
13. 100×9 **900**
14. $10^3 \times 6$ **6,000**
15. 8×10^5 **800,000**

16. Write $10 \times 10 \times 10 \times 10 \times 10 \times 10$ with an exponent. Explain how you decided what exponent to write.
    10^6; Sample explanation: Since 10 is multiplied 6 times, the exponent is 6.

*For another example, see Set A on page 49.

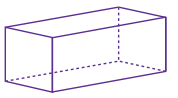
Math Practices and Problem Solving

17. One box of printer paper has 3×10^2 sheets of paper. Another box has 10^3 sheets of paper. What is the total number of sheets in both boxes?
    1,300 sheets

18. **MP.1 Make Sense and Persevere** A post is put every 6 feet along a fence around a rectangular field that is 42 ft long and 36 ft wide. How many posts are needed?
    26 posts

19. **Number Sense** A company had 9×10^6 dollars in sales last year. Explain how to find the product 9×10^6.
    Write a 9 and then write 6 zeros after it.

20. An aquarium has the same shape as the solid figure shown below. What is the name of this solid figure?



    Rectangular Prism

21. **MP.4 Model with Math** Isaac takes 5 minutes to ride his bike down the hill to school and 10 minutes to ride up the hill from school. He attends school Monday through Friday. How many minutes does he spend biking to and from school in two weeks? Write an equation to model your work.
    $(5 \times 10) + (10 \times 10) = 50 + 100 = 150$ minutes

22. **Higher Order Thinking** Santiago hopes to buy a 4-horse trailer for about $12,000. Describe all the numbers that when rounded to the nearest hundred are 12,000.
    Numbers greater than or equal to 11,950 and less than 12,050

Common Core Assessment

23. Choose all the equations that are true.
    - ☐ $10 \times 10 \times 10 \times 10 = 40$
    - ■ $10 \times 10 \times 10 \times 10 = 10^4$
    - ☐ $10 \times 10 \times 10 \times 10 = 1{,}000$
    - ■ $10 \times 10 \times 10 \times 10 = 10{,}000$
    - ☐ $10 \times 10 \times 10 \times 10 = 4 \times 10^4$

24. Choose all the equations that are true.
    - ■ $6 \times 10^5 = 6 \times 100{,}000$
    - ☐ $6 \times 10^5 = 6 \times 10{,}000$
    - ■ $6 \times 10^5 = 600{,}000$
    - ☐ $6 \times 10^5 = 60{,}000$
    - ☐ $6 \times 10^5 = 650{,}000$

Error Intervention: Item 7

If students have difficulty writing the standard form for each product, **then** have them write out the factors for the exponential form for each power of 10; for example, $9 \times 10^2 = 9 \times 10 \times 10 = 900$.

RtI **Reteaching** Assign Reteaching Set A on p. 49.

Item 18 MP.1 Make Sense and Persevere Remind students that the shape of the field is a rectangle. *How many sides of the rectangle are 42 feet long?* [2] *How many posts are needed for these two sides? Explain.* [Sample answer: $42 \div 6 = 7$, so 7 posts for each side.] *How many sides of the rectangle are 36 feet wide?* [2] *How many posts are needed for these two sides? Explain.* [Sample answer: $36 \div 6 = 6$, so 6 posts for each side.]

Item 19 Number Sense Ask students to write the product 9×10^6 (9,000,000) and then check that the number of zeros in their answer is the same as the exponent.

Item 21 MP.4 Model with Math *What expression models the time it takes Isaac to ride his bike down the hill?* [Sample answer: 5×10.] *What expression models the time it takes Isaac to ride his bike up the hill?* [Sample answer: 10×10.] *What equation can you write to model your work?* [Sample answer: $(5 \times 10) + (10 \times 10) = 50 + 100 = 150$.]

Item 22 Higher Order Thinking If students have difficulty thinking of all the numbers that round to 12,000 when rounded to the nearest hundred, ask them to give one number that does. If the number is less than 12,000, ask them if that is the least number that will round to 12,000 when rounded to the nearest hundred. Repeat for a number greater than 12,000.

Multi-Step Problems *Page 8 Items 17, 18, and 21; Page 10 Items 16, 19, and 20*

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

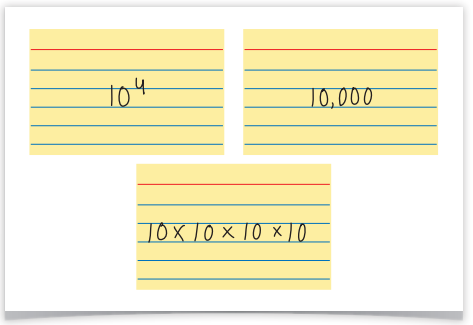
Intervention Activity I

The Power of Tens

Materials

Index cards

- Distribute 18 index cards to each pair of students.
- Have pairs create the following groups of index cards: Group 1: 10^1, 10^2, 10^3, 10^4, 10^5, 10^6; Group 2: 10, 100, 1,000, 10,000, 100,000, 1,000,000; Group 3: 10, 10×10, $10 \times 10 \times 10$, $10 \times 10 \times 10 \times 10$, $10 \times 10 \times 10 \times 10 \times 10$, $10 \times 10 \times 10 \times 10 \times 10 \times 10$
- The first partner draws a card from Group 1 showing a number written in exponential form.
- The second partner finds the cards in Groups 2 and 3 that show the same number written in standard form and as a product of factors.
- The first partner verifies that the second partner's answers are correct.
- Partners switch roles and repeat the activity.



Reteach I

Name _____

Reteach to Build Understanding 1-1

Vocabulary

The number 100 can be written as a **power** of 10 using 10 as the base and 2 as the exponent.

$100 = 10 \times 10 = 10^2$ (factors, exponent, base)

1. An **exponent** is a number that tells how many times to use the base number as a factor.
   Which number is the exponent in 10^5? 5
2. When a number is written with an exponent, the **base** is the number that is used as a factor.
   In the expression 2×10^4, which base is used as a factor 4 times? 10
3. When we write 1,000 as a **power** of 10, we can find the value of the exponent by counting the number of zeros in 1,000.
   1,000 written as a power of 10 is equal to 10^3.
4. 10,000 written as a power of 10 is equal to 10^4.
5. One bee colony on Mr. Gordon's farm contains 60,000 bees. Complete the pattern to write 60,000 using an exponent.
   $6 \times 10^1 = 6 \times 10 =$ 60
   $6 \times 10^2 = 6 \times 10 \times 10 =$ 600
   $6 \times 10^3 = 6 \times$ 10 $\times$ 10 $\times$ 10 = 6,000
   $6 \times 10^4 = 6 \times$ 10 $\times$ 10 $\times$ 10 $\times$ 10 = 60,000
   So, 60,000 written with an exponent is 6×10^4.

On the Back!

6. Write $10 \times 10 \times 10 \times 10 \times 10$ with an exponent. 10^5

R 1-1

On-Level and Advanced Activity Centers O A

Name _____

Math and Science Activity 1-1

Grasshopper Swarms

Did You Know? Grasshoppers cause a great deal of damage when the population grows too large. Swarms eat everything: grass, crops, shrubs, leaves, sheep's wool, cotton T-shirts, even the paint off a barn. In 1875, a swarm covered 198,000 square miles, an area larger than California. With several trillion grasshoppers, the swarm weighed several million tons.

1. How can you show 198,000 as a power of 10 using an exponent?
   $198{,}000 = 198 \times 1{,}000 = 198 \times 10 \times 10 \times 10 = 198 \times 10^3$
2. How can you write 3 million using exponents?
   $3{,}000{,}000 = 3 \times 1{,}000{,}000 = 3 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 3 \times 10^6$
3. Suppose a farm has 1,200,000 square meters of cropland. A swarm of grasshoppers forms with 30 grasshoppers per square meter. How many grasshoppers are in the swarm? Show the number with an exponent and in standard form.
   36×10^6; 36,000,000
4. **Extension** One trillion in standard form is 1,000,000,000,000. Write the missing exponent in the equation. Explain how you decided which exponent to write.
   4 trillion = 4×10^{12}
   Sample explanation: I counted the number of zeros in 1 trillion.

Math and Science Activity 1-1

Math and Science Activity STEM

This activity revisits the science theme **Pollinating Insects,** introduced on page 1 in the Student's Edition.

Sample Student Work

1. Since 198,000 has 3 zeros, the exponent for 10 will be 3.
$198{,}000 = 198 \times 10^3$

4. since a trillion has 12 zeros,
4 trillion = 4×10^{12}

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–10, 22–23 O Items 2–3, 5–6, 11–13, 17–18, 21–23 A Items 3, 5–6, 14–17, 19–23

Name _____

Help Practice Buddy Tools Games

Another Look!

Patterns can help you multiply by powers of 10.

Find the product of 8×10^4.

Write the product in standard form.

$8 \times 10^1 = 8 \times 10 = 80$
$8 \times 10^2 = 8 \times 10 \times 10 = 800$
$8 \times 10^3 = 8 \times 10 \times 10 \times 10 = 8{,}000$
$8 \times 10^4 = 8 \times 10 \times 10 \times 10 \times 10 = 80{,}000$

So, 8×10^4 written in standard form is 80,000.

Homework & Practice 1-1
Patterns with Exponents and Powers of 10

1. Write $10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$ with an exponent. 10^7

2. Write $6 \times 10 \times 10 \times 10 \times 10$ with an exponent. 6×10^4

3. How many zeros are in the standard form of 10^7? Write this number in standard form.
7 zeros; 10,000,000

In **4–14**, find each product. Use patterns to help.

4. $4 \times 10^1 =$ **40**
$4 \times 10^2 =$ **400**
$4 \times 10^3 =$ **4,000**
$4 \times 10^4 =$ **40,000**

5. $7 \times 10 =$ **70**
$7 \times 100 =$ **700**
$7 \times 1{,}000 =$ **7,000**
$7 \times 10{,}000 =$ **70,000**

6. $5 \times 10^1 =$ **50**
$5 \times 10^2 =$ **500**
$5 \times 10^3 =$ **5,000**
$5 \times 10^4 =$ **50,000**

7. 3×10^1 **30**

8. 2×100 **200**

9. 3×10^4 **30,000**

10. $1{,}000 \times 9$ **9,000**

11. 6×10^2 **600**

12. 3×10^3 **3,000**

13. $10{,}000 \times 2$ **20,000**

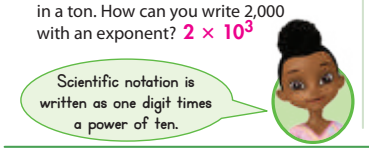
14. 8×10^5 **800,000**

15. Explain how to find the number of zeros in the product for Exercise 14.
Sample answer: Since the exponent for 10 is 5, there are 5 zeros in the product.

16. Maria saw 2×10^1 dogs in the park on Saturday. She saw twice as many dogs on Sunday as she saw on Saturday. How many dogs did she see over the two days?
60 dogs

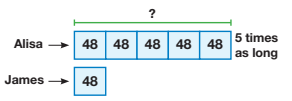
17. **Number Sense** In which place is the digit in the number 5,341 that would be changed to form 5,841? How do the values of the two numbers compare?
The hundreds place; 5,841 is 500 greater than 5,341.

18. **Math and Science** There are 2,000 pounds in a ton. How can you write 2,000 with an exponent? **2×10^3**



19. **MP.6 Be Precise** Kay buys 12 pounds of apples. Each pound costs $3. If she gives the cashier two $20 bills, how much change should she receive?
$4

20. **MP.4 Model with Math** James practiced piano for 48 minutes. Alisa practiced for 5 times as long as James. How many minutes did Alisa practice? How many minutes in all did James and Alisa practice? Write an equation to model your work.



240 minutes; 288 minutes;
240 + 48 = 288

21. **Higher Order Thinking** George said that 6×10^3 is 180. Do you agree or disagree? If you disagree, explain the mistake that he made and find the correct answer.
Sample answer: George multiplied 6 by 10 by the exponent 3 to get 180 rather than multiplying 6 by the product (10 × 10 × 10). The correct answer is 6,000.

Common Core Assessment

22. Choose all the equations that are true.
- [x] $10 \times 10 \times 10 \times 10 \times 10 = 100{,}000$
- [ ] $10 \times 10 \times 10 \times 10 \times 10 = 50$
- [ ] $10 \times 10 \times 10 \times 10 \times 10 = 50{,}000$
- [x] $10 \times 10 \times 10 \times 10 \times 10 = 10^5$
- [ ] $10 \times 10 \times 10 \times 10 \times 10 = 500{,}000$

23. Choose all the equations that are true.
- [ ] $90{,}000 = 9 \times 1{,}000$
- [x] $90{,}000 = 9 \times 10{,}000$
- [x] $90{,}000 = 9 \times 10^4$
- [ ] $90{,}000 = 9 \times 10^5$
- [ ] $90{,}000 = 9 \times 10^6$

LESSON 1-2

UNDERSTAND WHOLE-NUMBER PLACE VALUE

DIGITAL RESOURCES PearsonRealize.com

- **eText** Student and Teacher eTexts
- **PD** Listen and Look For Lesson Video
- **Think** Today's Challenge
- **Solve** Solve and Share
- **Learn** Visual Learning Animation Plus
- **Glossary** Animated Glossary
- **Practice Buddy** Online Personalized Practice
- **Tools** Math Tools
- **Assessment** Quick Check
- **Help** Another Look Homework Video
- **Games** Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.A Understand the place value system.

Content Standard 5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Mathematical Practices MP.2, MP.3, MP.4, MP.7

Objective Read and write whole numbers using standard form, expanded form, and number names.

Essential Understanding Understanding each digit's place value in a number provides a way to understand the number's value.

Vocabulary Value, Expanded form

Materials Place-Value Charts (Teaching Tool 3)

COHERENCE

In this lesson, students will learn to extend their prior knowledge of place value for numbers through hundred thousands in order to read and write numbers through hundred millions. The ideas that the value of a digit depends on its place, or position, in a number and that each place has a value equal to 10 times the value of the place to its right (Standard 4.NBT.A.1) is extended to hundred millions.

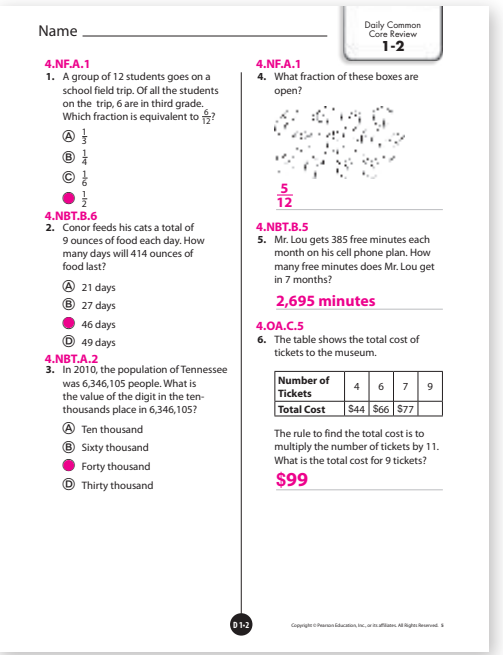
RIGOR

This lesson emphasizes **conceptual understanding** of place value. Students deepen their knowledge about place value through hundred millions as they extend the idea that the value of a digit depends on its place in a number. They extend their understanding that each place has a value equal to 10 times the value of its place to its right, and develop the understanding that each place has a value equal to $\frac{1}{10}$ of what it represents in the place to its left (Standard 5.NBT.A.1).

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 1-2

4.NF.A.1
1. A group of 12 students goes on a school field trip. Of all the students on the trip, 6 are in third grade. Which fraction is equivalent to $\frac{6}{12}$?
   - Ⓐ $\frac{1}{3}$
   - Ⓑ $\frac{1}{4}$
   - Ⓒ $\frac{1}{6}$
   - ● $\frac{1}{2}$

4.NBT.B.6
2. Conor feeds his cats a total of 9 ounces of food each day. How many days will 414 ounces of food last?
   - Ⓐ 21 days
   - Ⓑ 27 days
   - ● 46 days
   - Ⓓ 49 days

4.NBT.A.2
3. In 2010, the population of Tennessee was 6,346,105 people. What is the value of the digit in the ten-thousands place in 6,346,105?
   - Ⓐ Ten thousand
   - Ⓑ Sixty thousand
   - ● Forty thousand
   - Ⓓ Thirty thousand

4.NF.A.1
4. What fraction of these boxes are open?

$\frac{5}{12}$

4.NBT.B.5
5. Mr. Lou gets 385 free minutes each month on his cell phone plan. How many free minutes does Mr. Lou get in 7 months?

2,695 minutes

4.OA.C.5
6. The table shows the total cost of tickets to the museum.

Number of Tickets	4	6	7	9
Total Cost	$44	$66	$77	

The rule to find the total cost is to multiply the number of tickets by 11. What is the total cost for 9 tickets?

$99

D1-2

Today's Challenge

Think Use the Topic 1 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Strategies Use prior knowledge to understand meanings.

Use with the Visual Learning Bridge on Student's Edition p. 12.

To introduce the new vocabulary, write the word(s) *value* and *expanded form* on note cards. Display the cards and have students repeat the word(s). Review the word *digits* before learning the word *value*. Write a three-digit number on the board. Point to the number: *What number is this?* Ask the students how many digits the number has. Make sure that they understand the difference between *digits* and *number*. Next, introduce the word *value* and the place-value chart. Explain that the value of a digit depends on its place, or position, in the number.

Beginning Point to the ones period in the place-value chart. Then point to the ones digit: *This digit is in the ones place. What digit is this?* [0]. Point to the digit in the tens place and have students complete the sentence: This digit is in the _____ place.

Intermediate Have students work in pairs to read numbers on the place-value chart. They will point to and identify the value of digits in the thousands place.

Advanced Have students read numbers on the place-value chart. Ask them to say the value of digit 1 on the chart.

Summarize How can you find the value of a digit?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students determine the value of two digits in a number in the millions. They explain how the values of the two digits are related.

10–15 min

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Solve

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
MP.7 Use Structure Listen and look for students who use the structure of a place-value chart to determine the relationship between two digits in a number in the millions.

2. **Build Understanding**
With which period of numbers are you already familiar? [Ones and thousands]
What are you asked to find out? [How the values of the two 8s in 1,880,000 are related]

Small Group DURING

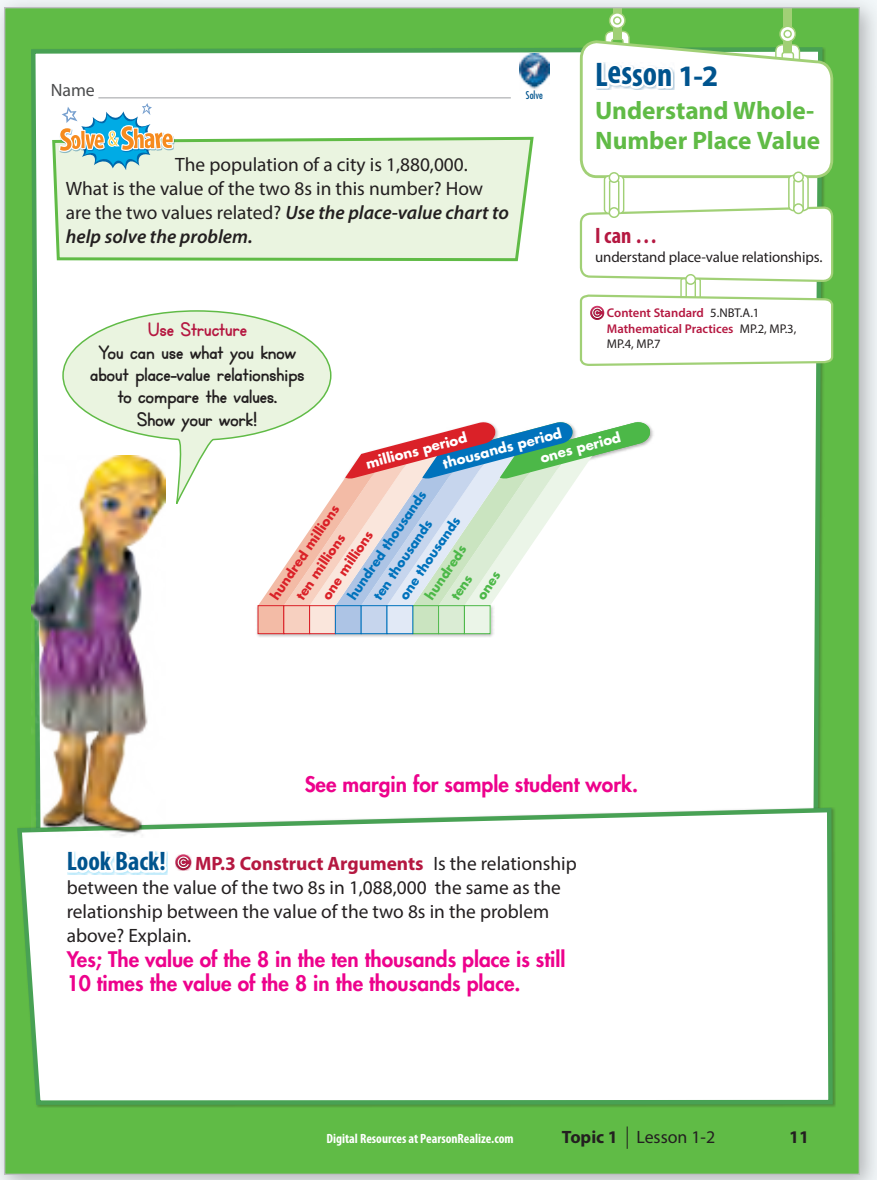
3. **Ask Guiding Questions As Needed**
How many place values are included in each period on your place-value chart? [Three place values]

Whole Class AFTER

4. **Share and Discuss Solutions**
Solve Start with students' solutions. If needed, project Cory's work below to show how to use a place-value chart to determine and explain how the values of the two 8s are related.

5. **Transition to the Visual Learning Bridge**
A digit in any place represents 10 times as much as it would represent in the place to its right. Whole numbers are grouped into periods of three places, separated by commas. Each period has a ones, a tens, and a hundreds place.

6. **Extension for Early Finishers**
Rearrange the digits in 605,800,000 to make the greatest possible number. [865,000,000]



Name _____ Solve

Solve & Share

The population of a city is 1,880,000. What is the value of the two 8s in this number? How are the two values related? ***Use the place-value chart to help solve the problem.***

Lesson 1-2
Understand Whole-Number Place Value

I can ...
understand place-value relationships.

Content Standard 5.NBT.A.1
Mathematical Practices MP.2, MP.3, MP.4, MP.7

Use Structure
You can use what you know about place-value relationships to compare the values. Show your work!

millions period | thousands period | ones period
hundred millions | ten millions | one millions | hundred thousands | ten thousands | one thousands | hundreds | tens | ones

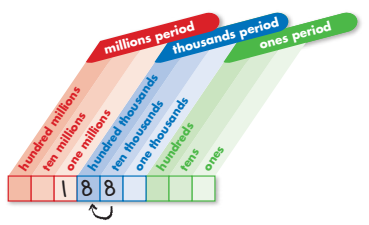
See margin for sample student work.

Look Back! MP.3 Construct Arguments Is the relationship between the value of the two 8s in 1,088,000 the same as the relationship between the value of the two 8s in the problem above? Explain.
Yes; The value of the 8 in the ten thousands place is still 10 times the value of the 8 in the thousands place.

Digital Resources at PearsonRealize.com Topic 1 | Lesson 1-2 11

Analyze Student Work

Cory's Work



× 10

8 hundred thousands is 800,000.

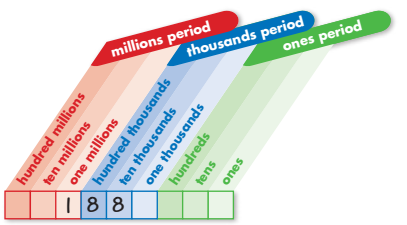
8 ten thousands is 80,000.

80,000. × 10 = 800,000

800,000. is 10 times as great as 80,000.

Cory uses a place-value chart to write 1,880,000. He uses the chart to determine and explain how the values of the two 8s are related.

Albert's Work



8 hundred thousands is 800,000.

8 ten thousands is 80,000.

Albert uses a place-value chart to write 1,880,000 and find the values of the two 8s. However, he does not explain how the values are related.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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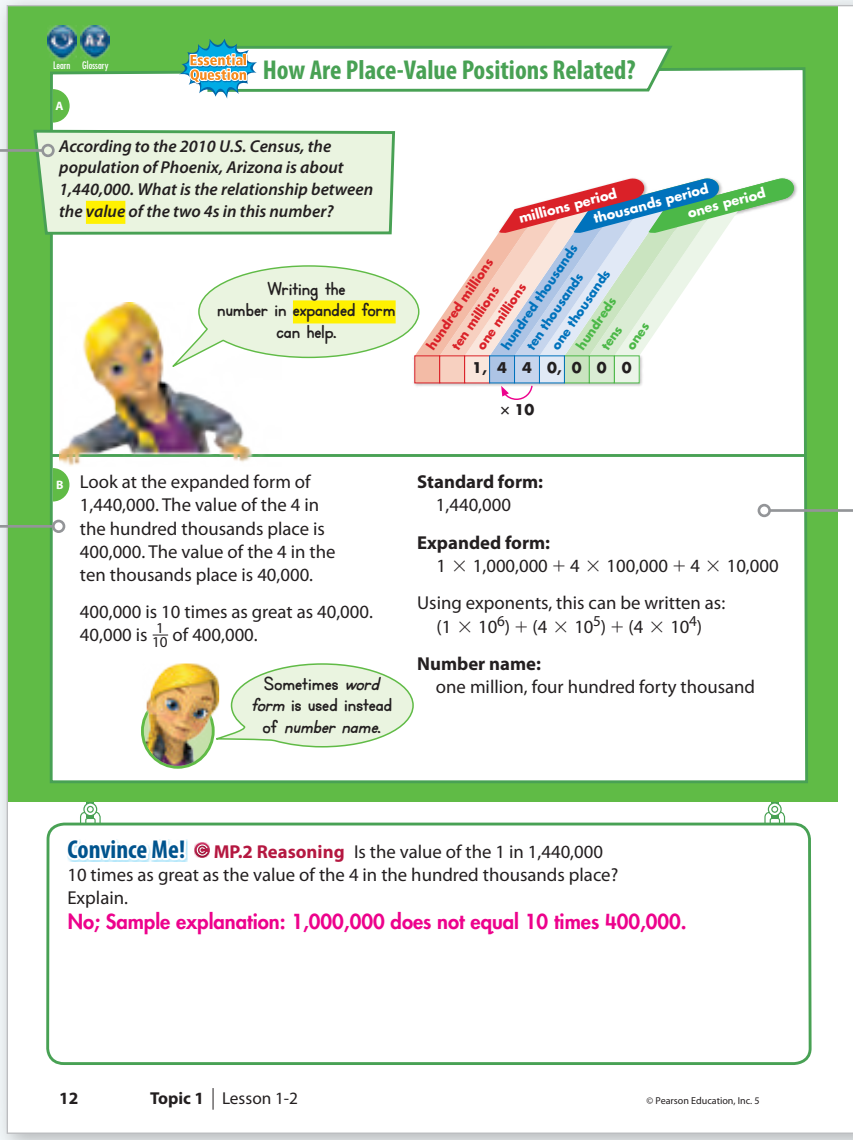
Learn Glossary

MP.2 Reason Quantitatively *If the first digit of a whole number is in the millions place, how many digits are in the number?* [7]

MP.3 Construct Arguments *In 1,440,000, which digit has the greatest place value?* [1]

Why does the 1 have a greater value than either 4? [The 1 is in the millions place and has a greater value than the 4 in the hundred thousands place or the 4 in the ten thousands place because those two numbers have zero millions.]



Visual Learning Bridge

Which digits are used in the population of Phoenix, Arizona? [0, 1, and 4]

Convince Me! MP.2 Reason Abstractly Students use reasoning and place-value relationships to determine whether a suggested relationship between two values in a number is correct.

Coherence The population of Phoenix problem emphasizes the fact that for the value of any digit in a number to be 10 times as great as the value of the digit to its right (or $\frac{1}{10}$ the value of the digit to its left), the two digits must be the same.

Essential Question

Revisit the Essential Question. Remind students that each place value represents a power of ten, so for any multi-digit number, the same digit in each place represents 10 times as much as it represents in the place to its right and one tenth as much as it represents in the place to its left.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 7 and 14 are worth 1 point. Item 19 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Another Example

When two digits next to each other in a number are the same, the digit on the left has 10 times the value of the digit to its right.

When two digits next to each other are the same, the digit on the right has $\frac{1}{10}$ the value of the digit to its left.

5 5 5, 0 0 0
×10 ×$\frac{1}{10}$

Guided Practice*

Do You Understand?

1. **MP.3 Construct Arguments** In 9,290, is the value of the first 9 ten times as great as the value of the second 9? Explain.
   No. Since the 9s are not next to each other in the number, the value of the first 9 is not 10 times the value of the second 9.

Do You Know How?

2. Write 4,050 in expanded form.
   $(4 \times 10^3) + (5 \times 10^1)$

In **3** and **4**, write the values of the given digits.

3. the 7s in 7,700
   7,000; 700
4. the 2s in 522
   20; 2

Independent Practice

In **5–7**, write each number in standard form.

5. 8,000,000 + 300 + 9
   8,000,309
6. $(4 \times 10^4) + (6 \times 10^2)$
   40,600
7. 10,000 + 20 + 3
   10,023

In **8–10**, write each number in expanded form.

8. 5,360
   (5 × 1,000) + (3 × 100) + (6 × 10)
9. 102,200
   (1 × 100,000) + (2 × 1,000) + (2 × 100)
10. 85,000,011
    (8 × 10,000,000) + (5 × 1,000,000) + (1 × 10) + (1 × 1)

In **11–13**, write the values of the given digits.

11. the 7s in 6,778
    700, 70
12. the 9s in 990,250
    900,000; 90,000
13. the 1s in 2,011,168
    10,000; 1,000; 100

*For another example, see Set B on page 49.

Math Practices and Problem Solving

14. Write the number name and expanded form for the number of driver ants that could be in two colonies.
    Forty-four million; 40,000,000 + 4,000,000

Up to 22,000,000 driver ants can live in a single colony.

15. **Math and Science** A queen ant can produce about nine million ants in her lifetime. Write this number in standard form.
    9,000,000

16. **MP.3 Critique Reasoning** Paul says that in the number 6,367, one 6 is 10 times as great as the other 6. Is he correct? Explain why or why not.
    No; Sample answer: The 6s are not next to each other. The 6 in the thousands place is 10 × 10 or 100 times as great as the 6 in the tens place.

17. Jorge drew a square that had a side length of 8 inches. What is the perimeter of Jorge's square?
    32 inches

Remember, the *perimeter* of a shape is the distance around it.

18. **Higher Order Thinking** Dan wrote $(2 \times 10^6) + (3 \times 10^4) + (5 \times 10^3) + 4$ for the expanded form of two million, three hundred fifty thousand, four. What error did he make in the expanded form? What is the standard form of the number?
    Dan should have multiplied 3 by 10^5 and 5 by 10^4; 2,350,004.

Common Core Assessment

19. Colleen says she is thinking of a 4-digit number in which all the digits are the same. The value of the digit in the hundreds place is 200.

Part A

What is the number? Explain.

2,222; Sample explanation: The digit in the hundreds place is 2 since its value is 200. Since one digit is 2, all the digits are 2.

Part B

Describe the relationship between the values of the digits in the number.

Sample answer: Each digit has a value 10 times the value of the digit to its right and $\frac{1}{10}$ of the value of the digit to its left.

Another Example *In 555,000, how many times as great is the 5 in the hundred thousands place compared to the 5 in the thousands place?* [100 times]

Reteaching Assign Reteaching Set B on page 49.

Error Intervention: Items 3–4

If students do not understand how to find the value of a given digit in a number,

then have them write the entire number in a place-value chart and use the labels in the chart to find the value of the given digit.

Items 8–10 Remind students that they do not need to include the value of the digit 0 when they write numbers in expanded form.

Item 16 MP.3 Critique Reasoning If students have difficulty analyzing Paul's reasoning, suggest that they write 6,367 in expanded form. Then have them compare the two terms that have a 6.

Item 18 Higher Order Thinking If students are having difficulty finding Dan's error, have them write the number in expanded form without using exponents: $2 \times 1{,}000{,}000 + 3 \times 100{,}000 + 5 \times 10{,}000$. Then they can compare each part to the expanded form with exponents that Dan wrote.

Coherence The place-value system is structured so that a digit in one place is ten times as great as it would be in the place to its right, and one tenth as great as it would be in the place to its left.

Students can learn greater numbers by building on their knowledge of numbers in the thousands and millions.

Multi-Step Problems *Page 14 Item 18; Page 16 Item 10*

STEP 3 ASSESS AND DIFFERENTIATE

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

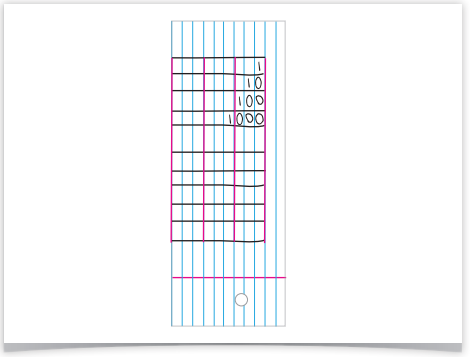
Intervention Activity I

Place Value

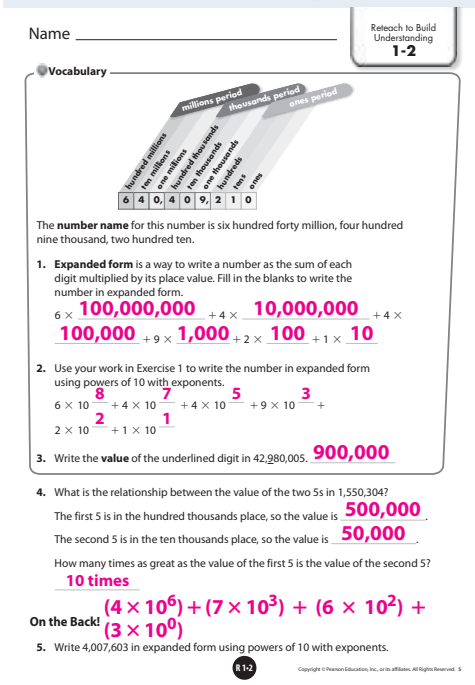
Materials

Lined paper, colored pencils

- Guide students to turn the paper sideways and draw nine horizontal lines to create a grid with eight rows.
- Then have them draw a colored line to mark every third vertical column so that the ones, thousands, and millions periods are separated.
- Tell students you will name some numbers that are between 1 and 999,999,999. Call out the following numbers and have students write them on the grid: 1; 10; 100; 1,000; 10,000; 100,000; 1,000,000; 10,000,000; 100,000,000.
- You may pause after each number as needed and guide students to write the number and count its zeros.
- Ask volunteers to read their numbers.



Reteach I



Name _____

Reteach to Build Understanding 1-2

Vocabulary

millions period | thousands period | ones period

hundred millions | ten millions | one millions | hundred thousands | ten thousands | one thousands | hundreds | tens | ones

6 4 0, 4 0 9, 2 1 0

The **number name** for this number is six hundred forty million, four hundred nine thousand, two hundred ten.

1. **Expanded form** is a way to write a number as the sum of each digit multiplied by its place value. Fill in the blanks to write the number in expanded form.
$6 \times$ 100,000,000 $+ 4 \times$ 10,000,000 $+ 4 \times$ 100,000 $+ 9 \times$ 1,000 $+ 2 \times$ 100 $+ 1 \times$ 10

2. Use your work in Exercise 1 to write the number in expanded form using powers of 10 with exponents.
$6 \times 10^{8} + 4 \times 10^{7} + 4 \times 10^{5} + 9 \times 10^{3} + 2 \times 10^{2} + 1 \times 10^{1}$

3. Write the **value** of the underlined digit in 42,980,005. 900,000

4. What is the relationship between the value of the two 5s in 1,550,304?
The first 5 is in the hundred thousands place, so the value is 500,000.
The second 5 is in the ten thousands place, so the value is 50,000.
How many times as great as the value of the first 5 is the value of the second 5?
10 times

On the Back! $(4 \times 10^{6}) + (7 \times 10^{3}) + (6 \times 10^{2}) + (3 \times 10^{0})$

5. Write 4,007,603 in expanded form using powers of 10 with exponents.

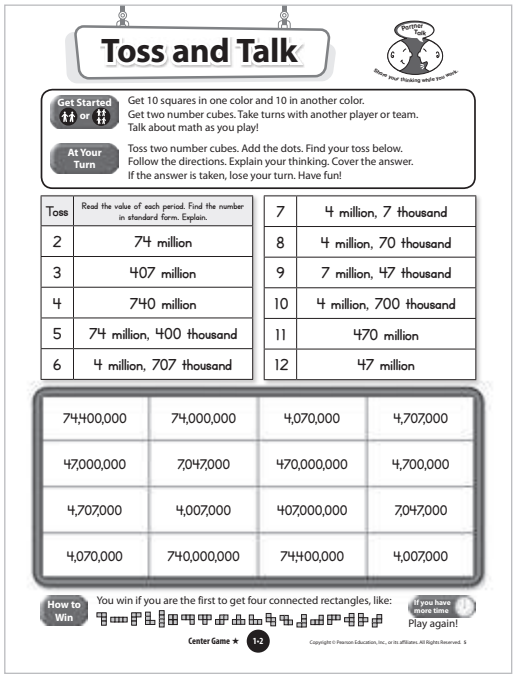
R 1-2

On-Level and Advanced Activity Centers O A

Center Games

Students work in pairs or small groups to read values for different periods and match them to their standard forms. Have students write the expanded form for some of their tosses.

★ On-Level



Toss and Talk

Partner Talk — Share your thinking while you work.

Get Started (1 or 2) Get 10 squares in one color and 10 in another color. Get two number cubes. Take turns with another player or team. Talk about math as you play!

At Your Turn Toss two number cubes. Add the dots. Find your toss below. Follow the directions. Explain your thinking. Cover the answer. If the answer is taken, lose your turn. Have fun!

Toss	Read the value of each period. Find the number in standard form. Explain.
2	74 million
3	407 million
4	740 million
5	74 million, 400 thousand
6	4 million, 707 thousand
7	4 million, 7 thousand
8	4 million, 70 thousand
9	7 million, 47 thousand
10	4 million, 700 thousand
11	470 million
12	47 million

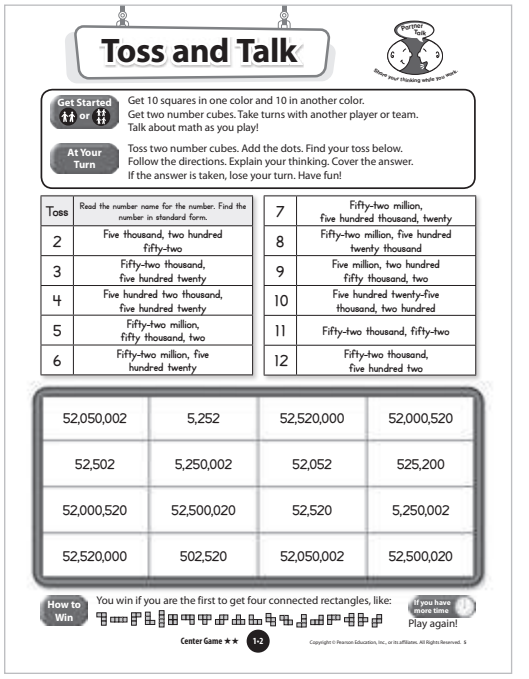
74,400,000	74,000,000	4,070,000	4,707,000
47,000,000	7,047,000	470,000,000	4,700,000
4,707,000	4,007,000	407,000,000	7,047,000
4,070,000	740,000,000	74,400,000	4,007,000

How to Win You win if you are the first to get four connected rectangles, like:

If you have more time: Play again!

Center Game ★ 1-2

★★ Advanced



Toss and Talk

Partner Talk — Share your thinking while you work.

Get Started (1 or 2) Get 10 squares in one color and 10 in another color. Get two number cubes. Take turns with another player or team. Talk about math as you play!

At Your Turn Toss two number cubes. Add the dots. Find your toss below. Follow the directions. Explain your thinking. Cover the answer. If the answer is taken, lose your turn. Have fun!

Toss	Read the number name for the number. Find the number in standard form.
2	Five thousand, two hundred fifty-two
3	Fifty-two thousand, five hundred twenty
4	Five hundred two thousand, five hundred twenty
5	Fifty-two million, fifty thousand, two
6	Fifty-two million, five hundred twenty
7	Fifty-two million, five hundred thousand, twenty
8	Fifty-two million, five hundred twenty thousand
9	Five million, two hundred fifty thousand, two
10	Five hundred twenty-five thousand, two hundred
11	Fifty-two thousand, fifty-two
12	Fifty-two thousand, five hundred two

52,050,002	5,252	52,520,000	52,000,520
52,502	5,250,002	52,052	525,200
52,000,520	52,500,020	52,520	5,250,002
52,520,000	502,520	52,050,002	52,500,020

How to Win You win if you are the first to get four connected rectangles, like:

If you have more time: Play again!

Center Game ★★ 1-2

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–3, 5–6, 9, 11, 14

O Items 3–4, 6–8, 10, 12, 14

A Items 4–8, 10, 12–14

Name _____

Help Practice Buddy Tools Games

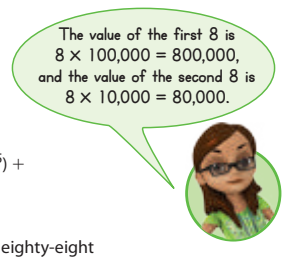
Another Look!

A place-value chart can help you write larger numbers. What are the various ways to write 92,888,100?

Expanded form: $(9 \times 10^7) + (2 \times 10^6) + (8 \times 10^5) + (8 \times 10^4) + (8 \times 10^3) + (1 \times 10^2)$

Standard form: 92,888,100

Number name: ninety-two million, eight hundred eighty-eight thousand, one hundred



Homework & Practice 1-2
Understand Whole-Number Place Value

1. Write 720,080 in expanded form with exponents.
$(7 \times 10^5) +$ **$(2 \times 10^4) + (8 \times 10^1)$**

2. Write the number name for 43,080,700.
Forty-three million, eighty thousand, seven hundred

In **3–5**, write the values of the given digits.

3. the 2s in 42,256
2,000; 200

4. the 9s in 9,905,482
9,000,000; 900,000

5. the 4s in 305,444
400; 40; 4

6. Write 12,430,000 in expanded form.
$1 \times 10{,}000{,}000 + 2 \times 1{,}000{,}000 + 4 \times 100{,}000 + 3 \times 10{,}000$

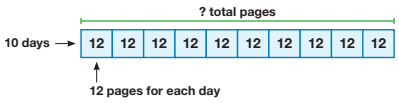
7. Write 337,060 in expanded form using exponents.
$(3 \times 10^5) + (3 \times 10^4) + (7 \times 10^3) + (6 \times 10^2)$

8. Write the number name for 3,152,308.
What is the value of the underlined digit?
Three million, one hundred fifty-two thousand, three hundred eight; 50,000

9. **MP.7 Use Structure** Sue and Jonah chose numbers for a place-value game. Sue chose the number one hundred fifty-two thousand. Jonah chose five million for his number. Who chose the greater number? Explain.
Jonah; Sample answer: Jonah's number has 5 millions and Sue's number has no millions.

10. **Higher Order Thinking** One day, the state fair total attendance was 126,945. Round 126,945 to the nearest hundred thousand, nearest ten thousand, and nearest thousand. Which of these rounded amounts is closest to the actual attendance?
100,000; 130,000; 127,000; 127,000

11. **MP.4 Model with Math** Maricko and her family went on a 10-day vacation. She read 12 pages in her book each day. How many total pages did she read while on vacation? **120 pages**



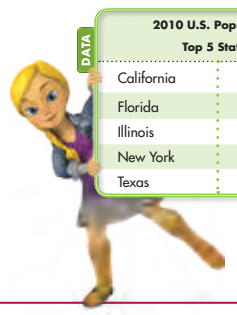
12. **MP.3 Construct Arguments** Is the value of the first 5 in California's population 10 times as great as the value of the second 5? Explain.
No. Since the digits are not next to each other, one value is more than 10 times greater than the other value.

13. **Number Sense** Write the population of Florida in expanded form using exponents.
$(1 \times 10^7) + (8 \times 10^6) + (8 \times 10^5) + (1 \times 10^3) + (3 \times 10^2) + (1 \times 10^1)$

DATA

2010 U.S. Populations
Top 5 States

California	37,253,956
Florida	18,801,310
Illinois	12,830,632
New York	19,378,102
Texas	25,145,561



Common Core Assessment

14. Joseph says that in the number 9,999,999, all the digits have the same value.

Part A

Is Joseph correct? Explain.

No; Sample explanation: Although the digits are all the same, each digit has a different value.

Part B

Describe the relationship between the values of the digits in the number.

Sample answer: Each digit has a value 10 times the value of the digit to its right and $\frac{1}{10}$ of the value of the digit to its left.

15–16

LESSON 1-3

DECIMALS TO THOUSANDTHS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain **5.NBT** Number and Operations in Base Ten

Cluster **5.NBT.A** Understand the place value system.

Content Standard **5.NBT.A.1** Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. Also **5.NBT.A.3a**.

Mathematical Practices **MP.2, MP.3, MP.4, MP.6, MP.7**

Objective Represent decimals to thousandths as fractions and fractions with denominators of 1,000 as decimals.

Essential Understanding Our number system is based on powers of 10. Whenever we get 10 in one place value, we move to the next greater place value.

Vocabulary Thousandths

Materials Decimal Place-Value Charts (Teaching Tool 6)

COHERENCE

In this lesson, students will learn to extend their understanding of the place-value system (Cluster 5.NBT.A) from whole numbers to decimals through thousandths. They apply their previous knowledge of fractions as they learn that fractions with denominators of 10, 100, and 1,000 can be expressed as decimals, and that the denominator of the fraction determines the place values used for the decimal. They also use decimal place value to write decimals as fractions.

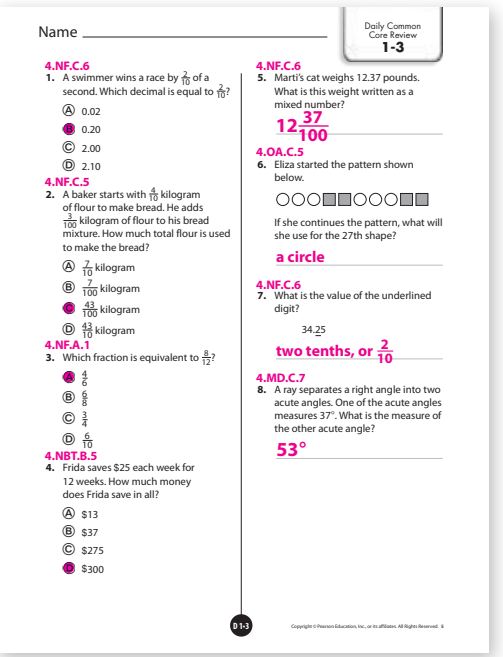
RIGOR

This lesson emphasizes **conceptual understanding**. Students deepen their knowledge of place value through thousandths as they extend the idea that the value of a digit depends on its place in a number. They also extend their understanding of the relationships between decimal place values–that each place has a value equal to 10 times the value of the place to its right, and a value equal to $\frac{1}{10}$ of what it represents in the place to its left (Standard 5.NBT.A.1).

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 1-3

4.NF.C.6
1. A swimmer wins a race by $\frac{7}{10}$ of a second. Which decimal is equal to $\frac{7}{10}$?
   - Ⓐ 0.02
   - Ⓑ 0.20
   - Ⓒ 2.00
   - Ⓓ 2.10

4.NF.C.5
2. A baker starts with $\frac{4}{10}$ kilogram of flour to make bread. He adds $\frac{3}{100}$ kilogram of flour to his bread mixture. How much total flour is used to make the bread?
   - Ⓐ $\frac{7}{10}$ kilogram
   - Ⓑ $\frac{7}{100}$ kilogram
   - Ⓒ $\frac{43}{100}$ kilogram
   - Ⓓ $\frac{43}{10}$ kilogram

4.NF.A.1
3. Which fraction is equivalent to $\frac{8}{12}$?
   - Ⓐ $\frac{4}{6}$
   - Ⓑ $\frac{6}{8}$
   - Ⓒ $\frac{3}{4}$
   - Ⓓ $\frac{6}{10}$

4.NBT.B.5
4. Frida saves $25 each week for 12 weeks. How much money does Frida save in all?
   - Ⓐ $13
   - Ⓑ $37
   - Ⓒ $275
   - Ⓓ $300

4.NF.C.6
5. Marti's cat weighs 12.37 pounds. What is this weight written as a mixed number?
   $12\frac{37}{100}$

4.OA.C.5
6. Eliza started the pattern shown below.

   ○○○■■○○○■■

   If she continues the pattern, what will she use for the 27th shape?
   a circle

4.NF.C.6
7. What is the value of the underlined digit?
   34.25
   two tenths, or $\frac{2}{10}$

4.MD.C.7
8. A ray separates a right angle into two acute angles. One of the acute angles measures 37°. What is the measure of the other acute angle?
   53°

1-3

Today's Challenge

Think Use the Topic 1 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Strategies Use reading supports, such as charts, to enhance comprehension of written text.

Use with the Visual Learning Bridge on Student's Edition p. 18.

Display the place-value charts from the student page. *What do these decimal place-value charts help you do?* [Represent decimals to the thousandths.] *How do the charts help you represent decimals to the thousandths?* [On the place-value charts, the thousandths place is three places to the right of the decimal point. $\frac{5}{1,000}$ is represented by the decimal 0.005.] Write 0.785 on the board. *Five is in the thousandths place.* Remind students that the value of a digit depends on its place, or position, in the number.

Beginning *How would you represent the following fractions as decimals on a place-value chart: $\frac{692}{1,000}$, $\frac{8}{1,000}$, $\frac{75}{1,000}$?* [0.692, 0.008, 0.075]

Intermediate *Marcos has a hose that measures $\left(\frac{5 \times 1}{10}\right) + \left(\frac{7 \times 1}{100}\right) + \left(\frac{6 \times 1}{1,000}\right)$ meters. How would you represent this measurement as a decimal on a place-value chart?* [0.576]

Advanced Have students work in pairs to describe the value of the digit 9 on a place-value chart where the fraction $\frac{999}{1,000}$ is represented by the decimal 0.999. [The value of the digit 9 in the hundredths place has 10 times the value of the digit 9 in the thousandths place and $\frac{1}{10}$ the value of the digit 9 in the tenths place.]

Summarize: How do you use place-value charts to represent decimals to thousandths?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use their knowledge about decimals to the hundredths place to explain the meaning of a decimal to the thousandths place.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
You may wish to provide decimal place-value charts to students (Teaching Tool 6).

MP.7 Use Structure Listen and look for students who use the structure of decimals to the hundredths to explain the meaning of a decimal to the thousandths.

2. Build Understanding
What do you already know that can help you solve the problem? [How to use decimals to the hundredths place, which will help me explain decimals to the thousandths place]

Small Group DURING

3. Ask Guiding Questions As Needed
How many places to the right of the decimal point is the tenths place? [1] *The hundredths place?* [2] *What place do you think is 3 places to the right of the decimal point?* [Thousandths] *How many cubes would you use to model* $\frac{305}{1,000}$ *cubes?* [305]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. Have them share the strategies used to solve the problem. If needed, project and analyze Billy's work to facilitate a discussion of the meaning of 0.305.

5. Transition to the Visual Learning Bridge
When reading and writing decimals, the thousandths place is three places to the right of the decimal point.

6. Extension for Early Finishers
How would you represent $\frac{472}{1,000}$ *as a decimal?* [0.472]


Name _____ Solve

Solve & Share

Jennie is training for a race. On Tuesday she finished her sprint 0.305 second faster than she did on Monday. How can you explain the meaning of 0.305? ***Solve this problem any way you choose.***

Lesson 1-3
Decimals to Thousandths

I can ...
read and write decimals to the thousandths.

Content Standards 5.NBT.A.1, 5.NBT.A.3a
Mathematical Practices MP.2, MP.3, MP.4, MP.6, MP.7

You can use structure. Use what you know about place value to help solve the problem. Show your work!

See margin for sample student work.

Look Back! MP.3 Construct Arguments Gabriel says that there are 5 hundredths in 0.305. Do you agree or disagree? Explain.
Disagree; Sample explanation: The hundredths place is the second place to the right of the decimal point, which has the digit 0. There are 0 hundredths in 0.305.

Digital Resources at PearsonRealize.com Topic 1 | Lesson 1-3 17

Analyze Student Work

Billy's Work

Billy explains the meaning of 0.305 by connecting it to a fraction.

Ginny's Work

Ginny explains the meaning of 0.305 using place value.

STEP 2

DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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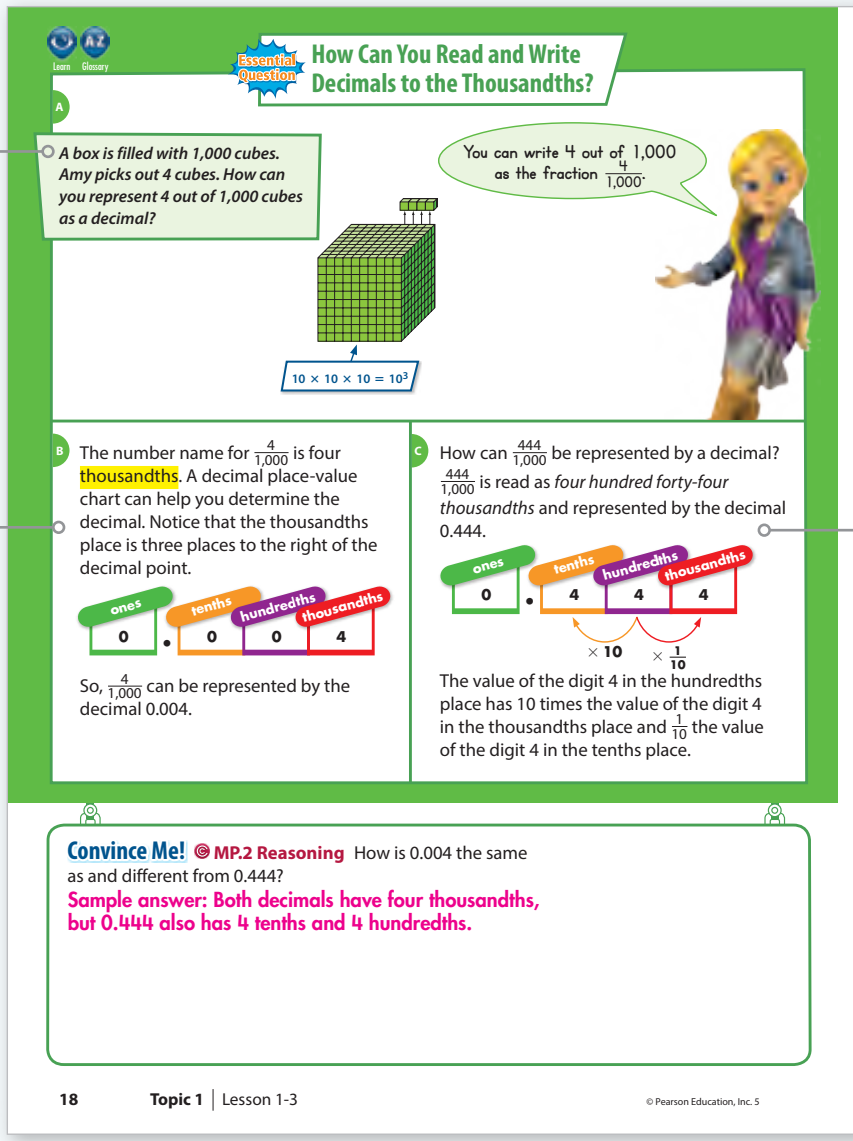
Learn Glossary

Emphasize to students that the 1,000 cubes in the box are of equal size. *How do you write 4 out of 1,000 cubes as a fraction?* [$\frac{4}{1,000}$] *How do you write 40 out of 1,000 cubes as a fraction?* [$\frac{40}{1,000}$]

MP.3 Construct Arguments Remind students to include a zero in the ones place when writing a decimal less than 1. Emphasize the importance of placing zeros in the correct place. *Is 0.04 equal to 0.004? Explain.* [No; 0.04 is equal to 0.040. So, 0.04 is four hundredths, or forty thousandths. 0.004 is 4 thousandths. So, 0.04 is not equal to 0.004.]

Prevent Misconceptions RtI

Some students may have difficulty determining which zeros can be omitted and which zeros must be written in decimal numbers. Emphasize that students should find the non-zero digit that is farthest to the right in a decimal. Only the zeros to the right of this digit can be dropped.



Visual Learning Bridge

MP.2 Reason Abstractly *How does the value of the digit 4 in the tenths place compare to the value of the digit 4 in the hundredths place?* [Sample answer: The 4 in the tenths place has a value 10 times as great as the 4 in the hundredths place.] *How does the value of the digit 4 in the tenths place compare to the value of the digit 4 in the thousandths place?* [Sample answer: The 4 in the tenths place has a value 100 times as great as the 4 in the thousandths place.]

Convince Me! MP.2 Reason Quantitatively Although both decimals have a 4 in the thousandths place, students should notice that there are 0 tenths and 0 hundredths in 0.004, but 4 tenths and 4 hundredths in 0.444.

Coherence Choosing cubes from a box filled with 1,000 cubes stresses the idea that the value of any digit in a number is dependent on its place in the number, and that the same digit in a different place will have a different value. This concept has been extended from whole numbers to decimals. For example, 4,000 = 4 thousands; 40 = 4 tens, 0.4 = 4 tenths; and 0.004 = 4 thousandths.

Essential Question Revisit the Essential Question. Our number system is based on powers of ten. Whenever we get 10 in one place value, we move to the next greater place value. A digit in one place value represents 10 times as much as the same digit represents in the place to its right, and $\frac{1}{10}$ of what the same digit represents in the place to its left.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 11 and 34 are worth 1 point. Item 31 is worth 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

Do You Understand?

1. **MP.6 Be Precise** If four cubes are pulled from the box on the previous page, how would you write the fraction representing the cubes that are left? the decimal representing the cubes that are left?
   $\frac{996}{1,000}$; 0.996
2. **MP.2 Reasoning** 0.3 is 10 times as great as what decimal? 0.003 is $\frac{1}{10}$ of what decimal? 0.03; 0.03

Do You Know How?

In **3–6**, write each decimal as a fraction.

3. 0.001 = $\frac{1}{1,000}$
4. 0.05 = $\frac{5}{100}$
5. 0.512 = $\frac{512}{1,000}$
6. 0.309 = $\frac{309}{1,000}$

In **7–10**, write each fraction as a decimal.

7. $\frac{2}{1,000}$ = 0.002
8. $\frac{34}{100}$ = 0.34
9. $\frac{508}{1,000}$ = 0.508
10. $\frac{99}{1,000}$ = 0.099

Independent Practice

In **11–18**, write each decimal as a fraction.

11. 0.007 $\frac{7}{1,000}$
12. 0.08 $\frac{8}{100}$
13. 0.065 $\frac{65}{1,000}$
14. 0.9 $\frac{9}{10}$
15. 0.832 $\frac{832}{1,000}$
16. 0.203 $\frac{203}{1,000}$
17. 0.78 $\frac{78}{100}$
18. 0.999 $\frac{999}{1,000}$

In **19–26**, write each fraction as a decimal.

19. $\frac{434}{1,000}$ 0.434
20. $\frac{3}{10}$ 0.3
21. $\frac{873}{1,000}$ 0.873
22. $\frac{17}{1,000}$ 0.017
23. $\frac{309}{1,000}$ 0.309
24. $\frac{5}{1,000}$ 0.005
25. $\frac{6}{100}$ 0.06
26. $\frac{999}{1,000}$ 0.999

27. Look at the middle 9 in Exercise 18. How is its value related to the value of the 9 to its left? to the value of the 9 to its right?
    Sample answer: The value of the 9 in the middle is $\frac{1}{10}$ the value of the 9 to its left and 10 times as great as the value of the 9 to its right.

*For another example, see Set C on page 49.

Math Practices and Problem Solving

28. **MP.4 Model with Math** The Palmer's property tax bill for the year is $3,513. In their first installment, they paid $1,757. How much do they still owe on their bill? Write an equation to model your work.
    $3,513 − $1,757 = $1,756

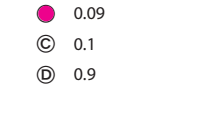
29. **MP.7 Use Structure** Write the fractions $\frac{22}{100}$ and $\frac{22}{1,000}$ as decimals. How are the values of the digit 2 related in each of the decimals?
    0.22; 0.022; Sample answer: In each decimal, the digit 2 in the place farthest to the right is $\frac{1}{10}$ the value of the digit to its left.

30. Simon scored 4×10^2 points in a game. Joe scored 2×10^3 points in the same game. Whose score is higher? How much higher?
    Joe; 1,600 points higher

31. **Higher Order Thinking** Kelly said that $\frac{97}{1,000}$ can be written as 0.97. Is she correct? Explain.
    No; $\frac{97}{1,000}$ is equivalent to 0.097. 0.97 is equivalent to $\frac{97}{100}$.

32. **MP.3 Critique Reasoning** Frank reasoned that in the number 0.555, the value of the 5 in the thousandths place is ten times as great as the 5 in the hundredths place. Is he correct? Explain.
    No, the value of the 5 in the thousandths place is $\frac{1}{10}$ the value of the 5 in the hundredths place.

33. **MP.3 Construct Arguments** How many cubes are in the box? What fraction of the entire box do the 7 cubes represent? Explain your answer.



10 × 10 × 10

There are 1,000 cubes. 7 out of 1,000 is $\frac{7}{1,000}$.

Common Core Assessment

34. 0.04 is 10 times as great as which decimal?
    - Ⓐ 0.4
    - Ⓑ 0.1
    - ● 0.004
    - Ⓓ 0.001

35. 0.009 is $\frac{1}{10}$ of which decimal?
    - Ⓐ 0.01
    - ● 0.09
    - Ⓒ 0.1
    - Ⓓ 0.9

Error Intervention: Item 1

If students have difficulty identifying from which place they should subtract 4,

then remind them that the thousandths place is $\frac{1}{10}$ as great as the hundredths place, and that the hundredths place is $\frac{1}{10}$ as great as the tenths place.

RtI **Reteaching** Assign Reteaching Set C on p. 49.

Item 19 Students may have difficulty working with a fraction with a large denominator. Remind them to be precise (MP.6) and that a fraction with a denominator of 1,000 can always be converted to a decimal with three digits to the right of the decimal point (although some digits may be 0).

Item 31 Higher Order Thinking If needed, provide students with a place-value chart and have them write 0.97 in the chart to determine whether it is equal to $\frac{97}{1,000}$.

Item 33 MP.3 Construct Arguments Students should recognize that the label under the box gives important information. *What information does the label under the box provide?* [Possible answers: The box contains 1,000 cubes, the denominator of the fraction]. *How many cubes are to the right of the box?* [7 cubes] *What fraction of the entire box do the seven cubes show?* [$\frac{7}{1,000}$]

Coherence Students have worked with tenths and hundredths previously. Thousandths are just an extension of the decimal place-value system.

For students who need review with tenths and hundredths, remind them that a dime is $\frac{1}{10}$ (0.1) of a dollar and a penny is $\frac{1}{100}$ (0.01) of a dollar. Ask: *What is the value of a dime compared to a penny?* [ten times as great] *What is the value of a penny compared to a dime?* [one tenth as great]

Multi-Step Problems *Page 20 Item 30; Page 22 Item 28*

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

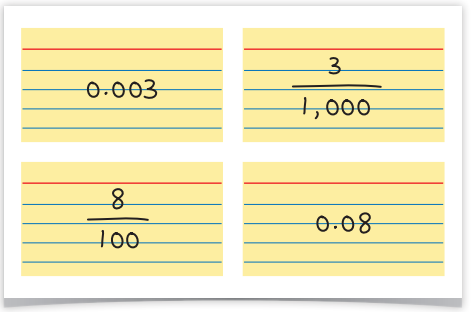
Intervention Activity I

Thousandths

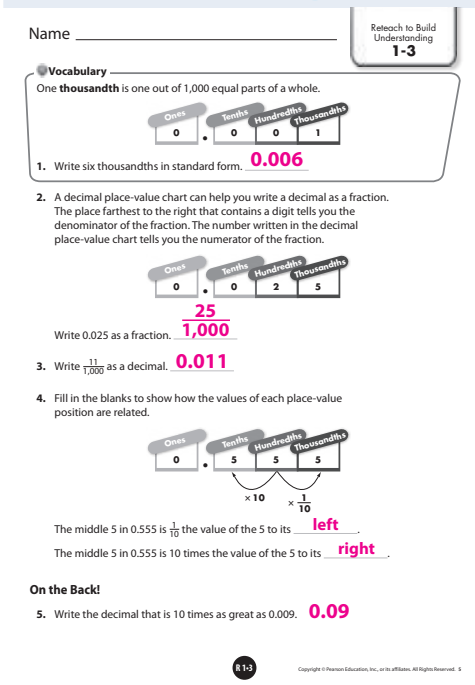
Materials

Index cards

- Have students create 6 cards in a group, from 0.1, 0.01, 0.001, $\frac{1}{10}$, $\frac{1}{100}$, and $\frac{1}{1,000}$ through 0.9, 0.09, 0.009, $\frac{9}{10}$, $\frac{9}{100}$, and $\frac{9}{1,000}$.
- Shuffle the cards and lay them all face down. Have students take turns drawing matches using these guidelines:
  - Each decimal can be matched with one fraction.
  - When a match is found, say the decimal number aloud.
  - Keep matches as points, and turn non-matches upside down.



Reteach I



Name _____

Reteach to Build Understanding 1-3

Vocabulary

One **thousandth** is one out of 1,000 equal parts of a whole.

Ones	Tenths	Hundredths	Thousandths
0	0	0	1

1. Write six thousandths in standard form. 0.006

2. A decimal place-value chart can help you write a decimal as a fraction. The place farthest to the right that contains a digit tells you the denominator of the fraction. The number written in the decimal place-value chart tells you the numerator of the fraction.

Ones	Tenths	Hundredths	Thousandths
0	0	2	5

Write 0.025 as a fraction. $\frac{25}{1,000}$

3. Write $\frac{11}{1,000}$ as a decimal. 0.011

4. Fill in the blanks to show how the values of each place-value position are related.

Ones	Tenths	Hundredths	Thousandths
0	5	5	5

×10 ×$\frac{1}{10}$

The middle 5 in 0.555 is $\frac{1}{10}$ the value of the 5 to its left.

The middle 5 in 0.555 is 10 times the value of the 5 to its right.

On the Back!

5. Write the decimal that is 10 times as great as 0.009. 0.09

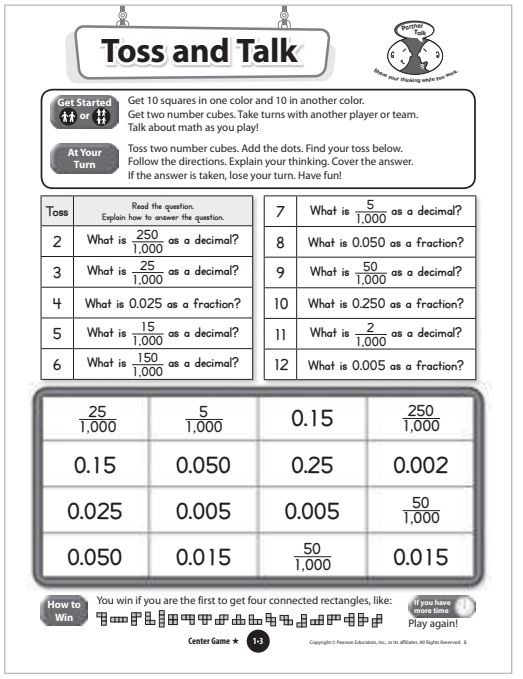
R 1-3

On-Level and Advanced Activity Centers O A

Center Games

Students work in pairs or small groups to answer questions about equivalent values for fractions and decimals. In the Advanced version, ask students to explain why they answered YES or NO for different questions.

★ On-Level



Toss and Talk

Partner Talk — Share your thinking while you work.

Get Started (1 or 2) Get 10 squares in one color and 10 in another color. Get two number cubes. Take turns with another player or team. Talk about math as you play!

At Your Turn Toss two number cubes. Add the dots. Find your toss below. Follow the directions. Explain your thinking. Cover the answer. If the answer is taken, lose your turn. Have fun!

Toss	Read the question. Explain how to answer the question.
2	What is $\frac{250}{1,000}$ as a decimal?
3	What is $\frac{25}{1,000}$ as a decimal?
4	What is 0.025 as a fraction?
5	What is $\frac{15}{1,000}$ as a decimal?
6	What is $\frac{150}{1,000}$ as a decimal?
7	What is $\frac{5}{1,000}$ as a decimal?
8	What is 0.050 as a fraction?
9	What is $\frac{50}{1,000}$ as a decimal?
10	What is 0.250 as a fraction?
11	What is $\frac{2}{1,000}$ as a decimal?
12	What is 0.005 as a fraction?

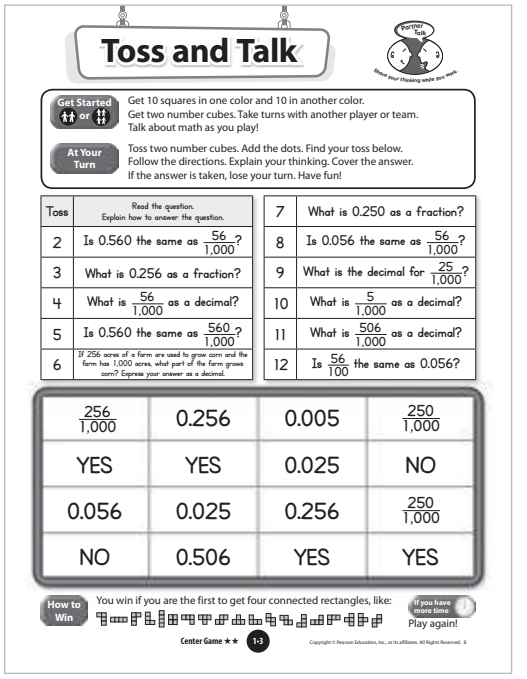
$\frac{25}{1,000}$	$\frac{5}{1,000}$	0.15	$\frac{250}{1,000}$
0.15	0.050	0.25	0.002
0.025	0.005	0.005	$\frac{50}{1,000}$
0.050	0.015	$\frac{50}{1,000}$	0.015

How to Win You win if you are the first to get four connected rectangles, like:

If you have more time Play again!

Center Game ★ 1-3

★★ Advanced



Toss and Talk

Partner Talk — Share your thinking while you work.

Get Started (1 or 2) Get 10 squares in one color and 10 in another color. Get two number cubes. Take turns with another player or team. Talk about math as you play!

At Your Turn Toss two number cubes. Add the dots. Find your toss below. Follow the directions. Explain your thinking. Cover the answer. If the answer is taken, lose your turn. Have fun!

Toss	Read the question. Explain how to answer the question.
2	Is 0.560 the same as $\frac{56}{1,000}$?
3	What is 0.256 as a fraction?
4	What is $\frac{56}{1,000}$ as a decimal?
5	Is 0.560 the same as $\frac{560}{1,000}$?
6	If 256 acres of a farm are used to grow corn and the farm has 1,000 acres, what part of the farm grows corn? Express your answer as a decimal.
7	What is 0.250 as a fraction?
8	Is 0.056 the same as $\frac{56}{1,000}$?
9	What is the decimal for $\frac{25}{1,000}$?
10	What is $\frac{5}{1,000}$ as a decimal?
11	What is $\frac{506}{1,000}$ as a decimal?
12	Is $\frac{56}{100}$ the same as 0.056?

$\frac{256}{1,000}$	0.256	0.005	$\frac{250}{1,000}$
YES	YES	0.025	NO
0.056	0.025	0.256	$\frac{250}{1,000}$
NO	0.506	YES	YES

How to Win You win if you are the first to get four connected rectangles, like:

If you have more time Play again!

Center Game ★★ 1-3

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–8, 13–16, 21–22, 25–27, 29–30
O Items 2–4, 9–12, 17–20, 22–30
A Items 3–4, 10–12, 18–30

Name _____

Help Practice Buddy Tools Games

Another Look!

Patterns can help you read and write decimals.

Decimal	Fraction	Number Name
0.1	$\frac{1}{10}$	One tenth
0.01	$\frac{1}{100}$	One hundredth
0.001	$\frac{1}{1,000}$	One thousandth

0.01 is 10 times as great as 0.001.

0.01 is $\frac{1}{10}$ as great as 0.1.

0.1 is 10 times as great as 0.01.

Homework & Practice 1-3
Decimals to Thousandths

The value of each place-value position is 10 times the value of the place to its right and $\frac{1}{10}$ the value of the place to its left.

1. 0.08 is 10 times as great as **0.008**.
2. 0.002 is $\frac{1}{10}$ of **0.02**.
3. 0.5 is 10 times as great as **0.05**.
4. 0.07 is $\frac{1}{10}$ of **0.7**.

In **5–12**, write each decimal as a fraction.

5. 0.009 $\frac{9}{1,000}$
6. 0.105 $\frac{105}{1,000}$
7. 0.2 $\frac{2}{10}$
8. 0.025 $\frac{25}{1,000}$
9. 0.563 $\frac{563}{1,000}$
10. 0.31 $\frac{31}{100}$
11. 0.6 $\frac{6}{10}$
12. 0.004 $\frac{4}{1,000}$

In **13–20**, write each fraction as a decimal.

13. $\frac{8}{1,000}$ **0.008**
14. $\frac{63}{100}$ **0.63**
15. $\frac{984}{1,000}$ **0.984**
16. $\frac{29}{1,000}$ **0.029**
17. $\frac{111}{1,000}$ **0.111**
18. $\frac{3}{10}$ **0.3**
19. $\frac{6}{1,000}$ **0.006**
20. $\frac{5}{1,000}$ **0.005**

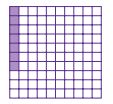
21. **Number Sense** Tommy is beginning a science experiment in the lab. The instructions call for 0.322 kilogram of potassium. Write 0.322 as a fraction.
$\frac{322}{1,000}$

22. Mt. McKinley is the highest mountain peak in North America with an elevation of 20,320 feet. What is the value of the digit 3 in 20,320?
300

23. **MP.3 Construct Arguments** Jorge said that 0.029 can be written as $\frac{29}{100}$. Is he correct? Explain.
No; 0.029 is 29 thousandths which is equivalent to the fraction $\frac{29}{1,000}$.

24. **MP.6 Be Precise** The area of the continent of North America is about 9,540,000 square miles. Write 9,540,000 in expanded form using exponents to show powers of 10.
$(9 \times 10^6) + (5 \times 10^5) + (4 \times 10^4)$

25. **MP.4 Model with Math** What part of the entire square is shaded? Write your answer as a fraction and as a decimal.



$\frac{7}{100}$; 0.07

26. **Higher Order Thinking** Write the fractions $\frac{5}{10}$, $\frac{5}{100}$, and $\frac{5}{1,000}$ as decimals. How are the decimals related?
0.5, 0.05, 0.005; Sample answer: 0.5 is 10 times as great as 0.05. 0.05 is 10 times as great as 0.005

27. **Vocabulary** Complete the sentence using one of the words below.
power **base** **exponent**
The number 1,000,000 is a(n) **power** of 10.

28. **Algebra** In three months, Harold watched a total of 40 movies. If he watched 12 movies in June and 13 movies in July, how many movies did he watch in August? Write an equation using the variable *a* to model your work.
15 movies; Sample equation: $40 = 12 + 13 + a$

Common Core Assessment

29. 0.003 is $\frac{1}{10}$ of which decimal?
Ⓐ 0.3
● 0.03
Ⓒ 0.33
Ⓓ 0.333

30. 0.8 is 10 times as great as which decimal?
● 0.08
Ⓑ 0.88
Ⓒ 0.008
Ⓓ 0.888

LESSON 1-4

UNDERSTAND DECIMAL PLACE VALUE

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.A Understand the place value system.

Content Standard 5.NBT.A.3a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times \left(\frac{1}{10}\right) + 9 \times \left(\frac{1}{100}\right) + 2 \times \left(\frac{1}{1000}\right)$.

Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.7, MP.8

Objective Read and write numbers with decimals through thousandths using standard form, expanded form, and number names; identify equivalent decimals.

Essential Understanding Our number system is based on powers of ten. Digits within decimal numbers have place value. Understanding a digit's decimal place value in a number helps determine the value of the number.

Vocabulary Equivalent decimals

Materials Decimal Place-Value Charts (Teaching Tool 6)

COHERENCE

In this lesson, students will learn to extend their knowledge about decimals from the previous lesson to write decimals in standard form, expanded form, and using number names. In Grade 4, students learned to write whole numbers using these various formats (Standard 4.NBT.A.2).

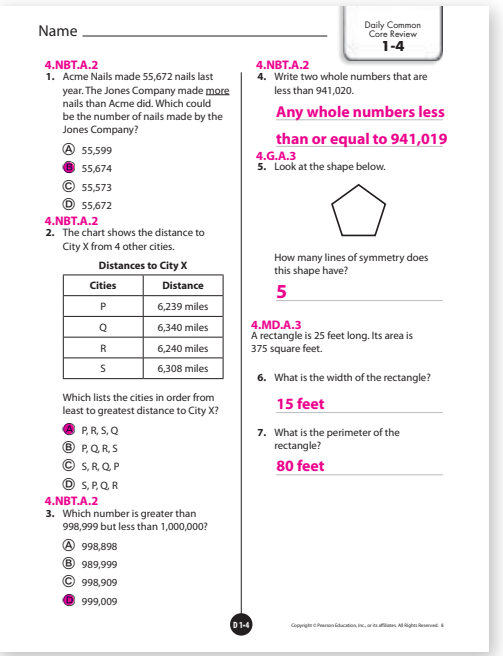
RIGOR

This lesson emphasizes **conceptual understanding** of decimals as students realize that equivalent decimals can be written in different ways, but still name the same amount. For example, $2.8 = 2.80 = 2.800$.
This understanding will be used as students compare decimals later in this topic (Standard 5.NBT.A.3).

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 1-4

4.NBT.A.2
1. Acme Nails made 55,672 nails last year. The Jones Company made more nails than Acme did. Which could be the number of nails made by the Jones Company?
   - Ⓐ 55,599
   - Ⓑ 55,674
   - Ⓒ 55,573
   - Ⓓ 55,672

4.NBT.A.2
2. The chart shows the distance to City X from 4 other cities.

Distances to City X

Cities	Distance
P	6,239 miles
Q	6,340 miles
R	6,240 miles
S	6,308 miles

Which lists the cities in order from least to greatest distance to City X?
- Ⓐ P, R, S, Q
- Ⓑ P, Q, R, S
- Ⓒ S, R, Q, P
- Ⓓ S, P, Q, R

4.NBT.A.2
3. Which number is greater than 998,999 but less than 1,000,000?
   - Ⓐ 998,898
   - Ⓑ 989,999
   - Ⓒ 998,909
   - Ⓓ 999,009

4.NBT.A.2
4. Write two whole numbers that are less than 941,020.

Any whole numbers less than or equal to 941,019

4.G.A.3
5. Look at the shape below.

How many lines of symmetry does this shape have?

5

4.MD.A.3
A rectangle is 25 feet long. Its area is 375 square feet.

6. What is the width of the rectangle?

15 feet

7. What is the perimeter of the rectangle?

80 feet

0 1-4

Today's Challenge

Think Use the Topic 1 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Strategies Use and reuse academic language in meaningful ways when speaking.

Use with the Visual Learning Bridge on Student's Edition p. 24.

Review the words *thousands, hundreds,* and *tens*. Write the words *thousandths, hundredths,* and *tenths* on note cards. Display the cards and read the words, emphasizing the final sound. Ask the students to repeat the words. Explain to the students that the words *thousandths, hundredths,* and *tenths* refer to decimal places. Write *0.374* on the board. *Three is in the tenths place, 7 is in the hundredths place, and 4 is in the thousandths place.*

Beginning Point to the digit in the tenths place: *Three is in the tenths place.* Have students write the digit in the hundredths place on the board. Then have them say the word aloud. [*7*; seven]

Intermediate Ask students to write the digit that is in the thousandths place on the board. Then ask them to complete a sentence that tells which digit is in the thousandths place: _____ is in the _____ place. [4; thousandths]

Advanced Ask students to write and describe a new decimal number.

Summarize What types of numbers do the words *thousandths, hundredths,* and *tenths* describe?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use their knowledge about decimals from the previous lesson to explain the meaning of a decimal. They use a place-value chart to display that decimal.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
You may provide Decimal Place-Value Charts (Teaching Tool 6) to each student.

MP.8 Generalize Look for students who use whole-number place value to help understand decimal place value.

2. Build Understanding
What are you asked to do? [Use place value to explain 9.85 seconds.]

How can a place-value chart help you? [A place-value chart shows the value of each place in a number.]

Small Group DURING

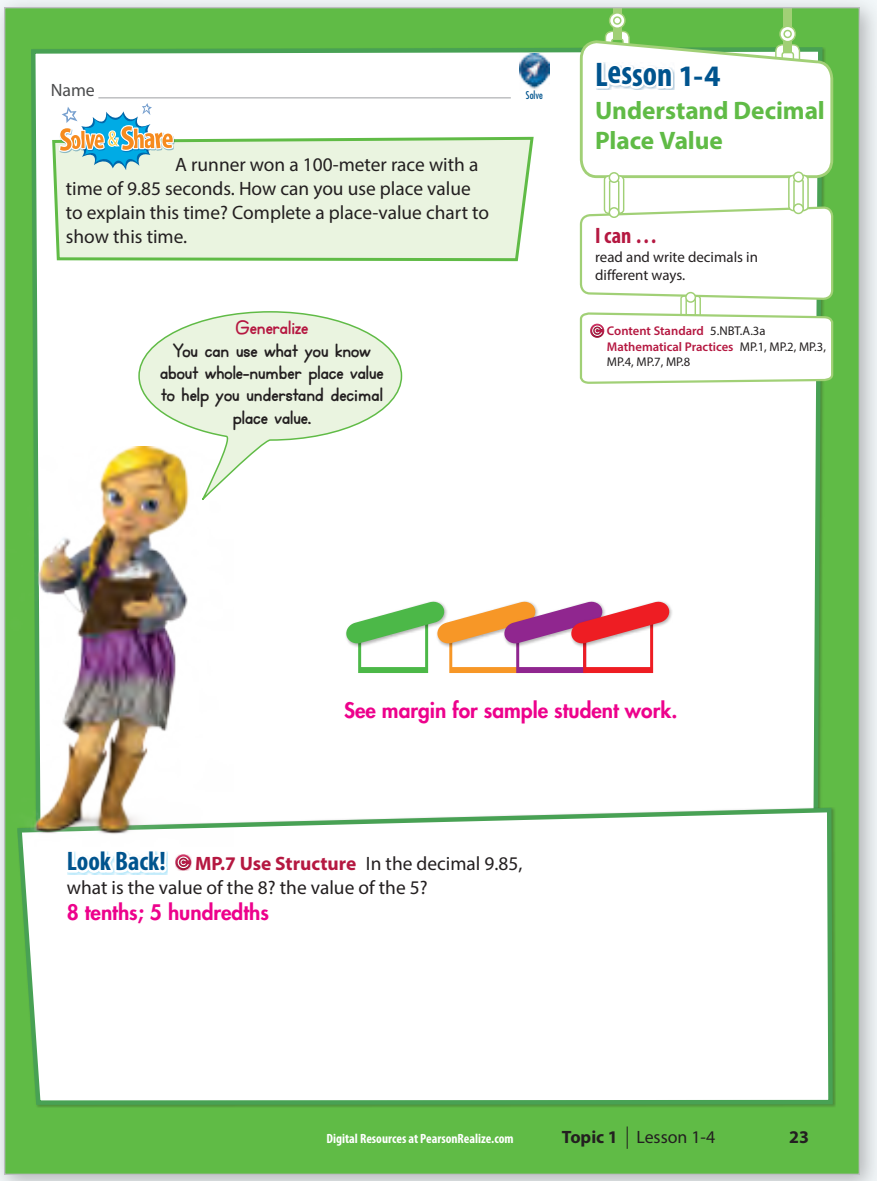
3. Ask Guiding Questions As Needed
Which digit or digits in the time have whole-number place values? [The 9] *Which digit or digits in the time have decimal place values?* [The 8 and the 5]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. If needed, project and analyze Lucero's work to show how to use a place-value chart to represent decimals.

5. Transition to the Visual Learning Bridge
You can use your understanding of place value to read and write decimals. You can read and write decimals in standard form, expanded form, and with number names.

6. Extension for Early Finishers
Write the following numbers in your place-value charts: 0.01, 0.245, 0.883.


Name _____ Solve

Solve & Share

A runner won a 100-meter race with a time of 9.85 seconds. How can you use place value to explain this time? Complete a place-value chart to show this time.

Lesson 1-4
Understand Decimal Place Value

I can ...
read and write decimals in different ways.

Content Standard 5.NBT.A.3a
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.7, MP.8

Generalize
You can use what you know about whole-number place value to help you understand decimal place value.

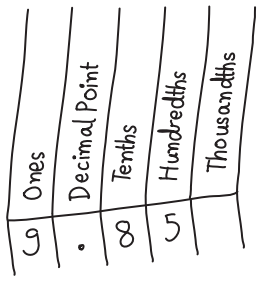
See margin for sample student work.

Look Back! MP.7 Use Structure In the decimal 9.85, what is the value of the 8? the value of the 5?
8 tenths; 5 hundredths

Digital Resources at PearsonRealize.com Topic 1 | Lesson 1-4 23

Analyze Student Work

Lucero's Work



Just like with whole numbers, I can use a place-value chart to represent decimals.

Lucero uses a place-value chart.

Rashard's Work

$9.85 = 9 + 0.8 + 0.05$
Nine and eighty-five hundredths

Rashard writes the decimal in expanded form and with number names.

STEP 2

DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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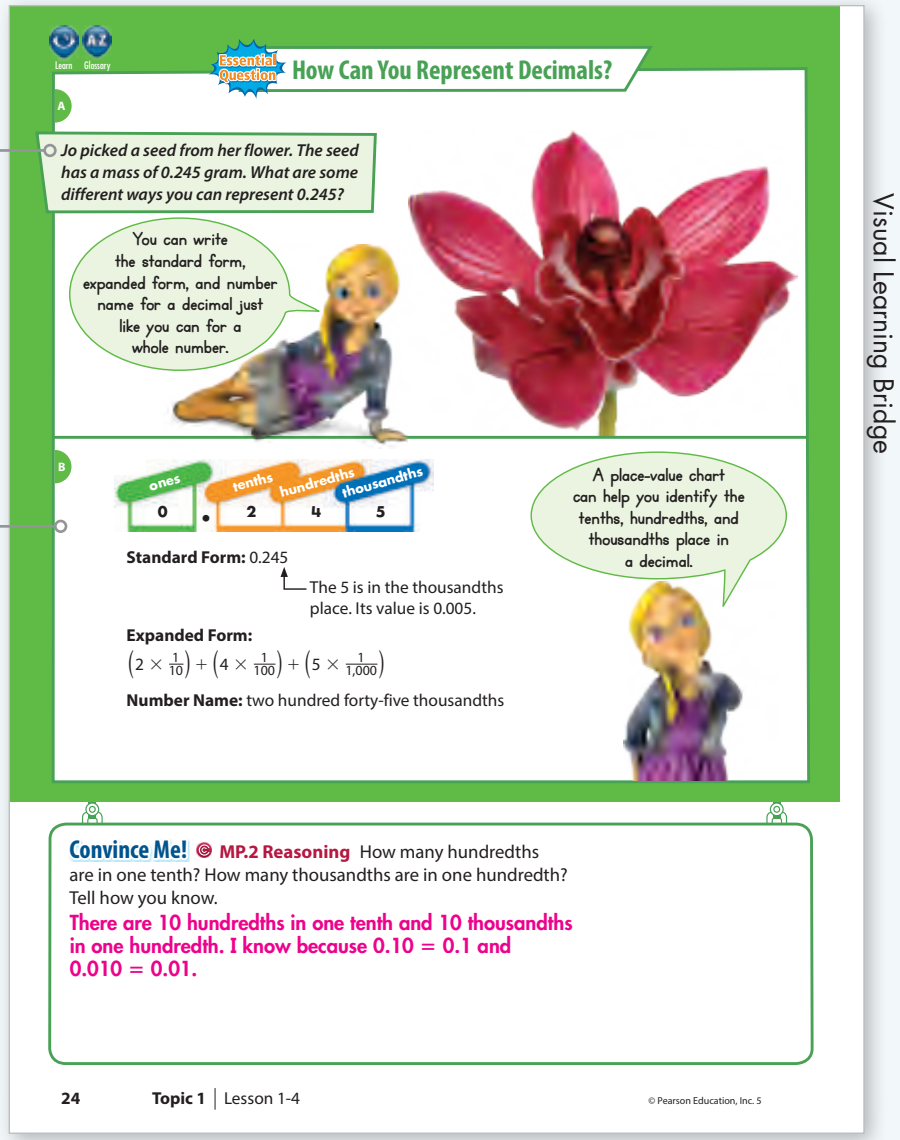
Learn Glossary

MP.7 Use Structure
What are the different ways to write numbers? [Standard form, expanded form, and with number names]

MP.7 Use Structure
How many tenths are in 1? [10]
How many hundredths are in 1? [100]
How many thousandths are in 1? [1,000]

Prevent Misconceptions RtI Tier 1

Students sometimes have difficulty writing a number in expanded form when one of the digits is zero. Suggest that they begin by multiplying zero by the fraction for that digit in the expanded form. For example, $1.082 = 1 + 0 \times \frac{1}{10} + 8 \times \frac{1}{100} + 2 \times \frac{1}{1{,}000}$. Then they can write the expanded form without multiplying by zero for that digit. For example, $1.082 = 1 + 8 \times \frac{1}{100} + 2 \times \frac{1}{1{,}000}$.



Visual Learning Bridge

Convince Me! MP.2 Reason Abstractly Students use reasoning skills to communicate and represent decimal place-value relationships through the thousandths place.

Coherence Writing the mass of the seed in different ways reinforces students' understanding that a digit in one place represents 10 times as much as it represents in the place to its right. (Standard 5.NBT.A.1). Since one tenth can be written as 0.1, one hundredth as 0.01, and one thousandth as 0.001, students know that 0.1 is ten times as great as 0.01, and therefore 10 hundredths are equal to 1 tenth. They also conclude that 0.01 is ten times as great as 0.001, and therefore, 10 thousandths is equal to one hundredth.

Essential Question

Revisit the Essential Question. Understanding place value is essential to representing decimals in different ways. The value of each digit in a decimal number is determined by its place in the number. Remember that our number system is based on powers of ten.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Item 5 is worth 1 point. Items 16 and 17 are each worth 2 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Another Example

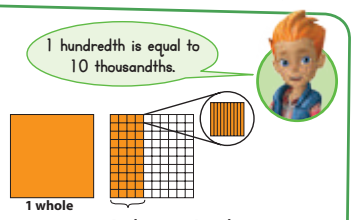
Equivalent decimals name the same amount.

What are two other decimals equivalent to 1.4?

One and four tenths is the same as one and forty hundredths.
1.4 = 1.40

One and four tenths is the same as one and four hundred thousandths.
1.4 = 1.400

So, 1.4 = 1.40 = 1.400.



Guided Practice

Do You Understand?

1. **MP.2 Reasoning** The number 3.453 has two 3s. Why does each 3 have a different value? **The first 3 is in the ones place, the second 3 is in the thousandths place.**

Do You Know How?

In **2** and **3**, write each number in standard form.

2. $4 \times 100 + 7 \times 10 + 6 \times 1 + 6 \times \left(\frac{1}{10}\right) + 3 \times \left(\frac{1}{100}\right) + 7 \times \left(\frac{1}{1{,}000}\right)$
476.637

3. four and sixty-eight thousandths
4.068

Independent Practice

In **4–6**, write each number in standard form.

4. $(2 \times 1) + \left(6 \times \frac{1}{1{,}000}\right)$
2.006

5. $(3 \times 1) + \left(3 \times \frac{1}{10}\right) + \left(9 \times \frac{1}{1{,}000}\right)$
3.309

6. nine and twenty hundredths
9.20 or 9.2

In **7–10**, write two decimals that are equivalent to the given decimal.
Sample answers are given.

7. 2.200
2.2, 2.20

8. 8.1
8.10, 8.100

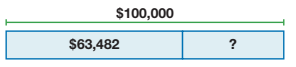
9. 9.50
9.5, 9.500

10. 4.200
4.2, 4.20

*For another example, see Set C on page 49.

Math Practices and Problem Solving

11. **MP.4 Model with Math** The annual fundraising goal of a charity is $100,000. So far $63,482 has been raised. How much more money is needed to reach the goal?
$36,518

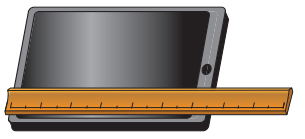


12. Santiago has a rope that measures 205.95 centimeters. Write this number in expanded form.
$2 \times 100 + 5 \times 1 + 9 \times \left(\frac{1}{10}\right) + 5 \times \left(\frac{1}{100}\right)$

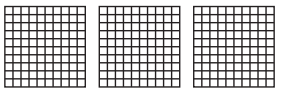
13. **MP.2 Reasoning** How can you tell that 7.630 and 7.63 are equivalent decimals?
Sample answer: The seven, six, and three are in the same place. The zero in the thousandths place adds no value to the number.

14. **MP.1 Make Sense and Persevere** In Justin's school, 0.825 of the students participate in a sport. If there are one thousand students in Justin's school, how many participate in a sport?
825 students

15. Maria incorrectly placed the decimal point when she wrote 0.65 inch for the width of her tablet computer. What is the correct decimal number for the width?
6.5 inches



16. **Higher Order Thinking** Three boys cut out hundredths decimal models. Derrick does not shade any of his models. Ari shades half of one model. Wesley shades two models and one tenth of another model. What decimal represents the amount each boy shades?



Derrick 0.0; Ari 0.50; Wesley 2.10

Common Core Assessment

17. Find two decimals that are equivalent to $(4 \times 10) + \left(7 \times \frac{1}{100}\right)$. Write the decimals in the box.

40.07, 40.070					
40.7	40.07	4.7	40.070	4.70	40.70

Another Example *Write a decimal that is equivalent to 7.800.* [7.8 or 7.80]

Error Intervention: Item 1

If students are not able to tell the difference between the values of the two 3s,

then write the number in a place-value chart. Point to the first 3 and ask: *Is this digit before or after the decimal point?* [Before] *In what place is this digit?* [The ones place] Repeat with the second 3.

Item 2 Have students write the number name of each digit to the right of the decimal point in their answer. [six tenths, three hundredths, seven thousandths]

RtI **Reteaching** Assign Reteaching Set C on page 49.

Item 11 **MP.4 Model with Math** Ask: *How does the model help you understand and solve the problem?* [Sample answer: It helps me see that the amount that still needs to be raised is the difference of $100,000 and $63,482.]

Item 13 **MP.2 Reason Abstractly** Have students explain why the decimals are equivalent. Remind students that it is not necessary to write zeros after the last non-zero digit in a decimal. Encourage students to come up with their own equivalent decimals.

Item 16 **Higher Order Thinking** The grids may be used to help students solve the problem, but there are not enough grids to model each boy's decimal.

Multi-Step Problems *Page 26 Item 17; Page 28 Item 15*

25–26

STEP 3

ASSESS AND DIFFERENTIATE

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

Decimal Place Value

Materials

Markers

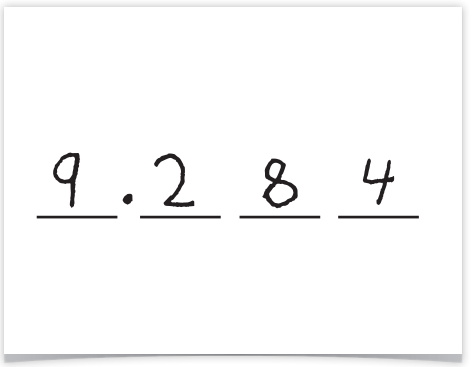
- On the board, draw four blanks with a decimal point as shown below:

  ____. ____ ____ ____

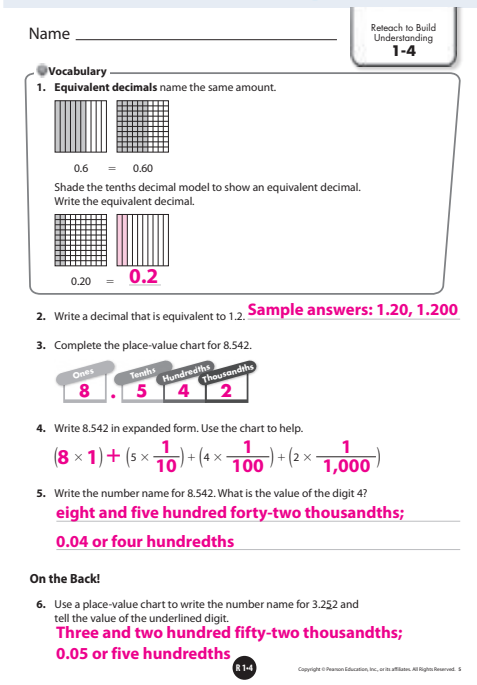
- Point to the decimal point and then to each place before and after it. Tell students that they will practice what they have learned about decimals.
- Encourage students to come to the board and carry out the following directions:

  Write a 9 in the ones place.
  Write a 2 in the tenths place.
  Write an 8 in the hundredths place.
  Write a 4 in the thousandths place.

- After all digits have been written, point to a digit and ask students to tell you its place value.
- Repeat with other numbers until students have a command of the exercise.



Reteach I



Name _____

Reteach to Build Understanding 1-4

Vocabulary

1. **Equivalent decimals** name the same amount.

0.6 = 0.60

Shade the tenths decimal model to show an equivalent decimal.
Write the equivalent decimal.

0.20 = 0.2

2. Write a decimal that is equivalent to 1.2. Sample answers: 1.20, 1.200

3. Complete the place-value chart for 8.542.

Ones	Tenths	Hundredths	Thousandths
8	5	4	2

4. Write 8.542 in expanded form. Use the chart to help.

$(8 \times 1) + \left(5 \times \frac{1}{10}\right) + \left(4 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1{,}000}\right)$

5. Write the number name for 8.542. What is the value of the digit 4?

eight and five hundred forty-two thousandths;
0.04 or four hundredths

On the Back!

6. Use a place-value chart to write the number name for 3.252 and tell the value of the underlined digit.

Three and two hundred fifty-two thousandths;
0.05 or five hundredths

R 1-4

On-Level and Advanced Activity Centers O A

Problem-Solving Reading Mat

Have students read the Problem-Solving Reading Mat for Topic 1 and then complete Problem-Solving Reading Activity 1-4.

See the Problem-Solving Reading Activity Guide for other suggestions on how to use the mat.

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

PEARSON realize.
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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games
A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–4, 6–7, 10, 12, 16

O Items 2, 4–5, 8–9, 11, 14–16

A Items 8–16

Name _____

Help Practice Buddy Tools Games

Homework & Practice 1-4
Understand Decimal Place Value

Another Look!

One of the largest ostrich eggs laid weighed 5.476 pounds. What is the value of the digit 6 in 5.476?

ones	tenths	hundredths	thousandths
5 .	4	7	6

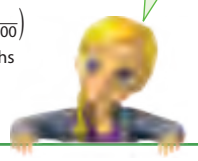
A place-value chart can show you the value of each digit in a decimal.

Standard Form: 5.476

Expanded Form: $(5 \times 1) + \left(4 \times \frac{1}{10}\right) + \left(7 \times \frac{1}{100}\right) + \left(6 \times \frac{1}{1{,}000}\right)$

Number Name: Five and four hundred seventy-six thousandths

The digit 6 is in the thousandths place, so the value is 0.006.



1. Complete the place-value chart for the following number. Write its number name and tell the value of the underlined digit.

ones	tenths	hundredths	thousandths
6 .	3	2	4

6.3$\underline{2}$4

six and three hundred twenty-four thousandths; 0.02 or 2 hundredths

2. Write 863.141 in expanded form. $8 \times 100 + 6 \times 10 + 3 \times 1 + 1 \times \left(\frac{1}{10}\right) + 4 \times \left(\frac{1}{100}\right) + 1 \times \left(\frac{1}{1{,}000}\right)$

In **3–5**, write each number in standard form.

3. $(8 \times 1) + \left(5 \times \frac{1}{100}\right) + \left(9 \times \frac{1}{1{,}000}\right)$ 8.059

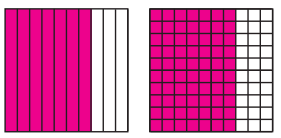
4. $1 + 0.9 + 0.08 + 0.001$ 1.981

5. Four hundred twenty-five and fifty-two hundredths 425.52

In **6–9**, write two decimals that are equivalent to the given decimal. Sample answers are given.

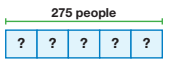
6. 5.300 — 5.3, 5.30
7. 3.7 — 3.70, 3.700
8. 0.9 — 0.90, 0.900
9. 2.50 — 2.5, 2.500

10. MP.4 Model with Math Shade the models to show that 0.7 and 0.70 are equivalent.



11. Marco has a piece of wood that measures $9 \times \frac{1}{10} + 6 \times \frac{1}{100} + 4 \times \frac{1}{1{,}000}$ meter. How can this measurement be written as a decimal?
0.964

12. There are 275 people in the movie theater. The same number of people are seated in each of the 5 different sections of the theater. How many people are seated in each section?
55



13. MP.3 Construct Arguments Cheryl's softball batting average is 0.340, and Karin's is 0.304. Karin says they have the same average. What error did she make? Explain.
Sample answer: They have different averages. Cheryl's average is 0.300 + 0.040. Karin's is 0.300 + 0.004.

14. Number Sense Nico spent eight dollars and seventy-five cents on lunch. Which two items did Nico buy?
Chef Salad and Pizza;
$4.50 + $4.25 = $8.75

DATA

Lunch Menu	
Item	Price
Hamburger	$4.20
Chef Salad	$4.50
Tuna Sandwich	$4.05
Pizza	$4.25

15. Higher Order Thinking Anthony drew a pentagon with each side measuring 6 inches. Carol drew a hexagon with each side measuring 5 inches. Which shape has a greater perimeter? Write an equation to help explain your answer.
Both shapes have a perimeter of 30 inches; $5 \times 6 = 6 \times 5$

Common Core Assessment

16. Find two decimals that are equivalent to $(8 \times 100) + \left(3 \times \frac{1}{10}\right) + \left(6 \times \frac{1}{100}\right)$. Write the decimals in the box.

800.36, 800.360
8.36 800.36 800.036 800.306 8.360 800.360

LESSON 1-5

COMPARE DECIMALS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.A Understand the place value system.

Content Standard 5.NBT.A.3b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Mathematical Practices MP.1, MP.3, MP.4, MP.6, MP.7

Objective Use place value to compare decimals through thousandths.

Essential Understanding Place value can be used to compare and order whole numbers and decimals.

Materials Decimal Place-Value Charts (Teaching Tool 6)

COHERENCE

In this lesson, students apply their knowledge about decimals from the previous two lessons in order to compare and order decimals. In the previous lesson, students learned about equivalent decimals such as 0.5, 0.50, and 0.500. In this lesson, they will learn to extend that knowledge to compare two decimals to determine the greater or lesser number, or whether the two decimals are equivalent. Then they extend comparing two numbers to ordering three or more decimals.

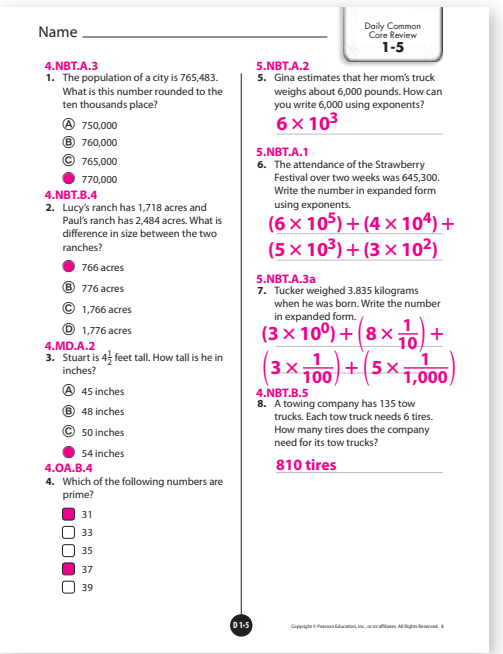
RIGOR

This lesson emphasizes **conceptual understanding**. Students deepen their understanding of comparing whole numbers (Standard 4.NBT.A.2) in order to compare and order decimals. Students learn how to compare and order decimals by using the visual model of a number line. Then that understanding is connected to the step-by-step **procedural skill** for comparing and ordering decimals.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 1-5

4.NBT.A.3
1. The population of a city is 765,483. What is this number rounded to the ten thousands place?
   - Ⓐ 750,000
   - Ⓑ 760,000
   - Ⓒ 765,000
   - ● 770,000

4.NBT.B.4
2. Lucy's ranch has 1,718 acres and Paul's ranch has 2,484 acres. What is difference in size between the two ranches?
   - ● 766 acres
   - Ⓑ 776 acres
   - Ⓒ 1,766 acres
   - Ⓓ 1,776 acres

4.MD.A.2
3. Stuart is $4\frac{1}{2}$ feet tall. How tall is he in inches?
   - Ⓐ 45 inches
   - Ⓑ 48 inches
   - Ⓒ 50 inches
   - ● 54 inches

4.OA.B.4
4. Which of the following numbers are prime?
   - ■ 31
   - □ 33
   - □ 35
   - ■ 37
   - □ 39

5.NBT.A.2
5. Gina estimates that her mom's truck weighs about 6,000 pounds. How can you write 6,000 using exponents?
   6×10^3

5.NBT.A.1
6. The attendance of the Strawberry Festival over two weeks was 645,300. Write the number in expanded form using exponents.
   $(6 \times 10^5) + (4 \times 10^4) + (5 \times 10^3) + (3 \times 10^2)$

5.NBT.A.3a
7. Tucker weighed 3.835 kilograms when he was born. Write the number in expanded form.
   $(3 \times 10^0) + \left(8 \times \frac{1}{10}\right) + \left(3 \times \frac{1}{100}\right) + \left(5 \times \frac{1}{1{,}000}\right)$

4.NBT.B.5
8. A towing company has 135 tow trucks. Each tow truck needs 6 tires. How many tires does the company need for its tow trucks?
   810 tires

Today's Challenge

Think Use the Topic 1 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Listening Demonstrate listening comprehension by responding to a question.

Use with the Visual Learning Bridge on Student's Edition p. 30.

Review language and vocabulary for comparison with students. Show two groups with the same number of objects. Guide students to count the objects and compare how many. *Are the amounts in the groups the same or different?* Remove one object from a group. *Which group has more objects? Which has fewer? We can also compare numbers.* Have students brainstorm and write down words they can use to compare numbers, such as *less than, greater than, equal.*

Beginning Have students write two numbers. Point to the numbers. *Are these numbers the same or different?*

Intermediate Have students write two numbers and use a complete sentence to tell if they are the same or different.

Advanced Have students compare two numbers and tell if they are the same or different and why.

Summarize How is comparing and ordering decimals like comparing and ordering whole numbers?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use their knowledge about decimals from the previous two lessons to compare and order decimals.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
You may provide Decimal Place-Value Charts (Teaching Tool 6).

MP.7 Use Structure Listen and look for students who use the structure of the Base Ten system and a decimal place value chart to help compare and order decimals.

2. Build Understanding
What are you asked to do? [Order the ants from longest to shortest.]

What are the names of the three place values to the right of the decimal point? [tenths, hundredths, thousandths]

Small Group DURING

3. Ask Guiding Questions As Needed
Are the tenths digits in these numbers the same or different? [Two have a 5 in the tenths place and one has a 4.]

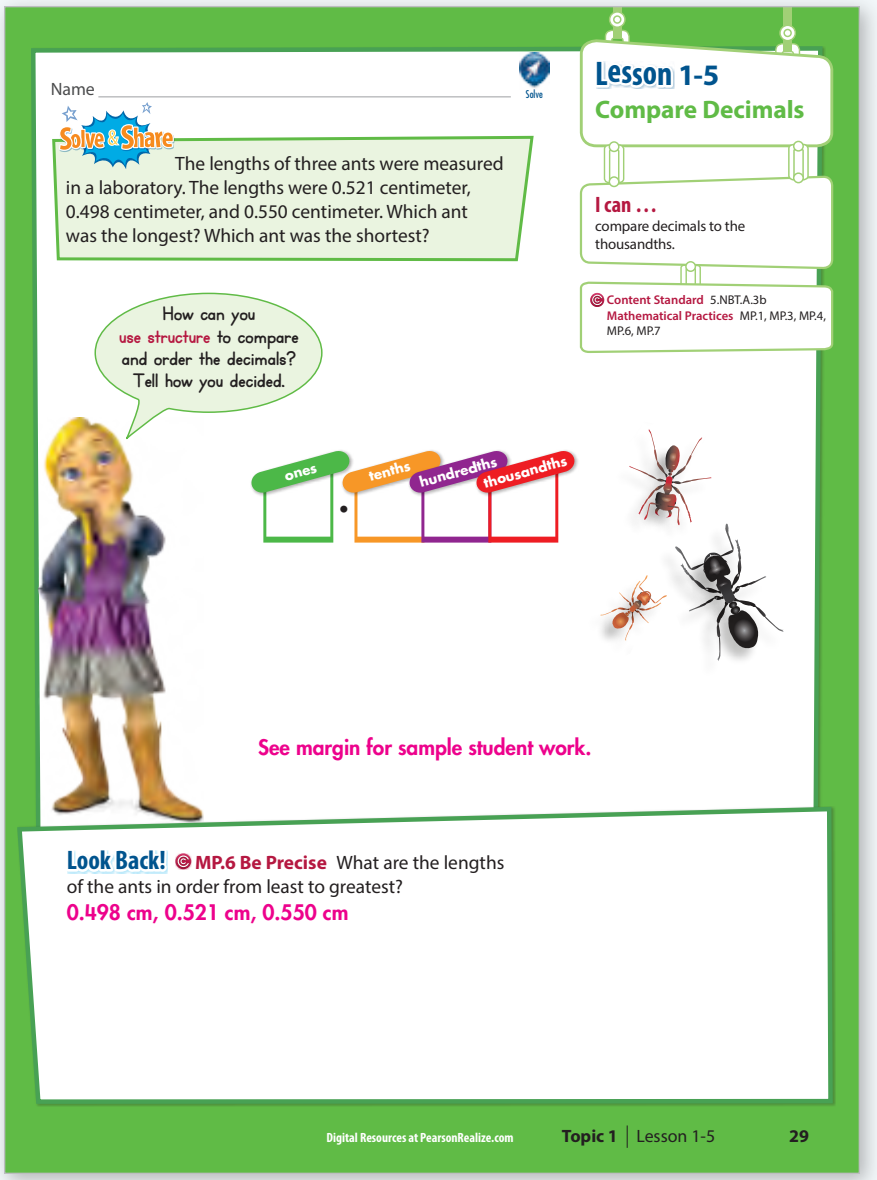
So which length is the shortest? [0.498 cm] *Which length is the longest?* [0.550 cm]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. If needed, project and analyze Carson's work to show how to complete a decimal place-value chart correctly.

5. Transition to the Visual Learning Bridge
Place value can be used to compare and order decimals.

6. Extension for Early Finishers
In the number 2.107, rearrange the digits to make two decimals that are less than 2.107. [Sample answers: 1.072, 0.127, 0.721]


Name _____ Solve

Solve & Share
The lengths of three ants were measured in a laboratory. The lengths were 0.521 centimeter, 0.498 centimeter, and 0.550 centimeter. Which ant was the longest? Which ant was the shortest?

How can you use structure to compare and order the decimals? Tell how you decided.

ones . tenths hundredths thousandths

See margin for sample student work.

Look Back! MP.6 Be Precise What are the lengths of the ants in order from least to greatest?
0.498 cm, 0.521 cm, 0.550 cm

Lesson 1-5 Compare Decimals

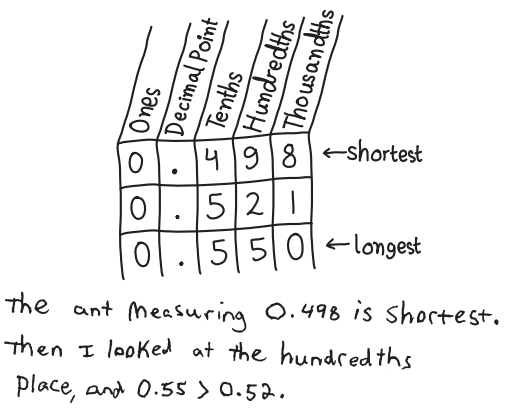
I can ...
compare decimals to the thousandths.

Content Standard 5.NBT.A.3b
Mathematical Practices MP.1, MP.3, MP.4, MP.6, MP.7

Digital Resources at PearsonRealize.com Topic 1 | Lesson 1-5 29

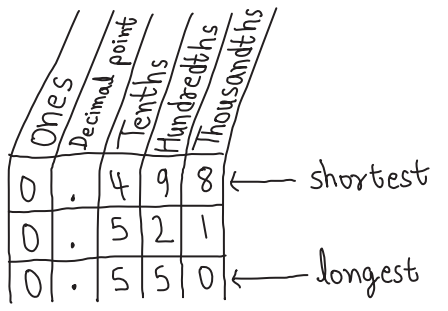
Analyze Student Work

Carson's Work



Carson fills in a decimal place-value chart correctly and provides a reasonable explanation.

Briana's Work



Briana uses a decimal place-value chart correctly, but she does not provide an explanation.

STEP 2

DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

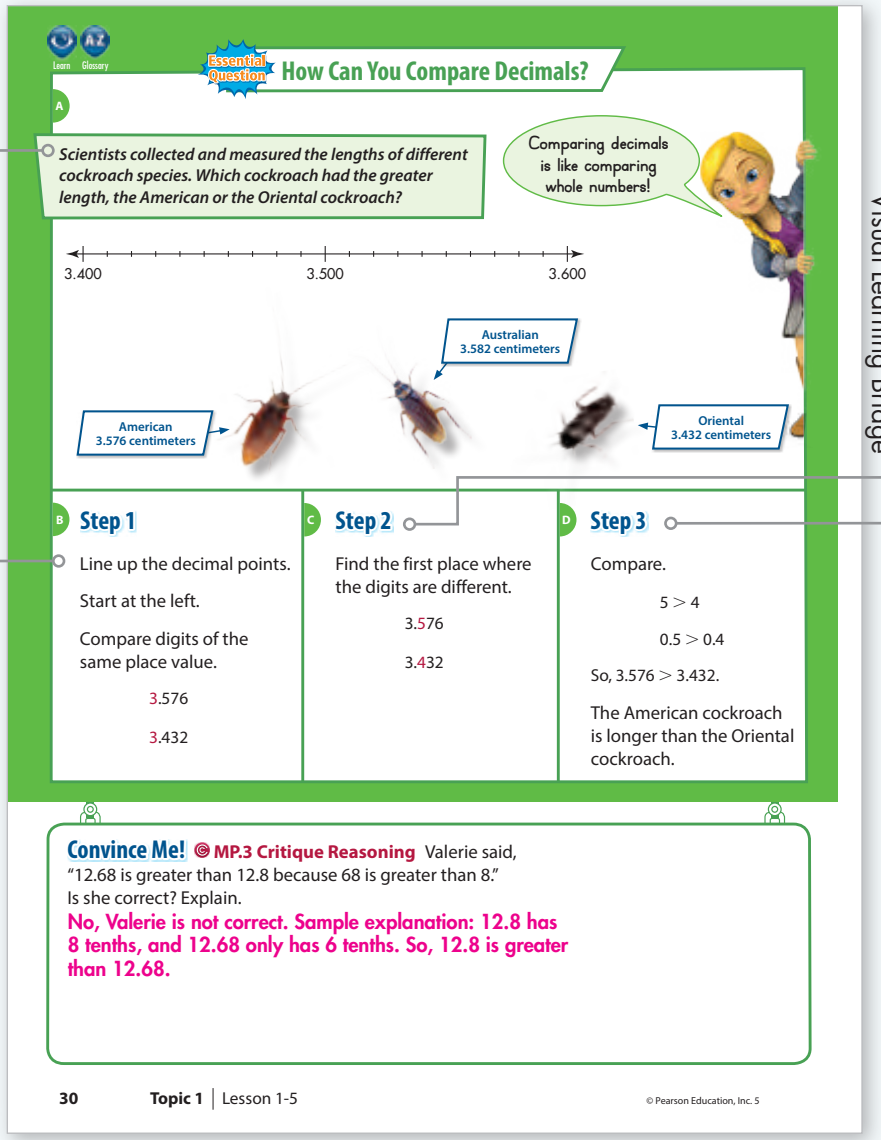
Visual Learning

PEARSON realize. PearsonRealize.com

Learn Glossary

The picture shows the lengths of three cockroaches. Which two numbers do you need to compare? [3.432 and 3.576]

MP.7 Use Structure
In Step 1, are the digits in the ones place the same or different? [Same]



Visual Learning Bridge

What is the name of the greatest place value for which the two numbers have different digits? [Tenths]

Prevent Misconceptions RtI

Students sometimes think that they automatically start comparing by looking at the left-most digit. This would not work for numbers such as 12.5 and 6.37. Emphasize the need to start by comparing the two digits that have the same greatest place value.

MP.2 Reason Quantitatively
In Step 3, is the Australian cockroach or the American cockroach the longest of the three? [Australian] *How do you know?* [The 8 in the hundredths place for the Australian cockroach is greater than the 7 in the hundredths place for the American cockroach.]

Convince Me! MP.3 Critique Reasoning Students use decimal place value to critique Valerie's reasoning and then provide an explanation for whether she is correct.

Coherence Determining which is the longer cockroach reinforces the procedural skill of comparing two numbers for both whole numbers and decimals. Students need to find the first place where the digits in the two numbers are different. Since 12.68 and 12.8 have the same digits for the tens and ones places, students need to compare the digits in the tenths place since they are different. Students compare 6 and 8 to determine that 12.8 is greater than 12.68 and that Valerie was incorrect in her comparison.

Essential Question

Revisit the Essential Question. Just as knowledge of place value can be used to compare and order whole numbers, it can be used to compare and order decimals.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Item 6 is worth 1 point. Items 15 and 17 are each worth 2 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Another Example

Order the cockroaches from least to greatest length.

Step 1

Write the numbers, lining up the decimal points. Start at the left. Compare digits of the same place value.

3.576
3.432
3.582

3.432 is the least.

Step 2

Write the remaining numbers, lining up the decimal points. Start at the left. Compare.

3.576
3.582

3.582 is greater than 3.576.

Step 3

Write the numbers from least to greatest.

3.432 3.576 3.582

From least to greatest lengths are the Oriental, the American, and the Australian.

Guided Practice*

Do You Understand?

1. **MP.3 Critique Reasoning** Scientists measured a Madeira cockroach and found it to be 3.44 centimeters long. Toby says that the Madeira is shorter than the Oriental because 3.44 has fewer digits than 3.432. Is he correct? Explain.
No, Toby is not correct. 3.44 has 440 thousandths, but 3.432 has only 432 thousandths.

Do You Know How?

In **2** and **3**, write >, <, or = for each ◯.

2. 3.692 < 3.697
3. 7.216 > 7.203

In **4** and **5**, order the decimals from least to greatest.

4. 5.540, 5.631, 5.625
5.540, 5.625, 5.631
5. 0.675, 1.529, 1.35, 0.693
0.675, 0.693, 1.35, 1.529

Independent Practice

In **6–8**, compare the two numbers. Write >, <, or = for each ◯.

6. 0.890 = 0.89
7. 5.733 > 5.693
8. 9.707 < 9.717

In **9** and **10**, order the decimals from greatest to least.

9. 878.403, 887.304, 887.043
887.304, 887.043, 878.403
10. 435.566, 436.565, 435.665
436.565, 435.665, 435.566

*For another example, see Set D on page 50.

Math Practices and Problem Solving

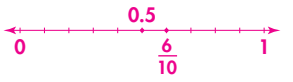
11. **MP.3 Critique Reasoning** Explain why it is not reasonable to say that 4.23 is less than 4.135 because 4.23 has fewer digits after the decimal point than 4.135.
Sample answer: Although 23 is less than 135, 0.23 is greater than 0.135.

12. **Number Sense** Carlos wrote three numbers between 0.33 and 0.34. What numbers could Carlos have written?
Sample answer: 0.334, 0.335, 0.336

13. **Vocabulary** Draw lines to match each decimal on the left to its **equivalent decimal** on the right.

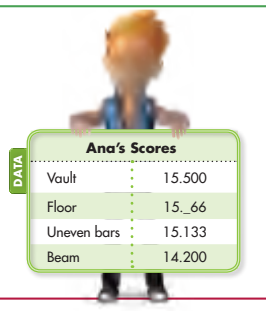
0.75	0.750
1.50	0.075
1.05	1.500
0.075	1.050

14. Is 0.5 greater than or less than $\frac{6}{10}$? Draw a number line to show your answer.



0.5 is less than $\frac{6}{10}$.

15. **Higher Order Thinking** Ana's gymnastics scores were posted on the scoreboard in order from highest to lowest score. One digit in her floor score is not visible. List all the possible digits for the missing number.
1, 2, 3, or 4



16. Marcia's vault score is 15.050. How does it compare to Ana's vault score?
It is lower than Ana's score.

Common Core Assessment

17. A grain of fine sand can have a diameter of 0.125 millimeter. Which numbers are less than 0.125?

- [x] 0.1
- [ ] 0.2
- [ ] 0.13
- [x] 0.12
- [ ] 0.126

18. Cara weighed some apples at the grocery store. The apples weighed 4.16 pounds. Which numbers are greater than 4.16?

- [ ] 4.15
- [x] 4.19
- [x] 4.2
- [ ] 4.09
- [ ] 4.1

Another Example *Which number is the least? How can you tell?* [3.432; it has only 4 tenths.] *Then what should you do?* [Compare the hundredths for the other two numbers.]

Error Intervention: Item 1

If students have difficulty critiquing Toby's reasoning,

then remind them that the number of decimal places is not important. They need to compare like place values to see which decimal is greater.

Item 8 Have students use precision (MP.6) to give an example of a decimal that is greater than 9.707 but less than 9.717.

RtI **Reteaching** Assign Reteaching Set D on page 50.

Item 11 MP.3 Critique Reasoning Remind students to compare like place values in the two decimals. Say: *Which is greater, one tenth or two tenths?* [Two tenths] *So, which is greater, 4.135 or 4.23?* [4.23]

Item 12 Number Sense Have students identify the digit in the thousandths place in each of their three numbers.

Item 14 Coherence A number line is a useful tool for comparing whole numbers. It is likewise a valuable tool students can use to compare decimals.

Item 15 Higher Order Thinking If students have trouble thinking of the possible digits in the tenths place, have them reread the problem text for important information. Ask: *What do you know about Ana's floor score?* [It is between her scores for the vault and uneven bars.] *So, between what two decimals is her floor score?* [Between 15.500 and 15.133]

Multi-Step Problems *Page 32 Item 15; Page 34 Item 17*

31–32

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

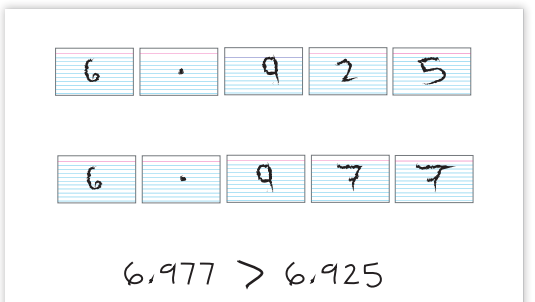
Intervention Activity I

Comparing and Ordering Decimals

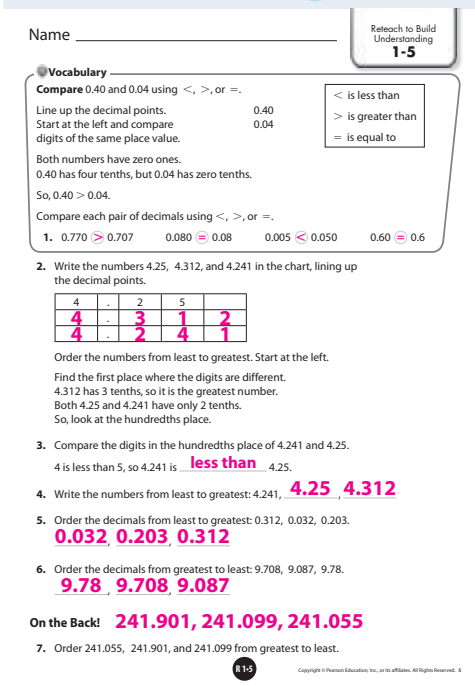
Materials

Index cards, markers

- Working in pairs or small groups, have students make 3 sets of number cards by writing the numbers 0–9 on index cards (with one number per card) and write decimal points on separate cards.
- Ask one student in each pair to use the number cards to make and display a decimal to the tenths place.
- Have students compare the decimals. Ask students to explain how they would determine which decimal is greater.
- Have students use the symbols >, <, or = to write a comparison statement.
- Repeat the activity for decimals to the hundredths and thousandths places.



Reteach I



Name _____

Reteach to Build Understanding 1-5

Vocabulary

Compare 0.40 and 0.04 using <, >, or =.

Line up the decimal points. Start at the left and compare digits of the same place value.

0.40
0.04

< is less than
> is greater than
= is equal to

Both numbers have zero ones.
0.40 has four tenths, but 0.04 has zero tenths.

So, 0.40 > 0.04.

Compare each pair of decimals using <, >, or =.

1. 0.770 > 0.707 0.080 = 0.08 0.005 < 0.050 0.60 = 0.6

2. Write the numbers 4.25, 4.312, and 4.241 in the chart, lining up the decimal points.

4	.	2	5	
4	.	3	1	2
4	.	2	4	1

Order the numbers from least to greatest. Start at the left.

Find the first place where the digits are different.
4.312 has 3 tenths, so it is the greatest number.
Both 4.25 and 4.241 have only 2 tenths.
So, look at the hundredths place.

3. Compare the digits in the hundredths place of 4.241 and 4.25.
4 is less than 5, so 4.241 is less than 4.25.

4. Write the numbers from least to greatest: 4.241, 4.25, 4.312

5. Order the decimals from least to greatest: 0.312, 0.032, 0.203.
0.032, 0.203, 0.312

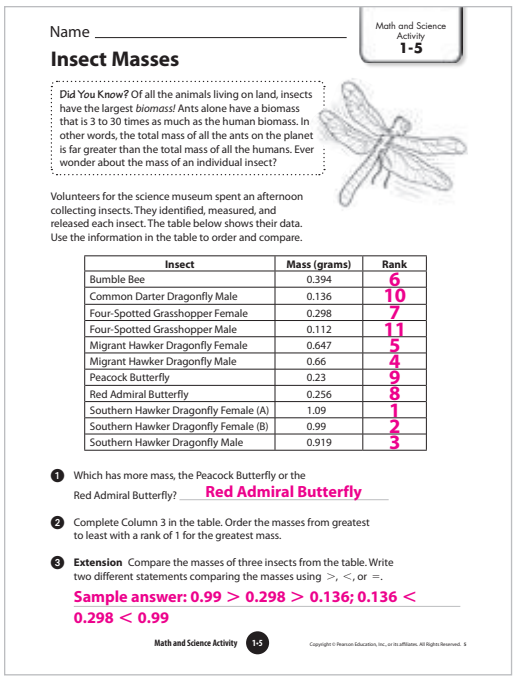
6. Order the decimals from greatest to least: 9.708, 9.087, 9.78.
9.78, 9.708, 9.087

On the Back! 241.901, 241.099, 241.055

7. Order 241.055, 241.901, and 241.099 from greatest to least.

R 1-5

On-Level and Advanced Activity Centers O A



Name _____

Math and Science Activity 1-5

Insect Masses

Did You Know? Of all the animals living on land, insects have the largest *biomass!* Ants alone have a biomass that is 3 to 30 times as much as the human biomass. In other words, the total mass of all the ants on the planet is far greater than the total mass of all the humans. Ever wonder about the mass of an individual insect?

Volunteers for the science museum spent an afternoon collecting insects. They identified, measured, and released each insect. The table below shows their data. Use the information in the table to order and compare.

Insect	Mass (grams)	Rank
Bumble Bee	0.394	6
Common Darter Dragonfly Male	0.136	10
Four-Spotted Grasshopper Female	0.298	7
Four-Spotted Grasshopper Male	0.112	11
Migrant Hawker Dragonfly Female	0.647	5
Migrant Hawker Dragonfly Male	0.66	4
Peacock Butterfly	0.23	9
Red Admiral Butterfly	0.256	8
Southern Hawker Dragonfly Female (A)	1.09	1
Southern Hawker Dragonfly Female (B)	0.99	2
Southern Hawker Dragonfly Male	0.919	3

1. Which has more mass, the Peacock Butterfly or the Red Admiral Butterfly? Red Admiral Butterfly

2. Complete Column 3 in the table. Order the masses from greatest to least with a rank of 1 for the greatest mass.

3. **Extension** Compare the masses of three insects from the table. Write two different statements comparing the masses using >, <, or =.
Sample answer: 0.99 > 0.298 > 0.136; 0.136 < 0.298 < 0.99

Math and Science Activity 1-5

Math and Science Activity STEM

This activity revisits the science theme **Pollinating Insects,** introduced on page 1 in the Student's Edition.

Sample Student Work

Rank	1	2	3	4	5	6	7	8	9	10	11
Mass (g)	1.09	0.99	0.919	0.66	0.647	0.394	0.298	0.256	0.23	0.136	0.112

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–3, 6–8, 11–14, 18–19 O Items 1, 4–10, 14–15, 17–19 A Items 6–7, 10–19

Name _____

Help Practice Buddy Tools Games

Homework & Practice 1-5
Compare Decimals

Another Look!

Amanda completed a race in 8.016 minutes. Liz's time was 7.03 minutes, and Steve's time was 8.16 minutes. Order the times from least to greatest. Who won the race?

Write the numbers, lining up the decimal points. Start at the left. Compare digits of the same place value.	Write the remaining numbers, lining up the decimal points. Start at the left. Compare.	
8.016 7.03 8.16	8.016 8.16	
7.03 is the least.	8.16 is greater than 8.016.	7.03, 8.016, 8.16

1. Order the speeds from least to greatest.
144.809, 145.155, 145.827
2. Driver D had a speed between Driver A and Driver C. Write a possible speed for Driver D.
Sample answer: 144.912

DATA

Driver	Average Speed (mph)
Driver A	145.155
Driver B	145.827
Driver C	144.809

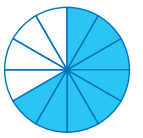
In **3–8**, write >, <, or = for each ◯.

3. 7.539 (>) 7.344
4. 9.202 (<) 9.209
5. 0.75 (=) 0.750
6. 4.953 (>) 4.951
7. 1.403 (>) 1.4
8. 3.074 (<) 3.740

In **9–12**, order from greatest to least.

9. 9.129, 9.37, 9.3, 9.219
9.37, 9.3, 9.219, 9.129
10. 0.012, 0.100, 0.001, 0.101
0.101, 0.100, 0.012, 0.001
11. 5.132, 5.123, 5.312, 5.231
5.312, 5.231, 5.132, 5.123
12. 62.905, 62.833, 62.950, 62.383
62.950, 62.905, 62.833, 62.383

13. **MP.4 Model with Math** Write three different fractions that each match the shaded part of the drawing.



Sample answer: $\frac{8}{12}, \frac{2}{3}, \frac{16}{24}$

14. **MP.4 Model with Math** The total cost to stay one night at Sleepy Head Motel is $119 without breakfast and $142 with breakfast included. What is the difference in the costs for a one-night stay with and without breakfast?

$142	
$119	?

$23

15. **MP.1 Make Sense and Persevere** Tanya bought the least expensive brand of dog food. Eddie bought the most expensive brand of dog food. Which brand did each person buy?
Tanya bought Brand B and Eddie bought Brand A.

DATA

Dog Food Sale	
Brand	**Price per bag**
A	$12.49
B	$11.55
C	$12.09
D	$11.59

16. Why can it help to line up the decimal points before comparing and ordering numbers with decimals?
Sample answer: When you line up the decimal points, you can easily compare digits of the same place value.

17. **Higher Order Thinking** The heights of four boys measured 152.0 cm, 150.75 cm, 149.5 cm, and 149.25 cm. Bradley is the tallest, Calvin is taller than Josh, but shorter than Mark. Josh is the shortest. What is Mark's height?
150.75 cm

Common Core Assessment

18. Jere is thinking of a number less than 28.431 and greater than 28.404. Which of the following could be Jere's number?

- ☐ 28.435
- ☐ 28.342
- ■ 28.430
- ■ 28.419
- ■ 28.42

19. During this year's basketball season, Michael averaged 22.075 points per game. Which numbers are less than 22.075?

- ■ 21.9
- ☐ 22.08
- ☐ 23.06
- ■ 22.07
- ☐ 22.079

LESSON 1-6

ROUND DECIMALS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain **5.NBT** Number and Operations in Base Ten

Cluster **5.NBT.A** Understand the place value system.

Content Standard **5.NBT.A.4** Use place value understanding to round decimals to any place.

Mathematical Practices **MP.1, MP.2, MP.3, MP.4, MP.6, MP.7**

Objective Use place value to round decimals to different places.

Essential Understanding Rounding is a process for finding the multiple of 10, 100, and so on, or of 0.1, 0.01, and so on, closest to a given number.

Materials Number Lines (Teaching Tool 12)

COHERENCE

In this lesson, students build on their knowledge of decimal place value from the previous three lessons to learn how to round decimals.

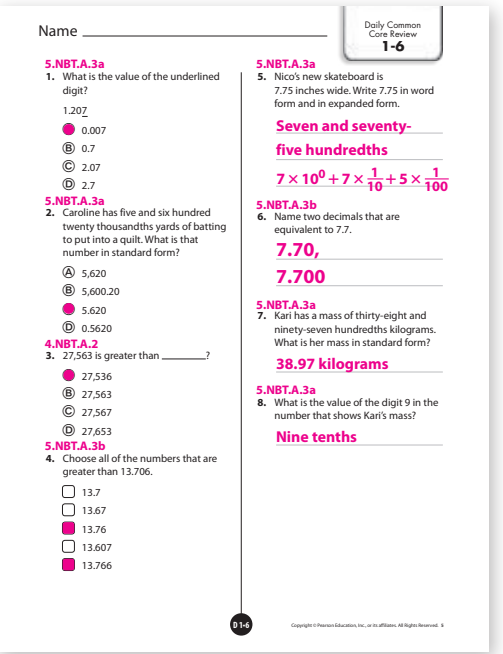
RIGOR

This lesson emphasizes **conceptual understanding**. Students deepen their understanding of rounding whole numbers (Standard 4.NBT.A.3) in order to round decimals. Students develop conceptual understanding for rounding decimals by using the visual model of a number line to identify a halfway point between two numbers and then determine which of those two numbers a decimal is closer to. This understanding is connected to the step-by-step **procedural skill** for rounding decimals.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 1-6

5.NBT.A.3a
1. What is the value of the underlined digit?
1.20**7**
● 0.007
Ⓑ 0.7
Ⓒ 2.07
Ⓓ 2.7

5.NBT.A.3a
2. Caroline has five and six hundred twenty thousandths yards of batting to put into a quilt. What is that number in standard form?
Ⓐ 5,620
Ⓑ 5,600.20
● 5.620
Ⓓ 0.5620

4.NBT.A.2
3. 27,563 is greater than _____?
● 27,536
Ⓑ 27,563
Ⓒ 27,567
Ⓓ 27,653

5.NBT.A.3b
4. Choose all of the numbers that are greater than 13.706.
☐ 13.7
☐ 13.67
☑ 13.76
☐ 13.607
☑ 13.766

5.NBT.A.3a
5. Nico's new skateboard is 7.75 inches wide. Write 7.75 in word form and in expanded form.
Seven and seventy-five hundredths
$7 \times 10^0 + 7 \times \frac{1}{10} + 5 \times \frac{1}{100}$

5.NBT.A.3b
6. Name two decimals that are equivalent to 7.7.
7.70, 7.700

5.NBT.A.3a
7. Kari has a mass of thirty-eight and ninety-seven hundredths kilograms. What is her mass in standard form?
38.97 kilograms

5.NBT.A.3a
8. What is the value of the digit 9 in the number that shows Kari's mass?
Nine tenths

D1-6

Today's Challenge

Think Use the Topic 1 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Listening Learn new language structures.

Use with the Visual Learning Bridge on Student's Edition p. 36.

To practice vocabulary that is used in the lesson, present an activity involving the words *round* or *rounding*. *When we round numbers, we choose a number that is slightly greater or less, but easier to work with.* Write the numbers 10 and 20 on the board. Then write 14 and 16. Point out that the halfway number is rounded to the greater multiple of 10.

Beginning Point to 14. *If I round 14, I round to a lesser number. I round 14 to 10.* Point to 16. *If I round 16, I round to a greater number. I round 16 to _____.* [20]

Intermediate Ask students to create a sentence to describe rounding 14 to 10 and 16 to 20.

Advanced Ask students to provide another number or example and describe how they would round it to the nearest multiple of ten.

Summarize What do you do when you round numbers?

STEP 1

DEVELOP: PROBLEM-BASED INTERACTIVE LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use their knowledge about decimals from the previous three lessons to determine whether different decimals are closer to 12 or to 13.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
You may wish to provide number lines to students (Teaching Tool 12).

MP.7 Use Structure Listen and look for students who round decimals to the nearest whole number. They may use the structure of a number line to represent the given data.

2. Build Understanding
What information is given in the problem? [The numbers 12.87, 12.13, 12.5, and 12.08] *What are you asked to do with these numbers?* [Tell whether each number is closer to 12 or 13.] *What tools can you use to help?* [A number line]

Small Group DURING

3. Ask Guiding Questions As Needed
What span of numbers could you mark on a number line to help with this problem? Why? [12 to 13 because each decimal is between these two whole numbers]

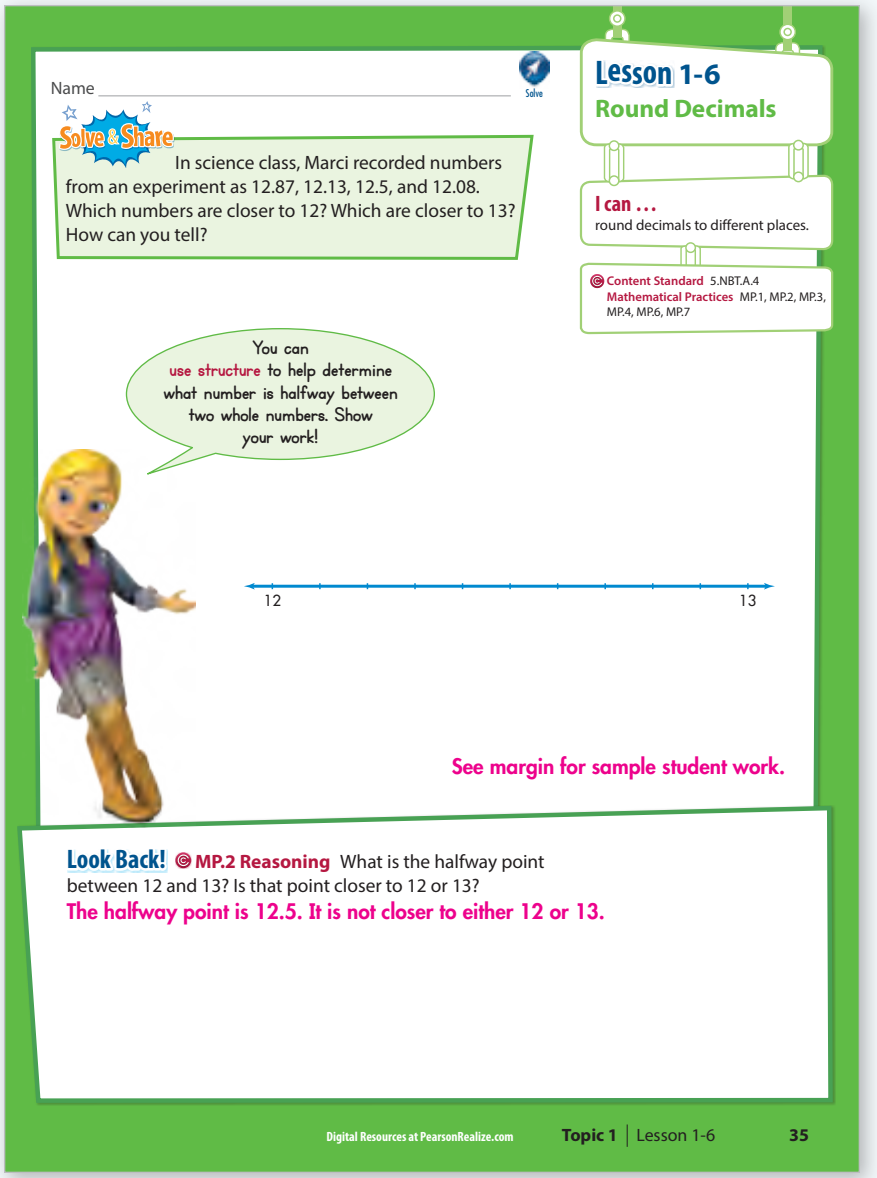
Which of the decimals is halfway between 12 and 13? [12.5]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. Then project and analyze Marcus's work as needed.

5. Transition to the Visual Learning Bridge
A number line can be used to help round decimals by making it easier to see to which whole number a decimal is closest.

6. Extension for Early Finishers
Tell the number halfway between each of the following pairs: 5 and 6; 0.60 and 0.70; 0.75 and 0.76. [5.5; 0.65; 0.755]


Name _____ Solve

Solve & Share

In science class, Marci recorded numbers from an experiment as 12.87, 12.13, 12.5, and 12.08. Which numbers are closer to 12? Which are closer to 13? How can you tell?

Lesson 1-6
Round Decimals

I can ...
round decimals to different places.

Content Standard 5.NBT.A.4
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.6, MP.7

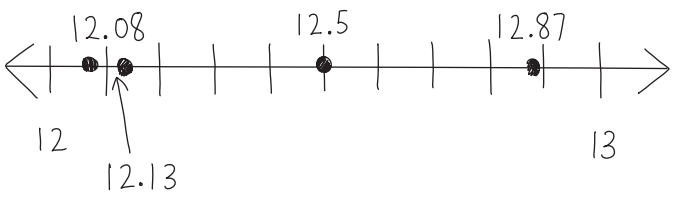
You can use structure to help determine what number is halfway between two whole numbers. Show your work!

See margin for sample student work.

Look Back! MP.2 Reasoning What is the halfway point between 12 and 13? Is that point closer to 12 or 13?
The halfway point is 12.5. It is not closer to either 12 or 13.

Analyze Student Work

Marcus's Work



Marcus uses a number line to show that 12.08 and 12.13 are closer to 12, while 12.87 is closer to 13.

Tia's Work

The 0 in the tenths digit tells me to round 12.08 to 12. 12.13 also rounds to 12 because the one in the tenths place is less than 5.
In the number 12.87, the 8 in the tenths digit is greater than 5, so I round to 13.

Tia uses rounding to the nearest whole number to show that 12.08 and 12.13 are closer to 12 and 12.87 is closer to 13.

STEP 2

DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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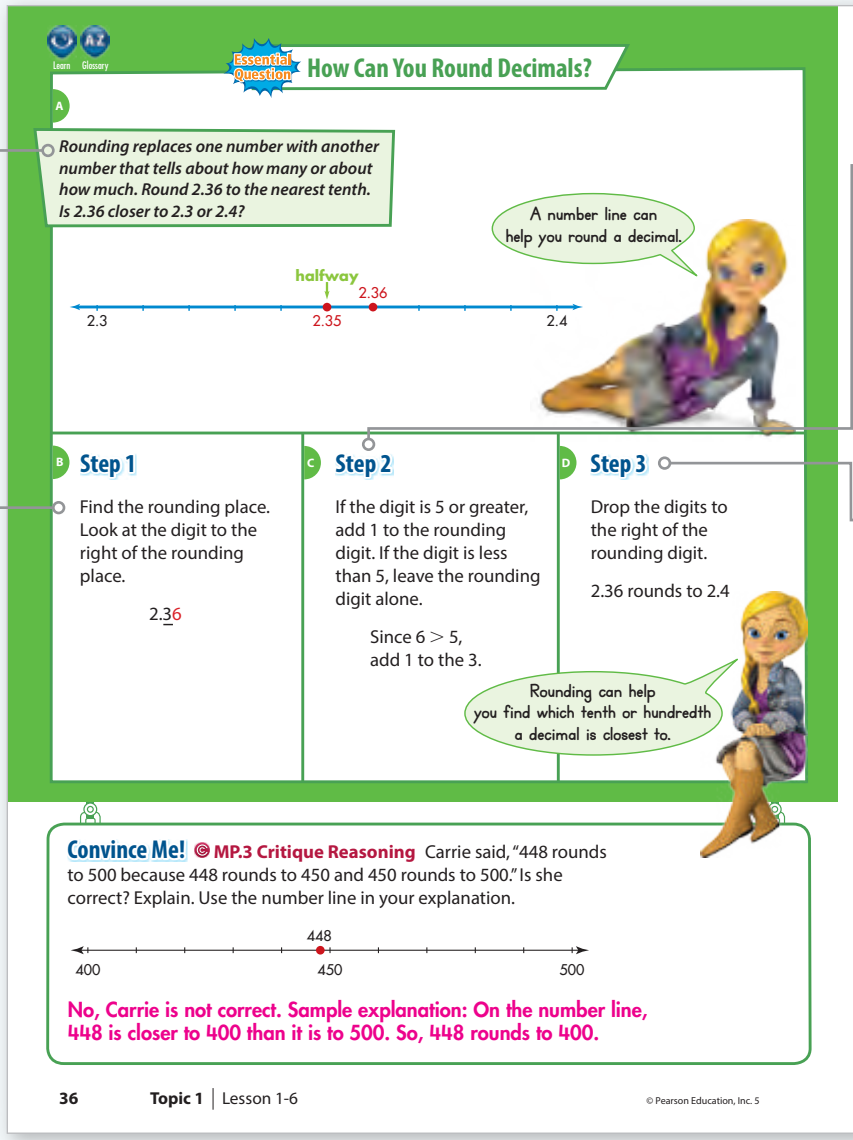
Learn Glossary

MP.4 Model with Math
What four numbers are labeled on the number line? [2.3, 2.35, 2.36, and 2.4]
How does a number line help you round decimals? [Sample answer: It helps me see and compare the decimals.]

MP.6 Be Precise
In Step 1, which is the rounding digit? [3] *What is the digit to the right of the rounding place?* [6]
Is 6 less than 5, equal to 5, or greater than 5? [Greater than 5]



Visual Learning Bridge

According to Step 2, what happens to the rounding digit, since 6 is greater than 5? [1 is added to the rounding digit.]

In Step 3, what happens to the 3 and 6 when 2.36 is rounded to the nearest tenth? [The 6 is dropped, and the 3 becomes a 4.]

Convince Me! MP.3 Critique Reasoning Students use a number line to represent the numbers in Carrie's statement and to help them determine whether she is correct.

Coherence The visual model of a number line helps students determine whether a decimal has been rounded correctly. The visual model reinforces the concept that when students are rounding a number to a given place, they can find the halfway mark between two numbers on a number line, plot the number that they are rounding, and determine the shorter distance to identify the rounded number.

Essential Question

Revisit the Essential Question. Remind students that rounding is a process for finding the multiple of 10, 100, and so on, or of 0.1, 0.01, and so on, closest to a given number.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Item 11 is worth 1 point. Items 23 and 26 are each worth 2 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Another Example

Round 3.2 to the nearest whole number.
Is 3.2 closer to 3 or 4?

Step 1
Find the rounding place. Look at the digit to the right of the rounding place.
3.2

Step 2
If the digit is 5 or greater, add 1 to the rounding digit. If the digit is less than 5, leave the rounding digit alone. Since $2 < 5$, leave 3 the same.

Step 3
Drop the digits to the right of the decimal point. Drop the decimal point.
3.2 rounds to 3.

Guided Practice*

Do You Understand?

1. To round 74.58 to the nearest tenth, which digit do you look at? What is 74.58 rounded to the nearest tenth?
   8; 74.6
2. **MP.3 Construct Arguments** A car-rental service charges customers for the number of miles they travel, rounded to the nearest whole mile. George travels 40.8 miles. For how many miles will he be charged? Explain.
   41 miles; 41 is the nearest whole number to 40.8.

Do You Know How?

In **3–10**, round each number to the place of the underlined digit.

3. 16.5 **17**
4. 56.1 **56**
5. 1.32 **1.3**
6. 42.78 **42.8**
7. 1.652 **1.65**
8. 582.04 **582.0**
9. 80,547.645 **80,547.65**
10. 135,701.949 **135,701.9**

Independent Practice

In **11–14**, round each decimal to the nearest whole number.

11. 4.5 **5**
12. 57.3 **57**
13. 34.731 **35**
14. 215.39 **215**

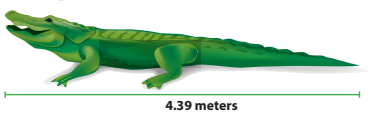
In **15–18**, round each number to the place of the underlined digit.

15. 7.158 **7.2**
16. 0.758 **0.76**
17. 6.4382 **6.44**
18. 84.732 **84.7**

*For another example, see Set E on page 50.

Math Practices and Problem Solving

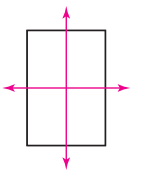
19. The picture at the right shows the length of an average American alligator. What is the length of the alligator rounded to the nearest tenth?
    4.4 meters



20. **MP.2 Reasoning** Name two different numbers that round to 8.21 when rounded to the nearest hundredth.
    Sample answer: 8.213, 8.209

21. **Number Sense** To the nearest hundred, what is the greatest whole number that rounds to 2,500? the least whole number?
    2,549; 2,450

22. Draw all of the lines of symmetry in the figure shown below.



23. **Higher Order Thinking** Emma needs 2 pounds of ground meat to make a meatloaf. She has one package with 2.36 pounds of ground meat and another package with 2.09 pounds of ground meat. She uses rounding and finds that both packages are close to 2 pounds. Explain how Emma can choose the package closer to 2 pounds.
    Look at the digit in the tenths place. 0 is less than 3, so 2.09 is closer to 2.

24. **MP.1 Make Sense and Persevere** Robert slices a large loaf of bread to make 12 sandwiches. He makes 3 turkey sandwiches and 5 veggie sandwiches. The rest are ham sandwiches. What fraction of the sandwiches Robert makes are ham?
    $\frac{4}{12}$ or $\frac{1}{3}$ are ham sandwiches.

25. **Algebra** After buying school supplies, Ruby had $32 left over. She spent $4 on notebooks, $18 on a backpack, and $30 on a new calculator. How much money, m, did Ruby start with? Write an equation to show your work.
    $32; Sample equation: $m = \$4 + \$18 + \$30 + \$32$

Common Core Assessment

26. Find two numbers that round to 35.4 when rounded to the nearest tenth. Write the numbers in the box.

35.391, 35.44
35.45 34.42 35.391 35.345 35.44 35.041

Another Example

Ask students to use the structure (MP.7) of a number line to name a decimal between 3 and 4 that rounds to 4. [Sample answers: 3.6, 3.9] Then ask students for a decimal in the hundredths that rounds to 4. [Sample answer: 3.75]

Error Intervention: Item 2

If students have difficulty getting started,

then draw a number line marked in tenths on the board. Mark and label 40 miles, 40.8 miles, and 41 miles. Ask: *Is 40.8 closer to 40 or 41?* [41]

Reteaching Assign Reteaching Set E on page 50.

Items 11–14 Have students clearly explain how they rounded each decimal to the nearest whole number. Make sure that students compare the digit in the tenths place to 5, and not the right-most place value for decimals to the hundredths or thousandths.

Item 20 MP.2 Reason Quantitatively Have students identify the digit in the thousandths place in their answers.

Item 23 Higher Order Thinking Have students discuss their explanations with a partner.

Coherence The process of rounding decimals builds on the skill of comparing decimals that students have learned. Remind students that rounding decimals is similar to rounding whole numbers.

Multi-Step Problems *Page 38 Items 24 and 25; Page 40 Item 18*

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

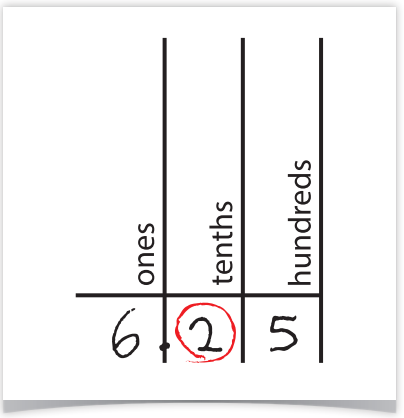
Intervention Activity I

Rounding Decimals

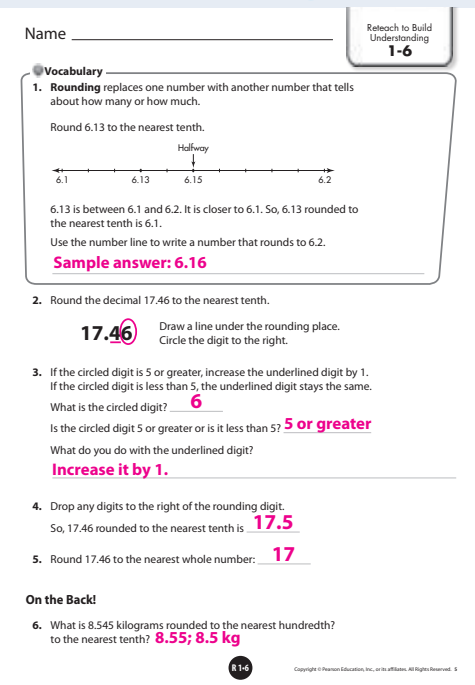
Materials

Decimal Place-Value Charts (Teaching Tool 6), pencils, markers

- Draw a place-value chart on the board. Have students copy your work in their charts.
- Write a decimal, such as 6.25, on the chart.
- Help students identify the place of each digit. [ones, tenths, hundredths] Then circle 2 and have students tell its place. [tenths]
- Tell students that you want to round the number to the nearest tenth. Point to the digit to the right of 2 and ask: *Is this digit five or more, or less than five?* [five] *Let's add one to the digit in the tenths place. What do we get?* [3] *What is 6.25 rounded to the nearest tenth?* [6.3]
- Repeat with other numbers.



Reteach I



Name _____

Reteach to Build Understanding 1-6

Vocabulary

1. **Rounding** replaces one number with another number that tells about how many or how much.

Round 6.13 to the nearest tenth.

Halfway
6.1 6.13 6.15 6.2

6.13 is between 6.1 and 6.2. It is closer to 6.1. So, 6.13 rounded to the nearest tenth is 6.1.

Use the number line to write a number that rounds to 6.2.

Sample answer: 6.16

2. Round the decimal 17.46 to the nearest tenth.

17.46 Draw a line under the rounding place. Circle the digit to the right.

3. If the circled digit is 5 or greater, increase the underlined digit by 1. If the circled digit is less than 5, the underlined digit stays the same.

What is the circled digit? 6

Is the circled digit 5 or greater or is it less than 5? 5 or greater

What do you do with the underlined digit?

Increase it by 1.

4. Drop any digits to the right of the rounding digit.

So, 17.46 rounded to the nearest tenth is 17.5

5. Round 17.46 to the nearest whole number: 17

On the Back!

6. What is 8.545 kilograms rounded to the nearest hundredth? to the nearest tenth? 8.55; 8.5 kg

R 1-6

On-Level and Advanced Activity Centers O A

Problem-Solving Reading Mat

Have students read the Problem-Solving Reading Mat for Topic 1 and then complete Problem-Solving Reading Activity 1-6.

See the Problem-Solving Reading Activity Guide for further suggestions on how to use this mat.

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

PEARSON realize.
PearsonRealize.com

Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–6, 9–10, 14, 18, 20–21

O Items 1, 4, 7–8, 10–14, 17, 19–21

A Items 5, 8, 11–13, 15–21

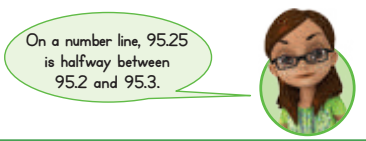
Name _____

Help Practice Buddy Tools Games

Homework & Practice 1-6
Round Decimals

Another Look!

An African Watusi steer's horn measures 95.25 centimeters around. What is 95.25 rounded to the nearest tenth?



Step 1

Find the rounding place. Look at the digit to the right of the rounding place.

95.25

Step 2

If the digit is 5 or greater, increase the rounding digit by 1. If the digit is less than 5, the rounding digit stays the same.

The digit to the right is 5, so increase the 2 in the tenths place to 3.

Step 3

Drop the digits to the right of the rounding digit.

95.25 rounded to the nearest tenth is 95.3.

1. Ian mailed a package that weighed 5.63 pounds. What is the first step in rounding this number to the nearest tenth? What is the next step? What is 5.63 rounded to the nearest tenth?
Find the rounding place and look at the digit to its right. Because the digit is less than 5, keep the rounding digit the same and drop the digit to its right; 5.6 pounds

In **2–5**, round each decimal to the nearest whole number.

2. 6.7 — **7**
3. 12.1 — **12**
4. 30.92 — **31**
5. 1.086 — **1**

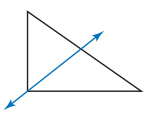
In **6–13**, round each number to the place of the underlined digit.

6. 32.65 — **32.7**
7. 3.246 — **3.25**
8. 41.073 — **41.1**
9. 0.424 — **0.42**
10. 6.099 — **6.1**
11. 6.13 — **6.1**
12. 183.92 — **184**
13. 905.255 — **905.26**

14. **Vocabulary** Complete the sentence using one of the words below.
power base exponent
In 10^6, the 10 is the **base**.

15. **MP.6 Be Precise** If the area of a park is exactly halfway between 2.4 and 2.5 acres, what is the area of the park?
2.45 acres

16. Does the blue line appear to be a line of symmetry? Explain.



No; the two parts formed by the line do not match.

17. **Higher Order Thinking** Explain how you can round 25.691 to the greatest place.
The greatest place is the tens place, so look at the ones place. The 5 in the ones place means increase the 2 in the tens place to 3, change the 5 to 0, and drop the decimals. 25.691 rounded to the nearest ten rounds to 30.

18. **MP.4 Model with Math** A professional baseball team won 84 games this season. The team won 14 more games than it lost. There were no ties. How many games did the team lose? How many did it play?
70 games; 154 games

?	
84	?

19. **MP.3 Construct Arguments** Rounded to the nearest dime, what is the greatest amount of money that rounds to $105.40? What is the least amount of money that rounds to $105.40? Explain your answers.
$105.44 is the greatest amount because $105.45 rounds to $105.50. $105.35 is the least amount because $105.34 rounds to $105.30.

20. **Math and Science** The students in Mr. Bhatia's class measure the length of four bees. The students round the lengths to the nearest tenth. Whose bee has a length that rounds to 0.5 inch? 0.8 inch?
The length of Pablo's bee rounds to 0.5 inch. The length of Isabel's bee rounds to 0.8 inch.

DATA

Student	Bee Lengths
Isabel	0.841 inch
Pablo	0.45 inch
Wendi	0.55 inch
Brett	0.738 inch

Common Core Assessment

21. Find two numbers that round to 15.5 when rounded to the nearest tenth. Write the numbers in the box.

15.49, 15.508					
15.04	15.55	15.508	15.445	15.0	15.49

39–40

MATH PRACTICES AND PROBLEM SOLVING | LESSON **1-7**

LOOK FOR AND USE STRUCTURE

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games
- MP — Math Practices Animations

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Mathematical Practices **MP.7** Look for and Use Structure. Also **MP.1, MP.6, MP.8**

Domain **5.NBT** Number and Operations in Base Ten

Cluster **5.NBT.A** Understand the place value system.

Content Standard **5.NBT.A.3a** Read and write decimals to thousandths, using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times \left(\frac{1}{10}\right) + 9 \times \left(\frac{1}{100}\right) + 2 \times \left(\frac{1}{1000}\right)$. Also **5.NBT.A.3b**

Objective Use the structure of the decimal place value system in order to solve problems involving patterns.

Essential Understanding Good math thinkers look for relationships in math to help solve problems.

Materials Decimal Place-Value Charts (Teaching Tool 6)

COHERENCE

Students have used this Mathematical Practice throughout the program prior to this lesson. This lesson emphasizes application of the thinking habits good problem solvers rely on when they *use structure*. Although the content used in this lesson was developed in this topic, instructions should emphasize the use and management of MP.7, as students apply content that they already know.

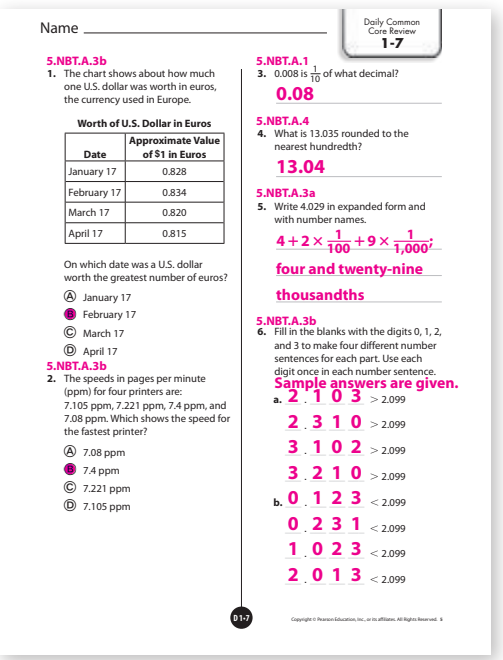
RIGOR

This lesson emphasizes **application**. Rigorous mathematics instruction calls for the selection, use, and management of multiple mathematical practices. All of the problems in this lesson elicit the use of multiple mathematical practices. For example, using precision, MP.6, is required to solve all problems. Any mathematical practices that come into play in this lesson should be made explicit. The classroom conversation should emphasize the thinking habits shown in the Solve & Share task for MP.7.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 1-7

5.NBT.A.3b
1. The chart shows about how much one U.S. dollar was worth in euros, the currency used in Europe.

Worth of U.S. Dollar in Euros

Date	Approximate Value of $1 in Euros
January 17	0.828
February 17	0.834
March 17	0.820
April 17	0.815

On which date was a U.S. dollar worth the greatest number of euros?
Ⓐ January 17
Ⓑ February 17
Ⓒ March 17
Ⓓ April 17

5.NBT.A.3b
2. The speeds in pages per minute (ppm) for four printers are: 7.105 ppm, 7.221 ppm, 7.4 ppm, and 7.08 ppm. Which shows the speed for the fastest printer?
Ⓐ 7.08 ppm
Ⓑ 7.4 ppm
Ⓒ 7.221 ppm
Ⓓ 7.105 ppm

5.NBT.A.1
3. 0.008 is $\frac{1}{10}$ of what decimal?
0.08

5.NBT.A.4
4. What is 13.035 rounded to the nearest hundredth?
13.04

5.NBT.A.3a
5. Write 4.029 in expanded form and with number names.
$4 + 2 \times \frac{1}{100} + 9 \times \frac{1}{1,000}$;
four and twenty-nine thousandths

5.NBT.A.3b
6. Fill in the blanks with the digits 0, 1, 2, and 3 to make four different number sentences for each part. Use each digit once in each number sentence.
Sample answers are given.
a. 2.103 > 2.099
2.310 > 2.099
3.102 > 2.099
3.210 > 2.099
b. 0.123 < 2.099
0.231 < 2.099
1.023 < 2.099
2.013 < 2.099

B1-7

Today's Challenge

Think Use the Topic 1 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Reading Use support from peers/teachers to enhance/confirm understanding.

Use with the Solve & Share on Student's Edition p. 41.

Read *Solve & Share*. Ask students to share ideas for arranging the books. Point to *Thinking Habits*. Read Question 1. *Do you see patterns?* Instruct students to describe patterns that they see. Continue the process with Questions 2–4.

Beginning Reread *Thinking Habit,* Question 1 to students. *Do you see patterns?* Instruct students to identify patterns to partners by pointing or using one or two words. Instruct students to confirm understanding of partners' responses by giving thumbs up or thumbs down. If thumbs down is given, instruct students to confer with other partner groups to confirm understanding. Continue with Questions 2–4.

Intermediate Reread *Thinking Habit,* Question 1 with students. *Do you see patterns?* Instruct students to identify patterns to partners by using the sentence stem: I see a pattern because _____. Instruct students to confirm understanding of partners' responses by giving thumbs up or thumbs down. If thumbs down is given, instruct students to confer with other partner groups. Continue with Questions 2–4.

Advanced Instruct students to reread *Thinking Habits* with partners. Ask students to reply to each question with partners and confirm understanding with thumbs up or thumbs down. If thumbs down is given, instruct students to confer with other partner groups.

Summarize Why is it important to look for patterns?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students will use what they know about the decimal place value system to explain how to order six decimals.

10–15 min

PEARSON realize. PearsonRealize.com

Solve

Whole Class BEFORE

You may wish to distribute Decimal Place-Value Charts (Teaching Tool 6) to students.

1. **Pose the Solve-and-Share Problem**
MP.7 Use Structure Listen and look for students who use the structure of the decimal place value system to order numbers with decimals to the thousandths.

2. **Build Understanding**
What information do you know? [The numbers on six books]
What are you asked to do? [Arrange the books in order by their numbers from least to greatest.]

Small Group DURING

3. **Ask Guiding Questions As Needed**
What can you do first to compare the numbers? [Write the numbers in a list, lining up the decimal points.] *What do you notice about the whole number part of the numbers?* [The whole number part is the same.] *How can you compare the decimal parts of the numbers?* [Start with tenths. Compare digits with the same place value.]

Whole Class AFTER

4. **Share and Discuss Solutions**
Solve Start with students' solutions. Have them share the strategies used to solve the problem. If needed, project and analyze Ray's work.

5. **Transition to the Visual Learning Bridge**
The structure of the place-value system can be used to order decimals.

6. **Extension for Early Finishers**
Order the following numbers from greatest to least: 21.052, 22.01, 21.005, 21.05, 21.15, 22.009 [22.01, 22.009, 21.15, 21.052, 21.05, 21.005]


Name _____ Solve

Solve & Share

Angie volunteers in the school library after school. The librarian gave her a stack of books and told her to use the number on each book to shelve it where it belongs.

How can Angie arrange the books in order from least to greatest to make shelving them easier?

See margin for sample student work.

Math Practices and Problem Solving

Lesson 1-7

Look for and Use Structure

I can . . .
look for and use the structure of our decimal place value system to solve problems.

Mathematical Practices MP.7. Also MP.1, MP.6, MP.8
Content Standards 5.NBT.A.3a, 5.NBT.A.3b

Thinking Habits

Be a good thinker! These questions can help you.

- What patterns can I see and describe?
- How can I use the patterns to solve the problem?
- Can I see expressions and objects in different ways?
- What equivalent expressions can I use?

Look Back! MP.7 Use Structure Explain why 323.202 is less than 323.21 even though 202 is greater than 21.

Sample answer: 323.202 has 0 hundredths and 323.21 has 1 hundredth so 323.202 < 323.21.

Digital Resources at PearsonRealize.com Topic 1 | Lesson 1-7 41

Analyze Student Work

Ray's Work

323.02, 323.13, 323.17, 323.202, 323.21, 323.233

Angie noticed that the whole numbers are all 323, so she began comparing digits with the tenths place. For the numbers that had the same digit in the tenths place, she compared the digits in the hundredths place.

Ray orders the numbers correctly and gives a good explanation.

Jana's Work

323 .02
323 .13
323 .17
323 .202
323 .21
323 .233

Angie wrote the numbers in order from least to greatest

Jana writes the numbers in the correct order, but does not provide a complete explanation.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

PEARSON realize. PearsonRealize.com

Learn Glossary

MP.6 Be Precise

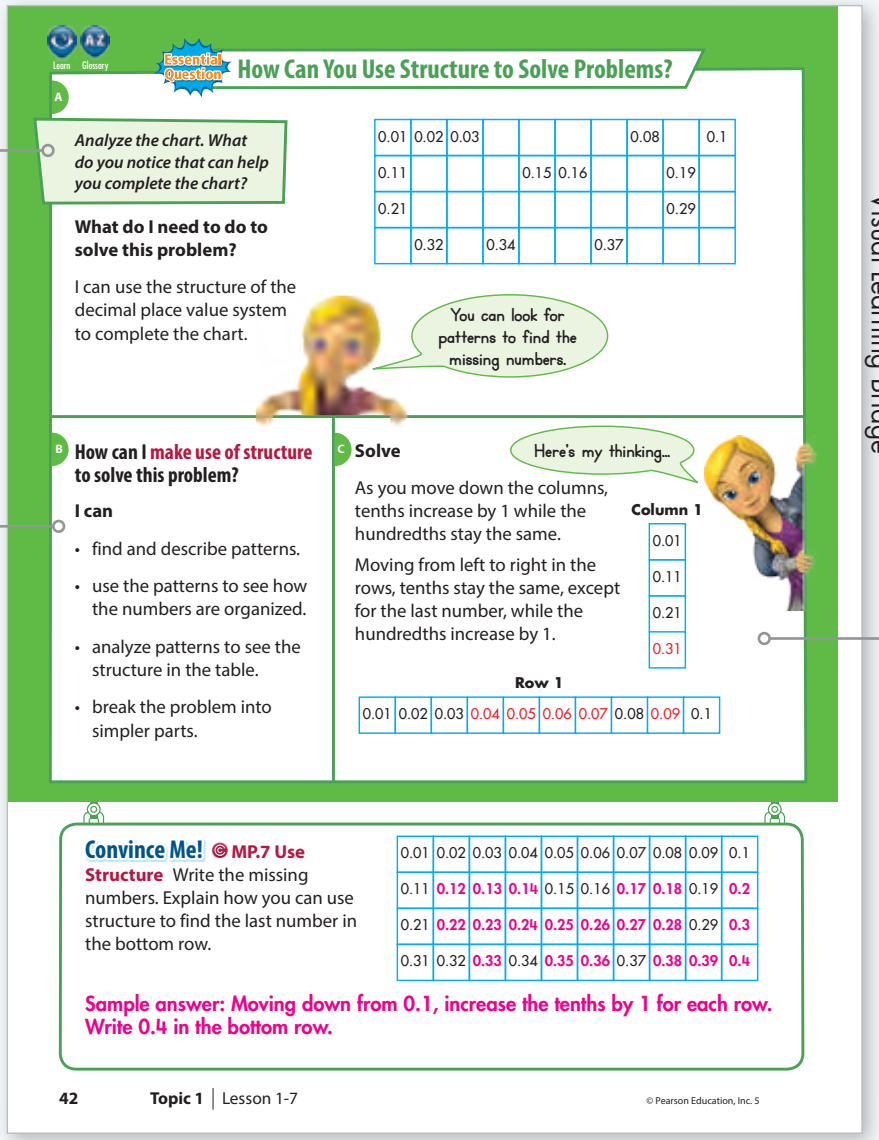
How many rows and columns does the chart have? [4 rows and 10 columns] *What do you notice about the numbers in the chart?* [Sample answer: The numbers are all decimals to the tenths place or the hundredths place. The numbers increase from left to right and top to bottom.]

MP.7 Use Structure

How can you find a pattern in the numbers in the chart? [Sample answer: I could use place-value relationships.]

Prevent Misconceptions RtI

Remind students that decimal place values differ from whole number place values. For example, the tens place is the second place value for a whole number, but the tenths place is the first place value to the right of the decimal point. Remind students that there is not a decimal place value that corresponds to "ones," so decimal place value begins with tenths and continues to the right.



Visual Learning Bridge

How do you read the numbers in column 1? [One hundredth; eleven hundredths; twenty-one hundredths; thirty-one hundredths] *Do the numbers increase as you move from top to bottom or from left to right? Explain.* [Top to bottom: the numbers increase by one tenth as you move from square to square; left to right: the numbers increase by one hundredth as you move from square to square.]

Convince Me! MP.7 Use Structure Students use the structure of the decimal place-value system to find additional numbers in the chart. They explain how they used structure to find the last number in the bottom row.

Coherence Students have learned to use structure in order to identify patterns in problems involving whole numbers. To complete the charts in this lesson, students extend that understanding to problems involving decimals to thousandths. They also use the skills for reading, writing, comparing, and ordering decimals that are developed throughout this topic.

Essential Question

Revisit the Essential Question. Students use what they know about the structure of the decimal place-value system to solve problems involving decimals.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 3 and 4 are each worth 1 point. Items 5–9 are worth up to 3 points.

20–30 min

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PearsonRealize.com

Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

MP.7 Use Structure
Each of these grids is a part of a decimal number chart similar to the one on page 42.

1. Describe the pattern for moving from a pink square to a green square. Then write the missing numbers.

0.55	0.66	
0.75	0.86	
0.95		

0.32		0.43
0.52		0.63
0.72		

The tenths increase by 1, and the hundredths increase by 1.

2. How can you use patterns to find the number that would be in the box below 0.52?
The tenths increase by 1 and the hundredths stay the same so the number would be 0.62.

Independent Practice

MP.7 Use Structure
Pamela is hiking. When she returns to camp, she passes the mile markers shown at the right.

3. Explain how you can use structure to find the decimal numbers that will be shown on the next four mile markers.
The pattern is that the whole number stays the same, and the tenths decrease by 1 until the marker after 2.0. Then the whole number decreases by 1, and the tenths begin again at 9; 2.2, 2.1, 2.0, 1.9

4. Pamela stops at the 1.8 mile marker. Where will she be if she walks one tenth of a mile towards camp? one mile towards camp? Explain.
1.7, 0.8; Sample explanation: Decrease the tenths by 1; Decrease the whole number by 1.

*For another example, see Set F on page 50.

Math Practices and Problem Solving

Common Core Performance Assessment

Thousandths Chart
The students in Ms. Lowell's class wrote a thousandths decimal chart on the board. Some of the numbers got erased.

0.001	0.002	**0.003**	0.004	0.005	0.006	**0.007**	**0.008**	**0.009**	0.01
0.011	**0.012**	0.013	**0.014**	**0.015**	0.016	0.017	**0.018**	0.019	0.02
0.021	0.022	**0.023**	**0.024**	**0.025**	**0.026**	0.027	**0.028**	0.029	**0.03**
0.031	0.032	**0.033**	0.034	0.035	**0.036**	0.037	**0.038**	**0.039**	**0.04**

5. **MP.7 Use Structure** Describe the pattern for moving across a row from left to right.
Hundredths stay the same except in the last square, and thousandths increase by 1.

6. **MP.6 Be Precise** How does the pattern change in the last square of each row?
Hundredths increase by 1. Thousandths are equal to 0, so they are not shown.

7. **MP.7 Use Structure** Describe the pattern for moving down a column.
Hundredths increase by 1, and the other digits stay the same.

8. **MP.8 Use Repeated Reasoning** Write the missing numbers in the decimal chart above.
See grid above.

9. **MP.7 Use Structure** Suppose the students add to the chart. Write the missing numbers in the row and the column below.

0.071						0.077				0.056
	0.072	**0.073**	**0.074**	**0.075**	**0.076**		**0.078**	**0.079**	**0.08**	**0.066**
										0.076
										0.086

MP.7 Use Structure Listen and look for these behaviors as evidence that students are exhibiting proficiency with MP.7.

- Recognizes, describes, and uses patterns in numbers
- Understands, identifies, and uses equivalent representations of numbers
- Describes how numbers and expressions are organized and put together as parts and wholes

RtI **Reteaching** Assign Reteaching Set F on p. 50.

Item 6 MP.6 Be Precise Make sure that students understand why the hundredths digit does not stay the same in the last square of each row. *How do the numbers change as you move from left to right in each row?* [Sample answer: As you move from square to square, the numbers increase by one thousandth.] *What happens when you add one thousandth to 0.019?* [Sample answer: You make a group of 10 thousandths. Ten thousandths are equal to one hundredth.] *What number is one thousandth greater than 0.019?* [0.02] *So, how is the pattern different for the last square in each row?* [Sample answer: The hundredths increase by 1. The digit in the thousandths place becomes 0.] *Do you need to show the zero in the thousandths place? Explain.* [Sample answer: No. Since 2 is the last non-zero digit to the right of the decimal point, you don't need to show any zeros to the right of 2.]

Item 8 MP.8 Generalize After students complete the entire chart, have them check their work by making sure that each row and column follows the patterns that they described in Items 5–7.

STEP 3

ASSESS AND DIFFERENTIATE

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

2 RtI

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

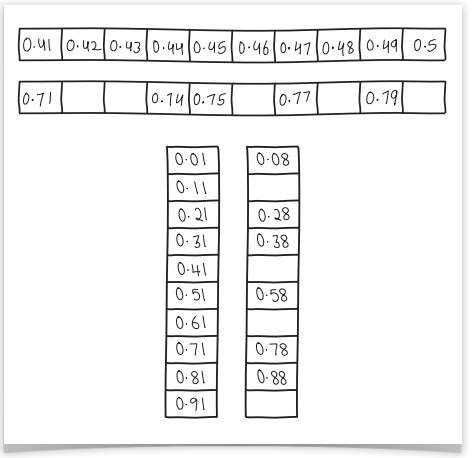
Intervention Activity I

Place-Value Patterns

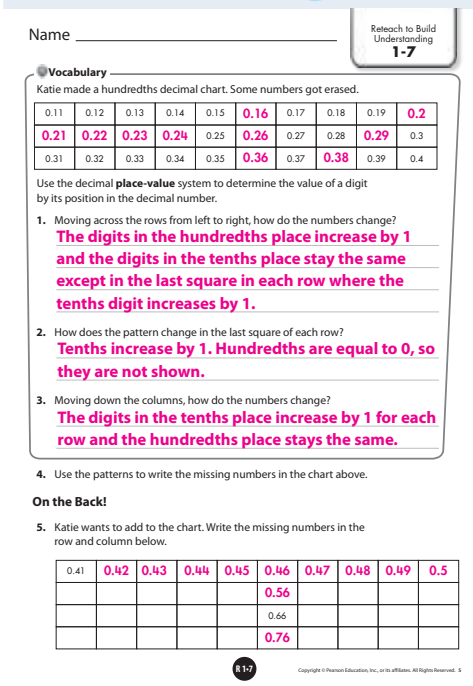
Materials

Centimeter Grid Paper (Teaching Tool 9) with the four charts shown at the right.

- Distribute the centimeter grid papers to students. *What pattern do you see in the completed horizontal chart?* [Sample answer: The digits in the hundredths place increase by 1, except for the last square.]
- *How can you complete the second horizontal chart?* [Sample answer: Fill in the first missing square by writing the decimal that has the same digit as 0.71 in the tenths place, and a digit that is 1 greater in the hundredths place.] *What are the missing numbers?* [0.72, 0.73, 0.76, 0.78, 0.80]
- Repeat for the vertical charts. *What are the missing numbers?* [0.18, 0.48, 0.68, 0.98]



Reteach I



Name _____

Reteach to Build Understanding 1-7

Vocabulary

Katie made a hundredths decimal chart. Some numbers got erased.

0.11	0.12	0.13	0.14	0.15	**0.16**	0.17	0.18	0.19	**0.2**
0.21	**0.22**	**0.23**	**0.24**	0.25	**0.26**	0.27	0.28	**0.29**	0.3
0.31	0.32	0.33	0.34	0.35	**0.36**	0.37	**0.38**	0.39	0.4

Use the decimal **place-value** system to determine the value of a digit by its position in the decimal number.

1. Moving across the rows from left to right, how do the numbers change?
The digits in the hundredths place increase by 1 and the digits in the tenths place stay the same except in the last square in each row where the tenths digit increases by 1.
2. How does the pattern change in the last square of each row?
Tenths increase by 1. Hundredths are equal to 0, so they are not shown.
3. Moving down the columns, how do the numbers change?
The digits in the tenths place increase by 1 for each row and the hundredths place stays the same.
4. Use the patterns to write the missing numbers in the chart above.

On the Back!

5. Katie wants to add to the chart. Write the missing numbers in the row and column below.

0.41	**0.42**	**0.43**	**0.44**	**0.45**	**0.46**	**0.47**	**0.48**	**0.49**	**0.5**
					0.56				
					0.66				
					0.76				

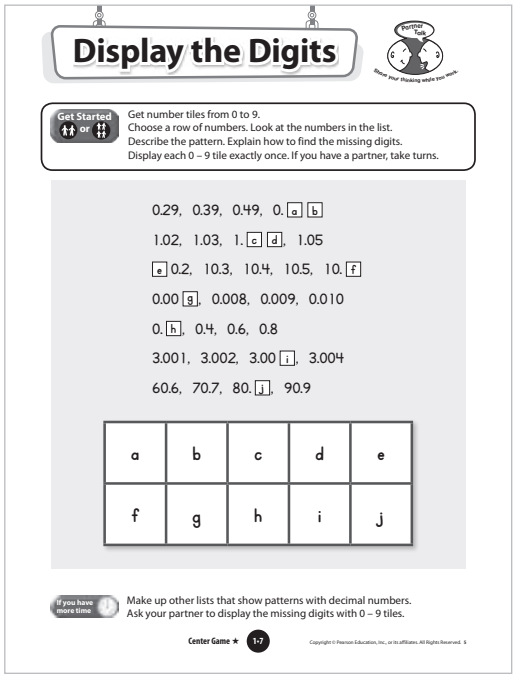
R 1-7

On-Level and Advanced Activity Centers O A

Center Games

Students work in pairs or small groups to describe decimal patterns and identify missing digits in the patterns.

★ On-Level



Display the Digits

Partner Talk — Show your thinking while you work.

Get Started (2 or 3)
Get number tiles from 0 to 9.
Choose a row of numbers. Look at the numbers in the list.
Describe the pattern. Explain how to find the missing digits.
Display each 0 – 9 tile exactly once. If you have a partner, take turns.

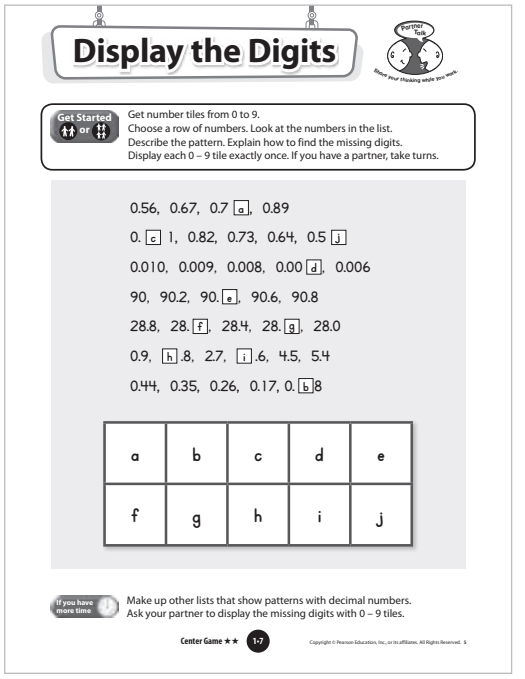
0.29, 0.39, 0.49, 0.[a][b]
1.02, 1.03, 1.[c][d], 1.05
[e]0.2, 10.3, 10.4, 10.5, 10.[f]
0.00[g], 0.008, 0.009, 0.010
0.[h], 0.4, 0.6, 0.8
3.001, 3.002, 3.00[i], 3.004
60.6, 70.7, 80.[j], 90.9

a	b	c	d	e
f	g	h	i	j

If you have more time — Make up other lists that show patterns with decimal numbers. Ask your partner to display the missing digits with 0 – 9 tiles.

Center Game ★ 1-7

★★ Advanced



Display the Digits

Partner Talk — Show your thinking while you work.

Get Started (2 or 3)
Get number tiles from 0 to 9.
Choose a row of numbers. Look at the numbers in the list.
Describe the pattern. Explain how to find the missing digits.
Display each 0 – 9 tile exactly once. If you have a partner, take turns.

0.56, 0.67, 0.7[a], 0.89
0.[c]1, 0.82, 0.73, 0.64, 0.5[j]
0.010, 0.009, 0.008, 0.00[d], 0.006
90, 90.2, 90.[e], 90.6, 90.8
28.8, 28.[f], 28.4, 28.[g], 28.0
0.9, [h].8, 2.7, [i].6, 4.5, 5.4
0.44, 0.35, 0.26, 0.17, 0.[b]8

a	b	c	d	e
f	g	h	i	j

If you have more time — Make up other lists that show patterns with decimal numbers. Ask your partner to display the missing digits with 0 – 9 tiles.

Center Game ★★ 1-7

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

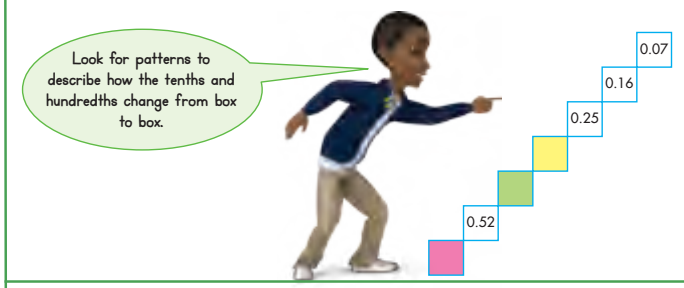
Leveled Assignment I Items 1–7 O Items 1–7 A Items 1–7

Name _____ Help Practice Buddy Tools Games

Homework & Practice 1-7
Look for and Use Structure

Another Look!

This grid is a part of a decimal number chart similar to the one on page 42. Write the missing number in each of the colored squares.



Tell how you can use structure.

Analyze the number pattern to find the structure of the grid.
Use the pattern to write the missing numbers.

Moving down and left, the tenths increase by 1, and the hundredths decrease by 1.
The number in the yellow box is 0.34.
The number in the green box is 0.43.
The number in the pink box is 0.61.

MP.7 Use Structure
In **1–3**, each grid is a part of a decimal number chart similar to the one on page 42. Write the missing numbers.

1.

0.63		0.65
0.64		0.75
		0.85

2.

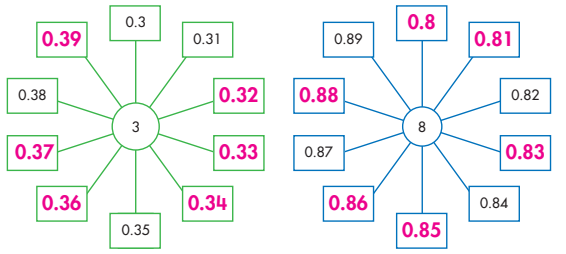
0.55			
	0.66	0.67	
0.75			0.77
0.85			0.87

3.

0.32			0.36
	0.43	0.45	
	0.54		
	0.63	0.65	
0.72			0.76

Common Core Performance Assessment

Decimal Wheels
Franco and Lisa are playing a game with decimal numbers. The first player to correctly write the missing numbers in each decimal wheel is the winner.



4. **MP. 8 Use Repeated Reasoning** Starting at the top, as you move clockwise around the wheel, how do the numbers change?

The tenths digit stays the same, and the hundredths digit increases by 1.

5. **MP. 6 Be Precise** Write the missing numbers in each decimal wheel.
See above.

6. **MP. 7 Use Structure** Suppose some of the boxes in a decimal wheel show these numbers: 0.62, 0.63, 0.67, and 0.69. Explain how to use structure to find the number that is written in the circle at the center of the decimal wheel.

The digit in the tenths place of each number in the boxes is the same as the number in the circle. So 6 is the number in the circle.

7. **MP.1 Make Sense and Persevere** Can you tell who won, Franco or Lisa? Explain.

No; Sample explanation: There is no information about who finished first or whose answers are correct.

45–46

TOPIC 1

FLUENCY PRACTICE ACTIVITY

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Games | Practice Buddy

FLUENCY PRACTICE ACTIVITY

Students practice fluently adding and subtracting multi-digit whole numbers and estimating sums and differences during a partner activity that reinforces mathematical practices.

Common Core Standards

Content Standard **4.NBT.B.4** Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Mathematical Practices **MP.2, MP.6**

Getting Started Work with a partner. Try to find a match for each clue without doing any computations. Then do the computations in the lower portion to check. Do the clues with exact answers first. Use each lettered clue only once.

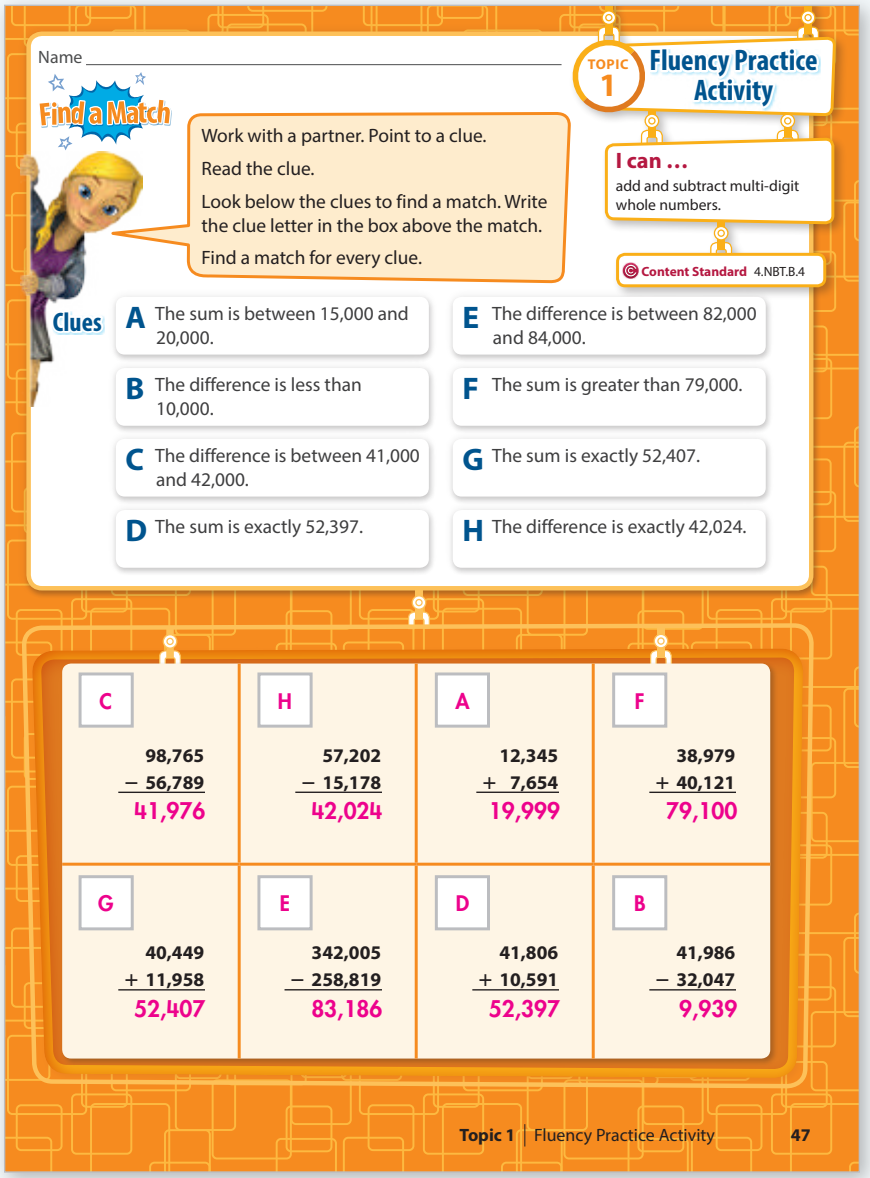
As Students Do the Activity Have students explain their thinking to each other.

Another Activity Have students write a second clue for each sum or difference. When the original clue was an exact answer, have them write a clue that is an estimate or a span. When the original clue was an estimate or a span, have them write a clue that is an exact answer. Then, have partners compare the new clues they wrote.

Extra Challenge *Write a new addition or subtraction problem for each original clue.*

Games **Online Game** The Game Center at PearsonRealize.com provides opportunities for fluency practice.

Practice Buddy **Steps to Fluency Success** To ensure that all students achieve fluency, see pages 109E–109H for additional resources including practice/assessment masters and online practice/assessment on fluency subskills. You can also use the ExamView® CD-ROM to generate worksheets with multiple-choice or free-response items on fluency subskills.


Name _____

TOPIC 1 Fluency Practice Activity

Find a Match

Work with a partner. Point to a clue.
Read the clue.
Look below the clues to find a match. Write the clue letter in the box above the match.
Find a match for every clue.

I can ...
add and subtract multi-digit whole numbers.

Content Standard 4.NBT.B.4

Clues

A The sum is between 15,000 and 20,000.
B The difference is less than 10,000.
C The difference is between 41,000 and 42,000.
D The sum is exactly 52,397.
E The difference is between 82,000 and 84,000.
F The sum is greater than 79,000.
G The sum is exactly 52,407.
H The difference is exactly 42,024.

C	H	A	F
98,765 − 56,789 = 41,976	57,202 − 15,178 = 42,024	12,345 + 7,654 = 19,999	38,979 + 40,121 = 79,100
G	**E**	**D**	**B**
40,449 + 11,958 = 52,407	342,005 − 258,819 = 83,186	41,806 + 10,591 = 52,397	41,986 − 32,047 = 9,939

Topic 1 | Fluency Practice Activity 47

VOCABULARY REVIEW

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Glossary Games

TOPIC 1 **Vocabulary Review**

Glossary

Word List

- base
- equivalent decimals
- expanded form
- exponent
- power
- thousandths
- value

Understand Vocabulary

Choose the best term from the Word List. Write it on the blank.

1. Decimal numbers that name the same part of a whole or the same point on a number line are called ___equivalent decimals___.
2. The ___value___ of a digit in a number depends on its place in the number.
3. The product that results from multiplying the same number over and over is a(n) ___power___ of that number.
4. A digit in the hundredths place has ten times the value of the same digit in the ___thousandths___ place.
5. In 10^5, the number 10 is the ___base___.

Draw a line from each number in Column A to the same number in Column B.

Column A	Column B
6. $7 \times 1{,}000 + 9 \times 10 + 2 \times 1$	4,000
7. 10^4	7,092
8. 4×10^3	10,000
9. 3.08	3.080

Use Vocabulary in Writing

10. Explain why each 8 in the number 8.888 has a different value. Use one or more terms from the Word List in your explanation.
Sample answer: Writing the number in expanded form shows that each 8 is multiplied by its place value:
$8 \times 1 + 8 \times \frac{1}{10} + 8 \times \frac{1}{100} + 8 \times \frac{1}{1{,}000}$.

48 **Topic 1** | Vocabulary Review

VOCABULARY REVIEW

Students review vocabulary words used in the topic.

Oral Language Before students complete the page, you might reinforce oral language through a class discussion involving one or more of the following activities.

- Have students define the terms in their own words.
- Have students say math sentences or math questions that use the words.
- Play a "What's My Word?" guessing game in which you or a student thinks about one of the words and says a clue that others listen to before they guess the word.
- Play a "Right or Wrong?" game in which you or a student says a sentence that uses one of the words correctly or incorrectly. Then others say "right" or "wrong."

Writing in Math After students complete the page, you might further reinforce writing in math by doing one or more of the following activities.

- Tell students to close their books. Then say the words and have students write them. Students trade papers to check whether the words are spelled correctly.
- Have students work with a partner. Each partner writes a math question that uses one of the words. Then students trade papers and give a written answer that uses the word.

Games **Online Game** The Game Center at PearsonRealize.com includes a vocabulary game that students can access anytime.

TOPIC 1

RETEACHING

UNDERSTAND PLACE VALUE

RtI Item Analysis for Diagnosis and Intervention

Reteaching Sets	Standard	MDIS
Set A	5.NBT.A.2	F17
Set B	5.NBT.A.1	F12
Set C	5.NBT.A.1, 5.NBT.A.3a	H26
Set D	5.NBT.A.3b	H31
Set E	5.NBT.A.4	H29
Set F	MP.7	H26

Name _____

TOPIC 1 Reteaching

Set A pages 5–10

How can you write 7,000 using exponents?

$7{,}000 = 7 \times 10 \times 10 \times 10 = 7 \times 10^3$

So, using exponents 7,000 is written as 7×10^3.

Remember the number of zeros in the product is the same as the exponent.

Find each product.

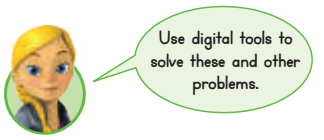
1. 9×10^1 **90**
2. $8 \times 1{,}000$ **8,000**
3. 5×10^2 **500**
4. 2×10^5 **200,000**

Set B pages 11–16

Write the number name and tell the value of the underlined digit for 930,365.

Nine hundred thirty thousand, three hundred sixty-five

Since the 0 is in the thousands place, its value is 0 thousands, or 0.



Remember you can find the value of a digit by its place in a number.

Write the number name and tell the value of the underlined digit.

1. 9,000,009 **Nine million, nine; 9,000,000**
2. 485,002,000 **Four hundred eighty-five million, two thousand; 80,000,000**
3. 25,678 **Twenty-five thousand, six hundred seventy-eight; 5,000**
4. 17,874,000 **Seventeen million, eight hundred seventy-four thousand; 10,000,000**

Set C pages 17–22, 23–28

A place-value chart can help you write the standard form, expanded form, and number name for a decimal.

Standard form: 8.026

Expanded form: $8 + 2 \times \frac{1}{100} + 6 \times \frac{1}{1{,}000}$

Number name: Eight and twenty-six thousandths

Remember the word *and* is written for the decimal point.

1. How can you write 0.044 as a fraction? How are the values of the two 4s related in 0.044?

Sample answer: $\frac{44}{1{,}000}$**; The value of the 4 in the hundredths place is 10 times the value of the 4 in the place to its right.**

Write each number in standard form.

2. eight and fifty-nine hundredths **8.59**
3. seven and three thousandths **7.003**
4. $3 + 2 \times \frac{1}{10} + 4 \times \frac{1}{1{,}000}$ **3.204**

Set D pages 29–34

Compare. Write >, <, or =.

8.45 ◯ 8.47

Line up the decimal points. Start at the left to compare. Find the first place where the digits are different.

8.45
8.47 0.05 < 0.07

So, 8.45 < 8.47.

Remember that equivalent decimals, such as 0.45 and 0.450, can help you compare numbers.

Compare. Write >, <, or =.

1. 0.584 (>) 0.58
2. 9.327 (>) 9.236
3. 5.2 (=) 5.20
4. 5.643 (<) 5.675
5. 0.07 (<) 0.08

Set E pages 35–40

Round 12.087 to the place of the underlined digit.

12.087 Look at the digit following the underlined digit. Look at 7.

Round to the next greater number of hundredths because 7 > 5.

12.087 rounded to the nearest hundredth is 12.09.

Remember that rounding a number means replacing it with a number that tells about how many or how much.

Round each number to the place of the underlined digit.

1. 10.245 **10.2**
2. 73.4 **70**
3. 0.145 **0.15**
4. 3.999 **4.0**
5. 13.023 **13.02**
6. 45.398 **45.4**

Set F pages 41–46

Think about these questions to help you **look for and use structure** to understand and explain patterns with decimal numbers.

Thinking Habits

- What patterns can I see and describe?
- How can I use the patterns to solve the problem?
- Can I see expressions and objects in different ways?
- What equivalent expressions can I use?

Remember to check that all of your answers follow a pattern.

Each grid is part of a decimal number chart. Write the missing numbers to complete the grids.

1.

0.12	0.13		
		0.14	
			0.24
			0.34

2.

0.64				0.68
0.74		0.85	0.86	0.78
0.84			0.87	0.88

Response to Intervention

Ongoing Intervention

- Lessons with guiding questions to assess understanding
- Support to prevent misconceptions and to reteach

Strategic Intervention

- Targeted to small groups who need more support
- Easy to implement

Intensive Intervention

- Instruction to accelerate progress
- Instruction focused on foundational skills

TOPIC 1

TOPIC ASSESSMENT

UNDERSTAND PLACE VALUE

Name _____

TOPIC 1 Assessment

1. Choose all the expressions that are equal to 6×10^3. **1 point**

- ☐ 6×100
- ■ $6 \times 1{,}000$
- ☐ $6 \times 10{,}000$
- ■ $6 \times 10 \times 10 \times 10$
- ☐ $6 \times 10 \times 10 \times 10 \times 10$

2. A national park has eighty thousand, nine-hundred twenty-three and eighty-six hundredths acres of land. Which shows this in standard form? **1 point**

- Ⓐ 80,923.086
- Ⓑ 80,923.68
- Ⓒ 80,923.806
- ● 80,923.86

3. For items **3a-3d**, choose Yes or No to tell if the digit in the hundreds place is $\frac{1}{10}$ the value of the digit in the thousands place. **1 point**

3a. 8,556	○ Yes	● No
3b. 6,855	○ Yes	● No
3c. 5,568	● Yes	○ No
3d. 5,656	○ Yes	● No

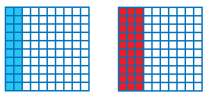
4. Mrs. Martin has $7,000 in her savings account. Alonzo has $\frac{1}{10}$ as much money in his account as Mrs. Martin. How much money does Alonzo have in his account? **1 point**

> $700

5. Choose all the comparisons that are true. **1 point**

- ■ $4.15 > 4.051$
- ☐ $1.054 > 1.45$
- ☐ $5.14 < 5.041$
- ■ $5.104 < 5.41$
- ■ $5.014 < 5.41$

6. Luke shaded 20 squares on his hundredths grid. Bekka shaded 30 squares on her hundredths grid.



Part A **1 point**

Write two decimals greater than Luke's decimal and less than Bekka's decimal.

> Sample answers: 0.24, 0.26

Part B

Write two decimals equivalent to Luke's decimal. **1 point**

> Sample answers: 0.2; 0.200

7. Determine the pattern, then write the decimals to complete the decimal grid. **2 points**

0.23		0.25
	0.34	
0.43	0.44	0.45
	0.54	
0.63		0.65

8. The weight of Darrin's phone is 3.405 ounces. What is 3.405 written in expanded form? **1 point**

- ● $3 \times 1 + 4 \times \frac{1}{10} + 5 \times \frac{1}{1{,}000}$
- Ⓑ $3 \times 10 + 4 \times \frac{1}{10} + 5 \times \frac{1}{1{,}000}$
- Ⓒ $3 \times 10 + 4 \times \frac{1}{10} + 5 \times \frac{1}{100}$
- Ⓓ $3 \times 1 + 4 \times \frac{1}{100} + 5 \times \frac{1}{1{,}000}$

9. Elaine has a piece of wire that is 2.16 meters long. Dikembe has a piece of wire that is 2.061 meters long. Whose piece of wire is longer? How can you tell? **1 point**

> Elaine's wire is longer. Sample explanation: Both numbers have a 2 in the ones place, but one tenth is greater than zero tenths.

10. In a basketball tournament, Dimitri averaged 12.375 rebounds per game. What is 12.375 written in expanded form? How is it written with number names? **2 points**

> $10 + 2 + 3 \times \frac{1}{10} + 7 \times \frac{1}{100} + 5 \times \frac{1}{1{,}000}$; twelve and three hundred seventy-five thousandths

11. The numbers below follow a pattern.

0.006 0.06 0.6 6 ____ ____

Part A

What are the next two numbers in the pattern? **1 point**

> 60; 600

Part B

What is the relationship between the terms in the pattern? **1 point**

> Sample answer: Each term is 10 times as great as the term to its left.

12. Kendra and her horse completed the barrel racing course in 15.839 seconds. What is this number rounded to the nearest tenth? Explain how you decided. **2 points**

> 15.8; Sample explanation: Since the digit in the hundredths place is less than 5, you keep the digit in the tenths place. Then you drop the digits in the hundredths and thousandths places.

ANSWERING THE TOPIC ESSENTIAL QUESTION

How are whole numbers and decimals written, compared, and ordered?

Restate the Topic Essential Question from the Topic Opener or project it from the Student's Edition eText.

Ask students to answer the Essential Question (verbally or in writing) and give examples that support their answers. The following are key elements of the answer to the Essential Question. Be sure that these are made explicit when discussing students' answers.

- Whole numbers and decimals can be written in standard, expanded, and word form.

  Examples: 601,345 (standard form) can also be written as 600,000 + 1,000 + 300 + 40 + 5 (expanded form) and as six hundred one thousand, three hundred forty-five (word form). 43.649 (standard form) can also be written as 40 + 3 + 0.6 + 0.04 + 0.009 (expanded form) and as forty-three and six hundred forty-nine thousandths.

- Whole numbers and decimals can be compared and ordered using place value.

  Examples: Compare 7.034 and 7.34. Compare the ones. $7 = 7$. Compare the tenths: $0 < 3$. So $7.034 < 7.34$.

  Order 0.65, 0.63, 0.69 from least to greatest. Align the numbers by their decimal points. Starting in the greatest place-value position, compare digits until you find digits that are different. In the hundredths place, 5 is greater than 3 but less than 9. Ordered from least to greatest: 0.63, 0.65, 0.69

ONLINE TOPIC ASSESSMENT

An auto-scored Topic Assessment is provided at PearsonRealize.com.

EXAMVIEW® TEST GENERATOR

ExamView can be used to create a blackline-master Topic Assessment with multiple-choice and free-response items.

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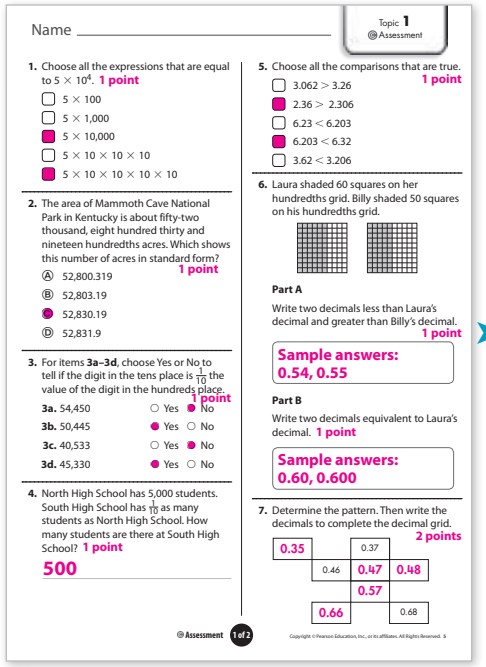
Assessment

Topic Assessment Masters



Name _____ Topic 1 Assessment

1. Choose all the expressions that are equal to 5×10^4. **1 point**

- ☐ 5×100
- ☐ $5 \times 1{,}000$
- ☑ $5 \times 10{,}000$
- ☐ $5 \times 10 \times 10 \times 10$
- ☑ $5 \times 10 \times 10 \times 10 \times 10$

2. The area of Mammoth Cave National Park in Kentucky is about fifty-two thousand, eight hundred thirty and nineteen hundredths acres. Which shows this number of acres in standard form? **1 point**

- Ⓐ 52,800.319
- Ⓑ 52,803.19
- Ⓒ 52,830.19
- Ⓓ 52,831.9

3. For items **3a–3d**, choose Yes or No to tell if the digit in the tens place is $\frac{1}{10}$ the value of the digit in the hundreds place. **1 point**

3a. 54,450	○ Yes	● No
3b. 50,445	● Yes	○ No
3c. 40,533	○ Yes	● No
3d. 45,330	● Yes	○ No

4. North High School has 5,000 students. South High School has $\frac{1}{10}$ as many students as North High School. How many students are there at South High School? **1 point**

500

5. Choose all the comparisons that are true. **1 point**

- ☐ $3.062 > 3.26$
- ☑ $2.36 > 2.306$
- ☐ $6.23 < 6.203$
- ☑ $6.203 < 6.32$
- ☐ $3.62 < 3.206$

6. Laura shaded 60 squares on her hundredths grid. Billy shaded 50 squares on his hundredths grid.

Part A

Write two decimals less than Laura's decimal and greater than Billy's decimal. **1 point**

Sample answers: 0.54, 0.55

Part B

Write two decimals equivalent to Laura's decimal. **1 point**

Sample answers: 0.60, 0.600

7. Determine the pattern. Then write the decimals to complete the decimal grid. **2 points**

0.35		0.37	
	0.46	0.47	0.48
		0.57	
	0.66		0.68

Assessment 1 of 2

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8. Maria walked 4.035 kilometers. What is 4.035 written in expanded form? **1 point**

- Ⓐ $4 \times 1 + 3 \times \frac{1}{10} + 5 \times \frac{1}{100}$
- Ⓑ $4 \times 1 + 3 \times \frac{1}{100} + 5 \times \frac{1}{1{,}000}$
- Ⓒ $4 \times 1 + 3 \times \frac{1}{10} + 5 \times \frac{1}{1{,}000}$
- Ⓓ $4 \times 10 + 3 \times \frac{1}{10} + 5 \times \frac{1}{100}$

9. Eddy's plum weighs 3.042 ounces. Desta's plum weighs 3.24 ounces. Whose plum weighs more? How can you tell? **1 point**

Desta's plum weighs more. Sample explanation: Both numbers have 3 in the ones place, but two tenths is greater than 0 tenths.

10. During the hockey season, Elena averaged 5.625 assists per game. What is 5.625 written in expanded form? How is it written with number names? **2 points**

$5 + 6 \times \frac{1}{10} + 2 \times \frac{1}{100} + 5 \times \frac{1}{1{,}000}$; five and six hundred twenty-five thousandths

11. The numbers below follow a pattern.

300 30 3 0.3 _____ _____

Part A

What are the next two numbers in the pattern? **1 point**

0.03; 0.003

Part B

What is the relationship between the terms in the pattern? **1 point**

Sample answer: Each term is $\frac{1}{10}$ the value of the term on its left.

12. Kent completed his homework in 52.752 minutes. What is this number rounded to the nearest tenth? Explain how you decided. **2 points**

52.8; Sample explanation: Since the digit in the hundredths place is equal to 5, you increase the digit in the tenths place by 1. Then you drop the digits to the right of the tenths place.

Assessment 2 of 2

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Scoring Guide

Item	Points	Topic Assessment (Student's Edition and Masters)
1	1	All correct choices selected.
2	1	Correct choice selected.
3	1	All correct choices selected.
4	1	Answer is correct.
5	1	All correct choices selected.
6	2	Correct answers to Part A and Part B
	1	Correct answer to Part A or Part B
7	2	All answers correct
	1	All but 1 or 2 answers correct
8	1	Correct choice selected.
9	1	Answer and explanation are correct.
10	2	Both answers correct
	1	Only 1 correct answer
11	2	Correct answers to Part A and Part B
	1	Correct answer to Part A or Part B
12	2	Correct answer and correct explanation
	1	Correct answer or correct explanation

RtI Item Analysis for Diagnosis and Intervention

Item	Standard	DOK	MDIS
1	5.NBT.A.2	2	F17
2	5.NBT.A.3a	2	H26
3	5.NBT.A.1	2	F9
4	5.NBT.A.1	1	F9
5	5.NBT.A.3b	2	H31
6A	5.NBT.A.3a	1	H30
6B	5.NBT.A.3	1	H30
7	5.NBT.A.3a, 5.NBT.A.3b	3	H26
8	5.NBT.A.3a	2	H26
9	5.NBT.A.3b, MP.7	2	H31
10	5.NBT.A.3a	2	H26
11A	5.NBT.A.1	1	H31
11B	5.NBT.A.1	2	H31
12	5.NBT.A.4	3	H29

The Topic Assessment Masters assess the same content item for item as the Topic Assessment in the Student's Edition.

TOPIC 1

TOPIC PERFORMANCE ASSESSMENT

UNDERSTAND PLACE VALUE

Name _____

TOPIC 1

Performance Assessment

Fruits and Vegetables

Henry recorded how many pounds of fruits and vegetables his family bought during the past two months.

1. Pick four fruits and list them in the table below.

Part A Check students' work.

Round each fruit's weight to the nearest 0.1 pound. Write the rounded weight in the next column. 1 point

Fruit	Rounded Weight (lb)	Fruit	Rounded Weight (lb)
apples	2.1	peaches	2.6
lemons	1.0	pears	3.6

DATA

Fruit	Weight (lb)
apples	2.068
blueberries	1.07
lemons	1.031
oranges	3.502
peaches	2.608
pears	3.592

Part B

Explain how you rounded the weights of the fruits. 2 points

Sample answer: I looked at the digit in the hundredths place. If it was 5 or greater, I rounded the tenths digit to the next greater tenth. If it was less than 5, I left the tenths digit alone, then dropped the hundredths and thousandths digits.

2. Pick four vegetables and list them in the table below.

Part A Check students' work.

Round each vegetable's weight to the nearest 0.01 pound. Write the rounded weight in the next column. 1 point

Vegetable	Rounded Weight (lb)	Vegetable	Rounded Weight (lb)
asparagus	2.32	corn	2.56
celery	1.40	red onions	1.86

DATA

Vegetable	Weight (lb)
asparagus	2.317
beets	1.862
celery	1.402
corn	2.556
potatoes	3.441
red onions	1.861

Part B

Explain how you rounded the weights of the vegetables. 2 points

Sample answer: I looked at the digit in the thousandths place. If it was 5 or greater, I rounded the hundredths digit to the next greater hundredth. If it was less than 5, I left the hundredths digit alone, then dropped the thousandths digit.

3. Use <, >, or = to compare the weights of blueberries and lemons. 1 point

1.031 < 1.07 or 1.07 > 1.031

4. When rounded to the nearest hundredth, two items will round to the same decimal. What two items are they? 1 point

Red onions and beets both round to 1.86.

5. How does writing the weight for potatoes in expanded form show why the same digit can have different values? 1 point

Sample answer: Expanded form shows that the value of one 4 is 4 × 0.1, and the value of the other 4 is 4 × 0.01.

6. What is the relationship between the values of the two 4s in the weight of the potatoes? 1 point

Sample answer: The value of the 4 in the tenths place is ten times as great as the value of the 4 in the hundredths place.

7. Write the number of pounds of celery Henry's family bought using number names and in expanded form. 2 points

One and four hundred two thousandths;
$1 + 4 \times \frac{1}{10} + 2 \times \frac{1}{1{,}000}$

8. The store where Henry's family shops sold 10^3 times as many pounds of corn as Henry's family bought.

Part A

How many pounds of corn did the store sell? Write your answer in standard form and with number names. 1 point

2,556 pounds; two thousand, five hundred fifty-six pounds

Part B

Explain how you found your answer. 2 points

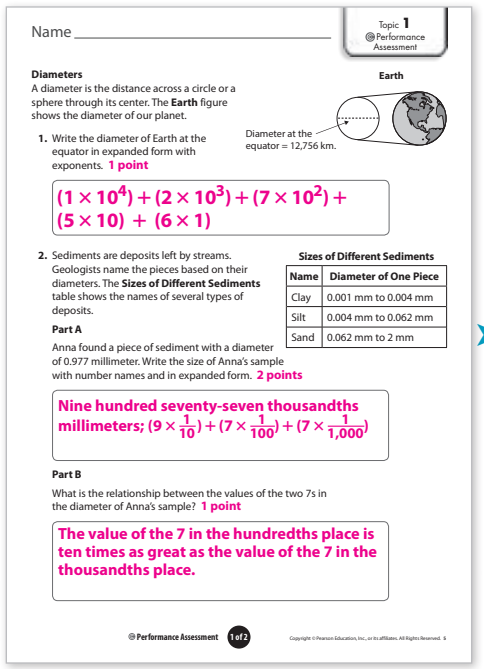
Sample answer: $10^3 = 10 \times 10 \times 10$, so I used patterns: $2.556 \times 10 = 25.56$, $2.556 \times 100 = 255.6$, and $2.556 \times 1{,}000 = 2{,}556$.

Scoring Guide

Item	Points	Topic Performance Assessment in the Student's Edition
1A	1	Correct answers for table
1B	2	Correct and thorough explanation
	1	Minor errors in explanation
2A	1	Correct answers for table
2B	2	Correct and thorough explanation
	1	Minor errors in explanation
3	1	Correct answer
4	1	Correct answer
5	1	Correct answer
6	1	Correct explanation
7	2	Correct number name and correct expanded form
	1	Correct number name or correct expanded form
8A	1	Correct answers
8B	2	Correct and thorough explanation
	1	Minor errors in explanation

Item Analysis for Diagnosis and Intervention for the assessment in the Student's Edition is at the top of page 54A.

Topic Performance Assessment Masters



Name _____

Topic 1 Performance Assessment

Diameters
A diameter is the distance across a circle or a sphere through its center. The **Earth** figure shows the diameter of our planet.

1. Write the diameter of Earth at the equator in expanded form with exponents. **1 point**

$(1 \times 10^4) + (2 \times 10^3) + (7 \times 10^2) + (5 \times 10) + (6 \times 1)$

2. Sediments are deposits left by streams. Geologists name the pieces based on their diameters. The **Sizes of Different Sediments** table shows the names of several types of deposits.

Sizes of Different Sediments

Name	Diameter of One Piece
Clay	0.001 mm to 0.004 mm
Silt	0.004 mm to 0.062 mm
Sand	0.062 mm to 2 mm

Part A
Anna found a piece of sediment with a diameter of 0.977 millimeter. Write the size of Anna's sample with number names and in expanded form. **2 points**

Nine hundred seventy-seven thousandths millimeters; $(9 \times \frac{1}{10}) + (7 \times \frac{1}{100}) + (7 \times \frac{1}{1{,}000})$

Part B
What is the relationship between the values of the two 7s in the diameter of Anna's sample? **1 point**

The value of the 7 in the hundredths place is ten times as great as the value of the 7 in the thousandths place.

Part C
Explain how to round Anna's sample to the nearest hundredth. **2 points**

The digit in the thousandths place is 5 or greater, so round the hundredths digit to the next greater hundredth. So, 0.977 rounds to 0.98.

Part D
According to the table, what is the name of Anna's sample? Explain your reasoning. **3 points**

Sand; Since 9 tenths is greater than 0 tenths, $0.977 > 0.062$. Since 2 is greater than 0, 0.977 mm is between 0.062 mm and 2 mm.

3. Josef found a piece of sediment with a diameter of 0.012 millimeter.

Part A
Use $<$, $>$, or $=$ to compare the diameter of Josef's sample to the diameter of Anna's sample. **1 point**

$0.012 < 0.977$ or $0.977 > 0.012$

Part B
Matthew found a deposit with a diameter that is 10^2 times as long as Josef's. How many millimeters long is the diameter of Matthew's deposit? Write your answer in standard form and with number names. **1 point**

1.2; one and two tenths

Part C
Explain how you found your answer to Part B. **2 points**

Sample answer: $10^2 = 10 \times 10$, so I used patterns: $0.012 \times 10 = 0.12$ and $0.012 \times 100 = 1.2$

Item Analysis for Diagnosis and Intervention

Item	Standard	DOK	MDIS
1	5.NBT.A.4, MP.1, MP.2	3	H28, H29
2	5.NBT.A.4, MP.1, MP.2	3	H28, H29
3	5.NBT.A.3b, MP.6	2	H30, H31
4	5.NBT.A.4, MP.6	3	H29
5	5.NBT.A.3a, MP.3	3	H26
6	5.NBT.A.1, MP.2	2	H26
7	5.NBT.A.3a, MP.6	2	H26
8	5.NBT.A.3a, MP.2, MP.7	3	H24, H61

Scoring Guide

Item	Points	Topic Performance Assessment Masters
1	1	Correct answer
2A	2	Correct number name and expanded form
	1	Correct number name or expanded form
2B	1	Correct answer
2C	2	Correct answer and explanation
	1	Correct answer or explanation
2D	3	Correct answer with correct and thorough explanation
	2	Correct answer with complete explanation that has minor errors
	1	Partially correct answer with some explanation
3A	1	Correct answer
3B	1	Correct answers
3C	2	Correct and complete explanation
	1	Partial explanation

Item Analysis for Diagnosis and Intervention

Item	Standard	DOK	MDIS
1	5.NBT.A.2, MP.7	2	F17
2A	5.NBT.A.3a, MP.7	2	H26
2B	5.NBT.A.1, MP.7	2	H26
2C	5.NBT.A.4, MP.1, MP.2	2	H29
2D	5.NBT.A.3b, MP.6	3	H31
3A	5.NBT.A.3b, MP.7	2	H31
3B	5.NBT.A.3a, MP.6	2	H26
3C	5.NBT.A.3a, MP.2, MP.7	3	H61

TOPIC 1

PLACEMENT TEST

Placement Test

Name _____ Placement Test

1. In which number is the value of the underlined digit ten times the value of the bold digit?

Ⓐ 5**0**5
Ⓑ 5,00**5**
Ⓒ **5**,500
Ⓓ 5**0**,500

2. A bakery uses 48 pounds of flour each day. It is open for business 28 days each month. How many pounds of flour does the bakery use each month?

Ⓐ 1,500 pounds
Ⓑ 1,344 pounds
Ⓒ 800 pounds
Ⓓ 76 pounds

3. Cameron collected 3 times as many canned goods as Diego. Diego collected 47 canned goods. How many canned goods did Cameron collect?

Ⓐ 50 canned goods
Ⓑ 121 canned goods
Ⓒ 141 canned goods
Ⓓ 150 canned goods

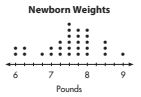
4. Which lists multiples of 8?

Ⓐ 8, 16, 24, 46
Ⓑ 8, 16, 24, 48
Ⓒ 8, 15, 32, 50
Ⓓ 8, 16, 40, 63

5. Gail ran $4\frac{6}{10}$ miles on Saturday and $6\frac{8}{10}$ miles on Sunday. How many miles did Gail run over the weekend?

Ⓐ 11 miles
Ⓑ $10\frac{14}{10}$ miles
Ⓒ $11\frac{4}{10}$ miles
Ⓓ $14\frac{2}{10}$ miles

6. The weights of babies born at a hospital in November are shown in a line plot. How many more babies weighed $8\frac{1}{2}$ pounds than $6\frac{1}{4}$ pounds?



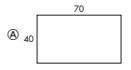
Ⓐ 1 baby
Ⓑ 2 babies
Ⓒ 3 babies
Ⓓ 4 babies

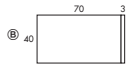
Name _____

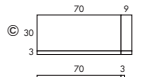
7. Round 43,628 to the thousands place.

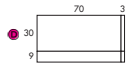
Ⓐ 40,000
Ⓑ 43,000
Ⓒ 43,600
Ⓓ 44,000

8. Which area model can you use to find 39×73?

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

9. Use an estimate to decide if the answer is reasonable. If the answer is not reasonable, find the actual quotient.

$$9\overline{)7{,}341} \quad 621 \text{ R}2$$

Ⓐ The answer is reasonable.
Ⓑ No; 815 R6
Ⓒ No; 815 R5
Ⓓ No; 815 R4

10. Which comparison is correct?

Ⓐ $\frac{2}{10} > \frac{1}{5}$
Ⓑ $\frac{2}{4} > \frac{4}{8}$
Ⓒ $\frac{2}{3} < \frac{10}{12}$
Ⓓ $\frac{9}{12} < \frac{3}{6}$

11. Which decimal makes the comparison true?

$7.68 > \_\_\_\_$

Ⓐ 8.81
Ⓑ 8.68
Ⓒ 7.86
Ⓓ 7.56

12. Which of the following letters is **NOT** line symmetric?

Ⓐ A
Ⓑ E
Ⓒ G
Ⓓ Y

Name _____

13. Find the sum.

$8{,}852 + 4{,}113$

Ⓐ 11,956
Ⓑ 12,865
Ⓒ 12,965
Ⓓ 13,065

14. Brandy made 7 batches of cookies. Each batch contained 12 cookies. She put the same number of cookies in each of 5 bags. How many cookies were not put in bags?

Ⓐ 16 cookies
Ⓑ 12 cookies
Ⓒ 4 cookies
Ⓓ 2 cookies

15. Ellen is making jewelry sets that contain a bracelet and a pair of earrings. Each bracelet uses 3 times as many beads as one earring. Ellen uses 13 beads for each earring. How many beads does Ellen need to make one jewelry set?

Ⓐ 13 beads
Ⓑ 39 beads
Ⓒ 52 beads
Ⓓ 65 beads

16. Inez and Joel work at a store that sells cell phones. Inez worked for 7 hours and 23 minutes. Joel worked for 4 hours and 51 minutes. How much longer did Inez work than Joel?

Ⓐ 2 hours 32 minutes
Ⓑ 12 hours 14 minutes
Ⓒ 3 hours 28 minutes
Ⓓ 3 hours 32 minutes

17. Which is the same length as 4 kilometers?

Ⓐ 4,000 meters
Ⓑ 4,000 centimeters
Ⓒ 4,000 millimeters
Ⓓ 40,000 millimeters

18. The following are rules for repeating patterns. For which rule will the 12th shape be a circle?

Ⓐ Triangle, Circle, Square
Ⓑ Circle, Square
Ⓒ Rectangle, Circle
Ⓓ Circle, Circle, Triangle

Name _____

19. Subtract.

$50{,}032 - 17{,}956$

Ⓐ 47,924
Ⓑ 42,976
Ⓒ 32,136
Ⓓ 32,076

20. Nick cut a circular cookie into 5 equal slices. What is the angle measure of each slice?

Ⓐ 36°
Ⓑ 72°
Ⓒ 108°
Ⓓ 144°

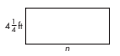
21. Franco made a dozen muffins for his party. Upon taking them out of the oven, he noticed that 2 of the muffins were badly burned. Franco served $\frac{7}{10}$ of the remaining muffins. Which equation shows the fraction of the non-burned muffins that remains?

Ⓐ $\frac{12}{12} - \frac{7}{12} = \frac{5}{12}$
Ⓑ $\frac{10}{10} - \frac{7}{10} = \frac{3}{10}$
Ⓒ $\frac{12}{12} - \frac{5}{12} = \frac{7}{12}$
Ⓓ $\frac{10}{10} - \frac{3}{10} = \frac{7}{10}$

22. Which expression does **NOT** equal $\frac{10}{12}$?

Ⓐ $\frac{5}{12} + \frac{5}{12}$
Ⓑ $\frac{3}{12} + \frac{2}{12} + \frac{2}{12} + \frac{2}{12} + \frac{1}{12}$
Ⓒ $\frac{4}{12} + \frac{3}{12} + \frac{2}{12} + \frac{1}{12}$
Ⓓ $\frac{5}{12} + \frac{4}{12} + \frac{3}{12} + \frac{2}{12} + \frac{1}{12}$

23. The perimeter of the rectangle shown below is 23 feet. What is the missing side length?



Ⓐ 14 feet
Ⓑ $7\frac{2}{4}$ feet
Ⓒ $7\frac{1}{4}$ feet
Ⓓ 7 feet

24. Mandy used the rule "Add 6" to make a pattern. She started with 20 and wrote the next 5 numbers in her pattern. Which number does **NOT** belong in Mandy's pattern?

Ⓐ 26
Ⓑ 32
Ⓒ 38
Ⓓ 43

Name _____

25. The sky ride at an amusement park spans 2,715 feet. Over the course of the day, Anna rode the sky ride 7 times. How many feet did she ride?

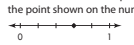
Ⓐ 14,025 feet
Ⓑ 15,500 feet
Ⓒ 19,005 feet
Ⓓ 21,000 feet

26. Find the quotient.

$463 \div 6$

Ⓐ 72
Ⓑ 77
Ⓒ 77 R1
Ⓓ 707 R1

27. Which fraction is **NOT** equivalent to the point shown on the number line?



Ⓐ $\frac{3}{5}$
Ⓑ $\frac{6}{10}$
Ⓒ $\frac{60}{100}$
Ⓓ $\frac{10}{12}$

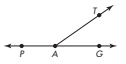
28. Hakim is making birdhouses. Each birdhouse uses $\frac{7}{8}$ yard of wood. What is the total length of wood Hakim will need to build 5 birdhouses?

Ⓐ $4\frac{3}{8}$ yards
Ⓑ $5\frac{7}{8}$ yards
Ⓒ $1\frac{4}{8}$ yards
Ⓓ $9\frac{2}{8}$ yards

29. Liam bought pizza and wings for $27.58. How much change should Liam receive if he gave the clerk three $10-bills? Use coins and bills to help solve.

Ⓐ $1.52
Ⓑ $2.42
Ⓒ $2.52
Ⓓ $12.42

30. Which geometric term describes $\angle TAG$?



Ⓐ Acute
Ⓑ Obtuse
Ⓒ Right
Ⓓ Straight

Name _____

31. Which are the partial products of $3{,}706 \times 4$?

Ⓐ 1,200 280 10
Ⓑ 1,200 280 24
Ⓒ 12,000 2,800 24
Ⓓ 12,000 280 24

32. Find the product.

57×34

Ⓐ 399
Ⓑ 1,238
Ⓒ 1,921
Ⓓ 1,938

33. Which lists all the factors of 78?

Ⓐ 1, 2, 3, 6, 13, 26, 39, 78
Ⓑ 1, 2, 4, 19, 39, 78
Ⓒ 1, 2, 6, 13, 39, 78
Ⓓ 2, 3, 6, 13, 26, 39

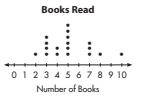
34. Classify the triangle by its sides and by its angles.

Ⓐ Isosceles, Obtuse
Ⓑ Scalene, Obtuse
Ⓒ Isosceles, Acute
Ⓓ Scalene, Acute

35. A tree was 17 feet tall when it was planted. It grew 8 times that height in 15 years. How much taller is the tree than when it was planted?

Ⓐ 119 feet
Ⓑ 136 feet
Ⓒ 247 feet
Ⓓ 255 feet

36. The line plot shows the number of books the students in Mrs. Kellogg's class read last week. How many students read 7 or more books?



Ⓐ 18 students
Ⓑ 13 students
Ⓒ 5 students
Ⓓ 4 students

ONLINE PLACEMENT TEST
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Assessment

RtI Item Analysis for Diagnosis and Intervention

Item	© Standard	MDIS	Item	© Standard	MDIS	Item	© Standard	MDIS
1	4.NBT.A.1, MP.7	F8	13	4.NBT.B.4	G18	25	4.NBT.B.5	G49
2	4.NBT.B.5	G68	14	4.OA.A.3, MP.1	G51	26	4.NBT.B.6	G54
3	4.NBT.B.5	G46	15	4.OA.A.3	G46	27	4.NF.A.1	H9
4	4.OA.B.4	G63	16	4.MD.A.2	I31	28	4.NF.B.4c	H47
5	4.NF.B.3d	H45	17	4.MD.A.1	I70	29	4.MD.A.2	G12
6	4.MD.B.4	I60	18	4.OA.C.5, MP.2	F24	30	4.G.A.1	I3
7	4.NBT.A.3	F9	19	4.NBT.B.4	G19	31	4.NBT.B.5	G45
8	4.NBT.B.5	G66	20	4.MD.C.5b	I18	32	4.NBT.B.5	G68
9	4.NBT.B.6	G43	21	4.NF.B.3d	H39	33	4.OA.B.4	G57
10	4.NF.A.2	H11	22	4.NF.B.3b	H40	34	4.G.A.2	G46
11	4.NF.C.7	H30	23	4.MD.A.3, MP.6	I41	35	4.OA.A.3	G43
12	4.G.A.3	I10	24	4.OA.C.5	F25	36	4.MD.B.4	I60

TOPIC 1

BASIC-FACTS TIMED TESTS

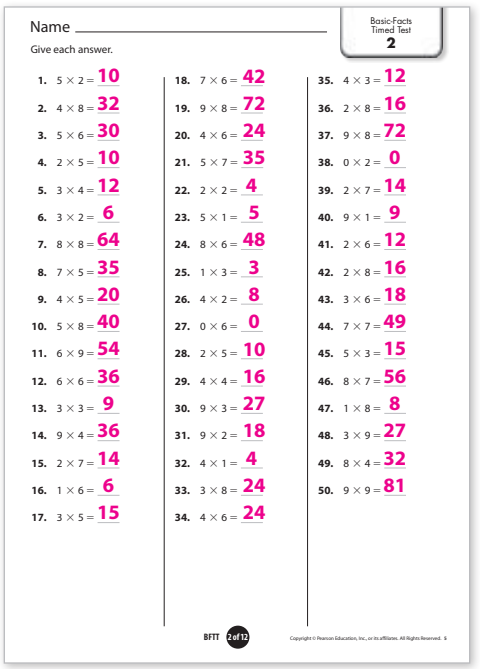
Basic-Facts Timed Tests, 1–6

Name _____ Basic-Facts Timed Test 1

Give each answer.

1. 2 + 6 = 8	18. 7 + 4 = 11	35. 8 − 8 = 0
2. 4 + 3 = 7	19. 9 + 7 = 16	36. 5 − 3 = 2
3. 2 + 4 = 6	20. 9 + 4 = 13	37. 14 − 8 = 6
4. 8 + 9 = 17	21. 7 + 8 = 15	38. 7 − 4 = 3
5. 9 + 1 = 10	22. 4 + 4 = 8	39. 9 − 9 = 0
6. 6 + 4 = 10	23. 7 + 7 = 14	40. 5 − 5 = 0
7. 7 + 9 = 16	24. 5 + 6 = 11	41. 12 − 7 = 5
8. 3 + 5 = 8	25. 7 + 1 = 8	42. 6 − 6 = 0
9. 5 + 8 = 13	26. 10 − 3 = 7	43. 9 − 3 = 6
10. 6 + 9 = 15	27. 4 − 0 = 4	44. 7 − 6 = 1
11. 2 + 2 = 4	28. 8 − 4 = 4	45. 6 − 2 = 4
12. 9 + 3 = 12	29. 9 − 3 = 6	46. 7 − 5 = 2
13. 3 + 3 = 6	30. 8 − 0 = 8	47. 11 − 4 = 7
14. 4 + 2 = 6	31. 7 − 6 = 1	48. 10 − 6 = 4
15. 7 + 2 = 9	32. 2 − 1 = 1	49. 2 − 1 = 1
16. 3 + 9 = 12	33. 8 − 5 = 3	50. 6 − 3 = 3
17. 7 + 3 = 10	34. 6 − 1 = 5	

BFTT 1 of 12



Name _____ Basic-Facts Timed Test 2

Give each answer.

1. 5 × 2 = 10	18. 7 × 6 = 42	35. 4 × 3 = 12
2. 4 × 8 = 32	19. 9 × 8 = 72	36. 2 × 8 = 16
3. 5 × 6 = 30	20. 4 × 6 = 24	37. 9 × 8 = 72
4. 2 × 5 = 10	21. 5 × 7 = 35	38. 0 × 2 = 0
5. 3 × 4 = 12	22. 2 × 2 = 4	39. 2 × 7 = 14
6. 3 × 2 = 6	23. 5 × 1 = 5	40. 9 × 1 = 9
7. 8 × 8 = 64	24. 8 × 6 = 48	41. 2 × 6 = 12
8. 7 × 5 = 35	25. 1 × 3 = 3	42. 2 × 8 = 16
9. 4 × 5 = 20	26. 4 × 2 = 8	43. 3 × 6 = 18
10. 5 × 8 = 40	27. 0 × 6 = 0	44. 7 × 7 = 49
11. 6 × 9 = 54	28. 2 × 5 = 10	45. 5 × 3 = 15
12. 6 × 6 = 36	29. 4 × 4 = 16	46. 8 × 7 = 56
13. 3 × 3 = 9	30. 9 × 3 = 27	47. 1 × 8 = 8
14. 9 × 4 = 36	31. 9 × 2 = 18	48. 3 × 9 = 27
15. 2 × 7 = 14	32. 4 × 1 = 4	49. 8 × 4 = 32
16. 1 × 6 = 6	33. 3 × 8 = 24	50. 9 × 9 = 81
17. 3 × 5 = 15	34. 4 × 6 = 24	

BFTT 2 of 12

Name _____ Basic-Facts Timed Test 3

Give each answer.

1. 24 ÷ 4 = 6	18. 36 ÷ 6 = 6	35. 35 ÷ 7 = 5
2. 54 ÷ 6 = 9	19. 16 ÷ 2 = 8	36. 30 ÷ 6 = 5
3. 21 ÷ 3 = 7	20. 35 ÷ 5 = 7	37. 56 ÷ 7 = 8
4. 21 ÷ 7 = 3	21. 14 ÷ 2 = 7	38. 0 ÷ 9 = 0
5. 15 ÷ 5 = 3	22. 3 ÷ 3 = 1	39. 18 ÷ 2 = 9
6. 45 ÷ 9 = 5	23. 7 ÷ 7 = 1	40. 42 ÷ 6 = 7
7. 24 ÷ 3 = 8	24. 12 ÷ 6 = 2	41. 18 ÷ 9 = 2
8. 40 ÷ 5 = 8	25. 6 ÷ 3 = 2	42. 7 ÷ 1 = 7
9. 27 ÷ 9 = 3	26. 48 ÷ 6 = 8	43. 18 ÷ 3 = 6
10. 8 ÷ 2 = 4	27. 25 ÷ 5 = 5	44. 20 ÷ 5 = 4
11. 49 ÷ 7 = 7	28. 18 ÷ 6 = 3	45. 12 ÷ 3 = 4
12. 12 ÷ 4 = 3	29. 20 ÷ 4 = 5	46. 28 ÷ 7 = 4
13. 63 ÷ 9 = 7	30. 40 ÷ 5 = 8	47. 81 ÷ 9 = 9
14. 4 ÷ 2 = 2	31. 10 ÷ 2 = 5	48. 12 ÷ 6 = 2
15. 36 ÷ 4 = 9	32. 6 ÷ 1 = 6	49. 25 ÷ 5 = 5
16. 16 ÷ 8 = 2	33. 21 ÷ 3 = 7	50. 32 ÷ 8 = 4
17. 36 ÷ 9 = 4	34. 72 ÷ 9 = 8	

BFTT 3 of 12

Name _____ Basic-Facts Timed Test 4

Give each answer.

1. 8 × 3 = 24	18. 36 ÷ 4 = 9	35. 4 × 6 = 24
2. 8 ÷ 1 = 8	19. 5 × 4 = 20	36. 64 ÷ 8 = 8
3. 9 × 6 = 54	20. 35 ÷ 7 = 5	37. 7 × 7 = 49
4. 48 ÷ 6 = 8	21. 5 × 3 = 15	38. 0 ÷ 4 = 0
5. 7 × 4 = 28	22. 6 ÷ 1 = 6	39. 5 × 5 = 25
6. 45 ÷ 5 = 9	23. 7 × 8 = 56	40. 45 ÷ 9 = 5
7. 5 × 5 = 25	24. 21 ÷ 3 = 7	41. 1 × 3 = 3
8. 40 ÷ 8 = 5	25. 6 × 2 = 12	42. 3 ÷ 3 = 1
9. 9 × 4 = 36	26. 48 ÷ 8 = 6	43. 4 × 9 = 36
10. 8 ÷ 4 = 2	27. 4 × 5 = 20	44. 35 ÷ 7 = 5
11. 9 × 9 = 81	28. 8 ÷ 4 = 2	45. 3 × 6 = 18
12. 15 ÷ 5 = 3	29. 4 × 6 = 24	46. 21 ÷ 3 = 7
13. 6 × 6 = 36	30. 36 ÷ 9 = 4	47. 9 × 1 = 9
14. 40 ÷ 5 = 8	31. 2 × 2 = 4	48. 6 ÷ 3 = 2
15. 8 × 2 = 16	32. 5 ÷ 1 = 5	49. 4 × 4 = 16
16. 24 ÷ 4 = 6	33. 3 × 3 = 9	50. 12 ÷ 3 = 4
17. 8 × 9 = 72	34. 54 ÷ 9 = 6	

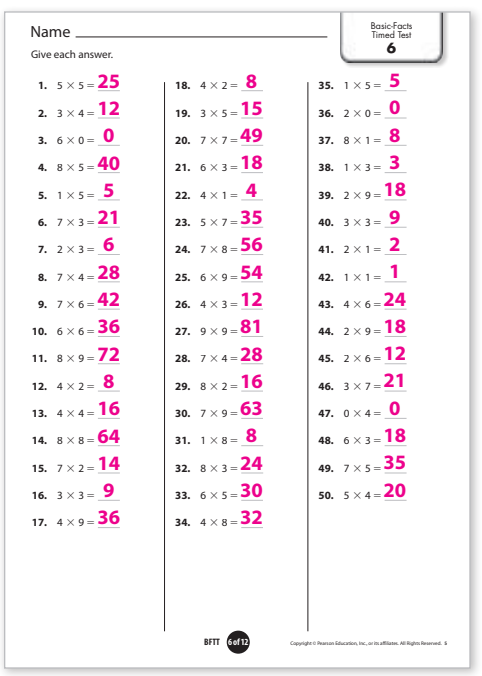
BFTT 4 of 12

Name _____ Basic-Facts Timed Test 5

Give each answer.

1. 4 + 3 = 7	18. 10 − 4 = 6	35. 7 + 1 = 8
2. 8 + 9 = 17	19. 11 − 8 = 3	36. 9 + 3 = 12
3. 5 − 1 = 4	20. 8 + 5 = 13	37. 10 − 8 = 2
4. 2 + 3 = 5	21. 14 − 9 = 5	38. 8 − 3 = 5
5. 11 − 3 = 8	22. 6 + 5 = 11	39. 8 + 1 = 9
6. 4 + 4 = 8	23. 9 + 9 = 18	40. 5 + 2 = 7
7. 9 − 2 = 7	24. 6 + 8 = 14	41. 10 − 1 = 9
8. 8 + 8 = 16	25. 16 − 8 = 8	42. 1 + 4 = 5
9. 6 + 7 = 13	26. 9 − 3 = 6	43. 11 − 4 = 7
10. 3 + 2 = 5	27. 8 + 6 = 14	44. 14 − 7 = 7
11. 1 + 6 = 7	28. 13 − 4 = 9	45. 16 − 8 = 8
12. 4 + 9 = 13	29. 8 + 4 = 12	46. 14 − 5 = 9
13. 10 − 7 = 3	30. 14 − 6 = 8	47. 3 + 7 = 10
14. 4 − 2 = 2	31. 6 + 3 = 9	48. 12 − 9 = 3
15. 9 − 5 = 4	32. 10 − 6 = 4	49. 4 + 7 = 11
16. 4 − 3 = 1	33. 12 − 3 = 9	50. 9 − 4 = 5
17. 7 + 2 = 9	34. 12 − 4 = 8	

BFTT 5 of 12



Name _____ Basic-Facts Timed Test 6

Give each answer.

1. 5 × 5 = 25	18. 4 × 2 = 8	35. 1 × 5 = 5
2. 3 × 4 = 12	19. 3 × 5 = 15	36. 2 × 0 = 0
3. 6 × 0 = 0	20. 7 × 7 = 49	37. 8 × 1 = 8
4. 8 × 5 = 40	21. 6 × 3 = 18	38. 1 × 3 = 3
5. 1 × 5 = 5	22. 4 × 1 = 4	39. 2 × 9 = 18
6. 7 × 3 = 21	23. 5 × 7 = 35	40. 3 × 3 = 9
7. 2 × 3 = 6	24. 7 × 8 = 56	41. 2 × 1 = 2
8. 7 × 4 = 28	25. 6 × 9 = 54	42. 1 × 1 = 1
9. 7 × 6 = 42	26. 4 × 3 = 12	43. 4 × 6 = 24
10. 6 × 6 = 36	27. 9 × 9 = 81	44. 2 × 9 = 18
11. 8 × 9 = 72	28. 7 × 4 = 28	45. 2 × 6 = 12
12. 4 × 2 = 8	29. 8 × 2 = 16	46. 3 × 7 = 21
13. 4 × 4 = 16	30. 7 × 9 = 63	47. 0 × 4 = 0
14. 8 × 8 = 64	31. 1 × 8 = 8	48. 6 × 3 = 18
15. 7 × 2 = 14	32. 8 × 3 = 24	49. 7 × 5 = 35
16. 3 × 3 = 9	33. 6 × 5 = 30	50. 5 × 4 = 20
17. 4 × 9 = 36	34. 4 × 8 = 32	

BFTT 6 of 12

Basic-Facts Timed Tests, 7–12

Name _____ Basic-Facts Timed Test 7

Give each answer.

1. 18 ÷ 6 = 3	18. 36 ÷ 4 = 9	35. 16 ÷ 2 = 8
2. 35 ÷ 5 = 7	19. 16 ÷ 2 = 8	36. 30 ÷ 6 = 5
3. 12 ÷ 4 = 3	20. 6 ÷ 1 = 6	37. 18 ÷ 3 = 6
4. 45 ÷ 9 = 5	21. 40 ÷ 5 = 8	38. 72 ÷ 9 = 8
5. 35 ÷ 5 = 7	22. 54 ÷ 9 = 6	39. 56 ÷ 7 = 8
6. 24 ÷ 8 = 3	23. 27 ÷ 9 = 3	40. 18 ÷ 2 = 9
7. 3 ÷ 3 = 1	24. 20 ÷ 5 = 4	41. 27 ÷ 9 = 3
8. 0 ÷ 8 = 0	25. 25 ÷ 5 = 5	42. 28 ÷ 4 = 7
9. 2 ÷ 2 = 1	26. 24 ÷ 4 = 6	43. 15 ÷ 5 = 3
10. 12 ÷ 2 = 6	27. 15 ÷ 3 = 5	44. 12 ÷ 4 = 3
11. 9 ÷ 3 = 3	28. 28 ÷ 7 = 4	45. 27 ÷ 3 = 9
12. 32 ÷ 4 = 8	29. 12 ÷ 6 = 2	46. 42 ÷ 6 = 7
13. 63 ÷ 9 = 7	30. 24 ÷ 3 = 8	47. 63 ÷ 7 = 9
14. 14 ÷ 2 = 7	31. 18 ÷ 9 = 2	48. 56 ÷ 8 = 7
15. 3 ÷ 3 = 1	32. 48 ÷ 8 = 6	49. 21 ÷ 7 = 3
16. 16 ÷ 4 = 4	33. 35 ÷ 7 = 5	50. 54 ÷ 6 = 9
17. 45 ÷ 5 = 9	34. 24 ÷ 6 = 4	

BFTT 7 of 12

Name _____ Basic-Facts Timed Test 8

Give each answer.

1. 6 ÷ 6 = 1	18. 4 + 4 = 8	35. 24 ÷ 8 = 3
2. 2 + 1 = 3	19. 12 − 4 = 8	36. 4 × 9 = 36
3. 5 − 1 = 4	20. 4 × 6 = 24	37. 5 + 4 = 9
4. 9 × 9 = 81	21. 5 ÷ 5 = 1	38. 11 − 4 = 7
5. 15 ÷ 3 = 5	22. 6 × 1 = 6	39. 5 + 2 = 7
6. 8 × 8 = 64	23. 6 + 8 = 14	40. 8 × 2 = 16
7. 7 × 6 = 42	24. 3 × 4 = 12	41. 8 − 3 = 5
8. 16 − 7 = 9	25. 2 + 3 = 5	42. 9 − 4 = 5
9. 24 ÷ 4 = 6	26. 5 + 5 = 10	43. 5 + 7 = 12
10. 4 × 8 = 32	27. 4 × 2 = 8	44. 81 ÷ 9 = 9
11. 20 ÷ 4 = 5	28. 4 ÷ 2 = 2	45. 3 × 3 = 9
12. 4 × 4 = 16	29. 3 × 3 = 9	46. 11 − 6 = 5
13. 9 + 3 = 12	30. 6 + 6 = 12	47. 6 × 3 = 18
14. 9 × 3 = 27	31. 6 × 6 = 36	48. 42 ÷ 7 = 6
15. 12 − 5 = 7	32. 1 + 9 = 10	49. 9 + 9 = 18
16. 11 − 4 = 7	33. 54 ÷ 6 = 9	50. 3 × 9 = 27
17. 8 × 3 = 24	34. 9 × 5 = 45	

BFTT 8 of 12

Name _____ Basic-Facts Timed Test 9

Give each answer.

1. 4 × 4 = 16	18. 5 + 4 = 9	35. 8 × 2 = 16
2. 6 + 6 = 12	19. 6 × 9 = 54	36. 3 + 6 = 9
3. 2 × 6 = 12	20. 4 × 2 = 8	37. 9 × 1 = 9
4. 2 + 8 = 10	21. 2 × 7 = 14	38. 1 + 2 = 3
5. 3 × 6 = 18	22. 7 + 9 = 16	39. 2 × 9 = 18
6. 4 + 3 = 7	23. 5 × 5 = 25	40. 1 + 4 = 5
7. 4 × 4 = 16	24. 9 × 5 = 45	41. 4 × 9 = 36
8. 9 × 9 = 81	25. 3 + 9 = 12	42. 2 × 2 = 4
9. 3 + 9 = 12	26. 7 + 7 = 14	43. 3 + 2 = 5
10. 4 × 8 = 32	27. 4 + 1 = 5	44. 9 + 9 = 18
11. 1 × 6 = 6	28. 2 + 5 = 7	45. 7 × 7 = 49
12. 4 × 7 = 28	29. 1 + 9 = 10	46. 9 × 8 = 72
13. 8 + 1 = 9	30. 5 × 8 = 40	47. 3 + 4 = 7
14. 6 × 7 = 42	31. 3 + 3 = 6	48. 1 × 7 = 7
15. 0 × 7 = 0	32. 3 × 0 = 0	49. 8 × 7 = 56
16. 7 × 9 = 63	33. 2 × 8 = 16	50. 5 × 7 = 35
17. 7 + 4 = 11	34. 1 + 6 = 7	

BFTT 9 of 12

Name _____ Basic-Facts Timed Test 10

Give each answer.

1. 14 − 6 = 8	18. 15 − 6 = 9	35. 27 ÷ 3 = 9
2. 9 − 3 = 6	19. 8 − 2 = 6	36. 35 ÷ 5 = 7
3. 12 − 4 = 8	20. 16 − 9 = 7	37. 5 ÷ 1 = 5
4. 7 − 0 = 7	21. 6 − 1 = 5	38. 21 ÷ 3 = 7
5. 14 − 5 = 9	22. 15 − 8 = 7	39. 16 ÷ 4 = 4
6. 15 − 9 = 6	23. 8 − 8 = 0	40. 15 ÷ 3 = 5
7. 16 − 8 = 8	24. 13 − 6 = 7	41. 49 ÷ 7 = 7
8. 9 − 5 = 4	25. 8 − 3 = 5	42. 9 ÷ 3 = 3
9. 10 − 4 = 6	26. 2 ÷ 2 = 1	43. 28 ÷ 4 = 7
10. 11 − 8 = 3	27. 30 ÷ 6 = 5	44. 45 ÷ 9 = 5
11. 13 − 12 = 1	28. 36 ÷ 9 = 4	45. 56 ÷ 7 = 8
12. 12 − 7 = 5	29. 24 ÷ 3 = 8	46. 35 ÷ 7 = 5
13. 11 − 3 = 8	30. 56 ÷ 8 = 7	47. 72 ÷ 8 = 9
14. 11 − 5 = 6	31. 48 ÷ 8 = 6	48. 54 ÷ 9 = 6
15. 9 − 2 = 7	32. 20 ÷ 4 = 5	49. 20 ÷ 4 = 5
16. 13 − 5 = 8	33. 8 ÷ 2 = 4	50. 12 ÷ 4 = 3
17. 8 − 4 = 4	34. 3 ÷ 3 = 1	

BFTT 10 of 12

Name _____ Basic-Facts Timed Test 11

Give each answer.

1. 9 + 9 = 18	18. 9 − 6 = 3	35. 7 + 2 = 9
2. 7 × 7 = 49	19. 4 + 6 = 10	36. 15 ÷ 3 = 5
3. 4 ÷ 2 = 2	20. 8 × 8 = 64	37. 8 × 2 = 16
4. 4 + 8 = 12	21. 3 + 5 = 8	38. 6 × 6 = 36
5. 2 × 7 = 14	22. 4 − 4 = 0	39. 4 + 2 = 6
6. 16 − 8 = 8	23. 1 × 7 = 7	40. 2 × 2 = 4
7. 3 − 3 = 0	24. 4 × 7 = 28	41. 3 − 3 = 0
8. 14 ÷ 7 = 2	25. 4 + 5 = 9	42. 9 − 8 = 1
9. 5 − 3 = 2	26. 2 + 9 = 11	43. 4 + 1 = 5
10. 5 × 5 = 25	27. 8 × 2 = 16	44. 64 ÷ 8 = 8
11. 11 − 8 = 3	28. 4 × 3 = 12	45. 5 ÷ 5 = 25
12. 15 − 9 = 6	29. 9 + 8 = 17	46. 11 − 5 = 6
13. 6 × 7 = 42	30. 5 + 5 = 10	47. 42 ÷ 7 = 6
14. 6 + 9 = 15	31. 9 + 4 = 13	48. 6 + 6 = 12
15. 15 ÷ 5 = 3	32. 11 − 6 = 5	49. 49 ÷ 7 = 7
16. 10 − 6 = 4	33. 3 ÷ 1 = 3	50. 3 × 6 = 18
17. 4 × 2 = 8	34. 3 × 4 = 12	

BFTT 11 of 12

Name _____ Basic-Facts Timed Test 12

Give each answer.

1. 4 × 3 = 12	18. 6 + 2 = 8	35. 7 + 1 = 8
2. 12 ÷ 2 = 6	19. 12 − 8 = 4	36. 32 ÷ 8 = 4
3. 6 + 9 = 15	20. 5 × 5 = 25	37. 4 + 3 = 7
4. 3 × 4 = 12	21. 28 ÷ 4 = 7	38. 6 × 2 = 12
5. 4 × 7 = 28	22. 6 − 6 = 0	39. 4 × 5 = 20
6. 3 − 1 = 2	23. 11 − 9 = 2	40. 3 × 5 = 15
7. 18 ÷ 3 = 6	24. 5 × 4 = 20	41. 4 + 7 = 11
8. 12 − 9 = 3	25. 2 + 8 = 10	42. 12 − 7 = 5
9. 24 ÷ 4 = 6	26. 4 + 5 = 9	43. 4 × 1 = 4
10. 5 × 8 = 40	27. 16 ÷ 4 = 4	44. 20 ÷ 5 = 4
11. 8 − 5 = 3	28. 2 × 4 = 8	45. 9 × 3 = 27
12. 3 × 9 = 27	29. 4 × 6 = 24	46. 14 − 9 = 5
13. 3 × 7 = 21	30. 5 − 3 = 2	47. 8 × 8 = 64
14. 72 ÷ 9 = 8	31. 3 + 8 = 11	48. 3 + 8 = 11
15. 7 − 6 = 1	32. 1 + 5 = 6	49. 2 + 9 = 11
16. 6 − 1 = 5	33. 48 ÷ 8 = 6	50. 7 × 8 = 56
17. 4 × 7 = 28	34. 4 × 8 = 32	

BFTT 12 of 12

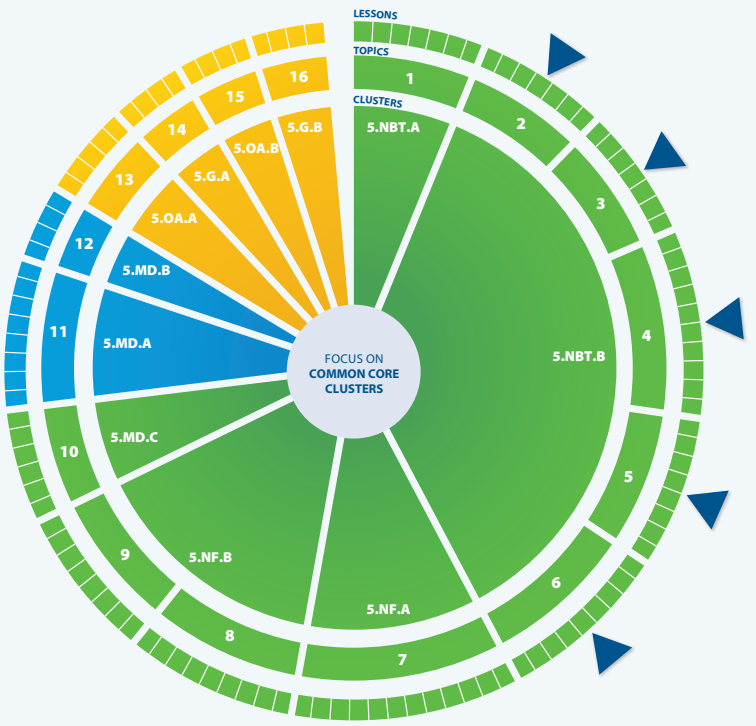
TOPICS 2–6

MAJOR CLUSTER 5.NBT.B

MATH BACKGROUND: FOCUS

FCR FOCUS | COHERENCE | RIGOR

MAJOR CLUSTER | SUPPORTING CLUSTER | ADDITIONAL CLUSTER



TOPIC 2 Add and Subtract Decimals to Hundredths

TOPIC 3 Fluently Multiply Multi-Digit Whole Numbers

TOPIC 4 Use Models and Strategies to Multiply Decimals

TOPIC 5 Use Models and Strategies to Divide Whole Numbers

TOPIC 6 Use Models and Strategies to Divide Decimals

TOPICS 2, 3, 4, 5, AND 6 FOCUS ON

MAJOR CLUSTER 5.NBT.B

Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Focus in enVisionmath2.0

Topics 2, 3, 4, 5, and 6 focus on deep understanding of whole-number and decimal operations. Students use the standard multiplication algorithm to fluently multiply multi-digit numbers. They use models and strategies, including standard algorithms, to divide with 2-digit divisors and to perform all four operations on decimals through hundredths.

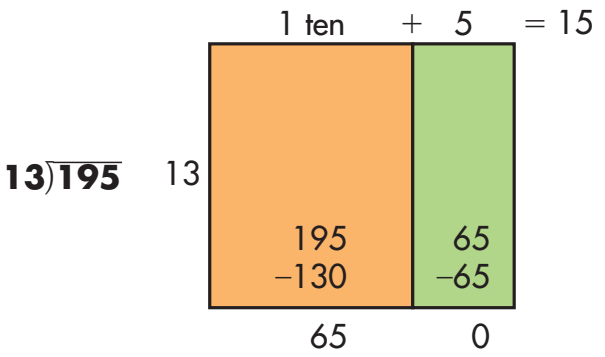
MULTIPLY AND DIVIDE WHOLE NUMBERS

- **Fluently Multiply with the Standard Algorithm**
  In Lesson 3-1, students use patterns to multiply by powers of 10. In Lesson 3-2, students estimate products. Lessons 3-3, 3-4, and 3-5 focus on developing fluency using the standard algorithm for multiplying multi-digit whole numbers. (5.NBT.B.5)

$$\begin{array}{r} {\scriptstyle 2} \\ 208 \\ \times\ \ 31 \\ \hline 208 \\ +\ 6240 \\ \hline 6{,}448 \end{array}$$

Add the Partial Products.

- **Divide Using Models and Partial Quotients**
  Lesson 5-1 uses patterns to divide by multiples of 10. In Lesson 5-2, students estimate quotients. In Lesson 5-3, students use an area model and the relationship between multiplication and division to find quotients of multi-digit whole numbers.



In Lesson 5-4, students use partial quotients to divide. (5.NBT.B.6)

Content Focus in enVisionmath2.0 (continued)

- **Divide Using the Standard Algorithm** Lessons 5-5, 5-6, and 5-7 develop the standard algorithm for dividing multi-digit whole numbers. (5.NBT.B.6)

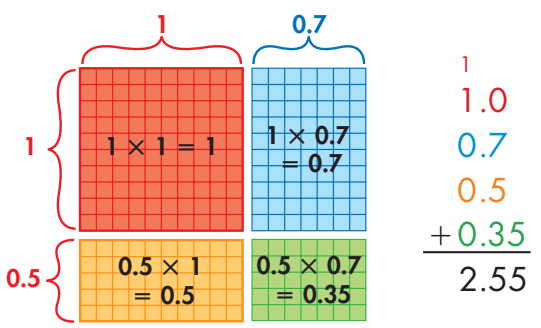
Standard Division Algorithm
Step 1 Divide
Step 2 Multiply
Step 3 Subtract
Step 4 Bring down the next digit

ADD, SUBTRACT, MULTIPLY, AND DIVIDE DECIMALS

- **Use Place Value to Add and Subtract Decimals** In Topic 2, students learn how to add and subtract decimals to hundredths using place-value understandings. They start with mental math in Lesson 2-1 and estimation in Lesson 2-2. They use models in Lesson 2-3 and then focus on the standard algorithms in Lessons 2-4, 2-5, and 2-6. (5.NBT.B.7)

$$\begin{array}{r} {}^{8}\,{}^{12} \\ 5.\not{9}\,\not{2} \\ -\,4.\,3\,7 \\ \hline 1.\,5\,5 \end{array}$$

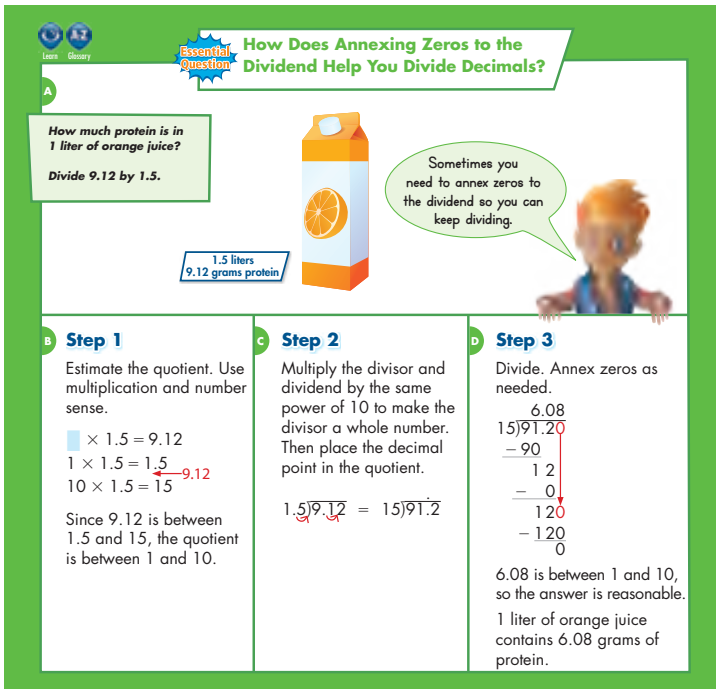
- **Models and Strategies for Multiplying Decimals** In Topic 4, students use area models, number patterns, number sense, and properties to multiply a decimal by a whole number or another decimal.



$$\begin{array}{r} {}^{1} \\ 1.0 \\ 0.7 \\ 0.5 \\ +\,0.35 \\ \hline 2.55 \end{array}$$

The standard algorithm is explicitly taught in Lessons 4-4 and 4-9. (5.NBT.B.7)

- **Strategies for Dividing Decimals** In Topic 6, students use area models, number patterns, and number sense to understand dividing a decimal by a whole number or another decimal. The standard algorithm is explicitly taught in Lessons 6-4, 6-5, and 6-8. (5.NBT.B.7)



PD **Professional Development Videos** Topic Overview Videos and Listen and Look For Lesson Videos present additional important information about the content of this cluster.

TOPICS 2–6

MAJOR CLUSTER 5.NBT.B

MATH BACKGROUND: COHERENCE

FOCUS | FCR COHERENCE | RIGOR

Content Coherence in enVisionmath2.0

Students learn best when ideas are connected in a coherent curriculum. This coherence is achieved through various types of connections including connections within clusters, across clusters, across domains, and across grades.

BIG IDEAS IN GRADES K–6

Big Ideas are the conceptual underpinnings of **enVision**math**2.0** and provide conceptual cohesion of the content. Big Ideas connect Essential Understandings throughout the program.

A Big Idea that connects most of the work in this cluster is that there are algorithms for performing each of the operations with rational numbers. Strategies and algorithms involving both mental math and paper and pencil use equivalence to transform expressions in order to perform more efficient calculations.

$$\begin{array}{rr} & 9.5 \\ & \times\ 5.6 \\ \hline 0.6 \times 0.5 = & 0.30 \\ 0.6 \times 9 = & 5.4 \\ 5 \times 0.5 = & 2.5 \\ 5 \times 9 = & 45 \\ \hline & 53.2 \end{array}$$

For a complete list of Big Ideas, see pages 110–111 in the *Teacher's Edition Program Overview*.

LOOK BACK

How do Topics 2–6 connect to what students learned earlier?

GRADE 4

- **Whole-Number Operations** Students used place-value understanding and properties of operations to perform multi-digit arithmetic. They developed fluency with addition and subtraction in Topic 2, used strategies to multiply multi-digit numbers in Topics 3 and 4, and used strategies to divide up to 4-digit numbers by 1-digit numbers in Topic 5. (4.NBT.B.4, 4.NBT.B.5)

$$\begin{array}{rl} & 591\ \text{R}1 \\ 8\overline{)4{,}729} & \\ -\ 40 & \\ \hline 72 & \\ -\ 72 & \\ \hline 09 & \\ -\ 8 & \\ \hline 1 & \end{array}$$

47 hundreds ÷ 8 is about 5 hundreds.
$8 \times 5 = 40$
72 tens ÷ 8 is 9 tens.
$8 \times 9 = 72$
9 ones ÷ 8 is about 1 one.
$8 \times 1 = 8$

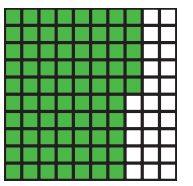
- **Fraction Multiplication** In Topic 10, students extended their understanding of multiplication to multiply a whole number by a fraction. (4.NF.B.4)

- **Decimal Notation** In Topic 12, students learned decimal notation for fractions. (4.NF.C.6)

$\frac{1}{100} = 0.01$

$\frac{75}{100}$ is seventy-five hundredths, or 0.75.

$\frac{75}{100} = 0.75$



EARLIER IN GRADE 5

- **Decimal Place Value** In Topic 1, students learned how to write powers of 10 with exponents and how to multiply 1-digit numbers by a power of 10. They learned decimal place value to thousandths, and to round decimals to any place. (5.NBT.A)

TOPICS 2–6

How is content connected within Topics 2–6?

- **Multiplication with Whole Numbers and with Decimals** Whole-number multiplication in Topic 2 is connected to decimal multiplication in Topic 4. The algorithm for multiplying with decimals is similar to the algorithm for multiplying with whole numbers. To decide where to put the decimal point in the product, students must use properties, number sense, or estimation. (5.NBT.B.5, 5.NBT.B.7)

125	1.25	2 decimal places
× 7	× 0.7	1 decimal place
875	0.875	3 decimal places

- **Division with Whole Numbers and with Decimals** Whole-number division in Topic 5 is connected to decimal division in Topic 6. The algorithm for dividing with decimals is similar to the algorithm for dividing with whole numbers. To decide where to put the decimal point in the quotient, students consider an equivalent division problem by multiplying the divisor and the dividend by the same power of 10. (5.NBT.A.2, 5.NBT.B.6, 5.NBT.B.7)

$$1.5\overline{)9.12} = 15\overline{)91.2}$$

$$\begin{array}{r} 6.08 \\ 15\overline{)91.20} \\ -\,90 \\ \hline 1\,2 \\ -\;\;0 \\ \hline 1\,20 \\ -\,1\,20 \\ \hline 0 \end{array}$$

- **Use Place-Value Concepts** Topics 2, 3, 4, and 6 also develop content from Major Cluster 5.NBT.A on understanding the place-value system. (5.NBT.A.2, 5.NBT.A.4)

LOOK AHEAD

How do Topics 2–6 connect to what students will learn later?

LATER IN GRADE 5

- **Convert Measurements** In Topic 11, students will use multiplication and division of whole numbers and decimals to convert units within the customary or metric systems to solve measurement problems. (5.MD.A.1)

B A whistle has a mass of about 5 grams. How many milligrams is this?

To change from a larger unit to a smaller unit, multiply.

Find 5×10^3.

$5 \times 10^3 = 5 \times 1{,}000 = 5{,}000$

So, 5 g = 5,000 mg.

So, a whistle has a mass of about 5,000 milligrams.

GRADE 6

- **Evaluate Expressions** In Topic 1, students will use computations with whole numbers and decimals to evaluate numerical and algebraic expressions. (6.EE.A.1, 6.EE.A.2)

7. $4^2 - (3.1 + 6.4) + 4.5$

$4^2 - 9.5 + 4.5$

$16 - 9.5 + 4.5$

$6.5 + 4.5$

11

- **Fluency with Whole Numbers and Decimals** In Topic 6, students will develop fluency with dividing multi-digit whole numbers. (6.NS.B.2) In Topic 7, they will develop fluency with adding, subtracting, multiplying, and dividing decimals. (6.NS.B.3)

TOPICS 2–6

MAJOR CLUSTER 5.NBT.B

MATH BACKGROUND: RIGOR

FOCUS | COHERENCE | FCR RIGOR

Content Rigor in enVisionmath2.0

A rigorous curriculum emphasizes conceptual understanding, procedural skill and fluency, and applications.

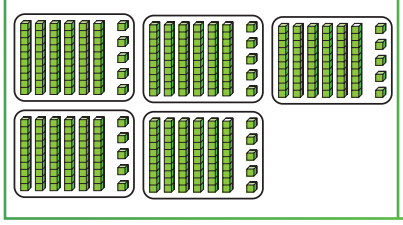
CONCEPTUAL UNDERSTANDING

- **Use Place Value and Properties to Add and Subtract Decimals** In Topic 2, students model and develop strategies for adding and subtracting decimals by applying what they know about the role of place value in whole-number addition and subtraction. (5.NBT.B.7)

- **Use Place Value and Properties to Multiply Decimals** In Topic 4, students model and develop strategies for multiplying decimals by using their understanding of place value, decimals as fractions, the multiplication algorithm for whole numbers, and the properties of multiplication. (5.NBT.B.7)

$$2.5 \times 3.25 = \frac{25}{10} \times \frac{325}{100}$$
$$= (25 \times 325) \times \left(\frac{1}{10} \times \frac{1}{100}\right)$$
$$= 8{,}125 \times \frac{1}{1{,}000}$$
$$= \frac{8{,}125}{1{,}000} = 8.125$$

- **Use Place Value and Properties to Divide Multi-digit Whole Numbers and Decimals** In Topics 5 and 6, students use their understanding of place value to develop models and strategies for dividing multi-digit whole numbers and decimals. (5.NBT.B.6, 5.NBT.B.7)

What You Show	What You Write
	0.6 5 **Think:** Each equal share has 6 tenths and 5 hundredths. 5)3.2 5 − 3 0 2 5 − 2 5 0

PROCEDURAL SKILL AND FLUENCY

Fluency with multiplying multi-digit whole numbers is an expectation of this cluster. (5.NBT.B.5)

- **Develop Fluency with Multiplying Multi-digit Whole Numbers** In Topic 3, students develop fluency with multiplying multi-digit whole numbers. (5.NBT.B.5)

- **Divide Multi-digit Whole Numbers** In Topic 5, students divide multi-digit whole numbers by 2-digit divisors. (5.NBT.B.6)

- **Perform Computations with Decimals** In Topics 2, 4, and 6, students use models, strategies based on place value, properties of operations, and the relationship between whole-number and decimal algorithms to learn written procedures for adding, subtracting, multiplying, and dividing decimals. (5.NBT.B.7)

APPLICATIONS

- **Solve Real-World Problems** Throughout Topics 2, 3, 4, 5, and 6, students add, subtract, multiply, and divide whole numbers and decimals to solve real-world problems. (5.NBT.B)

> Miranda mixed 34.5 fluid ounces of blue paint, 40.5 fluid ounces of red paint, and 2 fluid ounces of black paint to make purple paint. She poured the same amount of the purple paint into each of 14 jars. How much paint did she pour in each jar?

MAJOR CLUSTER 5.NBT.B

MATH PRACTICES

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MP

Connecting Math Practices and Content Standards in enVisionmath2.0

Math practices and content standards are connected within all lessons including the lessons that focus on math practices.

MATH PRACTICES WITHIN LESSONS

- **MP.1 Make sense of problems and persevere in solving them.**

  Students make sense of problems involving operations with whole numbers and decimals, plan how to solve them, and determine if their solutions make sense. (e.g., p. 200, Item 16)

- **MP.2 Reason abstractly and quantitatively.**

  Students use quantitative reasoning to estimate and perform mental math involving multi-digit whole numbers and decimals. (e.g., p. 60, Convince Me!)

- **MP.3 Construct viable arguments and critique the reasoning of others.**

  Students construct and critique their own and others' arguments to justify solutions to problems and computations involving whole numbers and decimals. (e.g., p. 72, Convince Me!)

- **MP.4 Model with mathematics.**

  Students model with math when they use bar diagrams and equations to represent problems involving whole numbers and decimals. (e.g., p. 198, Item 22)

- **MP.5 Use appropriate tools strategically.**

  Students use tools such as grid paper to represent whole numbers and decimals when solving problems. (e.g., p. 251, Solve and Share)

- **MP.6 Attend to precision.**

  Students attend to precision when they make clear explanations of solutions to problems involving decimals. (e.g., p. 61, Item 1)

- **MP.7 Look for and make use of structure.**

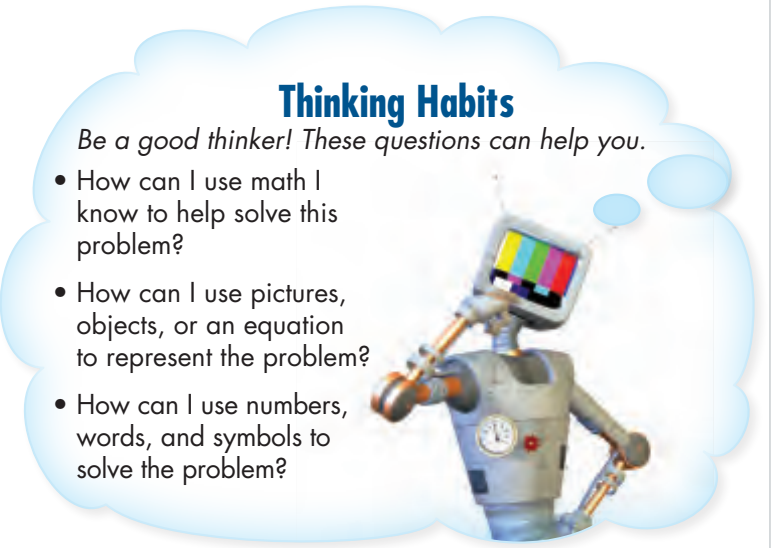
  Students use structure when they apply place-value relationships and properties of operations to compare solutions. (e.g., p. 340, Item 28)

- **MP.8 Look for and express regularity in repeated reasoning.**

  Students use repeated reasoning when they generalize operations with decimals based on their understanding of whole numbers. (e.g., p. 315, Item 2)

LESSONS THAT FOCUS ON MATH PRACTICES

- **Lessons 2-7 and 4-10** These lessons focus on MP.4. Students use the math they know to create bar diagrams and write equations to represent problems involving decimals.



- **Lesson 3-7** This lesson focuses on MP.3. Students use estimation to evaluate reasoning involving multi-digit multiplication.

- **Lesson 5-8** This lesson focuses on MP.1. Students make sense of how to solve problems involving 2-digit divisors.

- **Lesson 6-9** This lesson focuses on MP.2. Students identify what operations to use with decimal quantities.

For a list of Thinking Habits for MP.1, MP.2, and MP.3, see pp. F21–F23 of the Math Practices and Problem Solving Handbook in the Teacher's Edition.

Revisit the information about MP.1, MP.2, MP.3, and MP.4 in these other resources:

- **Math Practices and Problem Solving Handbook** before Topic 1; includes Math Practices Proficiency Rubrics.
- **Math Practices Posters** to display in your classroom

MP **Math Practices Animations,** one for each math practice, available at PearsonRealize.com.

TOPICS 2–6

MAJOR CLUSTER 5.NBT.B

DIFFERENTIATED INSTRUCTION

I Intervention O On-Level A Advanced

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Learn · Practice Buddy · Tools · Assessment · Games

Ongoing Intervention

1 RtI

During the core lesson, monitor progress, reteach as needed, and extend students' thinking.

Guiding Questions

- **In the Teacher's Edition** Guiding questions are used to monitor understanding during instruction.

Learn **Online Guiding Questions** Guiding questions are also in the online Visual Learning Animation Plus.

Prevent Misconceptions

This feature in the Teacher's Edition is embedded in the guiding questions.

Error Intervention: If... then...

This feature in the Teacher's Edition is provided during Guided Practice. It spotlights common errors and gives suggestions for addressing them.

Reteaching

Reteaching sets are at the end of the topic in the Student's Edition. They provide additional examples, reminders, and practice. Use these sets as needed before students do the Independent Practice.

Higher Order Thinking

These problems require students to think more deeply about the rich, conceptual knowledge developed in the lesson.

Practice Buddy Online

Practice Buddy Online auto-scored practice is provided for each lesson. On-screen learning aids include Help Me Solve This and View an Example.

Strategic Intervention

2 RtI

At the end of the lesson, assess to identify students' strengths and needs and then provide appropriate support.

Quick Check

In the Student's Edition Assess the lesson using 3 items checked in the Teacher's Edition.

Assessment **Online Quick Check** You can also assess the lesson using 5 online, machine-scored items.

Intervention Activity I

Teachers work with struggling students.

Reteach to Build Understanding I

This is a page of guided reteaching.

Technology Center I O A

Tools **Digital Math Tools Activities** reinforce the lesson content or previously taught content using a suite of digital math tools.

Games **Online Games** provide practice on the lesson content or previously taught content.

Homework and Practice I O A

Use the leveled assignment to provide differentiated homework and practice.

Additional resources to support differentiated instruction for on-level and advanced students include:

On-Level and Advanced Activity Centers O A

- **Center Games** are provided in on-level and advanced versions.
- **Math and Science Activity** is related to the topic science theme introduced at the start of the topic.
- **Problem-Solving Reading Mat** is used with a lesson-specific activity.

Intensive Intervention

3 RtI

As needed, provide more instruction that is on or below grade level for students who are struggling.

Math Diagnosis and Intervention System 2.0

- **Diagnosis** Use the diagnostic tests in the system. Also, use the item analysis charts given with program assessments at the start of a grade or topic, or at the end of a topic, group of topics, or the year.
- **Intervention Lessons** These two-page lessons include guided instruction followed by practice. The system includes lessons below, on, and above grade level.
- **Teacher Support** Teacher Notes provide the support needed to conduct a short lesson. The lesson focuses on vocabulary, concept development, and practice. The Teacher's Guide contains individual and class record forms and correlations to Student's Edition lessons.

Resources for Fluency Success

- A variety of print and digital resources are provided to ensure success on Common Core fluency standards. See Steps to Fluency Success on pages 109E–109H.

MAJOR CLUSTER 5.NBT.B

THE LANGUAGE OF MATH

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Glossary Games

English Language Learners

Provide ELL support through visual learning throughout the program, ELL instruction in every lesson, and additional ideas in an ELL Toolkit.

Visual Learning
The visual learning that is infused in **enVision**math**2.0** provides support for English language learners. This support includes a Visual Learning Animation Plus and a Visual Learning Bridge for each lesson.

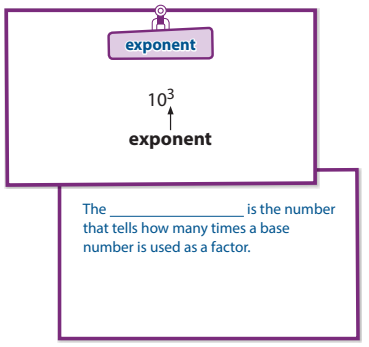
English Language Learners Instruction
Lessons provide instruction for English language learners at Beginning, Intermediate, and Advanced levels of English proficiency.

English Language Learners Toolkit
This resource provides professional development and resources for supporting English language learners.

Math Vocabulary

Build math vocabulary using the vocabulary cards, vocabulary activities, vocabulary review, and glossary plus the online glossary and vocabulary game.

My Word Cards
Vocabulary cards for a topic are provided in the Student's Edition. Students use the example on the front of the card to complete the definition on the back.



Vocabulary Activities
The Teacher's Edition provides vocabulary activities at the start of topics. These include activities for vocabulary in My Word Cards and/or activities for vocabulary in Review What You Know.

Vocabulary Review
A page of vocabulary review is provided at the end of each topic. It reviews vocabulary used in the topic.

Glossary
A glossary is provided at the back of the Student's Edition.

Animated Glossary
Glossary
An online, bilingual, animated glossary uses motion and sound to build understanding of math vocabulary.

Online Vocabulary Game
Games
An online vocabulary game is available in the Game Center.

Math and Reading

Connect reading and math using a data-filled reading mat for the topic with accompanying activity masters and guide.

Problem-Solving Reading Mats
There is a large, beautiful mat for each topic. At the start of the topic, help students become familiar with the mat and the vocabulary used by reading the mat aloud as students follow along. Use the Problem-Solving Reading Activity Guide for suggestions about how to use the mat.

Problem-Solving Reading Activity
At the end of some lessons, a Problem-Solving Reading Activity provides a page of math problems to solve by using the data on the mat.

TOPIC 2

TOPIC PLANNER

ADD AND SUBTRACT DECIMALS TO HUNDREDTHS

Lesson 2-1

MENTAL MATH pp. 59–64

Content Standard 5.NBT.B.7
Mathematical Practices MP.2, MP.3, MP.4, MP.6, MP.8

Objective Use properties of addition and strategies to solve problems mentally.

Essential Understanding There's more than one way to do a mental calculation. Mental addition and subtraction involve changing one or more numbers so that the calculations are easy to do.

Vocabulary Compatible numbers, Associative Property of Addition, Commutative Property of Addition, Compensation

ELL Listening: Learn new academic expressions.

Materials Decimal Place Value Charts (TT 6), markers, paper, tape

On-Level and Advanced Activity Centers
- Problem-Solving Reading Mat

Lesson 2-2

ESTIMATE SUMS AND DIFFERENCES pp. 65–70

Content Standards 5.NBT.B.7, 5.NBT.A.4
Mathematical Practices MP.2, MP.3, MP.4

Objective Use rounding or compatible numbers to estimate sums and differences.

Essential Understanding A sum or difference can be estimated by replacing numbers with other numbers that are easier to add or subtract mentally.

Vocabulary None

ELL Speaking: Speak using content area vocabulary in context.

Materials Red markers, paper, pencils

On-Level and Advanced Activity Centers
- Center Games

Lesson 2-3

USE MODELS TO ADD AND SUBTRACT DECIMALS pp. 71–76

Content Standard 5.NBT.B.7
Mathematical Practices MP.1, MP.3, MP.4, MP.5

Objective Model sums and differences of decimals.

Essential Understanding Models and algorithms for adding or subtracting multi-digit decimals are just an extension of models and algorithms for adding and subtracting whole numbers.

Vocabulary None

ELL Reading: Use reading supports, such as grids, to enhance comprehension of written text.

Materials Decimal grids (TT8), Decimal place-value chart (TT6), Place-Value Blocks (TT 4), Centimeter Grid Paper (TT9), scissors

On-Level and Advanced Activity Centers
- Math and Science Activity

LESSON RESOURCES

Digital
- Student's Edition
- Daily Common Core Review
- Reteach to Build Understanding
- Center Games
- Math and Science Activity
- Problem-Solving Reading Mat
- Problem-Solving Reading Activity

Print

Digital
- Listen and Look For PD Lesson Video
- Student's Edition eText
- Today's Challenge
- Solve & Share
- Visual Learning Animation Plus
- Animated Glossary
- Math Tools
- Practice Buddy Online Practice
- Quick Check
- Another Look Homework Video
- Math Games

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Digital

Lesson 2-4

ADD DECIMALS pp. 77–82

Content Standard 5.NBT.B.7
Mathematical Practices MP.2, MP.3, MP.4, MP.8

Objective Add decimals to the hundredths using the standard algorithm.

Essential Understanding Adding multi-digit decimals is similar to adding multi-digit whole numbers.

Vocabulary None

ELL Strategies: Use prior knowledge to generalize about new information.

Materials Decimal grids (TT 8), crayons or colored pencils

On-Level and Advanced Activity Centers
- Center Games

Lesson 2-5

SUBTRACT DECIMALS pp. 83–88

Content Standard 5.NBT.B.7
Mathematical Practices MP.1, MP.3, MP.4, MP.7, MP.8

Objective Subtract decimals to the hundredths using the standard algorithm.

Essential Understanding Subtracting multi-digit decimals is similar to subtracting multi-digit whole numbers.

Vocabulary None

ELL Reading: Use prereading supports such as graphic organizers to enhance comprehension of written text.

Materials None

On-Level and Advanced Activity Centers
- Math and Science Activity

Lesson 2-6

ADD AND SUBTRACT DECIMALS pp. 89–94

Content Standard 5.NBT.B.7
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.5, MP.7, MP.8

Objective Add and subtract decimals.

Essential Understanding Adding and subtracting decimals is similar to adding and subtracting whole numbers. Algorithms and models can be used to complete the calculations.

Vocabulary None

ELL Strategies: Use prior experiences to understand meanings.

Materials Decimal grids (TT 8), Index cards, Markers

On-Level and Advanced Activity Centers
- Problem-Solving Reading Mat

TOPIC RESOURCES

Digital

Start of Topic
- Math and Science Project
- Home-School Connection
- Review What You Know
- My Word Cards

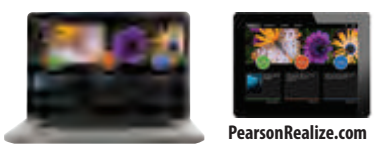
End of Topic
- Fluency Practice Activity
- Vocabulary Review
- Reteaching
- Topic Assessment
- Topic Performance Assessment

Print

Digital

Start of Topic
- Topic Overview PD Video

End of Topic
- Math Practices Animations
- Online Topic Assessment
- ExamView® Test Generator
- Practice Buddy Fluency Practice/Assessment



TOPIC 2

TOPIC PLANNER

ADD AND SUBTRACT DECIMALS TO HUNDREDTHS

Lesson 2-7

MATH PRACTICES AND PROBLEM SOLVING: MODEL WITH MATH
pp. 95–100

Mathematical Practices MP.4, Also MP.1, MP.2, MP.3
Content Standard 5.NBT.B.7

Objective Use prior math knowledge and equations or bar diagrams to solve problems.

Essential Understanding Good math thinkers choose and apply math they know to show and solve problems from everyday life.

Vocabulary None

ELL Reading: Use visual support to enhance understanding.

Materials None

On-Level and Advanced Activity Centers
- Center Games

Notes

TOPIC 2

TOPIC OPENER

ADD AND SUBTRACT DECIMALS TO HUNDREDTHS

TOPIC ESSENTIAL QUESTIONS

How can sums and differences of decimals be estimated? What are the standard procedures for adding and subtracting decimals? How can sums and differences be found mentally?

Revisit the Topic Essential Questions throughout the topic, and see a note about answering the questions in the Teacher's Edition for the Topic Assessment.

MATH AND SCIENCE PROJECT STEM

Science Theme The science theme for this project is **Producers and Consumers**. This theme will be revisited in the Math and Science Activities in Lessons 2-3 and 2-5, and in some lesson exercises.

A food web connects all living things. Without each producer, consumer, and decomposer, the food web falls apart and eventually everything is affected. Think about sharks, the kings of the ocean. If all other sea creatures ceased to exist, what would sharks eat?

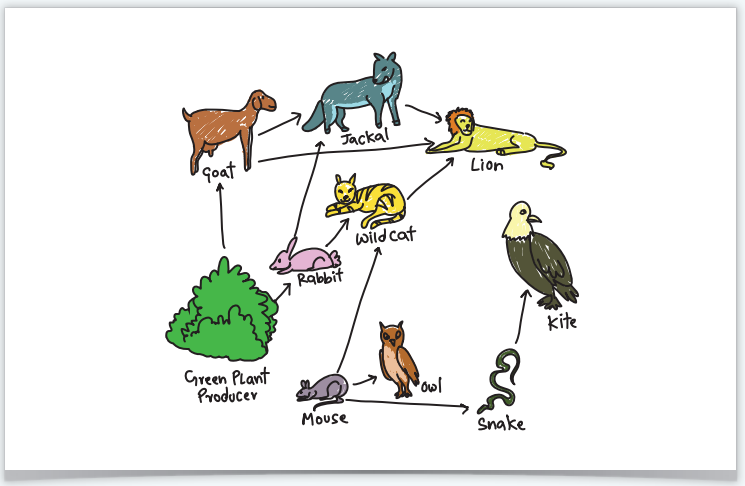
Consumers that eat only plants are called herbivores. Consumers that eat only other animals are called carnivores. Consumers that eat both plants and animals are called omnivores. Which kind of consumer are you?

Project-Based Learning Have students work on the **Math and Science Project** over the course of several days.

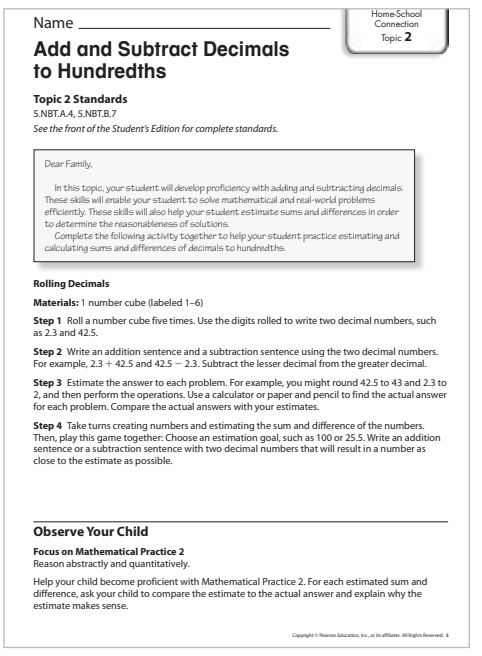
EXTENSION

Have students research the human food web. What do we, as humans, consume on a daily basis? What, if anything, do we produce?

Sample Student Work for Math and Science Project



Home-School Connection



Name _____

Home-School Connection Topic 2

Add and Subtract Decimals to Hundredths

Topic 2 Standards
5.NBT.A.4, 5.NBT.B.7
See the front of the Student's Edition for complete standards.

Dear Family,

In this topic, your student will develop proficiency with adding and subtracting decimals. These skills will enable your student to solve mathematical and real-world problems efficiently. These skills will also help your student estimate sums and differences in order to determine the reasonableness of solutions.

Complete the following activity together to help your student practice estimating and calculating sums and differences of decimals to hundredths.

Rolling Decimals

Materials: 1 number cube (labeled 1–6)

Step 1 Roll a number cube five times. Use the digits rolled to write two decimal numbers, such as 2.3 and 42.5.

Step 2 Write an addition sentence and a subtraction sentence using the two decimal numbers. For example, 2.3 + 42.5 and 42.5 − 2.3. Subtract the lesser decimal from the greater decimal.

Step 3 Estimate the answer to each problem. For example, you might round 42.5 to 43 and 2.3 to 2, and then perform the operations. Use a calculator or paper and pencil to find the actual answer for each problem. Compare the actual answers with your estimates.

Step 4 Take turns creating numbers and estimating the sum and difference of the numbers. Then, play this game together: Choose an estimation goal, such as 100 or 25.5. Write an addition sentence or a subtraction sentence with two decimal numbers that will result in a number as close to the estimate as possible.

Observe Your Child

Focus on Mathematical Practice 2
Reason abstractly and quantitatively.

Help your child become proficient with Mathematical Practice 2. For each estimated sum and difference, ask your child to compare the estimate to the actual answer and explain why the estimate makes sense.

Send this page home at the start of Topic 2 to give families an overview of the content in the topic.

Name _____

Review What You Know

Vocabulary

Choose the best term from the box. Write it on the blank.

- addend
- difference
- equivalent
- inverse operations
- round
- sum

1. The **difference** is the result of subtracting one number from another.
2. Two numbers or expressions that have the same value are **equivalent**.
3. The answer to an addition problem is the **sum**.
4. One way to estimate an answer is to **round** the numbers and then do the calculation.

Round Decimals

Round each number to the nearest tenth.

5. 74.362 **74.4**
6. 28.45 **28.5**
7. 13.09 **13.1**

Round each number to the nearest hundredth.

8. 43.017 **43.02**
9. 186.555 **186.56**
10. 222.222 **222.22**

Round each number to the underlined digit.

11. 8<u>4</u>.59 **85**
12. 2.9<u>4</u>8 **2.95**
13. 30.1<u>2</u>5 **30.13**

Addition and Subtraction with Regrouping

Find each sum or difference.

14. 9,536 + 495 **10,031**
15. 612 − 357 **255**
16. 5,052 − 761 **4,291**
17. Vivica sees that a printer costs $679 and a computer costs $1,358. What is the total cost of the printer and the computer? **$2,037**
18. The Pecos River is 926 miles long, and the Brazos River is 1,280 miles long. How many miles longer is the Brazos River than the Pecos River?

Ⓐ 2,206 miles Ⓑ 1,206 miles Ⓒ 364 miles ● 354 miles

Item Analysis for Diagnosis and Intervention

Item	Standard	MDIS
1–4	4.NBT.B.4	G2
5–13	5.NBT.A.4	H28
14–18	4.NBT.B.4	G15, G17

Topic 2 Vocabulary Words Activity

Use the Topic 11 activity on p. 632 with the Topic 2 words at the right.

My Word Cards

Use the examples for each word on the front of the card to help complete the definitions on the back.

compatible numbers

Estimate 547 + 294 and 547 − 294.
547 is about 550; 294 is about 300.
547 + 294 is about 550 + 300 = 850.
547 − 294 is about 550 − 300 = 250.

compensation

Find 648 + 325.
↓ Add 2
650 + 325 = 975
↓ Subtract 2
So, 648 + 325 = 973.

Commutative Property of Addition

6,283 + 4,129 = 4,129 + 6,283
10,412 = 10,412

Associative Property of Addition

243 + (157 + 732) = (243 + 157) + 732
243 + 889 = 400 + 732
1,132 = 1,132

My Word Cards

Complete the definition. Extend learning by writing your own definitions.

Compensation is adjusting one number to make a computation easier and balancing the adjustment by changing another number.

Compatible numbers are numbers that are easy to compute with mentally.

The **Associative Property of Addition** states that addends can be regrouped and the sum remains the same.

The **Commutative Property of Addition** states that addends can be added in any order and the sum remains the same.

56–58

LESSON 2-1

MENTAL MATH

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Mathematical Practices MP.2, MP.3, MP.4, MP.6, MP.8

Objective Use properties of addition and strategies to solve problems mentally.

Essential Understanding There's more than one way to do a mental calculation. Mental addition and subtraction involve changing one or more numbers so that the calculations are easy to do.

Vocabulary

Compatible numbers, Associative Property of Addition, Commutative Property of Addition, Compensation

Materials Decimal Place-Value Charts (or Teaching Tool 6)

COHERENCE

Students have learned to apply the Commutative and Associative Properties to add and subtract greater whole numbers with mental math, using strategies such as compensation and compatible numbers. Now they will extend their understanding of using the properties and strategies from calculations with whole numbers to sums and differences of decimals mentally.

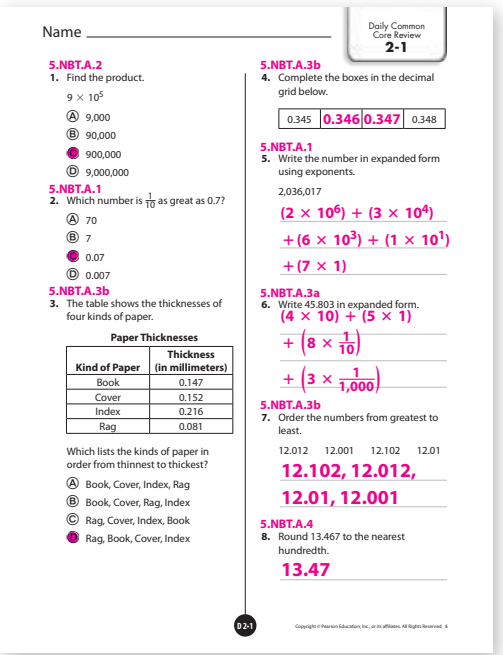
RIGOR

This lesson emphasizes **conceptual understanding** and **procedural skill** for mentally adding and subtracting decimals.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 2-1

5.NBT.A.2
1. Find the product.
9×10^5
Ⓐ 9,000
Ⓑ 90,000
● Ⓒ 900,000
Ⓓ 9,000,000

5.NBT.A.1
2. Which number is $\frac{1}{10}$ as great as 0.7?
Ⓐ 70
Ⓑ 7
● Ⓒ 0.07
Ⓓ 0.007

5.NBT.A.3b
3. The table shows the thicknesses of four kinds of paper.

Paper Thicknesses

Kind of Paper	Thickness (in millimeters)
Book	0.147
Cover	0.152
Index	0.216
Rag	0.081

Which lists the kinds of paper in order from thinnest to thickest?
Ⓐ Book, Cover, Index, Rag
Ⓑ Book, Cover, Rag, Index
Ⓒ Rag, Cover, Index, Book
● Ⓓ Rag, Book, Cover, Index

5.NBT.A.3b
4. Complete the boxes in the decimal grid below.

0.345	0.346	0.347	0.348

5.NBT.A.1
5. Write the number in expanded form using exponents.
2,036,017
$(2 \times 10^6) + (3 \times 10^4) + (6 \times 10^3) + (1 \times 10^1) + (7 \times 1)$

5.NBT.A.3a
6. Write 45.803 in expanded form.
$(4 \times 10) + (5 \times 1) + \left(8 \times \frac{1}{10}\right) + \left(3 \times \frac{1}{1{,}000}\right)$

5.NBT.A.3b
7. Order the numbers from greatest to least.
12.012 12.001 12.102 12.01
12.102, 12.012, 12.01, 12.001

5.NBT.A.4
8. Round 13.467 to the nearest hundredth.
13.47

D 2-1

Today's Challenge

Think Use the Topic 2 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Listening Learn new academic expressions.

Use with the Visual Learning Bridge on Student's Edition p. 60.

When you introduce the new vocabulary, display and discuss the phrase *compatible numbers*. Display this example: 2.50 + 3.78 + 1.50. Point to 2.50 and 1.50: *Why are these two numbers compatible?* [0.50 and 0.50 are easy to compute mentally.]

Beginning Display this example: 38 + 75 + 25. Point to 75 and 25: *These are compatible numbers. Why are these two numbers compatible?* [You can add 75 + 25 = 100 mentally.]

Intermediate Display this example: 4.15 + 2.67 + 0.85. Ask students to point to two numbers that are compatible and tell why they are compatible. Have students complete this sentence: A decimal addend that is compatible with 2.25 is _____. [Sample answer: 1.75]

Advanced *Write an addition expression using three decimal numbers, two of which are compatible.* Have students trade expressions. The partner finds and tells which numbers are compatible and why. Students listen and tell whether their partner's answer is correct.

Summarize How can you use compatible numbers to help add numbers?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use their knowledge of using properties of addition to solve problems mentally.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
You may wish to provide Decimal Place-Value Charts (Teaching Tool 6)

MP.2 Reason Quantitatively Listen and look for students who use properties to make addition problems easier to solve.

2. Build Understanding
What do you already know that can help you solve the problem? [How to use Commutative and Associative Properties of Addition to add whole numbers]

Small Group DURING

3. Ask Guiding Questions As Needed
Do you have to add the prices in the order given in the problem? [No, I can add the prices in any order.] *Which two prices would be easier to add mentally?* [$20.75 and $18.25]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. If needed, project Tara's work to show how to make the numbers easier to calculate mentally.

5. Transition to the Visual Learning Bridge
You can use the Commutative and Associative Properties of Addition to add decimals in the same way you use them to add whole numbers. There is more than one way to do mental calculations involving decimals. Most techniques involve the properties of addition and strategies to make the calculations easier to solve.

6. Extension for Early Finishers
Use mental math to find the difference between the first two pieces of software ($20.75 – $10.59). [$10.16]


Name _____ Solve

Solve & Share

Three pieces of software cost $20.75, $10.59, and $18.25. What is the total cost of the software?
Use mental math to solve.

Lesson 2-1
Mental Math

I can ...
use mental math to solve addition and subtraction problems.

Content Standard 5.NBT.B.7
Mathematical Practices MP.2, MP.3, MP.4, MP.6, MP.8

You can use reasoning to help you. What do you know about adding three numbers that will make it easier to solve this problem?

See margin for sample student work.

Look Back! MP.3 Construct Arguments Which two numbers above were easy to add in your head? Why?
Sample answer: $20.75 and $18.25 are easy to add because the cents add up to 1 dollar.

Digital Resources at PearsonRealize.com Topic 2 | Lesson 2-1 59

Analyze Student Work

Tara's Work

I can rearrange the addends. $20.75 + $18.25 is easy to do mentally.

$20.75 + $10.59 + $18.25 =
$20.75 + $18.25 + $10.59 =
$39.00 + $10.59 = $49.59

Tara rearranges the addends to make the numbers easier to calculate mentally.

Kyle's Work

I can group to add $20.75 and $18.25 first to get a whole number.

$20.75 + $10.59 + $18.25 =
$10.59 + ($20.75 + $18.25) =
$10.59 + $39 = $49.59

Kyle uses properties to change the order and groupings of the addends.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

PEARSON realize. PearsonRealize.com

Learn Glossary

MP.3 Construct Arguments *Is there a commutative property for subtracting decimals?* [No. For example, 4.2 – 2.6 is not the same as 2.6 – 4.2.]

Was the order of the addends changed in the Associative Property? [No, just the grouping was changed.]

The expression below the Commutative Property has parentheses. Why isn't this the Associative Property? [The same two addends are inside the parentheses; only the order of the addends inside the parentheses has changed.]

Visual Learning Bridge

MP.8 Generalize *How can 0.45 + 0.55 be done using mental math?* [0.05 and 0.05 make 0.10, adding 0.1 to 0.4 and 0.5 gives 1.0.]

Prevent Misconceptions RtI

Students may not understand that there may be several ways to use mental math to solve problems. For example, another way to solve 0.45 + 0.55 is to move 0.05 from 0.55 to 0.45 and then find 0.50 + 0.50.

Convince Me! MP.2 Reason Quantitatively Students use mental math to find the sum, and then provide an explanation to justify their answers.

Coherence Students' work with the Commutative and Associative Properties of Addition should be generalized to the understanding that these properties allow addition of more than two addends in any order. This should be generalized further to the understanding that the properties work the same way with decimals as they do with whole numbers.

Essential Question Revisit the Essential Question. Students can use properties of operations and strategies to find sums and differences mentally.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 9 and 13 are worth 1 point. Item 20 is worth up to 3 points.

20–30 min

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PearsonRealize.com

Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Another Example

With compensation, adjust one or both numbers to make the calculation easier. Then adjust the difference or sum to get the final answer.

Use compensation to subtract.

Find 4.25 − 0.08 mentally.

4.25 − 0.10 = 4.15

0.02 too much was subtracted | Compensate, add back 0.02

4.25 − 0.08 = 4.17

Use compensation to add.

Find $3.47 + $4.35 mentally.

$3.50 + $4.35 = $7.85

Add 0.03 | Compensate, take away 0.03

$3.47 + $4.35 = $7.82

Guided Practice*

Do You Understand?

1. **MP.6 Be Precise** In the addition example above, why is the answer $0.03 less than $7.85?
   Since $0.03 was added to $3.47 to get $3.50, you subtract $0.03 from the sum.
2. Which problem is easier to subtract, 15.50 − 8.75 or 15.75 − 9? Explain.
   15.75 − 9 because no regrouping is needed.

Do You Know How?

In **3–6**, use mental math to add or subtract.

3. 12 + 3.04 + 8.28 **23.32**
4. 6.97 + 4.15 **11.12**
5. 9.04 − 6.98 **2.06**
6. 4.02 + 0.19 + 16.48 **20.69**

Independent Practice

Leveled Practice In **7–12**, use properties and mental math to add or subtract.

7. 7.1 + 5.4 + 2.9 = **10** + 5.4 = **15.4**
8. 373.4 − 152.9 = 373.4 − **153** = 220.4 **220.4** + 0.1 = **220.5**
9. $18.25 + $7.99 + $4.75 **$30.99**
10. 1.05 + 3 + 4.28 + 0.95 **9.28**
11. 2,504 + 140 + 160 **2,804**
12. 35.7 − 14.8 **20.9**

*For another example, see Set A on page 103.

Math Practices and Problem Solving

13. **MP.4 Model with Math** Joanne bought three books that cost $3.95, $4.99, and $6.05. How much did she spend in all? Use compensation and mental math to find the sum.

$14.99

14. **MP.3 Construct Arguments** Use compensation to find each difference mentally. Explain how you found each difference.
   A 67 − 29 **38; add 1 to each number and then find 68 − 30.**
   B 456 − 198 **258; add 2 to each number and find 458 − 200.**

15. **Number Sense** The table shows how many points Eduardo scored during each game. Use mental math to find how many points he scored in the first three games.
   99 points

Game	Points
1	54
2	19
3	26
4	10

16. On three different days at her job, Sue earned $27, $33, and $49. She needs to earn $100 to buy a desk for her computer. If she buys the desk, how much money will she have left over? **$9**

17. A shelf can hold 50 DVDs. Jill has 27 DVDs. She plans to buy 5 new ones. Each DVD costs $9. After she buys the new ones, how many more DVDs will the shelf hold? **18 DVDs**

18. **MP.2 Reasoning** When finding the difference of two numbers mentally, can you use the Commutative Property? Explain. **No; Sample answer: The Commutative Property cannot be used for subtraction, because the order of the numbers matters.**

19. **Higher Order Thinking** Daria bought a skein of alpaca yarn for $47.50, a skein of angora yarn for $32.14, a skein of wool yarn for $16.50, and a pair of knitting needles for $3.86. How much did she spend in all? Describe how you calculated your answer. **$100; Sample answer: I used the Commutative and Associative Properties. I added $3.86 to $32.14 and $47.50 to $16.50.**

Common Core Assessment

20. Mrs. Healer's class took a field trip to a park 12.3 miles away. Mr. Dean's class drove 4.9 miles to the public library. How much farther did Mrs. Healer's class travel than Mr. Dean's class? Explain how you used mental math to determine the difference.

Sample answer: 7.4 miles farther; I added 0.1 to 4.9 to get 5. Then I found 12.3 − 5 = 7.3. Then I added 0.1 to 7.3 to get a difference of 7.4.

Another Example *Why do you add 0.03 in the addition example?* [To get 3.50, which is a number that is easier to add] *What do you have to do after you add?* [Take away the 0.03 that was added.]

Error Intervention: Item 2

If students can't explain why 15.75 and 9 are easier to subtract,

then help them write both problems vertically. Ask: *Which numbers can you subtract without regrouping?* [15.75 and 9]

RtI **Reteaching** Assign Reteaching Set A on p. 103.

Coherence Compensation uses the relationship between addition and subtraction. If students have trouble understanding Another Example, show how the strategies work with easier numbers. For example, to find 22 − 7, subtract 22 − 10 to get 12. Since 3 too many were subtracted, add 3 back to get 12 + 3 = 15. Another way to think about this is to add 3 to both 22 and 7 to get 25 − 10 = 15. In both cases, you are essentially adding 3 − 3 or 0.

Item 14 MP.3 Construct Arguments Remind students to look for compatible numbers to make their calculations easier. Students may find more than one way to use compatible numbers.

Item 16 Discuss with students how more than one step is needed to solve this problem. *What operations will you use to find the solution?* [Addition and subtraction] *What is the first answer you need to find?* [How much Sue earned in all.]

Item 19 Higher Order Thinking While students can add the numbers in any order, look for students to notice that adding $47.50 and $16.50 yields a whole number, as does adding $32.14 and $3.86.

Multi-Step Problems *Page 62 Items 16 and 19; Page 64 Items 16 and 19*

61–62

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

Mental Math

Materials

4 pieces of paper, markers, tape

- Write one of the following numbers on each piece of paper: 3, 6, 12, and 10.
- Have four students come to the front and tape one number to each student.
- Write *Associative Property* on the board. Have students with numbers 3 and 6 stand together on one side and 10 and 12 on another side.
- Ask the group to add the first two numbers. Write the answer on the board. [9] Then have them add the other two numbers. Write the answer on the board. [22]
- Ask the class to add the sums. [31]
- Repeat with other numbers to reinforce the idea of the Associate Property. Should time allow, create new cards with decimals to add.

Reteach I

Name _____

Reteach to Build Understanding 2-1

Vocabulary

1. **Commutative Property** You can add two numbers in any order. The sum stays the same. For example, 9.5 + 21.4 = 21.4 + 9.5.

   Associative Property You can change the grouping of the addends. (\$5.50 + \$7.83) + \$3.50 can be changed to **Sample answer:** \$5.50 + (\$7.83 + \$3.50)

2. One way to use **compensation** is to adjust a number to make it easier to add. Then adjust the other number in the opposite way.

   198 + 34 = ? To adjust 198 to 200, add 2.

   To compensate, adjust the other number, 34, by subtracting 2.

   So, 198 + 34 = 200 + 32 = 232

3. To add 6.53 + 1.28, adjust 1.28 to make it easier to add. 6.53 + 1.28 → add 0.02 → 1.30 ← adjusted number

4. Adjust the other number in the opposite way. 6.53 → subtract 0.02 → 6.51 ← adjusted number

5. Add. Use your adjusted numbers. 6.51 ← adjusted number; + 1.30 ← adjusted number; 7.81 ← sum

6. 6.53 + 1.28 = 7.81.

On the Back!

7. Use compensation to add 3.55 + 1.17 + 2.1. Explain how you adjusted the numbers. **Sample answer: Change 1.17 to 1.20 by adding 0.03. Change 3.55 to 3.52 by subtracting 0.03. Add 3.52 + 1.2 + 2.1 = 6.82.**

R 2-1

On-Level and Advanced Activity Centers O A

Problem-Solving Reading Mat

Have students read the Problem-Solving Reading Mat for Topic 2 and then complete Problem-Solving Reading Activity 2-1.

See the Problem-Solving Reading Activity Guide for further suggestions on how to use the mat.

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games
A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–6, 9–12, 16, 19–20
O Items 2–3, 7–10, 13–15, 16–20
A Items 5–6, 10–15, 16–20

Name _____

Help Practice Buddy Tools Games

Homework & Practice 2-1
Mental Math

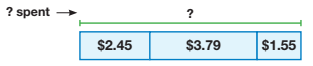
Another Look!

Use properties of addition to find 5.7 + 6 + 4.3.	Use compensation to find 12.7 + 0.9.	Use compensation to find 18.3 − 6.9.
5.7 + 6 + 4.3 Use the Commutative Property. 5.7 + 4.3 + 6 Add. 10 + 6 = 16	12.7 + 0.9 Add 0.1 to 0.9. 12.7 + 1 = 13.7 Subtract 0.1. 12.7 + 0.9 = 13.6	18.3 − 6.9 Add 0.1 to 6.9. 18.3 − 7 = 11.3 0.1 too much was subtracted. Add 0.1. 18.3 − 6.9 = 11.4

Leveled Practice In **1–15**, use properties and mental math to solve.

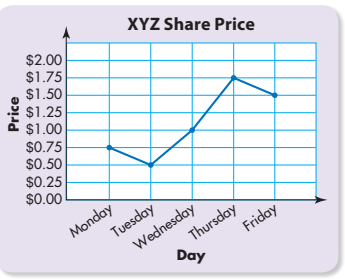
1. 275 + 180 + 120 =
   275 + 300 =
   575
2. 19.5 + 24 + 7.5 =
   19.5 + 7.5 + 24 =
   27 + 24 = 51
3. 87.2 − 25.9 =
   87.2 − 26 = 61.2
   61.2 + 0.1 = 61.3
4. 8.4 + 6.21 + 2.6
   17.21
5. 7.35 + 1.47 + 9.65
   18.47
6. 12.32 − 8
   4.32
7. 75.25 − 11.92
   63.33
8. 34.76 + 170 + 16.24
   221
9. 54.3 − 19.74
   34.56
10. 192.63 − 7.95
    184.68
11. 201.96 + 38.7 + 0.84
    241.5
12. 100.6 + 296.5
    397.1
13. 421.2 − 305.8
    115.4
14. 1,050 + 815 + 250
    2,115
15. $5.40 + $8.70 + $6.30
    $20.40

16. **MP.4 Model with Math** James is buying school supplies. He buys a notebook for $2.45, a package of mechanical pencils for $3.79, and an eraser for $1.55. Use mental math to find how much he spent in all. **$7.79**



17. **MP.8 Generalize** How is using mental math to add with decimals like using mental math to add whole numbers? How is it different?
Sample answer: It is similar because you use numbers that are easy to add. It is different because with decimals, you are looking for decimal parts that add to 1 or 0.5.

18. Isabel made the following graph to show the daily share price for Company XYZ. What was the change in the price from Monday to Friday?
$0.75



19. **Higher Order Thinking** Julia went to the supermarket and bought a dozen eggs, two pounds of bananas, and a jar of tomato sauce. A store coupon for $0.70 off any purchase does not appear on the receipt. If Julia used the coupon, how much did she spend in all?
$5.28

Common Core Assessment

20. In a week Karry ran 9.3 miles and Tricia ran 4.4 miles. Use mental math to find how much farther Karry ran than Tricia. Explain how you determined the difference.

4.9 miles farther; Sample explanation: I added 0.1 to 9.3 to get 9.4. Then I found 9.4 − 4.4 = 5. Then I subtracted 0.1 from 5 to get a difference of 4.9.

63–64

LESSON 2-2

ESTIMATE SUMS AND DIFFERENCES

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain **5.NBT** Number and Operations in Base Ten

Cluster **5.NBT.B** Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standards **5.NBT.B.7** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings, and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Also **5.NBT.A.4**.

Mathematical Practices **MP.2, MP.3, MP.4**

Objective Use rounding or compatible numbers to estimate sums and differences.

Essential Understanding There is more than one way to estimate a sum or difference. To estimate sums and differences, numbers are replaced with other numbers that are easier to add or subtract mentally.

COHERENCE

In Topic 1, students learned to round decimals. In previous grades, they learned to use strategies such as rounding and compatible numbers to estimate sums and differences of whole numbers. In this lesson, students will learn to combine these skills to estimate the results of adding or subtracting decimals. In later lessons, students will learn to use estimation skills to check that exact sums and differences they have found are reasonable.

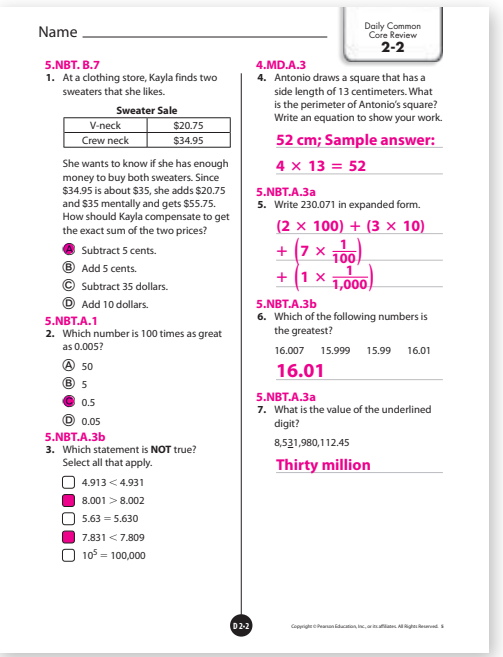
RIGOR

This lesson emphasizes number sense, **conceptual understanding**, and **procedural skill** for estimating decimal sums and differences. In order to estimate with decimals, students need to understand decimal place value and have number sense about the relative magnitudes of different numbers. They also need to be able to round decimals appropriately and recognize potential compatible numbers which can be used.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 2-2

5.NBT.B.7
1. At a clothing store, Kayla finds two sweaters that she likes.

Sweater Sale

V-neck	$20.75
Crew neck	$34.95

She wants to know if she has enough money to buy both sweaters. Since $34.95 is about $35, she adds $20.75 and $35 mentally and gets $55.75. How should Kayla compensate to get the exact sum of the two prices?

(A) Subtract 5 cents.
(B) Add 5 cents.
(C) Subtract 35 dollars.
(D) Add 10 dollars.

5.NBT.A.1
2. Which number is 100 times as great as 0.005?

(A) 50
(B) 5
(C) 0.5
(D) 0.05

5.NBT.A.3b
3. Which statement is **NOT** true? Select all that apply.

- [ ] $4.913 < 4.931$
- [x] $8.001 > 8.002$
- [ ] $5.63 = 5.630$
- [x] $7.831 < 7.809$
- [ ] $10^5 = 100{,}000$

4.MD.A.3
4. Antonio draws a square that has a side length of 13 centimeters. What is the perimeter of Antonio's square? Write an equation to show your work.

52 cm; Sample answer: $4 \times 13 = 52$

5.NBT.A.3a
5. Write 230.071 in expanded form.

$(2 \times 100) + (3 \times 10) + \left(7 \times \frac{1}{100}\right) + \left(1 \times \frac{1}{1{,}000}\right)$

5.NBT.A.3b
6. Which of the following numbers is the greatest?

16.007 15.999 15.99 16.01

16.01

5.NBT.A.3a
7. What is the value of the underlined digit?

8,5$\underline{3}$1,980,112.45

Thirty million

D2-2

Today's Challenge

Think Use the Topic 2 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Speaking Speak using content area vocabulary in context.

Use with the Solve and Share on Student's Edition p. 65.

To build students' proficiency in deciding when to estimate, have them say the phrases from the word problems that stand for estimating. [*About how long, about how much longer*] Have students describe real-life situations in which they estimate.

Beginning *I will read a problem aloud and you will tell which words mean that an estimate is needed. The office building is 126 feet tall. The tree is 32 feet tall. About how much shorter is the tree than the building?* [About how much]

Intermediate *Do you need to find an estimate or an exact answer for this problem: There are about twice as many chairs as students. There are 258 chairs. About how many students are there?* [An estimate] *Which words tell you so?* [About twice as many, about how many]

Advanced In partners, students write a problem that asks either for an estimate or an exact answer. They read their problem aloud. The partner tells whether an estimate or exact answer is needed, and why.

Summarize How can you tell when an estimate is needed?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use their prior knowledge of rounding and compatible numbers to estimate sums and differences of whole numbers and decimals.

10–15 min

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Solve

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
MP.2 Reason Quantitatively Listen and look for students who use rounding or compatible numbers to estimate the sum.

2. **Build Understanding**
Do you need to find an exact answer? How can you tell? [No, only an estimate is needed. The question asks "About how many…".] *What are some ways to estimate?* [Rounding, compatible numbers]

Small Group DURING

3. **Ask Guiding Questions As Needed**
What operation will you use to estimate the total length? [Addition]

Whole Class AFTER

4. **Share and Discuss Solutions**
Solve Start with students' solutions. If needed, project Nora's work to illustrate estimating.

5. **Transition to the Visual Learning Bridge**
There is more than one way to estimate a sum or difference. You can use rounding or compatible numbers to estimate by replacing numbers with other numbers that are close and easy to calculate mentally.

6. **Extension for Early Finishers**
Suppose that a student estimates the sum 628 + 485 by adding 600 + 400 = 1,000. Is this correct? [The student did not use rounding, but did use a legitimate estimation technique called "front-end estimation." The front digit in each number was used. This estimate is less than the one found with rounding to the nearest hundred.]

Name _____ Solve

Solve & Share
An amusement park has two roller coasters. One is 628 feet long, and the other is 485 feet long. If you ride both roller coasters, about how many feet will you travel in all? ***Use estimation to solve.***

See margin for sample student work.

Lesson 2-2
Estimate Sums and Differences

I can …
estimate sums and differences of decimals.

Content Standards 5.NBT.B.7, 5.NBT.A.4
Mathematical Practices MP.2, MP.3, MP.4

Look Back! MP.4 Model with Math About how much longer is the one coaster than the other? Show your work.
Sample answer: about 100 feet longer;
600 − 500 = 100.

Analyze Student Work

Nora's Work

628 rounds to 630
and 485 rounds to 490.

630 + 490 = 1,120.

Nora rounds to the nearest ten to estimate the total length.

Gina's Work

628 + 485 is about
600 + 500 = 1,100.

Gina rounds to the nearest hundred and uses a number line to estimate the total length.

STEP 2

DEVELOP: VISUAL LEARNING

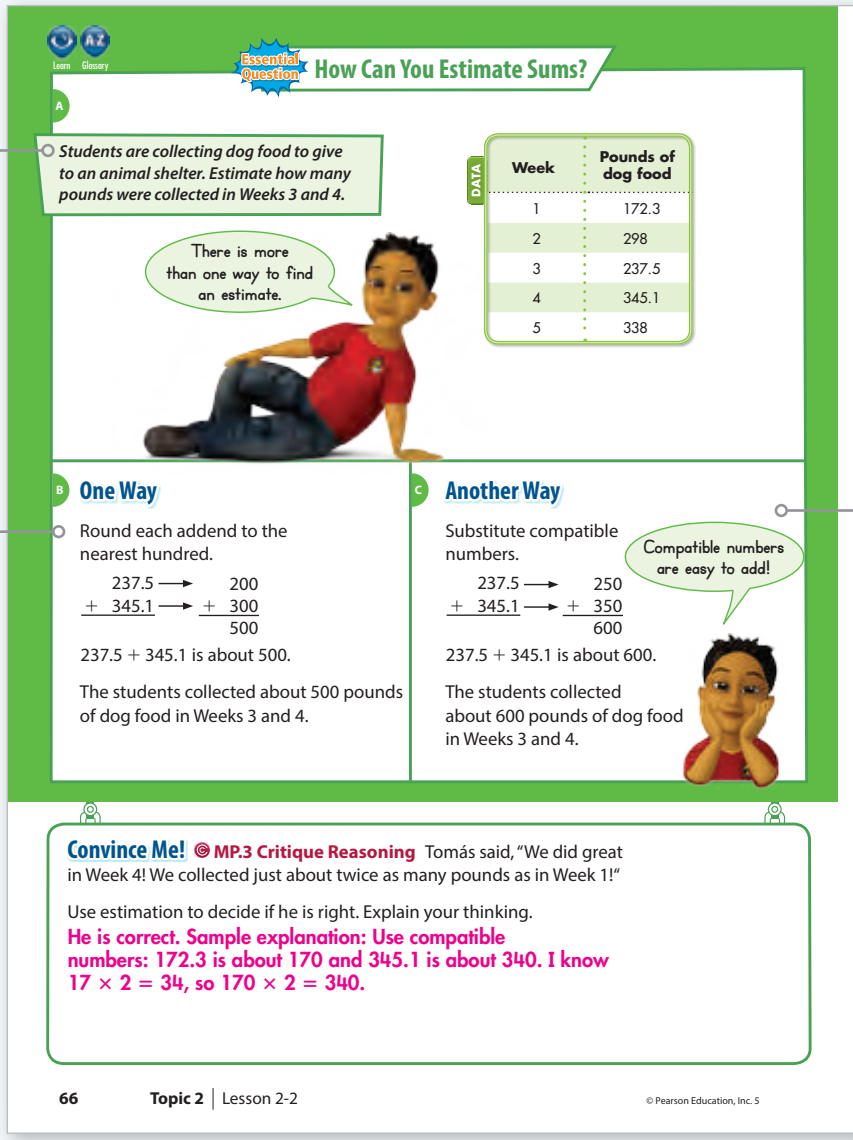
The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

PEARSON realize. PearsonRealize.com

Learn Glossary

If you round each number in the table to the nearest hundred, what numbers do you get? [200, 300, 200, 300, 300]



Visual Learning Bridge

MP.2 Reason Quantitatively *Will the actual sum be greater or less than the estimate of 500 pounds? How can you tell?* [Greater, because both rounded numbers are less than the actual numbers]

MP.3 Construct Arguments *How does using compatible numbers instead of rounding change the estimate in this example?* [Using compatible numbers results in an estimate closer to the actual sum.]

Prevent Misconceptions RtI

Point out that the compatible numbers do not need to be multiples of 100. Any estimates that are easy to add and close to the original numbers can be compatible numbers.

Convince Me! MP.3 Critique Reasoning *How can you check to see whether your estimate is reasonable?* [I can double check that my rounded or compatible numbers are close to the original numbers and that my work is correct.]

Essential Question

Revisit the Essential Question. Point out that students can use a variety of ways to estimate a sum or difference. Each estimation technique represents one way to find numbers that are close to the actual numbers and easy to calculate mentally.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 11 and 22 are worth 1 point. Item 20 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Another Example

You can estimate differences.

Estimate 22.8 − 13.9.

One Way
Round each number to the nearest whole number.

22.8 → 23
− 13.9 → − 14
9

22.8 − 13.9 is about 9.

Another Way
Substitute compatible numbers.

22.8 → 25
− 13.9 → − 15
10

22.8 − 13.9 is about 10.

Guided Practice*

Do You Understand?

1. **MP.3 Construct Arguments** In the example above, which estimate is closer to the actual difference? How can you tell without subtracting?
   9; Sample answer: The rounded numbers are closer to the original numbers than the compatible numbers.
2. In the example on page 66, the students collected more pounds of dog food in Week 4 than in Week 3. Estimate about how many more.
   Sample answer: About 110 more pounds

Do You Know How?

In **3–10**, estimate the sums and differences.

Sample answers are given.

3. 49 + 22.88 — **72**
4. 86.9 − 18 — **70**
5. 179 + 277.1 — **500**
6. 23.2 − 9.71 — **13**
7. 23.8 − 4.7 — **19**
8. 87.2 + 3.9 — **91**
9. 38.9 − 21.4 — **20**
10. 576 + 94.6 — **700**

Independent Practice

In **11–18**, estimate each sum or difference. **Sample answers are given.**

11. 79.1 + 32.4 — **110**
12. 788.9 − 572 — **200**
13. 837 + 488.12 — **1,300**
14. 418.5 − 23.7 — **400**
15. 2.9 + 3.9 — **7**
16. $12.99 − $3.95 — **$9**
17. 8.1 + 3.7 + 7.9 — **20**
18. 3.8 + 4.1 + 3.3 — **11**

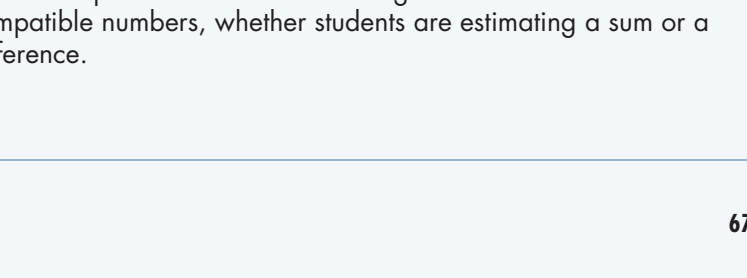
*For another example, see Set B on page 103.

Math Practices and Problem Solving

19. **MP.3 Construct Arguments** The cost of one DVD is $16.98, and the cost of another DVD is $9.29. Ed estimated the cost of the two DVDs to be about $27. Is his estimate higher or lower than the actual cost? Explain.
    Higher; Ed used numbers that are greater than the actual addends.

20. **Higher Order Thinking** A teacher is organizing a field trip. Each bus can seat up to 46 people. Is it better to estimate a greater or lesser number than the actual number of people going on the field trip? Why?
    Greater; Sample answer: To make sure there are enough seats for everyone

21. The size and shape of Golden Gate Park are often compared to the size and shape of Central Park. About how many more acres does Golden Gate Park cover than Central Park?
    Sample answer: About 200 acres



Common Core Assessment

22. Three rock samples have masses of 74.05 grams, 9.72 grams, and 45.49 grams. A scientist estimates the total mass of the samples by rounding each mass to the nearest whole number. Which lists the numbers will he add?
    - Ⓐ 75, 10, and 46
    - Ⓑ 74.1, 9.7, and 45.5
    - ● 74, 10, and 45
    - Ⓓ 75, 10, and 50

23. Umberto buys a game for $7.89 and some batteries for $5.49. He pays with a $20 bill. Which is the best estimate of how much change he should get?
    - Ⓐ $5.00
    - ● $7.00
    - Ⓒ $13
    - Ⓓ $17.00

Another Example *What is the exact difference?* [8.9] *Which estimate is closer to the exact answer?* [9] *Why were 25 and 15 used as compatible numbers?* [Because it is easy to subtract 15 from 25 mentally]

Error Intervention: Item 8

If students cannot decide how to round the numbers,

then ask: *Is 87.2 closer to 87 or to 88? How can you tell?* [87; 87.2 is less than 87.5] *Is 3.9 closer to 4 or to 3? How can you tell?* [4; 3.9 is greater than 3.5] *What is 87 plus 4?* [91]

Reteaching Assign Reteaching Set B on p. 103.

Item 16 If necessary, remind students that money amounts are just like decimals. People often estimate sums and differences with money amounts mentally instead of trying to calculate exact answers.

Items 17–18 Encourage students to work with two numbers at a time.

Item 19 MP.3 Construct Arguments Ask students to round each number to the next greater whole number. Then have them tell if the rounded numbers are greater or less than the actual numbers.

Item 21 Remind students that the picture contains important information. Then ask *Do you need an exact answer or an estimate?* [Estimate] *How can you tell?* [The question contains the word *about*.]

Coherence Point out how similar the procedures for estimating decimal sums are to the procedures for estimating decimal differences. The first step is to either round the original numbers or substitute compatible numbers, whether students are estimating a sum or a difference.

Multi-Step Problems *Page 68 Item 23; Page 70 Items 8 and 12*

67–68

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

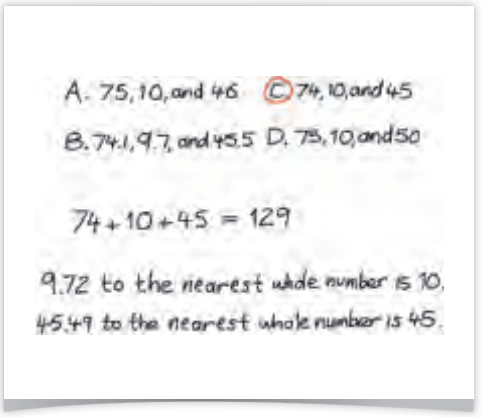
Intervention Activity I

Estimating Sums and Differences

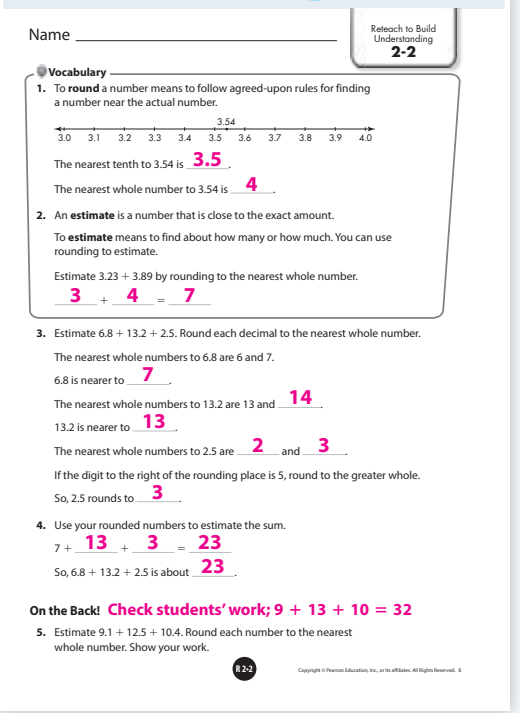
Materials

Paper, pencils, red markers

- Write on the board: *What are the addends 74.05 + 9.72 + 45.49 rounded to the nearest whole number?* Write the answer choices A–D shown on the board. Have students do the same on a piece of paper.
- Invite a volunteer to round 74.05 to the nearest whole number. [74]
- Guide students to look through the answers and use the marker to circle the answer that has 74 as the first number. [C]
- Tell students they are going to check the rounding for the other two numbers.
- Invite two volunteers to round 9.72 and 45.49 to the nearest whole numbers. [10; 45]
- Have students add 74, 10, and 45, and provide the answer. [129]



Reteach I



Name _____

Reteach to Build Understanding 2-2

Vocabulary

1. To **round** a number means to follow agreed-upon rules for finding a number near the actual number.

The nearest tenth to 3.54 is 3.5.

The nearest whole number to 3.54 is 4.

2. An **estimate** is a number that is close to the exact amount.

To **estimate** means to find about how many or how much. You can use rounding to estimate.

Estimate 3.23 + 3.89 by rounding to the nearest whole number.

3 + 4 = 7

3. Estimate 6.8 + 13.2 + 2.5. Round each decimal to the nearest whole number.

The nearest whole numbers to 6.8 are 6 and 7.

6.8 is nearer to 7.

The nearest whole numbers to 13.2 are 13 and 14.

13.2 is nearer to 13.

The nearest whole numbers to 2.5 are 2 and 3.

If the digit to the right of the rounding place is 5, round to the greater whole.

So, 2.5 rounds to 3.

4. Use your rounded numbers to estimate the sum.

7 + 13 + 3 = 23

So, 6.8 + 13.2 + 2.5 is about 23.

On the Back! Check students' work; 9 + 13 + 10 = 32

5. Estimate 9.1 + 12.5 + 10.4. Round each number to the nearest whole number. Show your work.

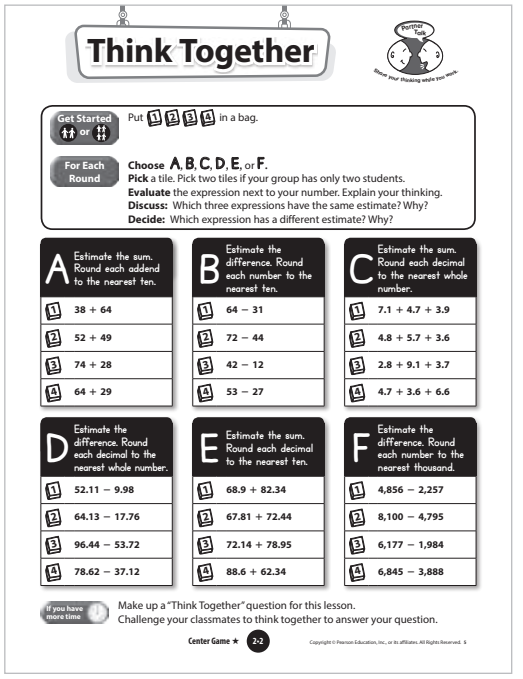
R 2-2

On-Level and Advanced Activity Centers O A

Center Games

Students estimate sums and differences by rounding whole numbers and decimals. Have students record their answers as they play the game.

★ On-Level



Think Together

Partner Talk — Show your thinking when you work.

Get Started — Put 1 2 3 4 in a bag.

For Each Round — Choose A, B, C, D, E, or F.
Pick a tile. Pick two tiles if your group has only two students.
Evaluate the expression next to your number. Explain your thinking.
Discuss: Which three expressions have the same estimate? Why?
Decide: Which expression has a different estimate? Why?

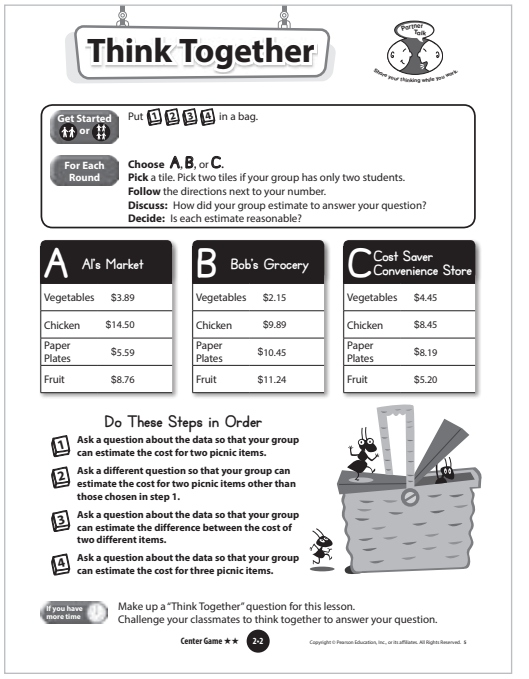
A Estimate the sum. Round each addend to the nearest ten.	B Estimate the difference. Round each number to the nearest ten.	C Estimate the sum. Round each decimal to the nearest whole number.
1 38 + 64	1 64 − 31	1 7.1 + 4.7 + 3.9
2 52 + 49	2 72 − 44	2 4.8 + 5.7 + 3.6
3 74 + 28	3 42 − 12	3 2.8 + 9.1 + 3.7
4 64 + 29	4 53 − 27	4 4.7 + 3.6 + 6.6

D Estimate the difference. Round each decimal to the nearest whole number.	E Estimate the sum. Round each decimal to the nearest ten.	F Estimate the difference. Round each number to the nearest thousand.
1 52.11 − 9.98	1 68.9 + 82.34	1 4,856 − 2,257
2 64.13 − 17.76	2 67.81 + 72.44	2 8,100 − 4,795
3 96.44 − 53.72	3 72.14 + 78.95	3 6,177 − 1,984
4 78.62 − 37.12	4 88.6 + 62.34	4 6,845 − 3,888

If you have more time — Make up a "Think Together" question for this lesson. Challenge your classmates to think together to answer your question.

Center Game ★ 2-2

★★ Advanced



Think Together

Partner Talk — Show your thinking when you work.

Get Started — Put 1 2 3 4 in a bag.

For Each Round — Choose A, B, or C.
Pick a tile. Pick two tiles if your group has only two students.
Follow the directions next to your number.
Discuss: How did your group estimate to answer your question?
Decide: Is each estimate reasonable?

A Al's Market		B Bob's Grocery		C Cost Saver Convenience Store	
Vegetables	$3.89	Vegetables	$2.15	Vegetables	$4.45
Chicken	$14.50	Chicken	$9.89	Chicken	$8.45
Paper Plates	$5.59	Paper Plates	$10.45	Paper Plates	$8.19
Fruit	$8.76	Fruit	$11.24	Fruit	$5.20

Do These Steps in Order

1. Ask a question about the data so that your group can estimate the cost for two picnic items.
2. Ask a different question so that your group can estimate the cost for two picnic items other than those chosen in step 1.
3. Ask a question about the data so that your group can estimate the difference between the cost of two different items.
4. Ask a question about the data so that your group can estimate the cost for three picnic items.

If you have more time — Make up a "Think Together" question for this lesson. Challenge your classmates to think together to answer your question.

Center Game ★★ 2-2

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games
A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment I Items 1–4, 7–8, 10–12 O Items 1, 3, 5, 7–12 A Items 1, 5, 6, 8–12

Name _____

Help Practice Buddy Tools Games

Homework & Practice 2-2
Estimate Sums and Differences

Another Look!

During one week, Mr. Graham drove a truck to four different towns to make deliveries. Estimate how far he drove in all. About how much farther did he drive on Wednesday than on Monday?

DATA **Mr. Graham's Mileage Log**

Day	Cities	Mileage
Monday	Mansley to Mt. Hazel	243.5
Tuesday	Mt. Hazel to Perkins	303
Wednesday	Perkins to Alberton	279.1
Thursday	Alberton to Fort Maynard	277.4

Round each number to the nearest hundred.

243.5 → 200
303 → 300
279.1 → 300
+ 277.4 → + 300
1,100

Mr. Graham drove about 1,100 miles.

Estimate the difference to the nearest ten.

279.1 → 280
− 243.5 → − 240
40

Mr. Graham drove about 40 more miles on Wednesday than on Monday.

1. Marisol rode her bicycle each day for five days. Estimate how far she biked in all. Round each number to the nearest whole number.
12 + 14 + 18 + 12 + 15 = 71
She biked about 71 miles.

2. About how much farther did she bike on Wednesday than on Thursday?
18 − 12 = 6
She biked about 6 more miles on Wednesday.

DATA **Marisol's Bike Rides**

Day	Mileage
Monday	12.3
Tuesday	14.1
Wednesday	17.7
Thursday	11.8
Friday	15.2

Estimate each sum or difference. **Sample answers are given.**

3. 19.7 − 6.9
13

4. 59 + 43.6
104

5. 5.82 + 1.69 + 2.3
10

6. 87.99 − 52.46
40

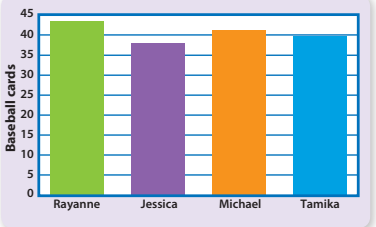
7. **Math and Science** About how many more inches of rain did Asheville get than Wichita? About how many more days did it rain in Asheville than Wichita?
Sample answers: About 19 in.; about 40 days

DATA **Average Yearly Precipitation of U.S. Cities**

City	Inches	Days
Asheville, North Carolina	47.71	124
Wichita, Kansas	28.61	85

8. **MP.2 Reasoning** Four friends made a bar graph to show how many baseball cards they collected over the summer.

About how many cards did they collect in all?
Sample answer: About 160 cards



9. **MP.3 Construct Arguments** Estimate the total weight of two boxes that weigh 9.4 pounds and 62.6 pounds using rounding and compatible numbers. Which estimate is closer to the actual total weight? Why?
Sample answers: Rounding, about 72 lb; compatible numbers, about 70 lb. The rounded numbers are closer to the original numbers, so the rounded estimate will be closer to the actual total weight.

10. **Higher Order Thinking** A gardener is estimating the amount of mulch needed for two garden beds. There is no room to store extra mulch. Is it better to estimate a greater or lesser amount than the mulch he needs? Why?
Lesser amount; Sample answer: There is no room to store the extra so the gardener should order just the amount he needs.

Common Core Assessment

11. Martha bought an apple for $0.89 and a drink for $1.95. Which is the best estimate of how much money she spent?

Ⓐ $2.00
● $3.00
Ⓒ $4.00
Ⓓ $5.00

12. Rachel bought a book for $5.49 and a game for $10.98. She paid with a $20 bill. Which is the best estimate of the amount of change she should receive?

● $4
Ⓑ $6
Ⓒ $14
Ⓓ $16

69–70

LESSON 2-3

USE MODELS TO ADD AND SUBTRACT DECIMALS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings, and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Mathematical Practices MP.1, MP.3, MP.4, MP.5

Objective Model sums and differences of decimals.

Essential Understanding Grids can be used to add and subtract decimals. Models and algorithms for adding or subtracting multi-digit decimals are just an extension of models and algorithms for adding and subtracting whole numbers.

Materials Decimal grids (Teaching Tool 8), Place-value chart (Teaching Tool 6)

COHERENCE

In the previous topic, students learned to use place-value charts, place-value blocks, grids, and number lines to develop concepts of decimal place value. In this lesson, they will learn to use hundredths grids to add and subtract decimals. This helps develop the conceptual understanding for the procedures taught in subsequent lessons.

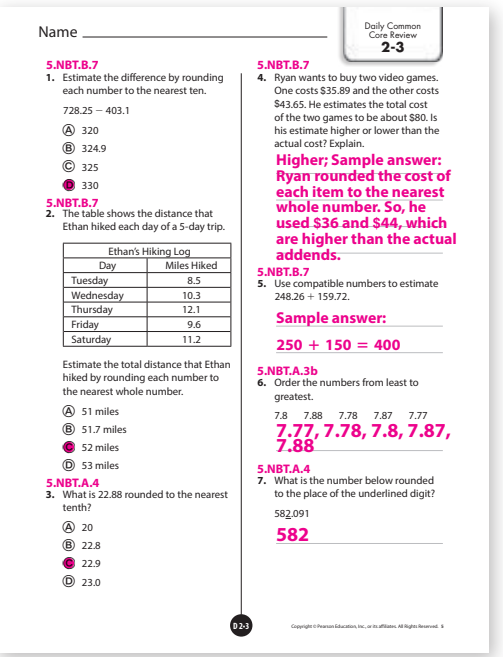
RIGOR

This lesson emphasizes **conceptual understanding**. Students shade grids divided into hundredths to show how parts of the whole written in decimal form can be combined. They use shading to show part of a whole and crossing out to show the parts that are taken away.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 2-3

5.NBT.B.7
1. Estimate the difference by rounding each number to the nearest ten.

728.25 − 403.1

Ⓐ 320
Ⓑ 324.9
Ⓒ 325
Ⓓ 330

5.NBT.B.7
2. The table shows the distance that Ethan hiked each day of a 5-day trip.

Ethan's Hiking Log	
Day	Miles Hiked
Tuesday	8.5
Wednesday	10.3
Thursday	12.1
Friday	9.6
Saturday	11.2

Estimate the total distance that Ethan hiked by rounding each number to the nearest whole number.

Ⓐ 51 miles
Ⓑ 51.7 miles
Ⓒ 52 miles
Ⓓ 53 miles

5.NBT.A.4
3. What is 22.88 rounded to the nearest tenth?

Ⓐ 20
Ⓑ 22.8
Ⓒ 22.9
Ⓓ 23.0

5.NBT.B.7
4. Ryan wants to buy two video games. One costs $35.89 and the other costs $43.65. He estimates the total cost of the two games to be about $80. Is his estimate higher or lower than the actual cost? Explain.

Higher; Sample answer: Ryan rounded the cost of each item to the nearest whole number. So, he used $36 and $44, which are higher than the actual addends.

5.NBT.B.7
5. Use compatible numbers to estimate 248.26 + 159.72.

Sample answer:
250 + 150 = 400

5.NBT.A.3b
6. Order the numbers from least to greatest.

7.8 7.88 7.78 7.87 7.77

7.77, 7.78, 7.8, 7.87, 7.88

5.NBT.A.4
7. What is the number below rounded to the place of the underlined digit?

582,091

582

D2-3

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Today's Challenge

Think Use the Topic 2 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Reading: Use reading supports, such as grids, to enhance comprehension of written text.

Use with the Visual Learning Bridge on Student's Edition p. 72.

Display the grids from the student page. *How do the grids help you add decimals?* [By shading squares in each grid in a different color and counting all of the shaded squares to find the sum] Explain to students that the shaded grids represent the monthly cost of using the dishwasher and the DVD player.

Beginning Point to the table on p. 72. *How many squares in each of the hundredths grids would you shade to show the total monthly cost of using the ceiling light and the dishwasher?* [89 to show $0.89 and 85 to show $0.85]. Then ask students to find the sum. [$0.89 + $0.85 = $1.74]

Intermediate Have students work in pairs to explain how to show the total monthly cost of using the DVD player and the ceiling light in the table on p. 72. They should explain that the shaded squares represent the monthly cost of each device, and the total monthly cost is the number of shaded squares in the grids. [$0.40 + $0.89 = $1.29]

Advanced Have students work in pairs to make hundredths grids showing the total monthly cost of using the microwave oven and the dishwasher in the table on p. 72: $3.57 + $0.85 = $4.42.

Summarize How do you use grids to add decimals?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use a tool to find the sum of two decimal numbers. This will prepare them to add and subtract decimal numbers on the next page.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
You may wish to provide decimal place value charts (or Teaching Tool 6) and decimal grids (or Teaching Tool 8).

MP.5 Use Appropriate Tools Strategically Listen and look for students who use tools to help them solve the problem.

2. Build Understanding
How can you estimate the answer? [Sample answer: Use compatible numbers: 0.8 + 1.2 = 2, so about two miles in all.]

Small Group DURING

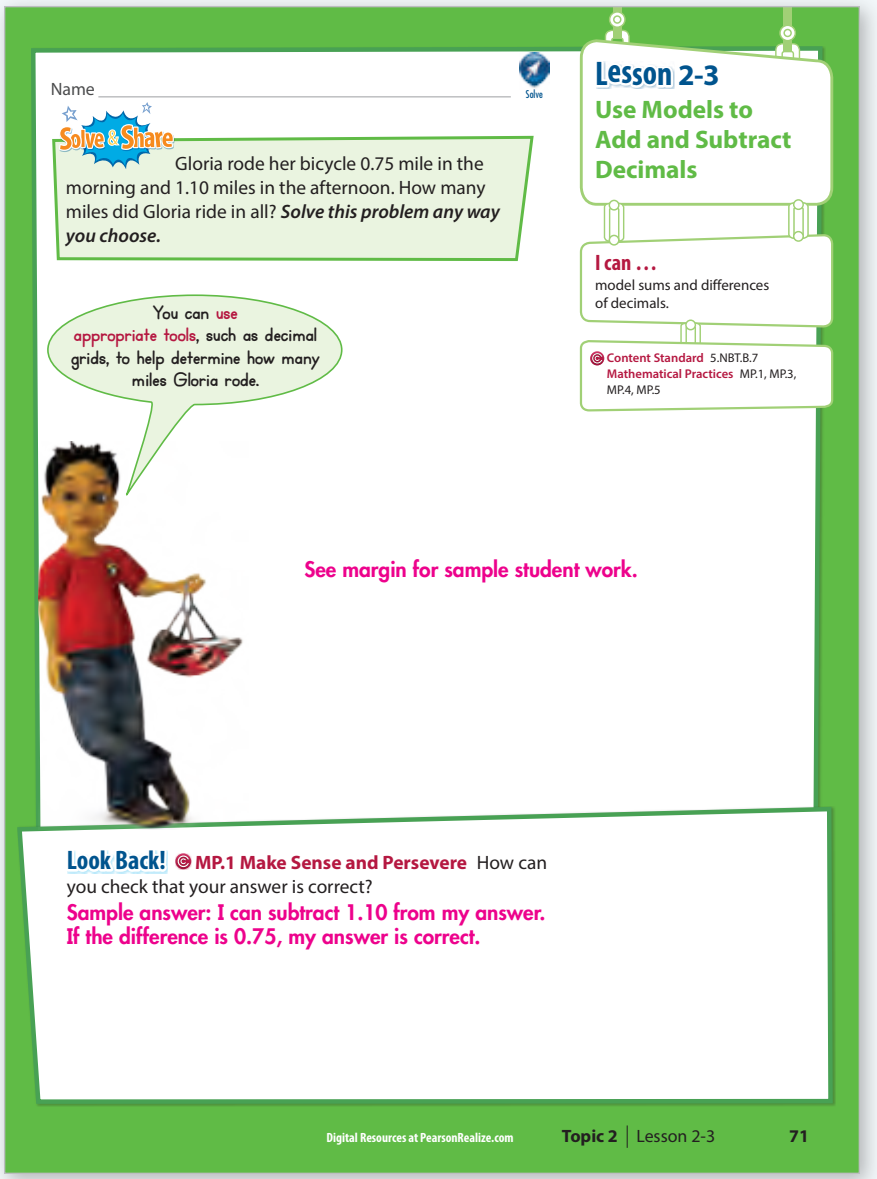
3. Ask Guiding Questions As Needed
What operation can you use to find the answer? [Addition]
How would you show 0.75 on a decimal grid? [Shade 75 of the small squares.]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with student's solutions. If needed, project Martina's work to show how to solve the problem.

5. Transition to the Visual Learning Bridge
Adding or subtracting decimal numbers is just like adding or subtracting whole numbers. You use place value to align the digits and then complete the calculation.

6. Extension for Early Finishers
How much farther did Gloria ride in the afternoon than in the morning? [0.35 mile]


Name _____ Solve

Solve & Share

Gloria rode her bicycle 0.75 mile in the morning and 1.10 miles in the afternoon. How many miles did Gloria ride in all? ***Solve this problem any way you choose.***

You can use appropriate tools, such as decimal grids, to help determine how many miles Gloria rode.

Lesson 2-3
Use Models to Add and Subtract Decimals

I can ...
model sums and differences of decimals.

Content Standard 5.NBT.B.7
Mathematical Practices MP.1, MP.3, MP.4, MP.5

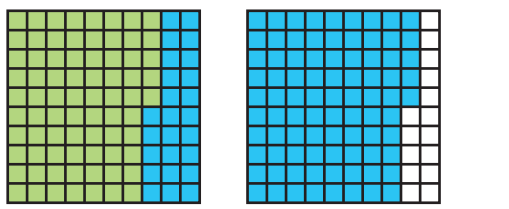
See margin for sample student work.

Look Back! MP.1 Make Sense and Persevere How can you check that your answer is correct?
Sample answer: I can subtract 1.10 from my answer. If the difference is 0.75, my answer is correct.

Digital Resources at PearsonRealize.com Topic 2 | Lesson 2-3 71

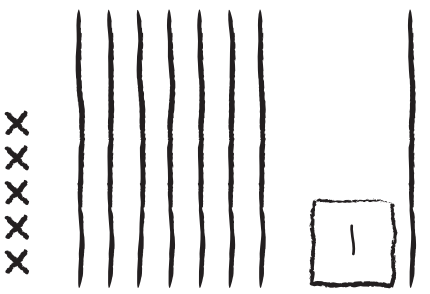
Analyze Student Work

Martina's work



Martina shades squares on decimal grids to model the addends and find the sum.

Frank's work



Frank uses a drawing of place-value blocks to solve the problem, but he does not find the total.

STEP 2

DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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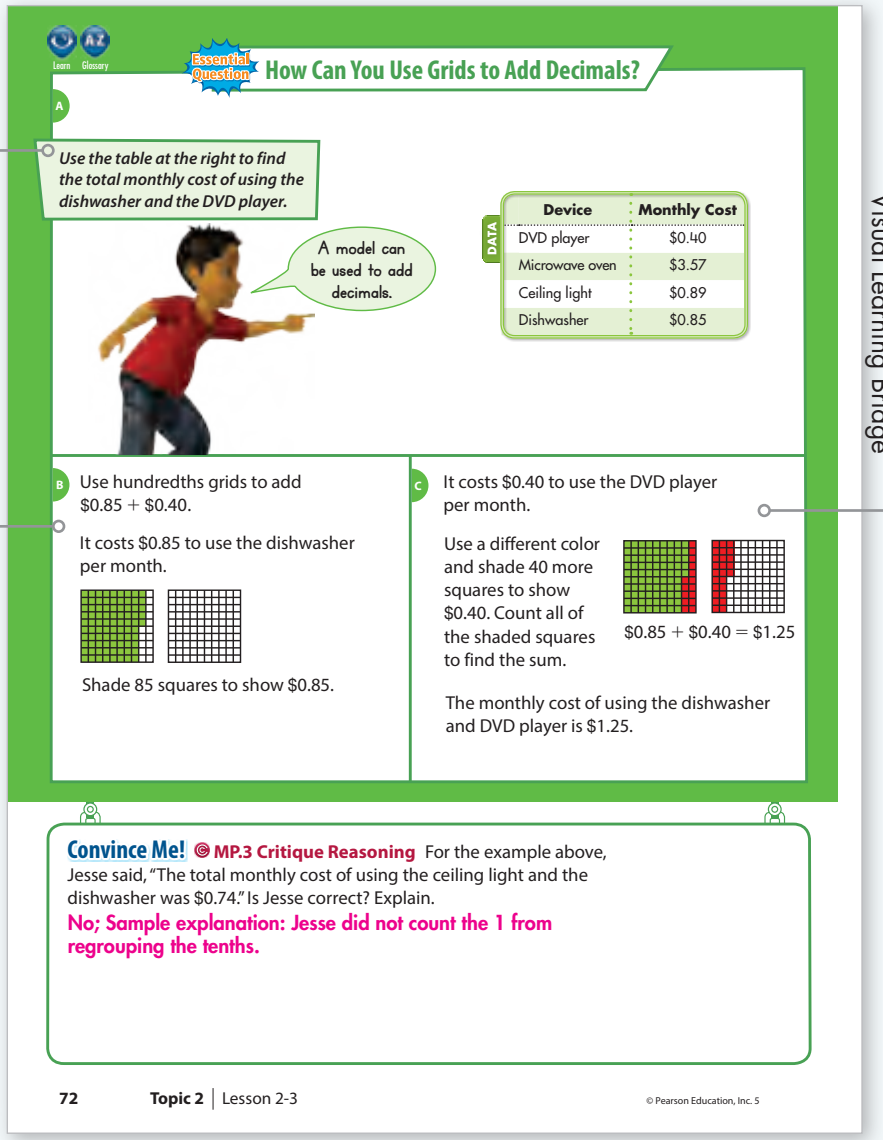
Learn Glossary

MP.1 Make Sense and Persevere
Which two monthly costs from the table should be added to answer the question? [$0.85 and $0.40]

MP.2 Reason Abstractly
How can you tell that using the dishwasher costs less than $1 per month? [The grid is not completely shaded.]



Visual Learning Bridge

Prevent Misconceptions RtI

Remind students to count all of the shaded squares to find the sum of the numbers.

Convince Me! MP.3 Critique Reasoning *How can you tell without adding that his answer doesn't make sense.* [Sample answer: Each of the addends is more than his answer for the total cost.]

Coherence As students work with the grids, help them see that in a number such as 0.85, the 8 columns shaded represent both 8 tenths and 80 hundredths of the whole. Review equivalent decimals in the previous topic, if necessary.

Essential Question

Revisit the Essential Question. Students can model decimal addition by shading squares on hundredths grids. The sum is the number of shaded squares. The difference of two decimal numbers can be modeled by crossing out shaded squares.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 10 and 14 are worth 1 point. Item 19 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

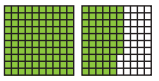
Practice Buddy | Tools | Assessment

Another Example

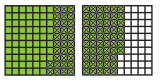
You can subtract decimals with grids.

Use hundredths grids to find 1.57 − 0.89.

Step 1
Shade 1 grid and 57 squares to show 1.57.



Step 2
Cross out 8 columns and 9 squares of the shaded grid. The difference is the squares that are shaded but not crossed out.



1.57 − 0.89 = 0.68

Guided Practice*

Do You Understand?

1. **MP.4 Model with Math** Explain how to use grids to find the difference between the monthly cost of using the DVD player and the dishwasher. Then find the difference.
   A grid should show 85 squares shaded and 40 crossed out; $0.85 − $0.40 = $0.45

Do You Know How?

In **2–7**, use hundredths grids to add or subtract.

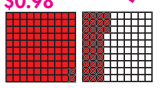
2. 1.22 + 0.34 — 1.56
3. 0.63 + 0.41 — 1.04
4. 2.73 − 0.94 — 1.79
5. $1.38 − $0.73 — $0.65
6. 0.47 − 0.21 — 0.26
7. 2.02 + 0.8 — 2.82

Independent Practice

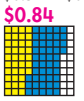
In **8–11**, add or subtract. Use hundredths grids to help.

8. 0.1 + 0.73 — 0.83

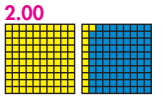
9. $1.33 − $0.35 — $0.98



10. $0.37 + $0.47 — $0.84



11. 1.11 + 0.89 — 2.00

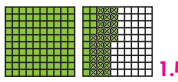


*For another example, see Set C on page 103.

Math Practices and Problem Solving

12. **MP.3 Construct Arguments** How is adding 4.56 + 2.31 similar to adding $2.31 + $4.56?
    The dollar signs in $2.31 + $4.56 do not affect the sum. The order of the numbers does not affect the answer.

13. **MP.4 Model with Math** Write an expression that is represented by the model below.



1.45 − 0.31

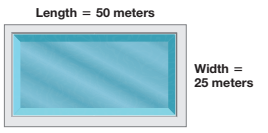
14. Is the sum of 0.46 + 0.25 less than or greater than one? Explain.
    Less than one; Sample explanation: The sum does not completely shade one hundredths grid.

15. **Number Sense** Estimate to decide if the sum of 314 + 175 is more or less than 600.
    Less than 600

16. **Higher Order Thinking** Do you think the difference of 1.4 − 0.95 is less than one or greater than one? Explain.
    Less than one; Sample explanation: 0.95 is almost 1, so the difference will be about 0.4.

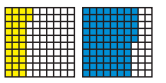
17. **Vocabulary** Estimate 53.8 − 27.6. Circle the **compatible numbers** to substitute.
    54 − 28 53 − 28 55 − 27 (55 − 25)

18. **Algebra** Write an expression that can be used to find the perimeter of the pool shown to the right. Remember, perimeter is the distance around a figure.
    50 + 50 + 25 + 25



Common Core Assessment

19. Each shaded area in the grids below represents a decimal.



Part A
What is the sum of the decimals?
1.07

Part B
Explain how you found your answer.
Sample answer: I counted 32 squares or 0.32 on the first grid and 75 squares or 0.75 on the second grid. The sum is 1.07.

Another Example *Why are 8 columns and 9 small squares crossed out?* [To model subtracting 8 tenths and 9 hundredths]

Error Intervention: Item 1

If students forget the value of the whole square,

then ask: *How many small squares are in the entire grid?* [100] *What does each small square represent?* [One hundredth] *What is the value of the entire grid?* [1; one hundred hundredths]

RtI **Reteaching** Assign Reteaching Set C on p. 103.

Item 9 Coherence Make sure that students see the connection between the method of subtracting decimals here and take-away subtraction, which they have been doing since first grade. To model a decimal subtraction problem, they show the minuend and then cross out the subtrahend, just as they did for a problem like 9−4.

Item 13 MP.4 Model with Math Remind students to determine which operation the model is showing.

Item 14 Encourage students to use reasoning to compare the sum to one. *Is 0.46 greater than 0.5 or less than 0.5?* [Less than] *Is 0.25 greater than 0.5 or less than 0.5?* [Less than] *So, what do you know about 0.46 + 0.25?* [Sample answer: The sum is less than 0.5 + 0.5 = 1.]

Multi-Step Problems *Page 76 Items 12 and 14*

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

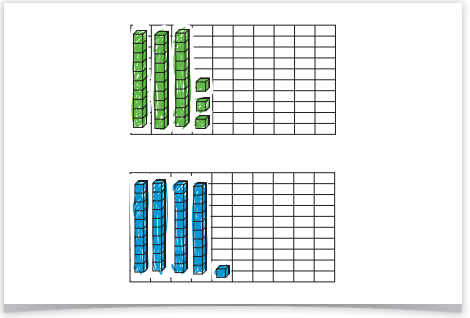
Use Models to Add and Subtract Decimals

Materials

Centimeter Grid Paper (Teaching Tool 9, Place-Value Blocks (or Teaching Tool 4), scissors)

Have students work in groups to solve 0.33 + 0.41.

- Have students cut out and place 33 blocks on one grid and 41 blocks of another color on a second grid.
- *How can you show adding 0.33 and 0.41?* Have students push the blocks together. *What is the sum?* [0.74]
- Have students solve 0.78 – 0.22 with place-value blocks as was done with the addition example.



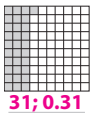
Reteach I

Name _____

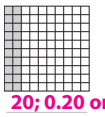
Reteach to Build Understanding 2-3

Vocabulary

1. One part of 100 equal parts of a whole is called a **hundredth**. Determine how many squares are shaded and then write a decimal for each model shown below.



31; 0.31



20; 0.20 or 0.2

Add or subtract. Use hundredths grids to help.

2. Add 0.32 + 0.17.

How many squares are shaded to show 0.32? 32

How many squares are shaded to show 0.17? 17

How many total squares are shaded? 49

So, 0.32 + 0.17 = 0.49.

3. Subtract 0.79 – 0.6.

How many squares are shaded to show 0.79? 79

How many of the shaded squares are crossed out to show subtracting 0.6? 60

How many shaded squares are not crossed out? 19

So, 0.79 – 0.6 = 0.19.

On the Back!

4. Use a hundredths grid to find the sum of 0.35 + 0.57.

0.92; Check students' work.

R 2-3

On-Level and Advanced Activity Centers O A

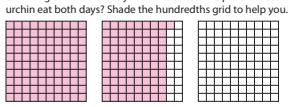
Name _____

Math and Science Activity 2-3

Giant Kelp

Did You Know? Giant kelp is a type of seaweed that grows so tall that it forms an underwater forest. Each kelp blade may grow about 2 feet a day, up to 175 feet high. Kelp produce their own food using sunlight. Ocean consumers that eat the kelp include sea urchins and kelp crab.

1. Suppose a sea urchin eats 1.30 kilograms of kelp one day and 0.51 kilogram the next day. How much total kelp did the sea urchin eat both days? Shade the hundredths grid to help you.



1.81 kilograms

2. How much more kelp did the sea urchin eat the first day than the second day? Write an equation to model your work.

0.79 kilogram; 1.30 – 0.51 = 0.79

3. **Extension** A sea urchin and a kelp crab ate a total of 1.81 kilograms of kelp one day and 1.15 kilograms the next day. The kelp crab ate 1.05 kilograms of kelp during the two days. How much kelp did the sea urchin eat during the two days?

1.91 kilograms

4. One kelp blade grew 1.19 feet in a day. Another kelp blade grew 1.91 feet in the same day. How much more did one kelp blade grow than the other? Use decimal grids to help solve.

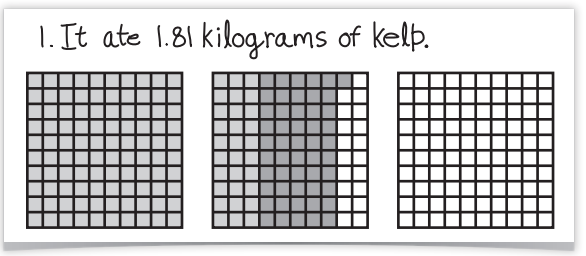
0.72 feet

Math and Science Activity 2-3

Math and Science Activity STEM

This activity revisits the science theme **Producers and Consumers,** introduced on p. 55 in the Student's Edition.

Sample Student Work



TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–4, 9–11, 13–16
O Items 1, 2, 5–8, 10, 11, 13–16
A Items 5–8, 9–14, 16

Name _____

Help Practice Buddy Tools Games

Another Look!

Find 0.22 + 0.17.

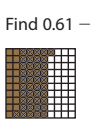
Step 1
Shade 22 squares to show 0.22.

Step 2
Use a different color to shade 17 squares to show 0.17.

Step 3
Count all the squares that are shaded. Write the decimal for the shaded squares: 0.39.

So, 0.22 + 0.17 = 0.39.

Find 0.61 − 0.42.



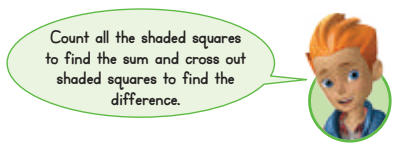
Step 1
Shade 61 squares to show 0.61.

Step 2
Cross out 42 squares to show subtracting 0.42.

Step 3
Count the squares that are shaded but not crossed out. Write the decimal: 0.19.

So, 0.61 − 0.42 = 0.19.

Homework & Practice 2-3
Use Models to Add and Subtract Decimals



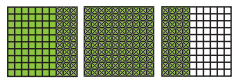
In **1** and **2**, use hundredths grids to add or subtract.

1. 0.27 + 0.19 = 0.46

2. 0.39 − 0.14 = 0.25

3. 0.68 − 0.24 = 0.44
4. 0.88 + 0.25 = 1.13
5. 2.88 − 0.59 = 2.29
6. 1.24 + 0.44 = 1.68
7. 0.96 + 1.05 = 2.01
8. 0.52 − 0.19 = 0.33

9. Write the number sentence that is shown by the hundredths grids to the right.
2.4 − 1.7 = 0.7



10. **MP.3 Construct Arguments** Is the difference of 1.48 − 0.25 less than or greater than one? Explain.
Greater than one; Sample explanation: Subtracting 0.25 would not cross out all the squares on the second hundredths grid

11. **Higher Order Thinking** A bottle of perfume holds 0.55 ounce. A bottle of cologne holds 0.2 ounce. How many more ounces does the bottle of perfume hold? 0.35 ounce

12. **MP.4 Model with Mathematics** As part of his workout, Jamal does 2 sets of 25 push-ups. If he does this 10 times each month, how many push-ups does he do each month? Write an equation to show your work.
500 push-ups; 2 × 25 × 10 = 500

13. The smallest video camera in the world is 0.99 millimeter in diameter. Is the diameter of the video camera less than or great than 0.1 millimeter?
Greater than 0.1 millimeter

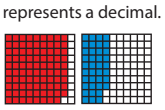
14. A restaurant bought 48.5 pounds of apples from a local orchard. The next month, the restaurant bought another 65.3 pounds of apples and 24.5 pounds of pears. How many pounds of fruit did the restaurant buy?
138.3 pounds

15. **MP.4 Model with Mathematics** Write an expression that is represented by the model below.

0.42 + 0.02

Common Core Assessment

16. Each shaded area in the grids below represents a decimal.



Part A
What is the sum of the decimals?
1.27

Part B
Explain how you found your answer.
Sample answer: I counted 89 squares on the first grid and 38 squares on the second grid. I added 0.89 and 0.38. The sum is 1.27.

75–76

LESSON 2-4

ADD DECIMALS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings, and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Mathematical Practices MP.2, MP.3, MP.4, MP.8

Objective Add decimals to the hundredths using the standard algorithm.

Essential Understanding Adding multi-digit decimals is similar to adding multi-digit whole numbers.

COHERENCE

Students are expected to master addition and subtraction of whole numbers by the end of fourth grade. In the previous topic, students learned how to extend their understanding of our base-ten numeration system to include decimals. They explored how the relationships between adjacent places are the same for whole numbers and decimals. Students will now combine these understandings to learn how to extend the standard algorithm for adding whole numbers to adding decimals.

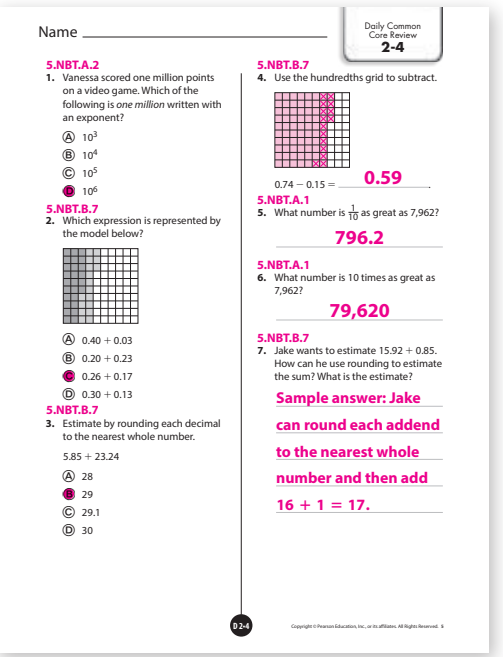
RIGOR

This lesson blends **conceptual understanding** and **procedural skill**. As students develop mastery, they relate the algorithm for adding decimals to adding whole numbers. They can then practice the procedure throughout the lesson.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 2-4

5.NBT.A.2
1. Vanessa scored one million points on a video game. Which of the following is *one million* written with an exponent?
Ⓐ 10^3
Ⓑ 10^4
Ⓒ 10^5
● 10^6

5.NBT.B.7
2. Which expression is represented by the model below?
Ⓐ 0.40 + 0.03
Ⓑ 0.20 + 0.23
● 0.26 + 0.17
Ⓓ 0.30 + 0.13

5.NBT.B.7
3. Estimate by rounding each decimal to the nearest whole number.
5.85 + 23.24
Ⓐ 28
● 29
Ⓒ 29.1
Ⓓ 30

5.NBT.B.7
4. Use the hundredths grid to subtract.
0.74 − 0.15 = 0.59

5.NBT.A.1
5. What number is $\frac{1}{10}$ as great as 7,962?
796.2

5.NBT.A.1
6. What number is 10 times as great as 7,962?
79,620

5.NBT.B.7
7. Jake wants to estimate 15.92 + 0.85. How can he use rounding to estimate the sum? What is the estimate?
Sample answer: Jake can round each addend to the nearest whole number and then add 16 + 1 = 17.

D2-4

Today's Challenge

Think Use the Topic 2 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Strategies Use prior knowledge to generalize about new information.

Use with the Visual Learning Bridge on Student's Edition p. 78.

Display a decimal place-value chart to thousandths. *What are the place values to the right of the decimal point?* [Tenths, hundredths, thousandths] Write 12.45 + 26.39 in vertical form in the chart. Circle the hundredths digits. *Add the hundredths. What is the total number?* [14 hundredths] *How can we record 14 hundredths in the exercise?* [Regroup 14 hundredths as 1 tenth 4 hundredths.] Record the regrouping. Continue adding.

Beginning Write 14.25 + 13.67 in vertical form. Have students circle the hundredths digits. *What steps do we use to add the hundredths?* [Add 5 + 7 = 12. Regroup 12 hundredths as 1 tenth 2 hundredths.]

Intermediate Have students write a decimal addition problem that needs regrouping of the hundredths, and have them use complete sentences to tell the steps for regrouping.

Advanced Have students write an addition problem that needs regrouping of the hundredths and the tenths. Have them tell why regrouping is needed and tell the regrouping steps using place value.

Summarize How do you add decimals with regrouping?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students add decimals in the hundredths by aligning their decimal points and then using the standard algorithm to find the sum.

10–15 min

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Solve

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
MP.8 Generalize Listen and look for students who add decimals in a way that is similar to how they add whole numbers.

2. **Build Understanding**
What are two compatible numbers you can use to estimate? [Sample answer: 14 and 11] *So, about how many pounds of potatoes does Mr. Davidson have?* [Sample answer: 25 pounds]

Small Group DURING

3. **Ask Guiding Questions As Needed**
How can you make sure that you are adding decimals correctly? [Align the decimal points in the addends and carefully complete the computation.]

Whole Class AFTER

4. **Share and Discuss Solutions**
Solve Start with students' solutions. If needed, project Sherry's work to show how to align decimals.

5. **Transition to the Visual Learning Bridge**
Adding multi-digit decimals is similar to adding multi-digit whole numbers. You can use the decimal point to make sure that the place values are aligned.

6. **Extension for Early Finishers**
Mr. Davidson's neighbor gives him a sack of potatoes weighing 15.58 pounds. Now how many pounds of potatoes does Mr. Davidson have in all? Write an equation to show your work. [41.24 pounds; 14.27 + 11.39 + 15.58 = 41.24]


Name _____

Solve

Solve & Share

Mr. Davidson has two sacks of potatoes. The first sack weighs 11.39 pounds. The second sack weighs 14.27 pounds. How many pounds of potatoes does Mr. Davidson have in all? ***Solve this problem any way you choose.***

Lesson 2-4
Add Decimals

I can ...
add decimals using the standard algorithm.

Content Standard 5.NBT.B.7
Mathematical Practices MP.2, MP.3, MP.4, MP.8

You can generalize what you know about whole number addition to decimal addition.

See margin for sample student work.

Potatoes 11.39 lb

Potatoes 14.27 lb

Look Back! MP.8 Generalize How is adding decimals like adding whole numbers?
Sample answer: You add the digits with the same place value, but now this includes the tenths and the hundredths places.

Digital Resources at PearsonRealize.com Topic 2 | Lesson 2-4 77

Analyze Student Work

Sherry's Work

$$\begin{array}{r} {\scriptstyle 1} \\ 11.39 \\ +\ 14.27 \\ \hline 25.66 \end{array}$$

Sherry successfully aligns the decimal points in the addends and correctly completes the computation.

Pat's Work

$$\begin{array}{r} {\scriptstyle 1} \\ 11.39 \\ +\ 14.27 \\ \hline 154.09 \end{array}$$

Pat does not align the decimal points and confuses the calculation, so the sum is not reasonable.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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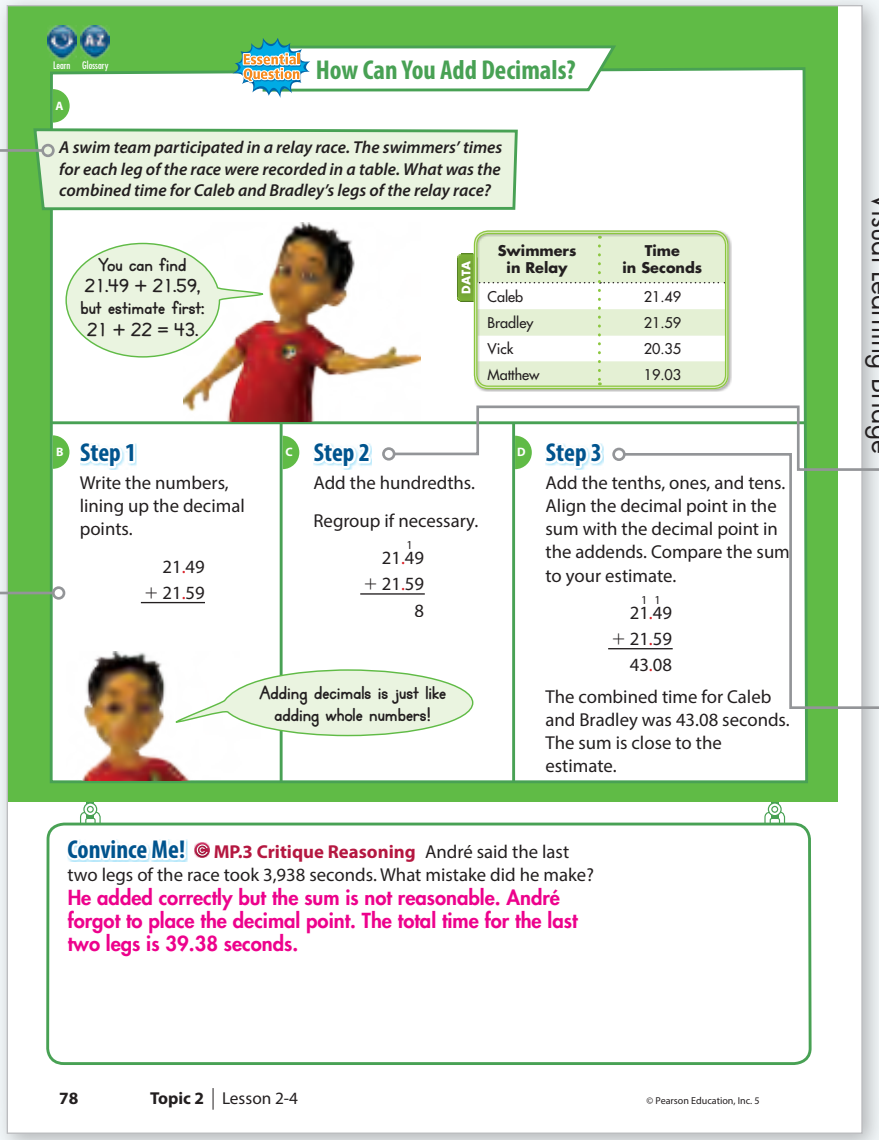
Learn Glossary

MP.1 Make Sense and Persevere
What was Caleb's time for the relay race? [21.49 seconds] *What was Bradley's time?* [21.59 seconds] *What operation would you use to find their combined time?* [Addition] *How can the estimate help?* [The estimate can help you decide if your answer is reasonable.]

MP.6 Be Precise
In Step 1, why do we line up the decimal points? [To make sure that all the place values are lined up correctly]



Visual Learning Bridge

In Step 2, what is the sum of the hundredths? [18 hundredths] *What do you write?* [8 hundredths in the sum and add 1 to the top of the tenths column]

MP.8 Generalize
In Step 3, how is the regrouping shown when the tenths are added? [A small 1 is written over the ones place and a zero is written in the tenths place in the sum.]

Convince Me! MP.3 Critique Reasoning Students use estimation and their knowledge of adding decimals to check André's answer for reasonableness and explain any errors that were made.

Coherence If students have difficulty understanding the standard algorithm for adding decimals, point out the similarities between adding 21.49 + 21.59 and adding 2,149 + 2,159. In the whole number computation, 4 tens + 5 tens + 1 ten = 10 tens and 10 tens are regrouped as 100. In the decimal computation, 4 tenths + 5 tenths + 1 tenth = 10 tenths and 10 tenths are regrouped as 1 whole.

Essential Question

Revisit the Essential Question. Students can add multi-digit decimals in the same way that they add multi-digit whole numbers. Remind students to always align the decimal points before using the standard algorithm to add. This will ensure that they are adding digits with the same place value.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 6 and 18 are worth 1 point. Item 16 is worth up to 3 points.

20–30 min

PEARSON realize.
PearsonRealize.com

Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Another Example

Carson ran 7.81 miles last week. He ran 14 miles this week.
How many miles did he run in the two weeks?

Step 1

Write the numbers, lining up the decimal points.

Annex two zeros so that both addends have the same number of decimal places.

$$\begin{array}{r} 14.00 \\ +\ 7.81 \\ \hline \end{array}$$

Step 2

Add the hundredths.

Regroup if necessary.

$$\begin{array}{r} 14.00 \\ +\ 7.81 \\ \hline 1 \end{array}$$

Step 3

Add the tenths, ones, and tens. Align the decimal point in the sum with the decimal point in the addends.

$$\begin{array}{r} {\scriptstyle 1}14.00 \\ +\ 7.81 \\ \hline 21.81 \end{array}$$

Carson ran 21.81 miles in all.

Guided Practice*

Do You Understand?

1. In the example on page 78, what was the combined time for the middle two legs of the relay race?
   41.94 seconds

Do You Know How?

In **2–5**, find each sum.

2. $\begin{array}{r} 0.82 \\ +\ 4.21 \\ \hline 5.03 \end{array}$

3. $\begin{array}{r} 9.1 \\ +\ 7.21 \\ \hline 16.31 \end{array}$

4. $0.26 + 8.3$ **8.56**

5. $4.98 + 3.02$ **8**

Independent Practice

You can estimate first to be sure your answers are reasonable.

Leveled Practice In **6–12**, find each sum.

6. $\begin{array}{r} 1.03 \\ +\ 0.36 \\ \hline 1.39 \end{array}$

7. $\begin{array}{r} 6.9 \\ +\ 2.8 \\ \hline 9.7 \end{array}$

8. $\begin{array}{r} 45.08 \\ +\ 2.01 \\ \hline 47.09 \end{array}$

9. $\begin{array}{r} 2.00 \\ +\ 0.78 \\ \hline 2.78 \end{array}$

10. $\$271.90 + \$34.22$ **$306.12**

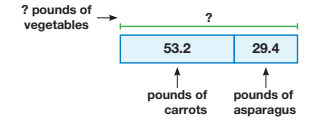
11. $7.2 + 3.96 + 8.8$ **19.96**

12. $16.62 + 4 + 2.38$ **23**

*For another example, see Set D on page 104.

Math Practices and Problem Solving

13. **MP.4 Model with Math** A farmer sold 53.2 pounds of carrots and 29.4 pounds of asparagus to a restaurant. How many pounds of these two vegetables did the restaurant buy? **82.6 lb**



For **14** and **15**, use the table.

14. **Math and Science** Which two cities have the greatest combined rainfall for a typical year?
    Springfield and Macon

15. **Number Sense** Which location had less than 45 inches of rain but more than 40 inches of rain?
    Springfield, MO

DATA

Location	Rainfall Amount in a Typical Year (inches)
Macon, GA	45
Boise, ID	12.19
Caribou, ME	37.44
Springfield, MO	44.97

16. **Higher Order Thinking** Tim earned $16 babysitting and $17.50 mowing a lawn. He paid $8.50 for a movie and bought a small popcorn for $1.95. Write an expression to show how much money he has left.
    $16 + $17.50 − $8.50 − $1.95

17. **MP.3 Critique Reasoning** Juan adds $3.8 + 4.6$ and gets a sum of 84. Is his answer correct? Tell how you know.
    No; Sample answer: 84 is not close to the estimated answer of 4 + 5 = 9. The correct sum should be 8.4.

Common Core Assessment

18. Choose all expressions that are equal to 12.9.
    - [x] 0.02 + 12 + 0.88
    - [ ] 0.06 + 12.03
    - [x] 11.9 + 1
    - [ ] 6.2 + 3.4 + 2.3
    - [ ] 3.01 + 2.01 + 7.7

19. Choose all expressions that are equal to 16.02.
    - [x] 16 + 0.02
    - [x] 3.42 + 8 + 4.6
    - [ ] 16.01 + 1
    - [ ] 12.06 + 3.14
    - [x] 7.36 + 8.66

Another Example *Why do you annex 2 zeros to 14?* [So that you can align the place values of the addends.] *Does annexing the zeros change the value of 14?* [No; 14 and 14.00 are equivalent.]

Error Intervention: Item 4

If students don't know how to line up the digits,

then have them point to and name the ones digit in each addend. Write the digits in a single column. Guide students to write the decimal point and continue with tenths and hundredths.

RtI **Reteaching** Assign Reteaching Set D on p. 104.

Items 10–12 Encourage students to write the problems vertically if they prefer. This will help them regroup when necessary. If students have difficulty adding the three numbers in Items 11 and 12, have students add two numbers first, and then add the third number. Suggest that they use estimation to check their sums for reasonableness.

Item 16 Higher Order Thinking To write an expression for the amount Tim has left, students need to determine which operations to use. *How can you represent the money Tim earned?* [Add $16 and $17.50] *The money he spent?* [Subtract $8.50 and $1.95]

Item 17 MP.3 Critique Reasoning Have students estimate before finding the exact answer and then compare the estimate with the exact answer to agree or disagree with Juan's answer.

Item 18 Review equivalent decimals as needed to help students understand why 12 can be written as 12.00 in order to add.

Multi-Step Problems *Page 80 Item 16; Page 82 Items 16 and 18*

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

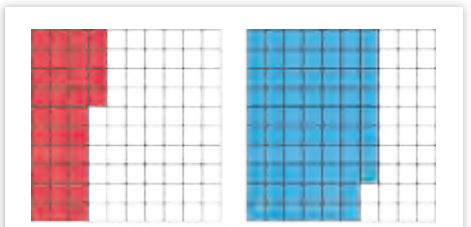
Intervention Activity I

Add Decimals

Materials

Decimal Grids (Teaching Tool 8), crayons or colored pencils

- Write 0.34, 0.68, 1.02, and 0.51 on the board.
- Have students color 34 boxes on one grid and 68 boxes of another color on a second grid. *You are going to add 0.34 and 0.68.* Have students count boxes and add. Have them write the sum and help them write the decimal point. *What is the sum?* [1.02]
- Repeat for 1.02 and 0.51 using three grids.



Reteach I

Name _____

Reteach to Build Understanding 2-4

Vocabulary

1. The value of a **digit** is determined by its place in a number.

0.28 The value of the digit in the ones place is **0**.
The value of the digit in the tenths place is **2** tenths or **0.2**.
The value of the digit in the hundredths place is **8 hundredths** or **0.08**.

2. A hundredths grid can be used to model decimals.
Each square has a value of one hundredth.
Each column has a value of one tenth.
Ten hundredths equals one tenth.

Two columns and three squares are shaded.
So, there are **2** tenths and **3** hundredths.
The decimal in standard form is **0.23**.

3. Add 0.74 + 0.52.
Use hundredths grids to help.
Write the missing digits in the boxes.

Step 1	Step 2	Step 3	Step 4
Add the hundredths.	Add the tenths.	Write the decimal point.	Add the ones.
0.74 + 0.52 = 6	1 0.74 + 0.52 = 26	1 0.74 + 0.52 = .26	1 0.74 + 0.52 = 1.26
6 hundredths	7 tenths + 5 tenths = 12 tenths 12 tenths = 1 one, 2 tenths		

So, 0.74 + 0.52 = **1.26**.

On the Back! **2.77; Check students' work.**

4. Find the sum of 0.94 + 0.63 + 1.2. Show all your work.

R 2-4

On-Level and Advanced Activity Centers O A

Center Games

Students work in pairs or small groups to add decimals through hundredths. Have students record their work as they play the game.

★ On-Level

Clip and Cover

Partner Talk — Show your thinking while you work.

Get Started	Get 10 squares in one color and 10 in another color, two paper clips, and two number cubes. Take turns.
At Your Turn	Toss two cubes to find your ovals. **EXAMPLE:** ⚁ ⚂ Choose the 3rd oval on the left and the 5th oval on the right, **or** choose the 5th oval on the left and the 3rd oval on the right. Mark your ovals with paper clips.
How to Play	Explain how to add the two numbers you chose. Find and cover the answer. Lose your turn if the answer is taken.
How to Win	The first player or team to get any three connected rectangles in a row or column wins.

15.3	9.8	5.69	21.06	2.65	0.05
4.87					18.46
21.01	28.21	24.1	39.47	21.06	3.09
2.6					7.2
4.87	12.07	7.96	23.33	4.92	3.09
21.01	22.5	18.39	33.76	15.35	18.46

If you have more time — Play again! Talk about how you know that your answer is reasonable.

Center Game ★ 2-4

★★ Advanced

Clip and Cover

Partner Talk — Show your thinking while you work.

Get Started	Get 10 squares in one color and 10 in another color, one paper clip, and one number cube. Take turns.
At Your Turn	Toss one cube to find your oval. **EXAMPLE:** ⚁ Choose the 3rd oval on the left, **or** choose the 3rd oval on the right. Mark your oval with a paper clip.
How to Play	The number you chose is a sum. Find two numbers that you can add to get that sum. Cover the answer. Lose your turn if the answer is taken.
How to Win	The first player or team to get any three connected rectangles in a row or column wins.

37.08	33.5 + 41.71	28.29 + 31.72	58.39 + 8.34	12.93 + 15.06	88.70
17.49					66.73
47.81	73.2 + 5.26	13.68 + 23.4	27.4 + 32.61	56.45 + 32.87	89.32
83.53					78.46
27.99	13.97 + 14.02	4.00 + 84.7	56.8 + 26.73	64.11 + 25.21	31.90
75.21	35.24 + 12.57	23.87 + 13.21	17.3 + 14.60	7.08 + 10.41	60.01

If you have more time — Play again! Talk about your strategies as you play.

Center Game ★★ 2-4

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1, 2, 5–8, 10, 12, 13, 16–20

O Items 1, 3, 4, 7, 9–11, 14–20

A Items 2, 3, 8–11, 13–20

Name _____

Help Practice Buddy Tools Games

Homework & Practice 2-4
Add Decimals

Another Look!

A scientist used 0.62 milliliter of solution for an experiment and 0.56 milliliter of solution for a different experiment. How much solution did he use for the two experiments?

You can estimate first to be sure that your answer is reasonable.

Write the numbers, lining up the decimal points. Include the zeros to show place value.

0.62
+ 0.56

Add the hundredths and the tenths.

Remember to write the decimal point in your answer.

$$\begin{array}{r} {\scriptstyle 1}\\ 0.62\\ +\ 0.56\\ \hline 1.18 \end{array}$$

The scientist used 1.18 milliliters of solution.

Leveled Practice In **1–11**, find the sum.

1. Find 55.25 + 2.98 + 16.3.

$$\begin{array}{r} 55.25\\ 2.98\\ +\ 16.30\\ \hline 74.53 \end{array}$$

2. $\begin{array}{r} 37.2\\ 103.\\ +\ 8.52\\ \hline 148.72 \end{array}$

3. $\begin{array}{r} 2.97\\ +\ 0.35\\ \hline 3.32 \end{array}$

4. $\begin{array}{r} 5.62\\ +\ 7.99\\ \hline 13.61 \end{array}$

5. $\begin{array}{r} 23.59\\ +\ 6.56\\ \hline 30.15 \end{array}$

6. 13 + 7.69 **20.69**

7. 41.5 + 12.61 **54.11**

8. 39.48 + 26.7 **66.18**

9. 67.55 + 0.83 **68.38**

10. 88.8 + 4.27 + 78.95 **172.02**

11. 2.94 + 45 + 58.06 **106**

For **12** and **13**, use the table.

DATA

City	Snowfall (inches) in 2000
Milwaukee, WI	87.8
Baltimore, MD	27.2
Oklahoma City, OK	17.3

12. How much combined snowfall was there in Milwaukee and Oklahoma City?
105.1 in.

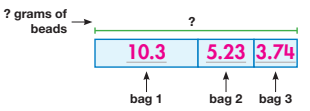
13. What is the combined snowfall total for all three cities?
132.3 in.

In science class, students weighed different amounts of clay. Carmen weighed 4.361 ounces, Kim weighed 2.704 ounces, Simon weighed 5.295 ounces, and Angelica weighed 8.537 ounces.

14. How many ounces of clay did Carmen and Angelica have in all?
12.898 ounces of clay

15. How many ounces of clay did Kim and Simon have in all?
7.999 ounces of clay

16. **MP.4 Model with Math** Three bags of beads have masses of 10.3 grams, 5.23 grams, and 3.74 grams. Complete the bar diagram to find the total mass of all the beads.



19.27 g

17. **MP.2 Reasoning** Reilly adds 45.3 and 3.21. Should his sum be greater than or less than 48? Tell how you know.
The sum should be greater than 48, because the whole numbers have a sum of 48 without adding the decimals.

18. **Higher Order Thinking** Patrick has a 600-meter skein of yarn. He used 248.9 meters of yarn to make a hat. Does he have enough yarn left to make a scarf that uses 354.03 meters of yarn? Explain.
No; 248.9 + 354.03 = 602.93, which is greater than 600.

Common Core Assessment

19. Choose all expressions that are equal to 15.02.

- [x] 12.96 + 2.06
- [ ] 0.56 + 14.64
- [x] 2.62 + 12.4
- [x] 1.22 + 1.8 + 12
- [ ] 1 + 0.5 + 13.8

20. Choose all expressions that are equal to 13.99.

- [ ] 13 + 0.9
- [x] 6.25 + 3.9 + 3.84
- [x] 4.635 + 9.355
- [x] 8 + 5.99
- [ ] 10 + 3.09

LESSON 2-5

SUBTRACT DECIMALS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings, and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Mathematical Practices MP.1, MP.3, MP.4, MP.7, MP.8

Objective Subtract decimals to the hundredths using the standard algorithm.

Essential Understanding Subtracting multi-digit decimals is similar to subtracting multi-digit whole numbers.

COHERENCE

Just as students learned to extend their understanding of whole number algorithms and decimal place value to add decimals in Lesson 2-3, they will learn to use similar steps to subtract decimals in this lesson.

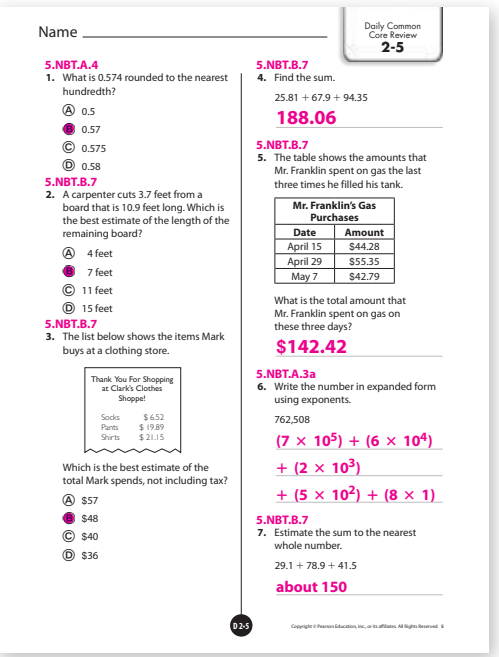
RIGOR

This lesson blends **conceptual understanding** and **procedural skill**. Students need to use their understanding of decimal place value and equivalent decimals to write 32.7 as 32.70 and then use their understanding of place value and the standard subtraction algorithm for whole numbers to subtract the decimals. They can then practice the procedure throughout the lesson.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 2-5

5.NBT.A.4
1. What is 0.574 rounded to the nearest hundredth?
Ⓐ 0.5
Ⓑ 0.57
Ⓒ 0.575
Ⓓ 0.58

5.NBT.B.7
2. A carpenter cuts 3.7 feet from a board that is 10.9 feet long. Which is the best estimate of the length of the remaining board?
Ⓐ 4 feet
Ⓑ 7 feet
Ⓒ 11 feet
Ⓓ 15 feet

5.NBT.B.7
3. The list below shows the items Mark buys at a clothing store.

Thank You For Shopping at Clark's Clothes Shoppe!
Socks $ 6.52
Pants $ 19.89
Shirts $ 21.15

Which is the best estimate of the total Mark spends, not including tax?
Ⓐ $57
Ⓑ $48
Ⓒ $40
Ⓓ $36

5.NBT.B.7
4. Find the sum.
25.81 + 67.9 + 94.35
188.06

5.NBT.B.7
5. The table shows the amounts that Mr. Franklin spent on gas the last three times he filled his tank.

Mr. Franklin's Gas Purchases	
Date	Amount
April 15	$44.28
April 29	$55.35
May 7	$42.79

What is the total amount that Mr. Franklin spent on gas on these three days?
$142.42

5.NBT.A.3a
6. Write the number in expanded form using exponents.
762,508
$(7 \times 10^5) + (6 \times 10^4) + (2 \times 10^3) + (5 \times 10^2) + (8 \times 1)$

5.NBT.B.7
7. Estimate the sum to the nearest whole number.
29.1 + 78.9 + 41.5
about 150

Today's Challenge

Think Use the Topic 2 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Reading Use prereading supports such as graphic organizers to enhance comprehension of written text.

Use with the Visual Learning Bridge on Student's Edition p. 84.

Display the subtraction steps from the student page. *What does this page help you do?* [Subtract decimals.] *What does Step 1 ask you to do?* [Write the numbers and line up the decimal points.] *What clues do you get from the numbers and marks in the math?* [In Step 2, the slashes over the digits 9 and 2 and the small numbers 8 and 12 above them mean to regroup the tenths and hundredths. The digit 5 in the difference means 5 hundredths are left. In Step 3: The two other digits written in the difference mean how many tenths and ones are left.]

Beginning Display 4.82 – 1.35. *What is Step 1 for subtracting the decimals?* [Write the numbers, lining up the decimal points.] *What is Step 2?* [Subtract the hundredths. Regroup.] *What step comes next?* [Subtract the tenths and ones.]

Intermediate Reproduce the bar diagram on p. 84, replacing the numbers to show a different subtraction. Cut apart and mix up the boxes. Have students rearrange the boxes in the correct positions.

Advanced Have students make a bar diagram or other graphic organizer showing the subtraction steps for 9.64 – 5.27.

Summarize What are the steps for subtracting decimals with regrouping?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

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Solve

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students subtract decimals in the hundredths place by using various strategies. This prepares students to subtract decimals to hundredths using the standard algorithm on the next page.

10–15 min

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
MP.8 Generalize Listen and look for students who use place value and what they know about subtracting whole numbers to subtract decimals.

2. Build Understanding
How can you estimate the answer to this problem? [Sample answer: 32.7 is about 33, and 15.33 is about 15. Since 33 − 15 = 18, the difference is about 18 meters.]

Small Group DURING

3. Ask Guiding Questions As Needed
What operation can you use to compare two lengths? [Subtraction] *In which place does 15.33 have a digit that 32.7 does not?* [Hundredths place] *What can you do to make the number of digits to the right of the decimal point match?* [Write a zero in the hundredths place of 32.7]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. If needed, project Darcy's work to show how to align decimal points.

5. Transition to the Visual Learning Bridge
Subtracting decimals is similar to subtracting whole numbers. Decimal subtraction involves aligning the decimal points in the numbers before subtracting.

6. Extension for Early Finishers
Ms. Garcia started with $57.50. She spent $29.25 at the hardware store and $7.75 buying lunch. How much money did she have left? [$20.50]

Name _____ Solve

Solve & Share
Ms. Garcia is an electrician and has a length of wire that is 32.7 meters long. She has another length of wire that is 15.33 meters long. How much longer is one wire than the other? ***Solve this problem any way you choose.***

Lesson 2-5
Subtract Decimals

I can ...
subtract decimals using the standard algorithm.

Content Standard 5.NBT.B.7
Mathematical Practices MP.1, MP.3, MP.4, MP.7, MP.8

See margin for sample student work.

Look Back! MP.7 Use Structure How can you use addition to check the problem about Ms. Garcia's wires?
Use place value to align the number being subtracted and the difference, and then add. The sum should be the number subtracted from; 15.33 + 17.37 = 32.70 and 32.70 is equivalent to 32.7.

Digital Resources at PearsonRealize.com Topic 2 | Lesson 2-5 83

Analyze Student Work

Darcy's Work

$$\begin{array}{r} {\scriptstyle 2\ 12\ 6\ 10} \\ 3\!\not{2}.\not{7}\not{0} \\ -\ 15.33 \\ \hline 17.37 \end{array}$$

One wire is 17.37 meters longer than the other wire.

Darcy aligns the decimal points and regroups as needed.

Trevor's Work

32.70 - 15 = 17.70
17.70 - 0.33 = 17.37

The longer wire is 17.37m longer.

Trevor subtracts the whole number first, then subtracts the decimal part.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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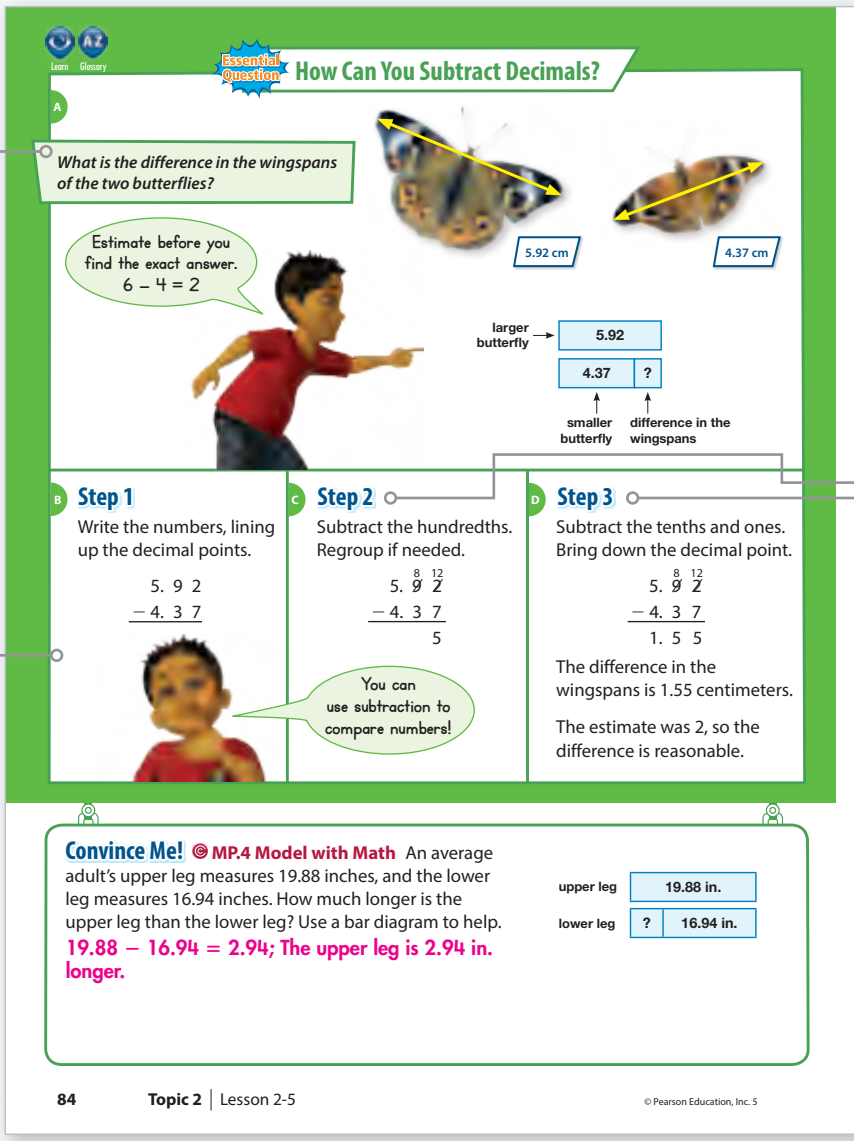
Learn Glossary

MP.4 Model with Math
What does the bar diagram show? [The wingspan of the larger butterfly, 5.92 cm, and the wingspan of the smaller butterfly, 4.37 cm] *What are you asked to find?* [How much greater the wingspan of the bigger butterfly is than the smaller one] *What does the estimated answer of 2 mean?* [It means that one butterfly's wingspans is about 2 cm greater than the other's.]

MP.7 Use Structure
Which values might it be necessary to regroup when subtracting? [The 9 tenths and the 2 hundredths]



Visual Learning Bridge

In Step 2, how is the regrouping shown? [9 tenths and 2 hundredths become 8 tenths and 12 hundredths.]

MP.1 Make Sense and Persevere
In Step 3, why do you need to bring down the decimal point in the answer? [The answer is 1.55, not 155.]

Convince Me! MP.4 Model with Math *How can you estimate the answer to this problem?* [Sample answer: 19.88 – 16.94 is about 20 – 17 = 3, so the difference is about 3 in.]

Coherence If students have difficulty relating the standard algorithm for subtracting whole numbers to the one for subtracting decimals, use decimal grids to model 5.92 – 4.37. Show how regrouping 0.92 in 5.92 involves decomposing one tenth into 10 hundredths, leaving 8 tenths and making 12 hundredths. This is similar to decomposing tens into ones when subtracting 592 – 437.

Essential Question

Revisit the Essential Question. Subtracting decimals is similar to subtracting whole numbers. Place-value knowledge can help determine the correct position of the decimal point in the difference of two decimal numbers.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 25 and 31 are worth 1 point. Item 28 is worth up to 3 points.

20–30 min

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PearsonRealize.com

Practice Buddy | Tools | Assessment

Name _____

Guided Practice*

Do You Understand?

1. **Number Sense** Explain why 1.55 centimeters is a reasonable answer for the difference in the wingspans of the two butterflies.
   1.55 cm is close to the estimate of 2 cm.
2. Maria rewrote 45.59 − 7.9 as 45.59 − 7.90. Is the value of 7.9 changed by annexing a zero after 7.9? Why or why not?
   No, 7.9 and 7.90 are equivalent decimals.

Do You Know How?

In **3–10**, subtract the decimals.

3. 16.82 − 5.21 = **11.61**
4. 7.21 − 6.1 = **1.11**
5. 23.06 − 8.24 = **14.82**
6. $4.08 − $2.12 = **$1.96**
7. 56.8 − 2.76 = **54.04**
8. $43.80 − $16.00 = **$27.80**
9. 22.4 − 10.7 = **11.7**
10. $36.40 − $21.16 = **$15.24**

Independent Practice

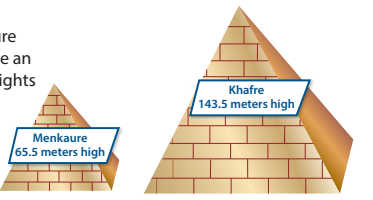
Leveled Practice In **11–26**, subtract to find the difference.

11. 7.8 − 4.9 = **2.9**
12. $20.60 − $14.35 = **$6.25**
13. 43.90 − 7.52 = **36.38**
14. 65.90 − 28.38 = **37.52**
15. 15.03 − 4.12 = **10.91**
16. 13.9 − 3.8 = **10.1**
17. 65.18 − 12.05 = **53.13**
18. $52.02 − $0.83 = **$51.19**
19. 7.09 − 3.65 = **3.44**
20. 34.49 − 12.61 = **21.88**
21. 85.22 − 43.5 = **41.72**
22. $10.05 − $4.50 = **$5.55**
23. 5.27 − 3.4 = **1.87**
24. 23.6 − 8.27 = **15.33**
25. 8.04 − 0.3 = **7.74**
26. $21.37 − $10.95 = **$10.42**

*For another example, see Set D on page 104.

Math Practices and Problem Solving

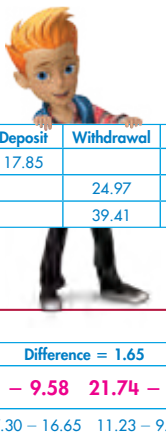
27. **Algebra** The Pyramid of Khafre measured 143.5 meters high. The Pyramid of Menkaure measured 65.5 meters high. Write and solve an equation to find *d*, the difference in the heights of these two pyramids.
    143.5 − 65.5 = *d*, *d* = 78 meters



28. **Higher Order Thinking** Jonah bought a 1.5-liter bottle of seltzer. He used 0.8 liter of seltzer in some punch. Which is greater, the amount he used or the amount he has left? Explain how you decided.
    The amount he used is greater. Sample answer: 1.5 − 0.8 = 0.7 and 0.8 > 0.7

29. **MP.3 Critique Reasoning** Sue subtracted 2.9 from 20.9 and got 1.8. Explain why this is not reasonable.
    A good estimate is 21 − 3 = 18, and 1.8 is not close to the estimate.

30. **MP.1 Make Sense and Persevere** Abe had $156.43 in his bank account at the beginning of the month. He made the two withdrawals shown in his check register. How much money does he have left in his bank account? He must have at least $100 in his account by the end of the month or he will be charged a fee. How much money does he need to deposit to avoid being charged a fee?
    The balance is $92.05. He has to deposit at least $7.95 to avoid a fee.



Date	Deposit	Withdrawal	Balance
9/1	17.85		156.43
9/8		24.97	**131.46**
9/10		39.41	**92.05**

Common Core Assessment

31. Which two subtraction problems have a difference of 1.65? Write those subtraction problems in the box.

Difference = 1.65
11.23 − 9.58 21.74 − 20.09
27.30 − 16.65 11.23 − 9.58 40.4 − 23.9 12.68 − 2.03 21.74 − 20.09

Error Intervention: Item 7

If students are confused by the number of digits in the number to be subtracted,

then remind them to add zeros as placeholders where necessary.

RtI **Reteaching** Assign Reteaching Set D on p. 104.

Items 15–26 Encourage students to rewrite the problems vertically if they prefer. This will help them regroup when that is necessary.

Item 16 Have students use mental math to subtract the decimals. *How can you use compensation to make this problem easier to solve?* [Sample answer: Add 0.2 to 3.8 to get 4: 13.9 − 4 = 9.9. Since 0.2 too much was subtracted, add 0.2 back to find the actual answer: 9.9 + 0.2 = 10.1.]

Item 28 Higher Order Thinking To find the solution, students need to answer a hidden question. *How can you find how much seltzer was left?* [Subtract 0.8 from 1.5; 0.7 liter was left.]

Item 29 MP.3 Critique Reasoning Some students may think Sue's answer is reasonable. Suggest that they use addition and estimation to check her work. *What is 1.8 rounded to the nearest whole number?* [2] *Is 2.9 + 2 close to 20.9?* [No]

Item 31 Some students may estimate the answer to each subtraction problem and then find exact answers for only those with estimates close to 1.65.

Multi-Step Problems *Page 86 Items 28 and 30; Page 88 Item 11*

85–86

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

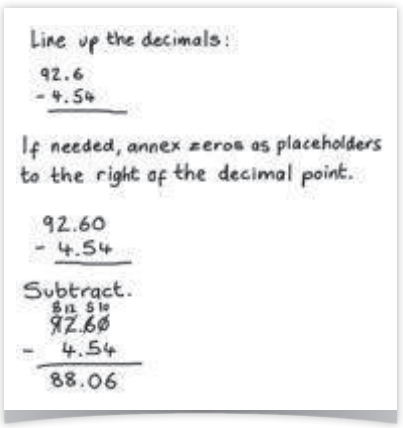
O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

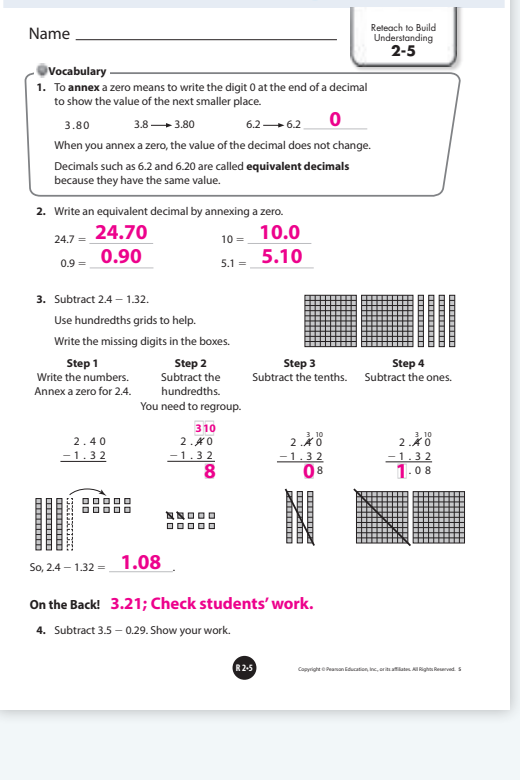
Intervention Activity I

Subtract Decimals

- Write 7, 15.96, and 92.6 spaced evenly across the board. Above these numbers and in the center, write 4.54.
- Write these steps on the board:
  Line up the decimals.
  If needed, annex zeros as placeholders to the right of the decimal point.
  Subtract.
- Call on volunteers to subtract 4.54 from one of the numbers below it.



Reteach I


Name _____

Reteach to Build Understanding 2-5

Vocabulary

1. To **annex** a zero means to write the digit 0 at the end of a decimal to show the value of the next smaller place.
   3.80 3.8 → 3.80 6.2 → 6.2 **0**
   When you annex a zero, the value of the decimal does not change.
   Decimals such as 6.2 and 6.20 are called **equivalent decimals** because they have the same value.

2. Write an equivalent decimal by annexing a zero.
   24.7 = **24.70** 10 = **10.0**
   0.9 = **0.90** 5.1 = **5.10**

3. Subtract 2.4 − 1.32.
   Use hundredths grids to help.
   Write the missing digits in the boxes.

Step 1	Step 2	Step 3	Step 4
Write the numbers. Annex a zero for 2.4.	Subtract the hundredths. You need to regroup.	Subtract the tenths.	Subtract the ones.
2.40 − 1.32	3 10 2.40 − 1.32 = **8**	3 10 2.40 − 1.32 = **08**	3 10 2.40 − 1.32 = **1.08**

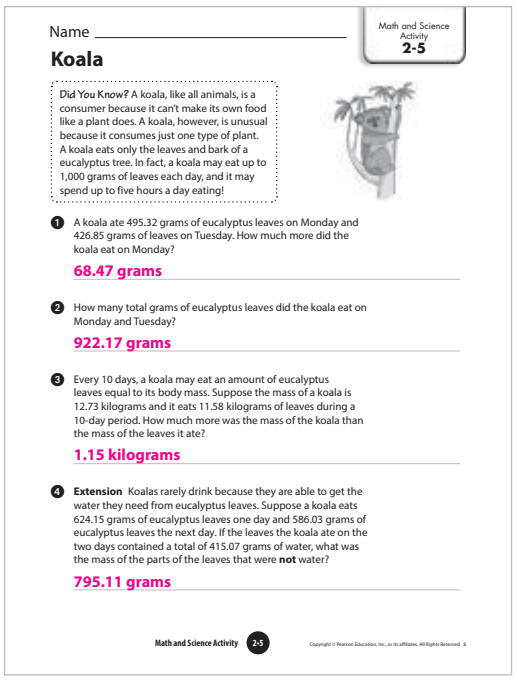
So, 2.4 − 1.32 = **1.08**.

On the Back! **3.21; Check students' work.**

4. Subtract 3.5 − 0.29. Show your work.

R 2-5

On-Level and Advanced Activity Centers O A


Name _____

Math and Science Activity 2-5

Koala

Did You Know? A koala, like all animals, is a consumer because it can't make its own food like a plant does. A koala, however, is unusual because it consumes just one type of plant. A koala eats only the leaves and bark of a eucalyptus tree. In fact, a koala may eat up to 1,000 grams of leaves each day, and it may spend up to five hours a day eating!

1. A koala ate 495.32 grams of eucalyptus leaves on Monday and 426.85 grams of leaves on Tuesday. How much more did the koala eat on Monday?
   68.47 grams

2. How many total grams of eucalyptus leaves did the koala eat on Monday and Tuesday?
   922.17 grams

3. Every 10 days, a koala may eat an amount of eucalyptus leaves equal to its body mass. Suppose the mass of a koala is 12.73 kilograms and it eats 11.58 kilograms of leaves during a 10-day period. How much more was the mass of the koala than the mass of the leaves it ate?
   1.15 kilograms

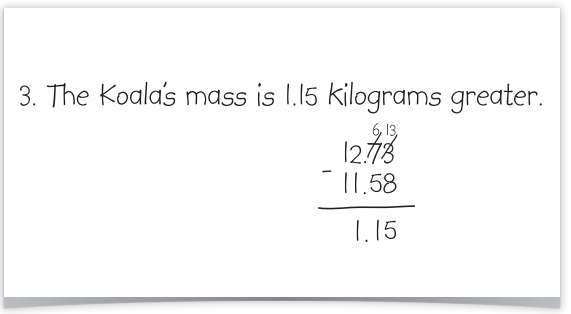
4. **Extension** Koalas rarely drink because they are able to get the water they need from eucalyptus leaves. Suppose a koala eats 624.15 grams of eucalyptus leaves one day and 586.03 grams of eucalyptus leaves the next day. If the leaves the koala ate on the two days contained a total of 415.07 grams of water, what was the mass of the parts of the leaves that were **not** water?
   795.11 grams

Math and Science Activity 2-5

Math and Science Activity STEM

This activity revisits the science theme **Producers and Consumers,** introduced on p. 55 in the Student's Edition.

Sample Student Work


3. The Koala's mass is 1.15 kilograms greater.

6 13
12.7̸3̸
− 11.58
1.15

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

PEARSON realize.
PearsonRealize.com

Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games
A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment I Items 1–5, 8–12, 14 O Items 1, 4–8, 10–14 A Items 5–7, 8–14

Name _____

Help Practice Buddy Tools Games

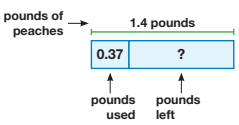
Homework & Practice 2-5
Subtract Decimals

Another Look!

Mr. Montoya bought 3.5 pounds of ground beef. He used 2.38 pounds to make hamburgers. How much ground beef does he have left?

Write the numbers, lining up the decimal points. Include the zero to show place value.	Subtract the hundredths. Regroup if necessary.	Subtract the tenths and the ones.
3.50 − 2.38	$3.\overset{4}{5}\overset{10}{\cancel{0}}$ − 2.38 2	$3.\overset{4}{5}\overset{10}{\cancel{0}}$ − 2.38 1.12
	Remember to write the decimal point in your answer.	So, Mr. Montoya has 1.12 pounds of ground beef left.

1. Anya bought 1.4 pounds of peaches. She used 0.37 pound in a fruit salad. How much is left? Use the bar diagram to help you.
She has 1.03 pounds left.



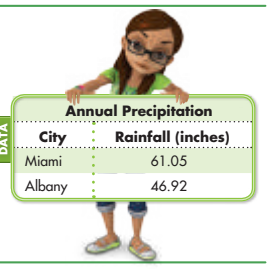
Leveled Practice In **2–7**, find the difference.

2. 82.70 − 5.59 = **77.11**
3. 43.30 − 12.82 = **30.48**
4. 7.28 − 4.90 = **2.38**
5. $72.35 − 6.19 = **$66.16**
6. 1.24 − 0.92 = **0.32**
7. 6.04 − 3.48 = **2.56**

8. A–Z **Vocabulary** Complete the sentence using one of the terms below.
Commutative property
Compensation
Compatible numbers
Compensation is adjusting one number in a problem to make computations easier and balancing the adjustment by changing the other number.

9. **MP.8 Generalize** Describe the steps you would use to subtract 7.6 from 20.39.
Sample answer: Write the numbers, lining up the decimal points. Write zeros to show place value. Subtract the hundredths, the tenths, and the ones. Place the decimal point in the answer.

In **10** and **11**, use the table.



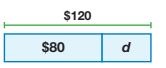
DATA

Annual Precipitation	
City	Rainfall (inches)
Miami	61.05
Albany	46.92

10. **Math and Science** How much greater was Miami's annual rainfall than Albany's? **14.13 inches**

11. The annual rainfall in Albany is 0.33 inch less than the annual rainfall in Nashville. How much less rainfall did Nashville get than Miami? Show your work.
13.8 inches; 46.92 + 0.33 = 47.25; 61.05 − 47.25 = 13.8

12. **MP.4 Model with Math** Lila would like to take a ceramics class. The class costs $120. She has saved $80 so far. Use the bar diagram to write and solve an equation to find the amount that Lila still needs.
d = $40; 80 + d = 120 80 + 40 = 120



13. **Higher Order Thinking** The first-place swimmer's time in the 100-meter freestyle at a local swim meet was 1.32 seconds faster than the second-place swimmer. What was the time for the first-place swimmer? What was the difference in time between the second- and third-place swimmers?
8.01 seconds; 4.32 seconds

DATA

100-m Freestyle	
Finish	Time (seconds)
First	?
Second	9.33
Third	13.65

Common Core Assessment

14. Which two subtraction problems have a difference of 10.2? Write those subtraction problems in the box.

Difference = 10.2
16.29 − 6.09 36.1 − 25.9
12.05 − 2.03 16.29 − 6.09 36.1 − 25.9 22.09 − 21.07 10.82 − 9.8

87–88

LESSON 2-6

ADD AND SUBTRACT DECIMALS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings, and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.5, MP.7, MP.8

Objective Add and subtract decimals.

Essential Understanding Adding and subtracting decimals is similar to adding and subtracting whole numbers. Using algorithms and models are among the ways to add and subtract decimals. Estimation can help you check your answers for reasonableness.

Materials Decimal Grids (Teaching Tool 8)

COHERENCE

In this lesson, students will learn how to use the standard algorithms for adding and subtracting decimals. In the next lesson, they will learn how to apply the computational skills they have developed to model and solve problems. They will also use what they learned about estimating with decimals to check that their answers are reasonable.

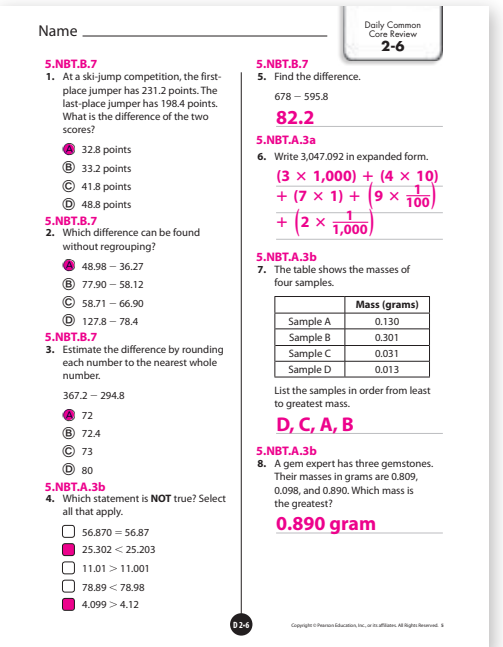
RIGOR

This lesson emphasizes **procedural skill**. Students add or subtract from right to left, regrouping as necessary. Regrouping involves composing or decomposing 10 of one unit for 1 of an adjacent unit, just as in addition or subtraction of whole numbers.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 2-6

5.NBT.B.7
1. At a ski-jump competition, the first-place jumper has 231.2 points. The last-place jumper has 198.4 points. What is the difference of the two scores?
   (A) 32.8 points
   (B) 33.2 points
   (C) 41.8 points
   (D) 48.8 points

5.NBT.B.7
2. Which difference can be found without regrouping?
   (A) 48.98 − 36.27
   (B) 77.90 − 58.12
   (C) 58.71 − 66.90
   (D) 127.8 − 78.4

5.NBT.B.7
3. Estimate the difference by rounding each number to the nearest whole number.
   367.2 − 294.8
   (A) 72
   (B) 72.4
   (C) 73
   (D) 80

5.NBT.A.3b
4. Which statement is **NOT** true? Select all that apply.
   ☐ 56.870 = 56.87
   ☑ 25.302 < 25.203
   ☐ 11.01 > 11.001
   ☐ 78.89 < 78.98
   ☑ 4.099 > 4.12

5.NBT.B.7
5. Find the difference.
   678 − 595.8
   82.2

5.NBT.A.3a
6. Write 3,047.092 in expanded form.
   $(3 \times 1{,}000) + (4 \times 10) + (7 \times 1) + \left(9 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1{,}000}\right)$

5.NBT.A.3b
7. The table shows the masses of four samples.

	Mass (grams)
Sample A	0.130
Sample B	0.301
Sample C	0.031
Sample D	0.013

List the samples in order from least to greatest mass.
D, C, A, B

5.NBT.A.3b
8. A gem expert has three gemstones. Their masses in grams are 0.809, 0.098, and 0.890. Which mass is the greatest?
0.890 gram

D 2-6

Today's Challenge

Think Use the Topic 2 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Strategies Use prior experiences to understand meanings.

Use with the Visual Learning Bridge on Student's Edition p. 90.

Discuss how word problems often describe situations that students may have experienced in their own lives. *You can use your experiences to help understand word problems.* Discuss words from the student page: *race, time, longer than. Have you ever been in a race? What happened?* List words that students share. Highlight words related to operations, such as: *faster than. If you ran a race faster than a friend, how would you find out exactly how much faster?* [Sample answer: subtract]

Beginning Read aloud this problem: *The total cost of Hal's items is $13.48. He pays with $20.00. How much change should Hal get back? Have you ever paid for items at a store? What happened? What operations could be used in this situation?* [Addition for total cost; subtraction for the change]

Intermediate Have students write a word problem about a situation that might happen in their own lives using 10 + 0.25.

Advanced Have students list a situation for adding decimals and another for subtracting decimals that might happen in their own lives.

Summarize How can you use your experiences to understand word problems?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students add and subtract decimals using models such as bar diagrams. This prepares them for adding and subtracting decimals using the standard algorithm.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
You may wish to provide Decimal grids (Teaching Tool 8).

MP.4 Model with Math Listen and look for students who use a decimal grid or bar diagram to show the information given in the problem.

2. Build Understanding
What operation would you use to solve this problem? [Addition]

Small Group DURING

3. Ask Guiding Questions As Needed
How does the grid represent a decimal? [The larger square represents 1 whole. Each of the 100 little squares represents one hundredth.]

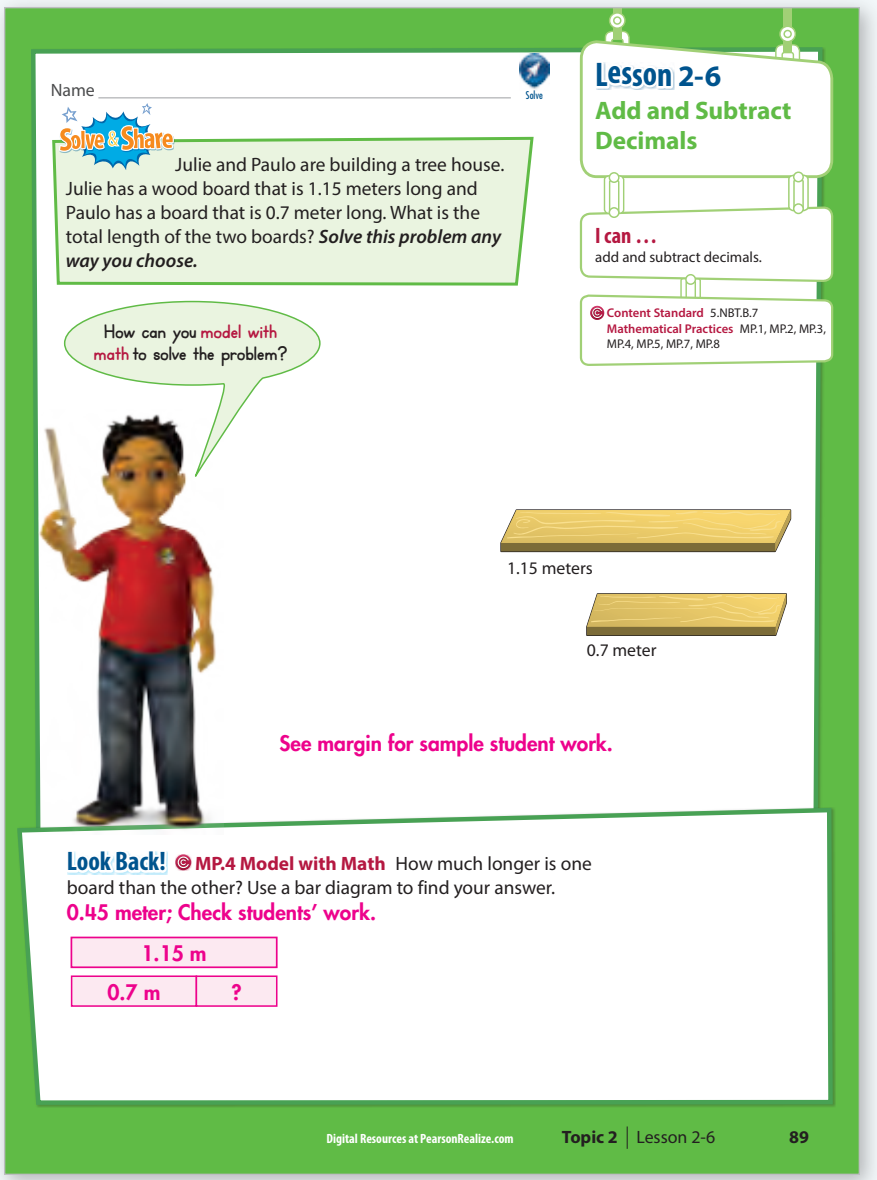
How much does each column represent? [One tenth]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. If needed, project Anna's work to discuss how to add with decimal grids.

5. Transition to the Visual Learning Bridge
You can add and subtract decimals using models just as you add and subtract whole numbers using models. The models can help you visualize the relationship between the numbers.

6. Extension for Early Finishers
Derrick brings three more boards measuring 3.2 meters, 2.75 meters, and 4.25 meters. What is the total length of Derrick's boards? [10.2 meters]


Name _____ Solve

Solve & Share

Julie and Paulo are building a tree house. Julie has a wood board that is 1.15 meters long and Paulo has a board that is 0.7 meter long. What is the total length of the two boards? ***Solve this problem any way you choose.***

How can you model with math to solve the problem?

1.15 meters

0.7 meter

See margin for sample student work.

Lesson 2-6
Add and Subtract Decimals

I can ...
add and subtract decimals.

Content Standard 5.NBT.B.7
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.5, MP.7, MP.8

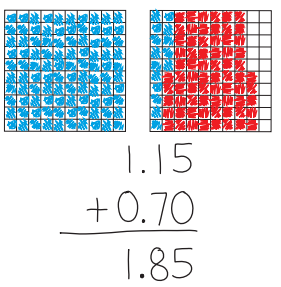
Look Back! MP.4 Model with Math How much longer is one board than the other? Use a bar diagram to find your answer.
0.45 meter; Check students' work.

1.15 m	
0.7 m	?

Digital Resources at PearsonRealize.com Topic 2 | Lesson 2-6 89

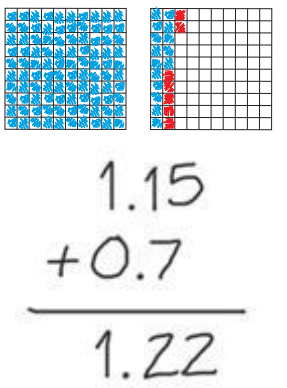
Analyze Student Work

Anna's Work



Anna uses different colored pencils to represent each addend.

Brad's Work



The 7 squares that Brad fills in for the second addend represent 0.07, not 0.7.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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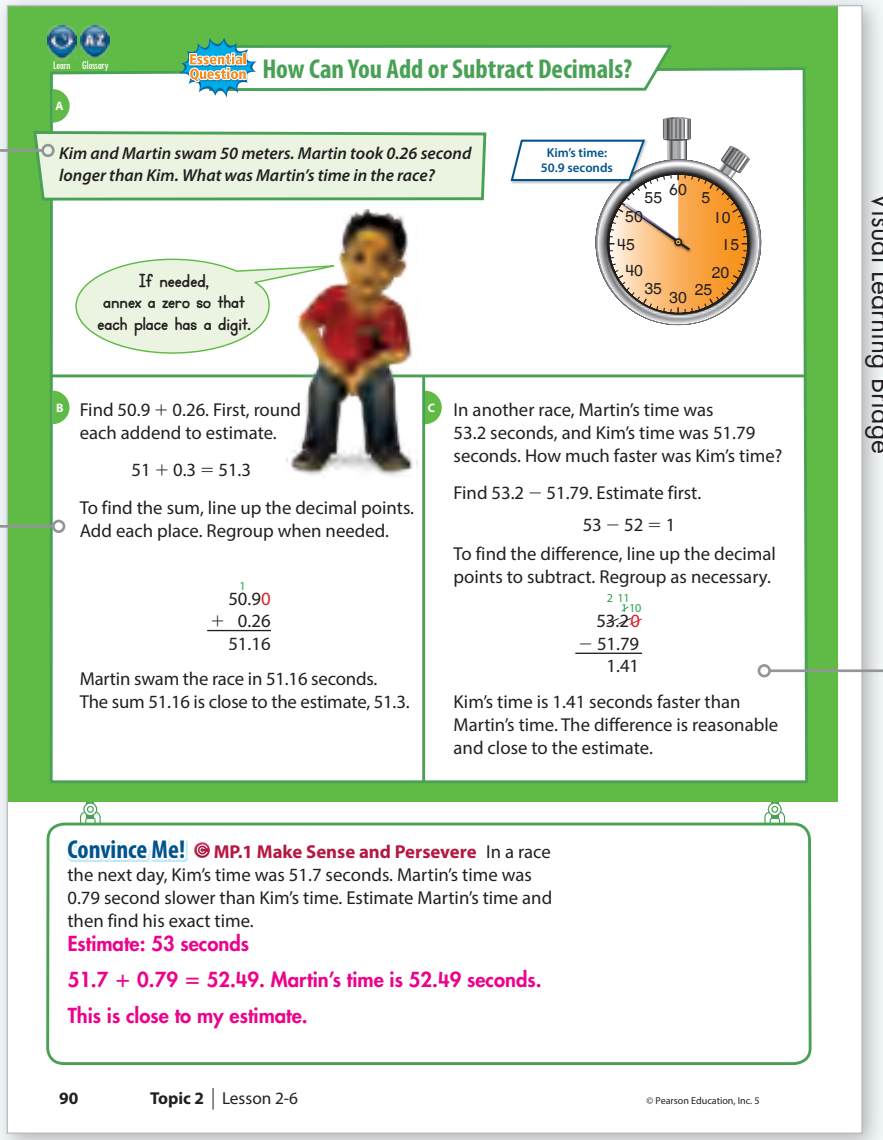
Learn Glossary

MP.1 Make Sense and Persevere
What operation can you use to solve this problem? How do you know? [Addition; I know the time it took for Kim to swim 50 m, and I have to find Martin's time, which is 0.26 second longer.]

MP.2 Reason Abstractly
Why do you round 0.26 to the nearest tenth? [0.26 is the number with the least value, and its greatest place is the tenths place, so round to the tenths place.]

Prevent Misconceptions 1 RtI

Some students may think that annexing a zero to the end of a decimal changes its value. Explain to students that annexing a zero is necessary so that each place has a digit.



Visual Learning Bridge

MP.8 Generalize
Are the exact answer and the estimate close? [Yes]
What does that tell you about your exact answer? [It is reasonable.]

Convince Me! MP.1 Make Sense and Persevere *How can you decide if your answer is reasonable?* [Estimate Martin's time first and then compare to the calculated answer.]

Coherence In solving these problems, students learn that they can see if their calculated answer is reasonable by comparing it to an estimate.

Essential Question

Revisit the Essential Question. Remind students that they can use the standard algorithms for adding and subtracting decimals as well as tools and other strategies, such as estimation, to help them check their answers for reasonableness.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 13 and 31 are worth 1 point. Item 29 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

Do You Understand?

1. **MP.8 Generalize** How are adding and subtracting decimals similar to and different from adding and subtracting whole numbers?
Sample answer: The adding and subtracting are the same. Lining up the decimals is different.
2. **MP.3 Construct Arguments** Describe how you know whether to add or subtract to solve a decimal problem.
Sample answer: I use addition to combine and subtraction to take away or compare.

Do You Know How?

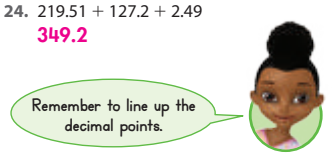
In **3–10**, find each sum or difference.

3. 5.9 + 2.7 = **8.6**
4. 4.01 − 2.95 = **1.06**
5. 2.57 + 7.7 = **10.27**
6. 1.5 − 1.05 = **0.45**
7. 10 + 3.28 = **13.28**
8. 15 − 6.01 = **8.99**
9. 3.45 − 1.6 = **1.85**
10. 9.12 + 2.06 = **11.18**

Independent Practice

Leveled Practice In **11–24**, find each sum or difference.

11. 2.17 − 0.80 = 1.**37**
12. 4.30 + 4.16 = 8.**46**
13. 7.62 − 3.86 = **3.7**6
14. 4.81 + 2.17 = **6.98**
15. 5.87 − 0.48 = **5.39**
16. 5.78 + 16.59 = **22.37**
17. 9.5 − 9.45 = **0.05**
18. 14 + 9.8 = **23.8**
19. 46.91 − 28.7 = **18.21**
20. 5.61 + 2.4 = **8.01**
21. 27 + 0.18 = **27.18**
22. 0.46 − 0.33 = **0.13**
23. 8.92 + 56 + 3.08 = **68**
24. 219.51 + 127.2 + 2.49 = **349.2**



*For another example, see Set D on page 104.

Math Practices and Problem Solving

25. **MP.3 Construct Arguments** Mr. Smith gave a cashier a $50 bill for a purchase of $38.70. The cashier gave him a $10 bill, two $1 bills, and three dimes back. Did Mr. Smith get the correct change? Why or why not?
No. $10 + $1 + $1 + $0.30 = $12.30; $50 − $38.70 = $11.30.

26. **MP.3 Critique Reasoning** Minh wrote the following number sentence: 2.6 + 0.33 = 5.9. Use estimation to show that Minh's answer is incorrect.
3 + 0 = 3; 5.9 is not reasonable.

27. **MP.7 Look for Relationships** Becky is counting backward from 18.5. Identify the pattern she is using and complete the sequence of numbers.
Pattern: Subtract 1.25
18.5, 17.25, 16, **14.75**, **13.5**

28. The price of one share of a company at the end of the day Monday was $126.38. The price of a share decreased $7.95 the next day. What was the price of the share at the end of the day Tuesday?
$118.43

29. **Higher Order Thinking** A visitor to the Grand Canyon hiked the South Kaibab Trail and the River Trail on one day. The next day, she hiked the Bright Angel Trail. How far did she hike the first day? How much farther did she hike the first day than the second day? How much longer was her total route than if she had hiked the North Kaibab Trail?
12.8 km; 0.2 km farther; 2.5 km longer

DATA

Trails in Grand Canyon National Park

Trail	Length (kilometers)
South Kaibab	10.1
River	2.7
Bright Angel	12.6
North Kaibab	22.9

Common Core Assessment

30. Choose all expressions that are equal to 3.89.
- [x] 16.09 − 12.2
- [ ] 48.5 − 9.6
- [x] 4.01 − 0.12
- [x] 128 − 124.11
- [ ] 6 − 3.89

31. Choose all of the addition problems in which you annex zeros to align place values in the addends.
- [x] 4 + 1.23 + 45.62
- [x] 0.09 + 12
- [ ] 0.11 + 12.11
- [ ] 19.9 + 0.6
- [x] 8.3 + 2 + 6.01

Item 1 MP.8 Generalize Encourage students to focus first on what is similar and then on what is different.

Error Intervention: Item 6

If students cannot decide how to subtract one decimal from the other,

then have them write a zero after 1.5 to show hundredths. [1.50] Ask: *What is 1.50 minus 1.05?* [0.45] If necessary, have students write this problem vertically to help them with regrouping.

RtI **Reteaching** Assign Reteaching Set D on p. 104.

Items 23–24 If necessary, have students add two numbers first, and then add the third number. Encourage students to use estimation to check their answers for reasonableness. *You can use estimation to check the sum of three numbers just as you can for two numbers.*

Items 15–24 Coherence Lesson 2-4 illustrates how annexing a zero creates equivalent decimals. Have students circle the computations that require the use of equivalent decimals when writing the problem.

Item 25 MP.3 Construct Arguments Encourage students who think the change is correct to carefully reread the problem. They may have overlooked that Mr. Smith's change included two $1 bills. Have students write down their work to see how the cashier made the mistake. If needed, remind students that the change added to the purchase price should equal $50.

Item 29 Higher Order Thinking Have students work on one part of the problem at a time. Also remind students to be precise (MP.6) in reading the correct rows of the table. *What two decimals do you need to add to find the distance the visitor hiked on the first day?* [10.1 and 2.7]

Multi-Step Problems *Page 92 Items 25 and 29; Page 94 Items 15 and 17*

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

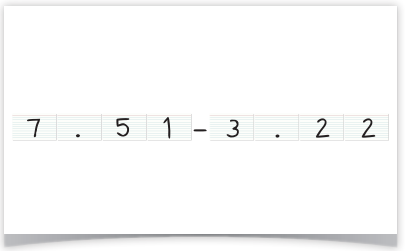
Add and Subtract Decimals

Materials

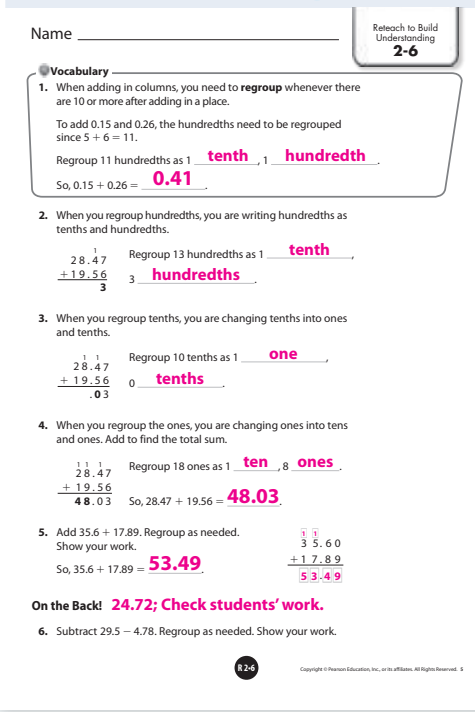
Index cards, markers

- Divide students into two groups. Give each group index cards and ask them to create three sets of numbers from 0 to 9, five cards with decimal points, five cards with addition signs, and five cards with subtraction signs.
- Have the groups take turns giving each other addition and subtraction problems to solve using a variety of decimal places, such as:
  x.xx − x.xx
  x.x + x.xx

  x.xx − x.x
  x.xx + x.xx
- Make sure students subtract the lesser number from the greater number.
- Have students use the cards with zeros as placeholders where necessary.



Reteach I



Name _____

Reteach to Build Understanding 2-6

Vocabulary

1. When adding in columns, you need to **regroup** whenever there are 10 or more after adding in a place.
   To add 0.15 and 0.26, the hundredths need to be regrouped since 5 + 6 = 11.
   Regroup 11 hundredths as 1 **tenth**, 1 **hundredth**.
   So, 0.15 + 0.26 = **0.41**.

2. When you regroup hundredths, you are writing hundredths as tenths and hundredths.
   28.47 + 19.56 = 3
   Regroup 13 hundredths as 1 **tenth**, 3 **hundredths**.

3. When you regroup tenths, you are changing tenths into ones and tenths.
   28.47 + 19.56 = .03
   Regroup 10 tenths as 1 **one**, 0 **tenths**.

4. When you regroup the ones, you are changing ones into tens and ones. Add to find the total sum.
   28.47 + 19.56 = 48.03
   Regroup 18 ones as 1 **ten**, 8 **ones**.
   So, 28.47 + 19.56 = **48.03**.

5. Add 35.6 + 17.89. Regroup as needed. Show your work.
   So, 35.6 + 17.89 = **53.49**.
   35.60 + 17.89 = 53.49

On the Back! **24.72; Check students' work.**

6. Subtract 29.5 − 4.78. Regroup as needed. Show your work.

R 2-6

On-Level and Advanced Activity Centers O A

Problem-Solving Reading Mat

Have students read the Problem-Solving Reading Mat for Topic 2 and then complete Problem-Solving Reading Activity 2-6.

See the Problem-Solving Reading Activity Guide for further suggestions on how to use the mat.

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games
A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–6, 9–12, 14, 15, 19, 20

O Items 3–9, 12, 13–16, 19, 20

A Items 7–12, 13, 15–20

Name _____

Help Practice Buddy Tools Games

Homework & Practice 2-6
Add and Subtract Decimals

Another Look!

Find 1.93 + 41.6.

Write the numbers, lining up the decimal points. Annex zeros so all numbers have the same number of decimal places.

$$\begin{array}{r} {\scriptstyle 1}\\ 1.93\\ +\ 41.60\\ \hline 43.53 \end{array}$$ ← Annex a zero.

Add the numbers. Regroup if necessary. Write the decimal point in your answer.

43.53 is close to 44, so the answer is reasonable.

Find 18.5 − 7.82.

Write the numbers, lining up the decimal points. Annex zeros so all numbers have the same number of decimal places.

$$\begin{array}{r} {\scriptstyle 7\ 14\ 10}\\ 18.50\\ -\ 7.82\\ \hline 10.68 \end{array}$$ ← Annex a zero.

Subtract. Regroup if necessary. Write the decimal point in your answer.

10.68 is close to 10.5, so the answer is reasonable.

Leveled Practice **1–12**, find the sum or difference.

1. $\begin{array}{r} 17.20\\ +\ 6.08\\ \hline \textbf{23.28} \end{array}$
2. $\begin{array}{r} 14.25\\ -\ 5.14\\ \hline \textbf{9.11} \end{array}$
3. $\begin{array}{r} 45.6\\ +\ 26.3\\ \hline \textbf{71.9} \end{array}$
4. 24.84 − 22.7 **2.14**
5. 13.64 − 8.3 **5.34**
6. 0.21 + 15.9 **16.11**
7. 3.65 − 1.41 **2.24**
8. 18.06 + 9.79 + 12 **39.85**
9. 8 − 6.38 **1.62**
10. 55.5 − 4.56 **50.94**
11. 8.32 + 95 + 12.68 **116**
12. 57.3 − 42.81 **14.49**

13. **MP.3 Critique Reasoning** Jaime wrote 4.4 − 0.33 = 1.1. Is his answer reasonable? Why or why not?
No; Sample answer: An estimate shows that 4.4 − 0.4 = 4.0, so his answer is not reasonable.

14. **MP.3 Critique Reasoning** Trey wrote 9.09 − 0.1 = 9.08. Is his answer correct? Why or why not?
No. Sample answer: The decimal points must be lined up when subtracting. The correct answer is 8.99.

For **15–17**, use the table.

DATA

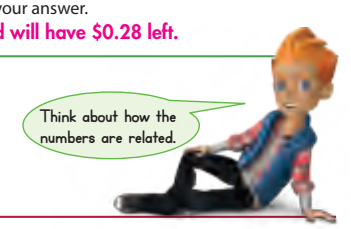
Craft Supplies	
Poster board	$1.29/sheet
Markers	$4.50/pack
Tape	$1.99/roll
Glue	$2.39/tube
Construction paper	$3.79/pack

15. **Higher Order Thinking** Jane bought three sheets of poster board and a pack of markers. Denise bought two packs of construction paper and a tube of glue. Who spent more? How much more?
Denise; $1.60

16. If Jane buys two more sheets of poster board, how much does she spend all together? **$10.95**

17. **MP.2 Reasoning** Julene has $25 to make posters. She buys two packs of markers, one pack of construction paper, two tubes of glue, and a roll of tape. How many sheets of poster board can she buy with the money she has left? Explain your answer.
She can buy 4 sheets of poster board and will have $0.28 left.

18. **MP.7 Look for Relationships** Mrs. Ibara wrote three decimal numbers on the board followed by two blank spaces. Complete the sequence of numbers.
4.15, 6.3, 8.45, **10.6**, **12.75**



Common Core Assessment

19. Choose all expressions that are equal to 0.8.
- [x] 15.3 − 14.5
- [ ] 12.96 − 12.88
- [ ] 128.2 − 120.2
- [ ] 1.77 − 0.08
- [x] 1.79 − 0.99

20. Choose all of the addition problems in which you annex zeros to align place values in the addends.
- [x] 0.54 + 12.1
- [ ] 2.55 + 145.05
- [x] 25.59 + 1.2
- [x] 23.04 + 124.1 + 34.06
- [ ] 1.51 + 3.07 + 4.18

MATH PRACTICES AND PROBLEM SOLVING | LESSON **2-7**

MODEL WITH MATH

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games
- MP — Math Practices Animations

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Mathematical Practices **MP.4** Model with Mathematics. Also **MP.1, MP.2, MP.3**

Domain **5.NBT** Number and Operations in Base Ten

Cluster **5.NBT.B** Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard **5.NBT.B.7** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Objective Use prior math knowledge and equations or bar diagrams to solve problems.

Essential Understanding Good math thinkers choose and apply math they know to show and solve problems from everyday life.

COHERENCE

In Grade 4, students learned how to model with mathematics to solve problems involving whole numbers and fractions with like denominators. This lesson emphasizes the thinking habits good problem-solvers use when they *model with mathematics*. This time, they use the mathematics learned in the topic of adding and subtracting decimals.

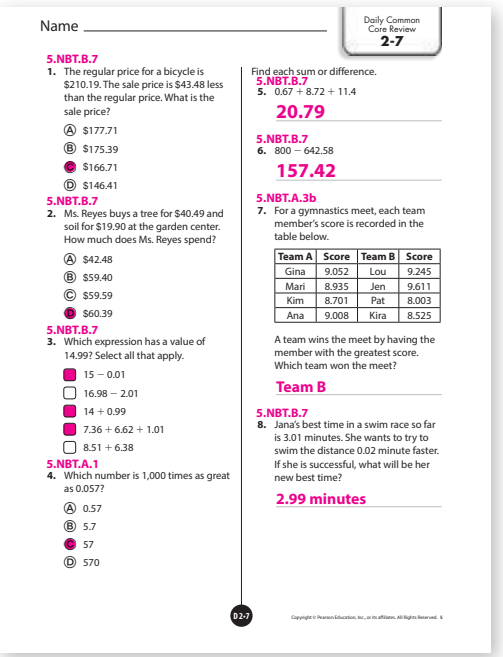
RIGOR

This lesson emphasizes **application**. Students will select and use multiple mathematical practices, with an emphasis on MP.4: Model with Math. The math they know and use is extended to include adding and subtracting decimals. They make sense of problems and persevere in solving them by finding and answering any hidden questions. Help students see the similarities in the structure of the bar diagrams used for decimals to those previously used for other numbers.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 2-7

5.NBT.B.7
1. The regular price for a bicycle is $210.19. The sale price is $43.48 less than the regular price. What is the sale price?
Ⓐ $177.71
Ⓑ $175.39
Ⓒ $166.71
Ⓓ $146.41

5.NBT.B.7
2. Ms. Reyes buys a tree for $40.49 and soil for $19.90 at the garden center. How much does Ms. Reyes spend?
Ⓐ $42.48
Ⓑ $59.40
Ⓒ $59.59
Ⓓ $60.39

5.NBT.B.7
3. Which expression has a value of 14.99? Select all that apply.
☑ 15 − 0.01
☐ 16.98 − 2.01
☑ 14 + 0.99
☑ 7.36 + 6.62 + 1.01
☐ 8.51 + 6.38

5.NBT.A.1
4. Which number is 1,000 times as great as 0.057?
Ⓐ 0.57
Ⓑ 5.7
Ⓒ 57
Ⓓ 570

Find each sum or difference.
5.NBT.B.7
5. 0.67 + 8.72 + 11.4
20.79

5.NBT.B.7
6. 800 − 642.58
157.42

5.NBT.A.3b
7. For a gymnastics meet, each team member's score is recorded in the table below.

Team A	Score	Team B	Score
Gina	9.052	Lou	9.245
Mari	8.935	Jen	9.611
Kim	8.701	Pat	8.003
Ana	9.008	Kira	8.525

A team wins the meet by having the member with the greatest score. Which team won the meet?
Team B

5.NBT.B.7
8. Jana's best time in a swim race so far is 3.01 minutes. She wants to try to swim the distance 0.02 minute faster. If she is successful, what will be her new best time?
2.99 minutes

D2-7

Today's Challenge

Think Use the Topic 2 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Reading Use visual support to enhance understanding.

Use with the Visual Learning Bridge on Student's Edition p. 96.

Review how a bar diagram can represent what is happening in a word problem. *How might a bar diagram look if you know the whole and one part, and want to find the other part?* [The unknown part is the difference between the whole and the known part in the diagram.]

Draw the bar diagram.

Beginning *How might a bar diagram look if you know two prices and want to find the total? Draw it.* [A box with two parts labeled with the prices; the whole amount represented by a line with a question mark on top of the two boxes.]

Intermediate *Draw two bar diagrams for this problem: The original price of a pen is $1.43. It is on sale for $0.19 off. Tom buys 3 pens at the sale price. What is his total cost?* [$1.24 × 3 = $3.72.]

Advanced Have students write a multi-step problem and trade problems with a partner to draw bar diagrams to show the parts of the problem.

Summarize How can you use bar diagrams to represent word problems?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

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Solve

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students extend their understanding of solving addition and subtraction of whole numbers to solving problems with decimals. They use what they have learned about adding and subtracting decimals.

10–15 min

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
MP.4 Model with Math Look for students who analyze information and use what they know about adding and subtracting decimals to solve a multi-step problem and who also use bar diagrams to write and solve equations.

2. **Build Understanding**
How should the two bar diagrams be used? [Use one to represent the total cost of the three items and the other to represent how much change Sheena receives.]

Small Group DURING

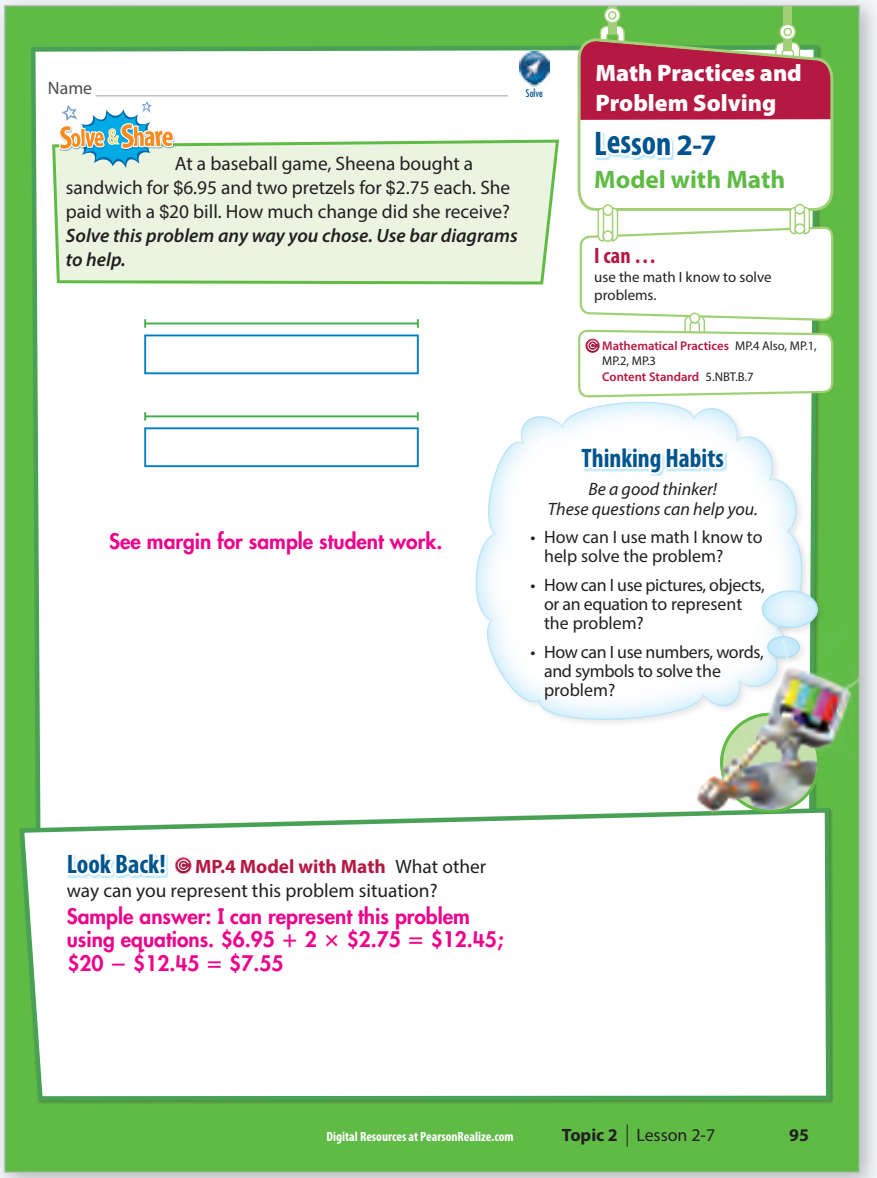
3. **Ask Guiding Questions As Needed**
What operation can you use to find the total Sheena spent on the three items? [Addition] *What operation can you use to find her change?* [Subtraction]

Whole Class AFTER

4. **Share and Discuss Solutions**
Solve Start with students' solutions. If needed, project Julie's work to show how she used a bar diagram to solve the problem.

5. **Transition to the Visual Learning Bridge**
Some problems involve several steps to find the answer. Bar diagrams can be used to represent the information in a problem.

6. **Extension for Early Finishers**
Sheena wants to buy a pennant for $4.85, a T-shirt for $14.95, and a cap for $13.50. If she has $30, does she have enough money for all three items? Use estimation to explain. [No. Sample explanation: $4.85 rounds to $5, $14.95 rounds to $15. These two items will cost about $20, and the cap costs more than $10.]


Name _____ Solve

Solve & Share

At a baseball game, Sheena bought a sandwich for $6.95 and two pretzels for $2.75 each. She paid with a $20 bill. How much change did she receive? ***Solve this problem any way you chose. Use bar diagrams to help.***

See margin for sample student work.

Math Practices and Problem Solving

Lesson 2-7
Model with Math

I can . . .
use the math I know to solve problems.

Mathematical Practices MP.4 Also, MP.1, MP.2, MP.3
Content Standard 5.NBT.B.7

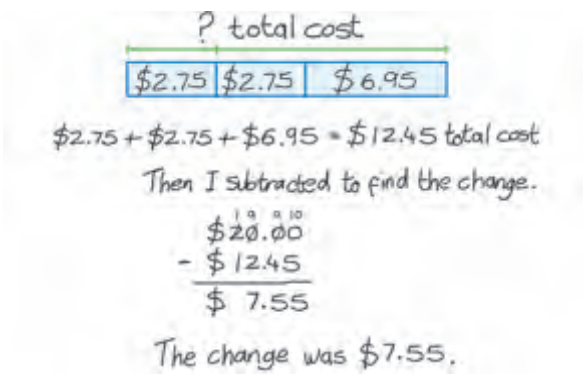
Thinking Habits
Be a good thinker! These questions can help you.
- How can I use math I know to help solve the problem?
- How can I use pictures, objects, or an equation to represent the problem?
- How can I use numbers, words, and symbols to solve the problem?

Look Back! MP.4 Model with Math What other way can you represent this problem situation?
Sample answer: I can represent this problem using equations. $6.95 + 2 × $2.75 = $12.45; $20 − $12.45 = $7.55

Digital Resources at PearsonRealize.com Topic 2 | Lesson 2-7 95

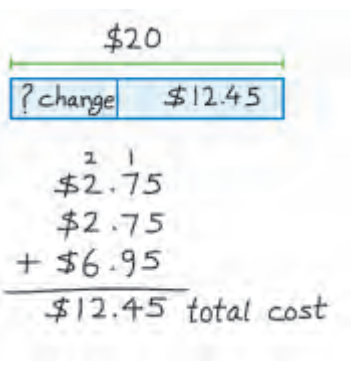
Analyze Student Work

Julie's Work



Julie uses a bar diagram to find the total cost of the three items, and then subtracts to find the change.

Laurie's Work



Laurie makes a bar diagram to find Sheena's change after adding the cost of the purchased items. However, she never finds how much change Sheena actually received.

STEP 2

DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

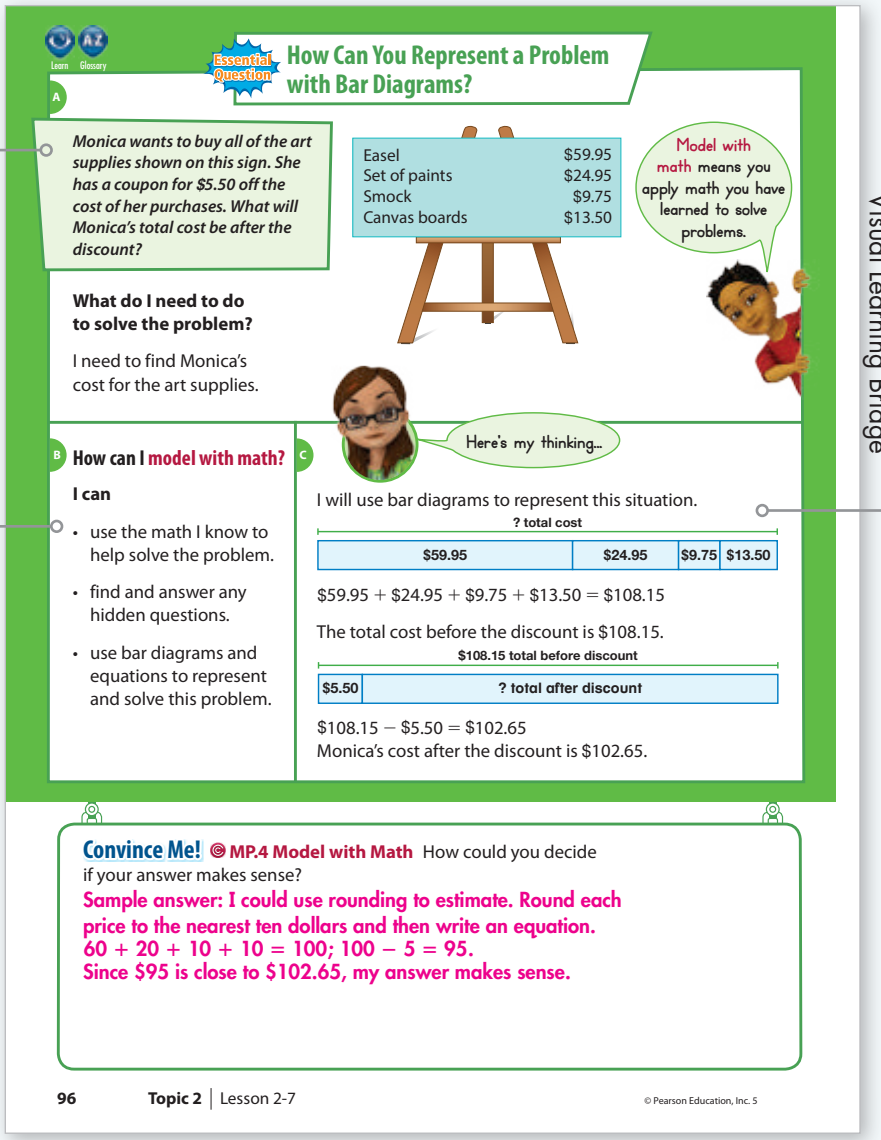
Visual Learning

PEARSON realize. PearsonRealize.com

Learn Glossary

What kind of diagram would help you solve this problem? [A bar diagram]

MP.4 Model with Math *What previously learned concepts and skills can you use to solve this problem?* [Adding and subtracting decimals]



Visual Learning Bridge

What expression shows the total cost of the art supplies? [$59.95 + $24.95 + $9.75 + $13.50] *How can you show the total amount after the discount?* [Make a bar diagram with the total cost and the part subtracted.]

Convince Me! MP.4 Model with Math Modeling with math involves translating a problem situation into mathematics, such as an equation. Bar diagrams can help with this translation. They also provide a visual representation to help students decide if an estimated or calculated answer is reasonable.

Coherence Focus the classroom conversation on describing how students can model with math to solve the problem involving finding Monica's total cost. For example ask, *What math that you have already learned can you use to solve the problem?* [Adding and subtracting decimals] *What hidden question must be answered first?* [What is the total cost before the discount?]

Essential Question

Revisit the Essential Question. Bar diagrams can be used to show how the information in a problem is related. They can also show you how to write and solve an equation.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 4 and 5 are each worth 1 point. Items 6–9 are worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

MP.4 Model with Math
Nate has $30.50. He wants to buy his dog a sweater that costs $15, a toy that costs $3.79, and a leash that costs $14.79. How much more money does he need?

When you model with math you use the math you already know to solve new problems!

1. What do you need to find before you can solve the problem?
   The total cost of the sweater, toy, and leash

2. Draw bar diagrams to represent the problem and then solve the problem. Show the equations you used to solve the problem.
   Check students' diagrams;
   $15 + $3.79 + $14.79 = $33.58;
   $33.58 − $30.50 = $3.08; Nate needs $3.08 more.

Independent Practice

MP.4 Model with Math
Luz Maria has $15. She buys a ticket to a movie and a smoothie. How much money does she have left?

Ticket	$9.50
Popcorn	$4.50
Smoothie	$2.85

3. What do you need to find before you can solve the problem?
   The total amount of money Luz Maria spends

4. Draw two bar diagrams to represent the problem.
   Check students' diagrams.

5. What is the solution to the problem? Show the equations you used to solve the problem.
   $9.50 + $2.85 = $12.35; $15 − $12.35 = $2.65;
   Luz Maria has $2.65 left.

*For another example, see Set E on page 104.

Math Practices and Problem Solving

Common Core Performance Assessment

School Trip
Audrey is saving for a school trip. She needs $180 for the bus tickets, $215 for the hotel, and $80 for meals. The table shows how much money she and her sister, Kelsey, have saved over a 4-month period. How much more money does Audrey need for the trip?

DATA

Monthly Savings

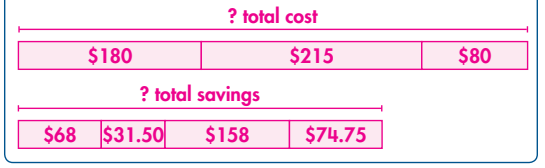
Month	Audrey's Savings	Kelsey's Savings
September	$68	$28
October	$31.50	$42.50
November	$158	$90.25
December	$74.75	$89

6. **MP.1 Make Sense and Persevere** What are you trying to find?
   How much more money Audrey needs for the trip

7. **MP.3 Construct Arguments** Should you multiply Audrey's savings for September by 4 since there are 4 months? Explain.
   No. You cannot multiply since the savings amounts for each month are different.

You can model with math by using what you know about adding and subtracting whole numbers to add and subtract decimals.

8. **MP.4 Model with Math** Draw bar diagrams to represent the total cost of Audrey's trip and the total she has saved. Then find the total cost and total savings.
   Check students' diagrams. $180 + $215 + $80 = $475 total cost; $68.00 + $31.50 + $158.00 + $74.75 = $332.25 total savings



9. **MP.4 Model with Math** Write and solve an equation to determine how much more money Audrey needs for the trip.
   Sample equation: $475 − $332.25 = $142.75.
   Audrey needs $142.75 more for the trip.

MP.4 Model with Math Listen and look for these behaviors as evidence that students are exhibiting proficiency with MP.4.

- Identifies the correct prior knowledge that needs to be applied to solve a problem
- Identifies the hidden question(s) in multiple-step problems
- Uses numbers, symbols, and words to solve problems
- Identifies the operation(s) needed to solve a problem
- Uses estimation as appropriate

Items 4–5 MP.4 Model with Math If students have difficulty drawing bar diagrams or writing equations to solve the problem, have them identify what quantities are given and what the numbers mean.

RtI **Reteaching** Assign Reteaching Set E on p. 104.

Items 4–5 Coherence If students have difficulty drawing bar diagrams and translating problems to equations, have them use whole numbers in place of the decimals to represent problems. Since the structure of each problem does not change, they can substitute the decimals for the whole numbers in the bar diagrams and equations.

Item 6 MP.1 Make Sense and Persevere If students have difficulty getting started, ask them to identify what information they need and what information is extra.

Item 7 MP.3 Construct Arguments If students think that they can use multiplication, remind them that equal groups are necessary in order to use multiplication.

Items 8–9 MP.4 Model with Math Make sure that students' bar diagrams and equations have the correct quantities. Encourage students to use estimation to check their answers for reasonableness.

STEP 3

ASSESS AND DIFFERENTIATE

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

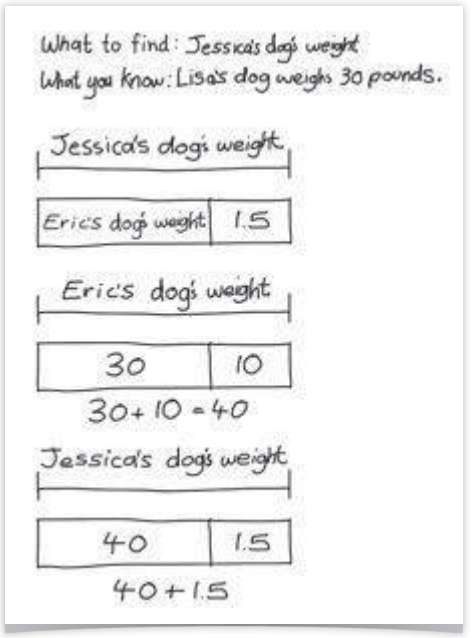
Intervention Activity I

Multi-Step Problems

Materials

Strips of paper, each with a different section of the problem below.

- Display this problem: Jessica's dog weighs 1.5 pounds more than Eric's dog. Eric's dog weighs 10 pounds more than Lisa's dog. Lisa's dog weighs 30 pounds. How much does Jessica's dog weigh? [41.5 lb] How much does Eric's dog weigh? [40 lb]
- Have students identify what they know and what they're asked to find. Then have them start with the main question and then look at each strip of paper for any hidden questions they need to solve.



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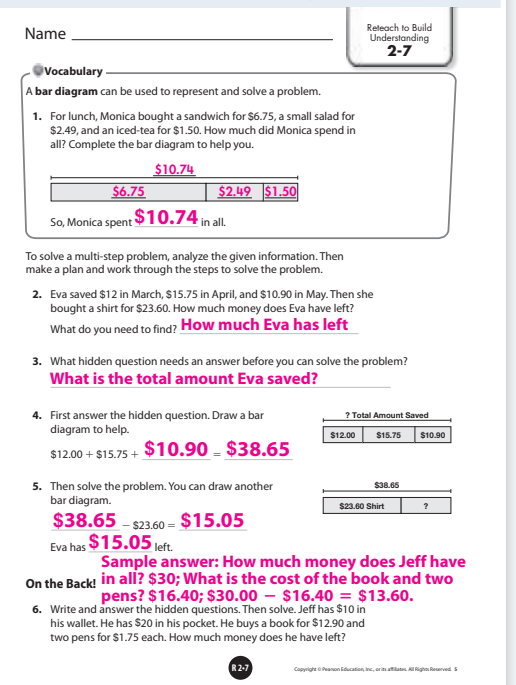


Name _____

Reteach to Build Understanding 2-7

Vocabulary

A **bar diagram** can be used to represent and solve a problem.

1. For lunch, Monica bought a sandwich for $6.75, a small salad for $2.49, and an iced-tea for $1.50. How much did Monica spend in all? Complete the bar diagram to help you.

$10.74
$6.75 | $2.49 | $1.50

So, Monica spent **$10.74** in all.

To solve a multi-step problem, analyze the given information. Then make a plan and work through the steps to solve the problem.

2. Eva saved $12 in March, $15.75 in April, and $10.90 in May. Then she bought a shirt for $23.60. How much money does Eva have left?
What do you need to find? **How much Eva has left**

3. What hidden question needs an answer before you can solve the problem?
What is the total amount Eva saved?

4. First answer the hidden question. Draw a bar diagram to help.
? Total Amount Saved: $12.00 | $15.75 | $10.90
$12.00 + $15.75 + **$10.90** = **$38.65**

5. Then solve the problem. You can draw another bar diagram.
$38.65: $23.60 Shirt | ?
$38.65 − $23.60 = **$15.05**
Eva has **$15.05** left.

On the Back!

6. Write and answer the hidden questions. Then solve. Jeff has $10 in his wallet. He has $20 in his pocket. He buys a book for $12.90 and two pens for $1.75 each. How much money does he have left?
Sample answer: How much money does Jeff have in all? $30; What is the cost of the book and two pens? $16.40; $30.00 − $16.40 = $13.60.

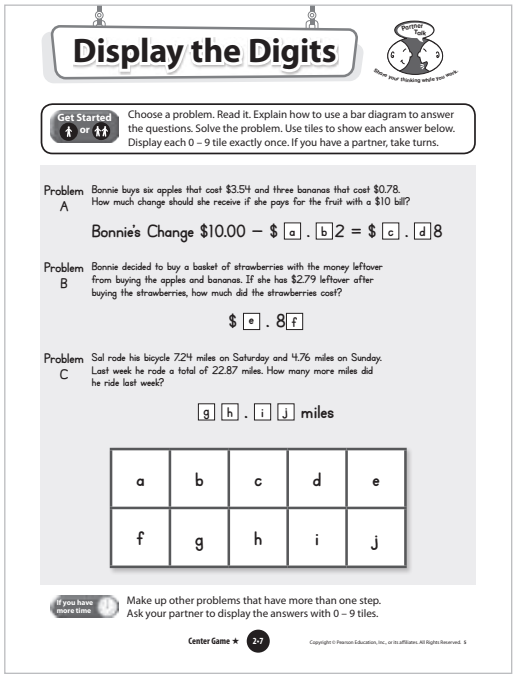
R 2-7

On-Level and Advanced Activity Centers O A

Center Games

Walk around the room and ask pairs how much Bonnie spent on apples and how much she spent on bananas. Have students record their work as they solve the problems.

★ On-Level



Display the Digits

Partner Talk — Show your thinking while you work.

Get Started — Choose a problem. Read it. Explain how to use a bar diagram to answer the questions. Solve the problem. Use tiles to show each answer below. Display each 0 – 9 tile exactly once. If you have a partner, take turns.

Problem A — Bonnie buys six apples that cost $3.54 and three bananas that cost $0.78. How much change should she receive if she pays for the fruit with a $10 bill?

Bonnie's Change $10.00 − $ [a] . [b]2 = $ [c] . [d]8

Problem B — Bonnie decided to buy a basket of strawberries with the money leftover from buying the apples and bananas. If she has $2.79 leftover after buying the strawberries, how much did the strawberries cost?

$ [e] . 8[f]

Problem C — Sal rode his bicycle 7.24 miles on Saturday and 4.76 miles on Sunday. Last week he rode a total of 22.87 miles. How many more miles did he ride last week?

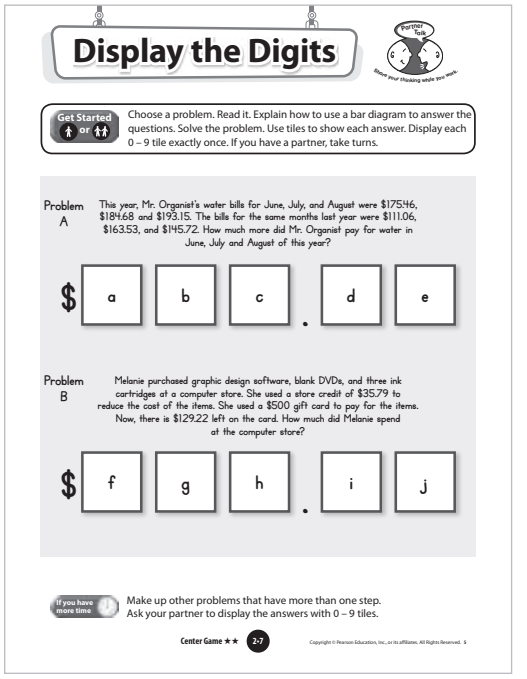
[g][h] . [i][j] miles

a	b	c	d	e
f	g	h	i	j

If you have more time — Make up other problems that have more than one step. Ask your partner to display the answers with 0 – 9 tiles.

Center Game ★ 2-7

★★ Advanced



Display the Digits

Partner Talk — Show your thinking while you work.

Get Started — Choose a problem. Read it. Explain how to use a bar diagram to answer the questions. Solve the problem. Use tiles to show each answer. Display each 0 – 9 tile exactly once. If you have a partner, take turns.

Problem A — This year, Mr. Organist's water bills for June, July, and August were $175.46, $184.68 and $193.15. The bills for the same months last year were $111.06, $163.53, and $145.72. How much more did Mr. Organist pay for water in June, July and August of this year?

$ [a][b][c] . [d][e]

Problem B — Melanie purchased graphic design software, blank DVDs, and three ink cartridges at a computer store. She used a store credit of $35.79 to reduce the cost of the items. She used a $500 gift card to pay for the items. Now, there is $129.22 left on the card. How much did Melanie spend at the computer store?

$ [f][g][h] . [i][j]

If you have more time — Make up other problems that have more than one step. Ask your partner to display the answers with 0 – 9 tiles.

Center Game ★★ 2-7

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment I Items 1–7 O Items 1–7 A Items 1–7

Name _____ Help Practice Buddy Tools Games

Homework & Practice 2-7
Model with Math

Another Look!

For her birthday, Lucy received $20 from her aunt, $15 from her grandmother, and $32 from her cousins. She bought an e-book for $10.85. How much birthday money does Lucy have left?

Show how you can model this problem.

I can use bar diagrams and equations to represent and solve this problem.

How much money did Lucy receive?

? total money received		
$20	$15	$32

$20 + $15 + $32 = $67 received

How much money does Lucy have left?

$67 total received	
$10.85	? money left

$67.00 − $10.85 = $56.15. Lucy has $56.15 left.

You can model with math by using bar diagrams to show the relationships between the whole and the parts.

MP.4 Model with Math
Jeffrey earned $65 doing yard work. He bought a pair of jeans for $31.25 and a sweatshirt for $16.50. He set aside the money left from his shopping trip to buy a gift for his cousin. How much money did he set aside for the gift?

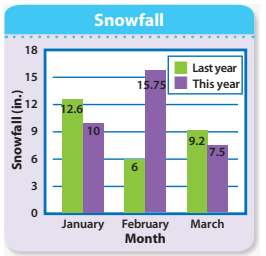
1. What do you need to find before you can solve the problem?
   The total amount of money Jeffrey spent
2. Draw bar diagrams to represent the problem.
   Check students' diagrams.

Remember, a bar diagram clearly shows how the quantities in the problem are related.

3. Write equations to represent the problem. Then solve the problem.
   $31.25 + $16.50 = $47.75; $65 − $47.75 = $17.25; He set aside $17.25 for the gift.

Common Core Performance Assessment

Snowfall
The total snowfall for last year was 36.4 inches. The graph shows snowfalls for 3 months last year and for the same 3 months this year. Find how much greater this year's 3-month snowfall was than last year's.



4. **MP.1 Make Sense and Persevere** Do you need all of the information given to solve the problem? Explain.
   No; I don't need the total snowfall for last year.
5. **MP.4 Model with Math** Draw bar diagrams to represent last year's total 3-month snowfall and this year's total 3-month snowfall. Then find the total 3-month snowfalls for each year.
   12.6 + 6 + 9.2 = 27.8 inches 3-month snowfall last year; 10 + 15.75 + 7.5 = 33.25 inches 3-month snowfall this year

? total 3-month snowfall last year		
12.6	6	9.2

? total 3-month snowfall this year		
10	15.75	7.5

6. **MP.4 Model with Math** Write and solve an equation to find how much greater this year's 3-month snowfall was than last year's.
   5.45 inches more; 33.25 − 27.8 = 5.45
7. **MP.2 Reasoning** Describe a way to determine how much more snow needs to fall so this year's total is 37.4 inches. Then find the answer.
   Write an equation to find the difference between 37.4 and the total snowfall for this year so far. 37.4 − 33.25 = 4.15 in.

When you model with math, you decide what steps need to be completed to find the final answer.

99–100

TOPIC 2

FLUENCY PRACTICE ACTIVITY

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Games | Practice Buddy

FLUENCY PRACTICE ACTIVITY

Students practice fluently subtracting whole numbers and estimating differences during a partner activity that reinforces mathematical practices.

Common Core Standards

Content Standard **4.NBT.B.4** Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Mathematical Practices **MP.2, MP.6**

Getting Started Ask partners to share one page. Tell them that the other partner's page will be used to record tally marks when they repeat the activity. Go over the directions. For each difference, only one partner will get a tally mark. Tell students that the difference 510 is not among the choices. Before they begin, you may wish to challenge them to find the number pair with that difference. (750 – 240)

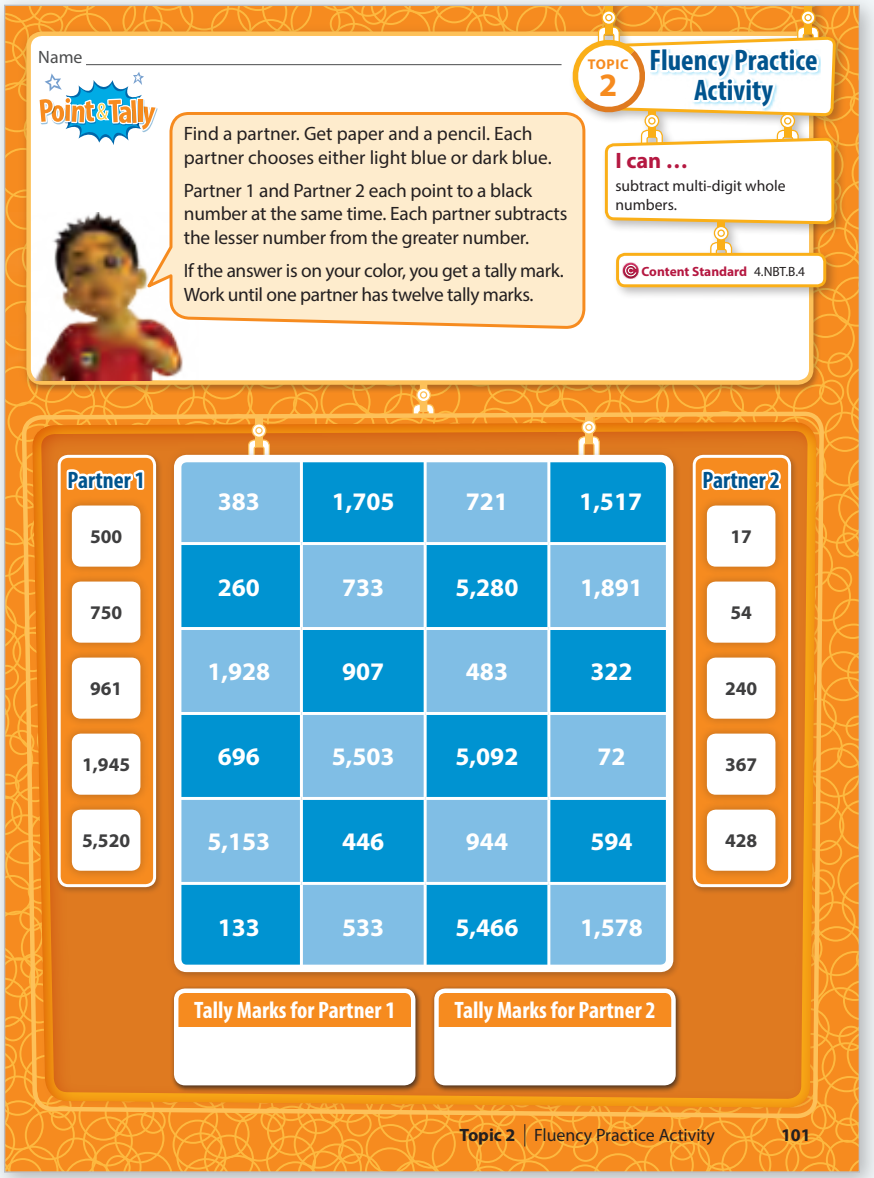
As Students Do the Activity Remind students to compare their answers.

Another Activity Students can repeat the activity and record tally marks on the other partner's page.

Extra Challenge *One partner chooses a light blue number and the other chooses a dark blue number. Each estimates the difference and then calculates the exact answer. Then the partners determine the difference of each estimate and the calculated answer. The partner whose estimate is closer to the exact answer gets a tally mark.*

Games **Online Game** The Game Center at PearsonRealize.com provides opportunities for fluency practice.

Practice Buddy **Steps to Fluency Success** To ensure that all students achieve fluency, see pages 109E–109H for additional resources including practice/assessment masters and online practice/ assessment on fluency subskills. You can also use the ExamView® CD-ROM to generate worksheets with multiple-choice or free-response items on fluency subskills.



VOCABULARY REVIEW

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Glossary Games

TOPIC 2 **Vocabulary Review**

Glossary

Word List

- Associative Property of Addition
- Commutative Property of Addition
- compatible numbers
- compensation
- equivalent decimals
- inverse operations

Understand Vocabulary

Choose the best term from the Word List. Write it on the blank.

1. When you adjust one number and change another number in the problem to make a computation easier, you use ___compensation___.
2. You can replace the values in a problem with ___compatible numbers___ so that it's easier to use mental math to complete the computation.
3. To align decimal points in a decimal addition problem, annex zeros to write ___equivalent decimals___ so that all addends have the same number of decimal places.
4. Because of the ___Commutative Property of Addition___, I know that $477.75 + (76.89 + 196.25) = (76.89 + 196.25) + 477.75$ without adding.
5. Cross out the numbers below that are NOT equivalent to 500.0.

   500.00 ~~5×10~~ 5×10^2 ~~50.05~~ ~~500.500~~

6. Cross out the numbers below that are NOT equivalent to $53.2 + 16.8$.

   7×10^1 ~~0.070~~ ~~7.0~~ ~~$7 \times \frac{1}{10}$~~ $(7 \times 10) + (0 \times 1)$

Circle the problem that uses compensation.

7. $32.7 + 15.6 = 32.6 + 15.7$ $45.7 + 26.2 = 45.7 + 26.3 - 0.1$
8. $14.24 - 11.8 = 14.24 - 12 + 0.2$ $168.3 - 53.8 = 168.3 - 53.4 - 0.4$

Use Vocabulary in Writing

9. Explain how the Commutative Property of Addition, the Associative Property of Addition and mental math can help you find $75.2 + (57.376 + 24.8)$. What is the sum?

   157.376; Sample explanation: The Commutative Property allows me to change the order of the addends and the Associative Property allows me to regroup them.

VOCABULARY REVIEW

Students review vocabulary words used in the topic.

Oral Language Before students do the page, you might reinforce oral language through a class discussion involving one or more of the following activities.

- Have students define the terms in their own words.
- Have students provide an example of each term.
- Play a "What's My Word?" guessing game in which you or a student thinks about one of the words and says a clue that others listen to before they guess the word.
- Play a "Right or Wrong?" game in which you or a student says a sentence that uses one of the words correctly or incorrectly. Then others say "right" or "wrong."

Writing in Math After students do the page, you might further reinforce writing in math by doing one or more of the following activities.

- Tell students to close their books. Then you say the words and have students write them. Students trade papers to check whether the words are spelled correctly.
- Have students work with a partner. Each partner gives an example and a non-example of one of the terms. Then they trade papers and identify which is the example and which is the non-example of the term.

Games **Online Game** The Game Center at PearsonRealize.com includes a vocabulary game that students can access any time.

TOPIC 2

RETEACHING

ADD AND SUBTRACT DECIMALS TO HUNDREDTHS

RtI Item Analysis for Diagnosis and Intervention

Reteaching Sets	Standard	MDIS
Set A	5.NBT.B.7	H56, H57
Set B	5.NBT.B.7, 5.NBT.A.4	H55
Set C	5.NBT.B.7	H54
Set D	5.NBT.B.7	H56, H57
Set E	MP.1, MP.4, MP.6	H56, H57

Name _____

TOPIC 2 Reteaching

Set A pages 59–64

Add 15.3 + 1.1 + 1.7 using mental math.

15.3 and 1.7 are compatible numbers because they are easy to calculate mentally.

The Commutative Property of Addition allows us to add in any order.

15.3 + 1.1 + 1.7 = 15.3 + 1.7 + 1.1
= 17.0 + 1.1
= 18.1

Remember that you can use compatible numbers or compensation to find sums and differences.

Use mental math to add or subtract.

1. 8.6 + 23.4 + 1.4 **33.4**
2. 27 − 9.9 **17.1**
3. 13.5 + 5.7 + 36.5 **55.7**
4. 205.4 − 99.7 **105.7**

Set B pages 65–70

Estimate 22.4 − 16.2.

22.4 → 20
− 16.2 → − 15
5

Use compatible numbers.

22.4 − 16.2 is about 5.

Remember that compatible numbers can give a different estimate than rounding.

Estimate each sum or difference.

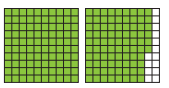
Sample estimates are given.

1. 358 + 293 **700**
2. 15.01 − 4.4 **11**
3. 80.01 + 2.89 **83**
4. 25,003 − 12,900 **12,000**

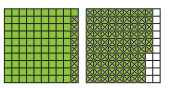
Set C pages 71–76

Use hundredths grids to subtract 1.86 − 0.95.

Shade one whole grid and 86 squares to show 1.86.



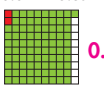
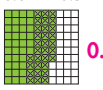
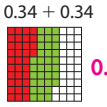
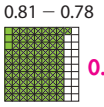
To subtract 0.95, cross out 95 of the shaded squares on the grids.



Count the squares that are shaded but not crossed out.

1.86 − 0.95 = 0.91

Remember that to add decimals, shade the first addend in one color. Then continue by shading the second addend with another color.

1. 0.02 + 0.89  **0.91**
2. 0.67 − 0.31  **0.36**
3. 0.34 + 0.34  **0.68**
4. 0.81 − 0.78  **0.03**

Set D pages 77–82, 83–88, 89–94

Lucy bought 3.12 pounds of pears and 9 pounds of apples. Find how many more pounds of apples than pears Lucy bought.

Write the numbers. Add a decimal point to the whole number. Annex zeros. Line up the decimal points.

$$\begin{array}{r} 9.00 \\ -\ 3.12 \\ \hline \end{array}$$

Subtract the hundredths, tenths, and ones.

$$\begin{array}{r} {\scriptstyle 8\ \not{9}\ {}^{1}\not{0}^{10}} \\ \not{9}.\not{0}\not{0} \\ -\ 3.12 \\ \hline 5.88 \end{array}$$

Remember to annex zeros so that each place has a digit and all of the decimal points line up.

1. 7.06 + 0.85 **7.91**
2. 24.07 − 5.316 **18.754**
3. 51.92 − 28.003 **23.917**
4. 8.71 − 0.4 **8.31**
5. 98 + 3.79 **101.79**
6. Talia measured two strings. The green string was 2.37 cm long. The blue string was 4 cm long. How many centimeters longer was the blue string than the green string?
   1.63 cm

Set E pages 95–100

Think about these questions to help you **model with math.**

Thinking Habits

- How can I use math I know to help solve the problem?
- How can I use pictures, objects, or an equation to represent the problem?
- How can I use numbers, words, and symbols to solve the problem?

Remember a good model clearly shows how the quantities in the problem are related.

Alberto ran 15.6 km on Monday, 12.8 km on Tuesday, and 6.5 km on Wednesday. Dennis ran 11.25 km on Monday, 14.6 km on Tuesday, and 8 km on Wednesday. Who ran farther? How much farther?

1. What do you need to find before you can solve the problem?
   How far Alberto ran and how far Dennis ran
2. Write equations to model this problem. Then solve the problem.
   15.6 + 12.8 + 6.5 = 34.9;
   11.25 + 14.6 + 8 = 33.85;
   34.9 − 33.85 = 1.05;
   Alberto ran 1.05 km farther.

Response to Intervention

Ongoing Intervention

- Lessons with guiding questions to assess understanding
- Support to prevent misconceptions and to reteach

Strategic Intervention

- Targeted to small groups who need more support
- Easy to implement

Intensive Intervention

- Instruction to accelerate progress
- Instruction focused on foundational skills

TOPIC 2

TOPIC ASSESSMENT

ADD AND SUBTRACT DECIMALS TO HUNDREDTHS

Name _____

TOPIC 2 Assessment

1. A dollhouse has 15.15 square feet downstairs and 6.25 square feet upstairs. Which of the following is the best estimate of the total area in the dollhouse? **1 point**

Ⓐ 9 square feet
Ⓑ 21 square feet
Ⓒ 78 square feet
Ⓓ 90 square feet

2. Use mental math to find the sum of $12.15, $16.85, and $1.74. **1 point**

Ⓐ $29.00
Ⓑ $30.74
Ⓒ $30.85
Ⓓ $32.74

3. Choose all the expressions that are equal to 2.65 + 3.78. **1 point**

- [x] 2.56 + 3.87
- [x] 3.78 + 2.65
- [ ] 10 − 3.67
- [x] 9.51 − 3.08
- [ ] 8.21 − 2.78

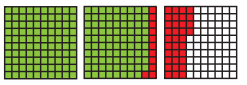
4. For questions 4a-4d, choose Yes or No to tell if the number 7.15 will make each equation true. **1 point**

4a. 4.95 + ☐ = 12.1 ● Yes ○ No
4b. 10.82 − ☐ = 3.77 ○ Yes ● No
4c. 8.47 + ☐ = 15.52 ○ Yes ● No
4d. 9.14 − ☐ = 1.99 ● Yes ○ No

5. Lawrence spent $1.89 on a bottle of paint and $0.45 on a brush.

Part A

What was the total amount he spent? Use the model to help you. **1 point**



$2.34

Part B

Explain how the model helps you find the sum. **1 point**

Sample answer: The number of full grids shaded is the number of dollars. The number of small squares shaded in the 3rd grid is the number of cents.

6. Draw lines to match each expression on the left to the equivalent decimal on the right. **1 point**

3.05 + 1.65	4.8
8.5 − 4.8	5.8
4.25 + 1.55	4.7
11.4 − 6.6	3.7

7. Ed is training for a race. He ran 12.56 miles on one day and 12.98 miles the next day.

Part A

What is his combined distance for the first two days? **1 point**

25.54 miles

Part B

How much farther did he run the second day than the first day? **1 point**

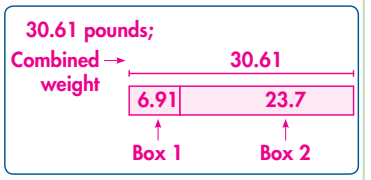
0.42 mile

8. The Thomas Jefferson Memorial is on 18.36 acres of land and the Franklin Delano Roosevelt Memorial is on 7.5 acres of land. How many more acres is the Jefferson Memorial than the Roosevelt Memorial? **1 point**

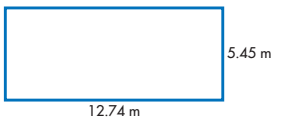
Ⓐ 9.86 acres
Ⓑ 10.86 acres
Ⓒ 11.31 acres
Ⓓ 17.61 acres

9. A box weighs 23.7 pounds. Another box weighs 6.91 pounds. What is the combined weight of the two boxes? Draw and label a bar diagram to model the problem. **2 points**

30.61 pounds;



10. Kassandra has a rectangular patio in her backyard. The patio is 12.74 meters long and 5.45 meters wide.



Part A

Round the length and width to the nearest whole number. Then estimate the perimeter of Kassandra's patio. Write an equation to model your work. **1 point**

36 meters;
Sample equation:
13 + 5 + 13 + 5 = 36

Part B

Round the length and width to the nearest tenth. Then estimate the perimeter of Kassandra's patio. Write an equation to model your work. **1 point**

36.4 meters;
Sample equation:
12.7 + 5.5 + 12.7 + 5.5 = 36.4

Part C

Find the exact perimeter. Which estimate is closer? Explain why you think that estimate is closer. **2 points**

36.38 meters; Sample explanation: The numbers rounded to the nearest tenth are closer to the actual measurements. So, that estimate is closer to the exact perimeter.

ANSWERING THE TOPIC ESSENTIAL QUESTIONS

How can sums and differences of decimals be estimated?

What are the standard procedures for adding and subtracting decimals? How can sums and differences be found mentally?

Restate the Topic Essential Questions from the Topic Opener or project them from the Student's Edition eText.

Ask students to answer the Essential Questions (verbally or in writing) and give examples that support their answers. The following are key elements of the answer to the Essential Question. Be sure that these are made explicit when discussing students' answers.

- Sums and differences of decimals can be estimated by rounding or by substituting compatible numbers.

  Example: To estimate the sum of 7.25 and 5.6 you can round each decimal to the nearest whole number.
  $7 + 6 = 13$, so $7.25 + 5.6$ is about 13.

- You can add or subtract decimals using place value and addition and subtraction strategies.

  Example: To add $546.7 + 123.2 + 3.8$, you can use the Associative Property of Addition: $(546.7 + 123.2) + 3.8$ or $546.7 + (123.2 + 3.8)$

  You can also use the Commutative Property of Addition: $123.2 + 546.7 = 546.7 + 123.2$

- Sums and differences can be found mentally by using compatible numbers and compensation.

  Examples: To add $15 + 27 + 85$, you can add 15 and 85 first. 15 and 85 are compatible numbers which means they are easy to add. Their sum is 100 and $100 + 27 = 127$. Similarly, to add $1.5 + 2.74 + 8.5$, add 1.5 and 8.5 first. Add 10, the sum, to 2.74.

  To find $23.2 - 17.8$, add 2 tenths to 17.8 so that the problem becomes $23.2 - 18 = 5.2$. Then add 2 tenths back to compensate and get the exact difference. $23.2 - 17.8 = 5.4$.

ONLINE TOPIC ASSESSMENT

An auto-scored Topic Assessment is provided at PearsonRealize.com.

EXAMVIEW® TEST GENERATOR

ExamView can be used to create a blackline-master Topic Assessment with multiple-choice and free-response items.

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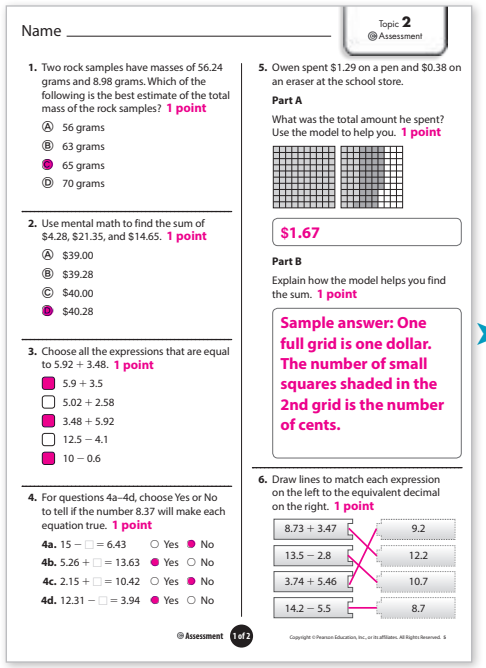
Assessment

Topic Assessment Masters



Name _____ Topic 2 Assessment

1. Two rock samples have masses of 56.24 grams and 8.98 grams. Which of the following is the best estimate of the total mass of the rock samples? **1 point**

Ⓐ 56 grams
Ⓑ 63 grams
● Ⓒ 65 grams
Ⓓ 70 grams

2. Use mental math to find the sum of $4.28, $21.35, and $14.65. **1 point**

Ⓐ $39.00
Ⓑ $39.28
Ⓒ $40.00
● Ⓓ $40.28

3. Choose all the expressions that are equal to 5.92 + 3.48. **1 point**

■ 5.9 + 3.5
☐ 5.02 + 2.58
■ 3.48 + 5.92
☐ 12.5 − 4.1
■ 10 − 0.6

4. For questions 4a–4d, choose Yes or No to tell if the number 8.37 will make each equation true. **1 point**

4a. 15 − □ = 6.43 ○ Yes ● No
4b. 5.26 + □ = 13.63 ● Yes ○ No
4c. 2.15 + □ = 10.42 ○ Yes ● No
4d. 12.31 − □ = 3.94 ● Yes ○ No

5. Owen spent $1.29 on a pen and $0.38 on an eraser at the school store.

Part A

What was the total amount he spent? Use the model to help you. **1 point**

$1.67

Part B

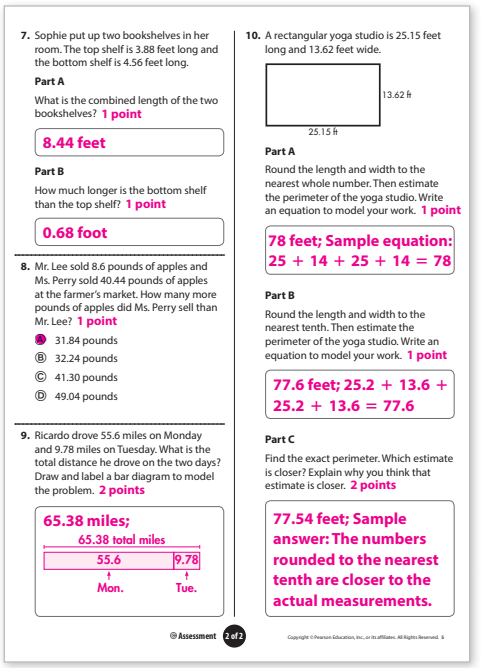
Explain how the model helps you find the sum. **1 point**

Sample answer: One full grid is one dollar. The number of small squares shaded in the 2nd grid is the number of cents.

6. Draw lines to match each expression on the left to the equivalent decimal on the right. **1 point**

8.73 + 3.47	9.2
13.5 − 2.8	12.2
3.74 + 5.46	10.7
14.2 − 5.5	8.7

Assessment 1 of 2



7. Sophie put up two bookshelves in her room. The top shelf is 3.88 feet long and the bottom shelf is 4.56 feet long.

Part A

What is the combined length of the two bookshelves? **1 point**

8.44 feet

Part B

How much longer is the bottom shelf than the top shelf? **1 point**

0.68 foot

8. Mr. Lee sold 8.6 pounds of apples and Ms. Perry sold 40.44 pounds of apples at the farmer's market. How many more pounds of apples did Ms. Perry sell than Mr. Lee? **1 point**

● Ⓐ 31.84 pounds
Ⓑ 32.24 pounds
Ⓒ 41.30 pounds
Ⓓ 49.04 pounds

9. Ricardo drove 55.6 miles on Monday and 9.78 miles on Tuesday. What is the total distance he drove on the two days? Draw and label a bar diagram to model the problem. **2 points**

65.38 miles;

10. A rectangular yoga studio is 25.15 feet long and 13.62 feet wide.

Part A

Round the length and width to the nearest whole number. Then estimate the perimeter of the yoga studio. Write an equation to model your work. **1 point**

78 feet; Sample equation: 25 + 14 + 25 + 14 = 78

Part B

Round the length and width to the nearest tenth. Then estimate the perimeter of the yoga studio. Write an equation to model your work. **1 point**

77.6 feet; 25.2 + 13.6 + 25.2 + 13.6 = 77.6

Part C

Find the exact perimeter. Which estimate is closer? Explain why you think that estimate is closer. **2 points**

77.54 feet; Sample answer: The numbers rounded to the nearest tenth are closer to the actual measurements.

Assessment 2 of 2

Item Analysis for Diagnosis and Intervention

Item	Standard	DOK	MDIS
1	5.NBT.A.4, 5.NBT.B.7	1	H55
2	5.NBT.B.7	1	H56
3	5.NBT.B.7	1	H56, H57
4	5.NBT.B.7	1	H56, H57
5A	5.NBT.B.7	1	H54, H56
5B	5.NBT.B.7	1	H54
6	5.NBT.B.7	2	H56, H57
7A	5.NBT.B.7	1	H56
7B	5.NBT.B.7	1	H57
8	5.NBT.B.7	1	H57
9	5.NBT.B.7, MP.4	2	H55, H56
10A	5.NBT.A.4, 5.NBT.B.7	2	H28, H55
10B	5.NBT.A.4, 5.NBT.B.7	2	H28, H55
10C	5.NBT.B.7	3	H30, H56

The Topic Assessment Masters assess the same content item for item as the Topic Assessment in the Student's Edition.

Scoring Guide

Item	Points	Topic Assessment (Student's Edition and Masters)
1	1	Correct choice selected.
2	1	Correct choice selected.
3	1	All correct choices selected.
4	1	All correct choices selected.
5A	1	Correct answer
5B	1	Correct explanation
6	1	All matches correct
7A	1	Correct answer
7B	1	Correct answer
8	1	Correct choice selected.
9	2	A correct answer and a correct bar diagram
	1	A correct answer or a correctly drawn bar diagram
10A	1	Correct answer
10B	1	Correct answer
10C	2	Correct answer and correct explanation
	1	Correct answer or correct explanation

TOPIC 2

TOPIC PERFORMANCE ASSESSMENT

ADD AND SUBTRACT DECIMALS TO HUNDREDTHS

Name _____

TOPIC 2

Performance Assessment

Video Games
Four students are playing the same video game. Their scores for the first three levels are added together to see if the student has enough points to move on to Round 2.

1. The students' scores are shown in the table below.

Round 1				
Level	**Kim**	**Sally**	**Tina**	**Zoey**
1	7.18	5.49	8.02	8.64
2	6.55	6.18	7.94	8.32
3	6.45	5.72	8.38	8.13
Total Points	20.18	17.39	24.34	25.09

Part A

A student must have at least 18 points to advance to Round 2. Use estimation to decide if any of the students did not get 18 points. 1 point

Sally did not get 18 points.

Part B

Use estimation to decide which student had the greatest number of points. Explain your reasoning. 1 point

Zoey; Sample explanation: All of Zoey's scores have an 8 in the ones place and none of Kim's or Sally's scores have an 8 in the ones place, so she has more points than Kim and Sally. I rounded Tina's and Zoey's scores to the nearest whole number and added them. Zoey has more points than Tina.

2. Complete the table to find the total number of points for each student. 2 points

3. How many more points did Zoey score than Sally? Write an equation to model your work. 1 point

7.7 more points; 25.09 − 17.39 = 7.7

4. Use the total points scored for each student.

Part A

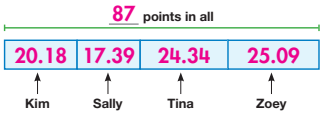
About how many points did the four students score in Round 1? Estimate by rounding each point total to the nearest whole number. 1 point

86 points; 20 + 17 + 24 + 25 = 86

Part B

Complete the bar diagram to show the exact total number of points the students scored. 1 point

87 points



5. In Round 2, Zoey had a total of 23.43 points. She got a score of 7.96 in Level 2 and a score of 8.03 in Level 3.

Part A

What score did she receive in Level 1? 1 point

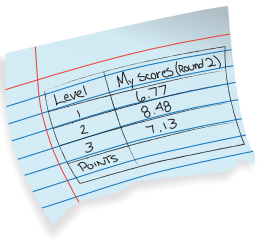
7.44

Part B

Explain how you found your answer. 2 points

Sample explanation: I added: 7.96 + 8.03 = 15.99. Then I subtracted: 23.43 − 15.99 = 7.44.

6. Kim recorded her scores for Round 2. To estimate her total, she rounds to the nearest whole number and says, "7 + 9 + 7 = 23, so my total is at least 23 points." Do you agree? Explain your reasoning. 2 points



No; Sample explanation: She rounded 8.48 to 9 but since there is a 4 in the tens place, it rounds to 8. Her estimate should have been 7 + 8 + 7 = 22.

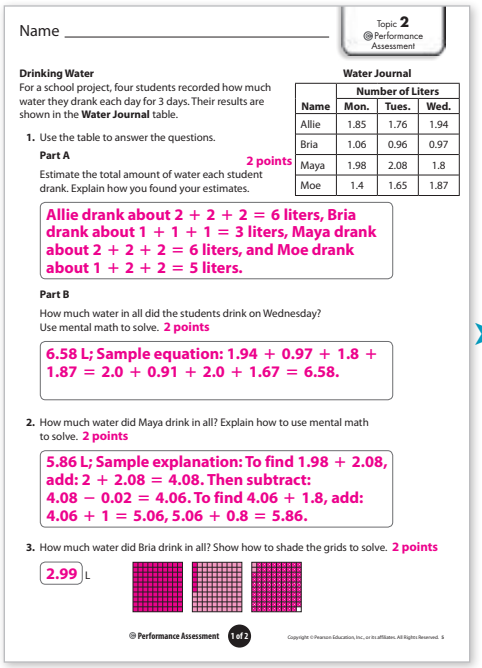
Scoring Guide

Item	Points	Topic Performance Assessment in the Student's Edition
1A	1	Correct answer
1B	1	Correct answer and explanation
2	2	All entries in the table are correct.
	1	2 or 3 entries in the table are correct.
3	1	Correct equation and solution

Item	Points	Topic Performance Assessment in the Student's Edition
4A	1	Correct solution
4B	1	Bar diagram and solution are correct.
5A	1	Correct solution
5B	2	Correct explanation and solution
	1	Explanation is only partially correct.
6	2	Correct and thorough explanation
	1	Thorough explanation has minor errors.

Item Analysis for Diagnosis and Intervention for the assessment in the Student's Edition is at the top right of page 108A.

Topic Performance Assessment Masters



Name _____

Topic 2 Performance Assessment

Drinking Water

For a school project, four students recorded how much water they drank each day for 3 days. Their results are shown in the **Water Journal** table.

Water Journal

Name	Number of Liters		
	Mon.	Tues.	Wed.
Allie	1.85	1.76	1.94
Bria	1.06	0.96	0.97
Maya	1.98	2.08	1.8
Moe	1.4	1.65	1.87

1. Use the table to answer the questions.

Part A — 2 points

Estimate the total amount of water each student drank. Explain how you found your estimates.

Allie drank about 2 + 2 + 2 = 6 liters, Bria drank about 1 + 1 + 1 = 3 liters, Maya drank about 2 + 2 + 2 = 6 liters, and Moe drank about 1 + 2 + 2 = 5 liters.

Part B

How much water in all did the students drink on Wednesday? Use mental math to solve. 2 points

6.58 L; Sample equation: 1.94 + 0.97 + 1.8 + 1.87 = 2.0 + 0.91 + 2.0 + 1.67 = 6.58.

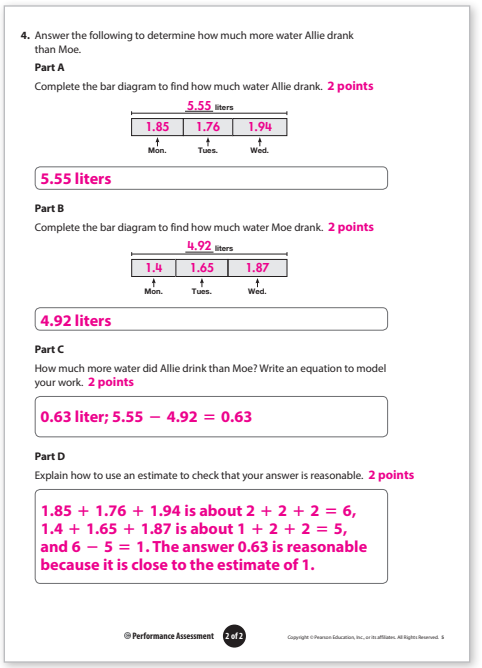
2. How much water did Maya drink in all? Explain how to use mental math to solve. 2 points

5.86 L; Sample explanation: To find 1.98 + 2.08, add: 2 + 2.08 = 4.08. Then subtract: 4.08 − 0.02 = 4.06. To find 4.06 + 1.8, add: 4.06 + 1 = 5.06, 5.06 + 0.8 = 5.86.

3. How much water did Bria drink in all? Show how to shade the grids to solve. 2 points

2.99 L

Performance Assessment 1 of 2



4. Answer the following to determine how much more water Allie drank than Moe.

Part A

Complete the bar diagram to find how much water Allie drank. 2 points

5.55 liters

Part B

Complete the bar diagram to find how much water Moe drank. 2 points

4.92 liters

Part C

How much more water did Allie drink than Moe? Write an equation to model your work. 2 points

0.63 liter; 5.55 − 4.92 = 0.63

Part D

Explain how to use an estimate to check that your answer is reasonable. 2 points

1.85 + 1.76 + 1.94 is about 2 + 2 + 2 = 6, 1.4 + 1.65 + 1.87 is about 1 + 2 + 2 = 5, and 6 − 5 = 1. The answer 0.63 is reasonable because it is close to the estimate of 1.

Performance Assessment 2 of 2

Item Analysis for Diagnosis and Intervention

Item	Standard	DOK	MDIS
1A	5.NBT.B.7, MP.1	2	H55
1B	5.NBT.B.7, MP.2	3	H55
2	5.NBT.B.7, MP.6	2	H56
3	5.NBT.B.7, MP.4	2	H57
4A	5.NBT.A.4, 5.NBT.B.7, MP.2	2	H55
4B	5.NBT.B.7, MP.4	2	H54
5A	5.NBT.B.7, MP.6	2	H56, H57
5B	5.NBT.B.7, MP.1	3	H56, H57
6	5.NBT.A.4, 5.NBT.B.7, MP.3	3	H55, H56

Scoring Guide

Item	Points	Topic Performance Assessment (TRM)
1A	2	Correct solution and explanation
	1	Correct solution or explanation
1B	2	Correct solution and work shown
	1	Correct solution or correct work shown
2	2	Correct solution and explanation
	1	Correct solution or explanation
3	2	Correct solution and shading
	1	Correct solution or shading
4A	2	Correct solution and bar diagram
	1	Correct solution or bar diagram
4B	2	Correct solution and bar diagram
	1	Correct solution or bar diagram
4C	2	Correct solution and equation
	1	Correct solution or equation
4D	2	Correct and thorough explanation
	1	Thorough explanation has minor errors.

Item Analysis for Diagnosis and Intervention

Item	Standard	DOK	MDIS
1A	5.NBT.A.4, MP.1	2	H55
1B	5.NBT.A.4, 5.NBT.B.7, MP.2	2	H55
2	5.NBT.B.7, MP.6	3	H56
3	5.NBT.B.7, MP.4	2	H54
4A	5.NBT.B.7, MP.4	3	H56
4B	5.NBT.B.7, MP.4	3	H56
4C	5.NBT.B.7, MP.4	2	H57
4D	5.NBT.A.4, 5.NBT.B.7, MP.3	2	H55

TOPIC 3

TOPIC PLANNER

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

Lesson 3-1

MULTIPLY GREATER NUMBERS BY POWERS OF 10 pp. 113–118

Content Standard 5.NBT.A.2
Mathematical Practices MP.1, MP.3, MP.5, MP.6, MP.7

Objective Use place-value understandings and patterns to mentally multiply whole numbers and powers of 10.

Essential Understanding Place-value patterns and mental math can be used to write the product of a whole number and a power of 10 by simply annexing the correct number of zeros to the whole number factor.

Vocabulary None

ELL Listening: Demonstrate listening comprehension by retelling.

Materials Place-value blocks (or TT 4 and 5), paper, red pencil

On-Level and Advanced Activity Centers
- Math and Science Activity

Lesson 3-2

ESTIMATE PRODUCTS pp. 119–124

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3

Objective Use rounding and compatible numbers to estimate products.

Essential Understanding Estimating products is a useful technique to quickly solve mathematical problems and understand the value of numbers used in real-world situations. There is more than one way to estimate a product.

Vocabulary Underestimate, Overestimate

ELL Strategies: Use nonverbal cues when speaking.

Materials Place-value blocks (or TT 4 and 5), index cards, markers

On-Level and Advanced Activity Centers
- Problem-Solving Reading Mat

Lesson 3-3

MULTIPLY 3-DIGIT BY 2-DIGIT NUMBERS pp. 125–130

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3, MP.7, MP.8

Objective Multiply 3-digit by 2-digit numbers by combining equal groups and adding partial products.

Essential Understanding Multiply 3-digit numbers by 2-digit numbers by combining equal groups. Rounding to the nearest 10 or using compatible numbers helps estimate with greater accuracy when multiplying with greater numbers.

Vocabulary Partial products

ELL Speaking: Speak using content area vocabulary in context.

Materials Place-value Chart (or TT 3), markers

On-Level and Advanced Activity Centers
- Center Games

LESSON RESOURCES

Digital
- Student's Edition
- Daily Common Core Review
- Reteach to Build Understanding
- Center Games
- Math and Science Activity
- Problem-Solving Reading Mat
- Problem-Solving Reading Activity

Print

Digital
- Listen and Look For PD Lesson Video
- Student's Edition eText
- Today's Challenge
- Solve & Share
- Visual Learning Animation Plus
- Animated Glossary
- Math Tools
- Practice Buddy Online Practice
- Quick Check
- Another Look Homework Video
- Math Games

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Digital

Lesson 3-4

MULTIPLY WHOLE NUMBERS WITH ZEROS pp. 131–136

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.7

Objective Use knowledge about place value and multiplying with 2-digit and 3-digit numbers to multiply with zeros.

Essential Understanding The process for multiplying factors with zeros is always the same regardless of the size of the numbers with zeros. Estimation is a strategy that can be used to check the final product for reasonableness.

Vocabulary None

ELL Strategies: Use prior knowledge to understand problems.

Materials Paper, pencils

On-Level and Advanced Activity Centers
- Problem-Solving Reading Mat

Lesson 3-5

MULTIPLY MULTI-DIGIT NUMBERS pp. 137–142

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3, MP.4

Objective Use properties and the standard algorithm for multiplication to find the product of multi-digit numbers.

Essential Understanding No matter the size of the numbers, the standard algorithm for multiplying whole numbers is always based on properties of operations and can be used to solve problems.

Vocabulary None

ELL Reading: Demonstrate comprehension by responding to questions.

Materials None

On-Level and Advanced Activity Centers
- Center Games

Lesson 3-6

SOLVE WORD PROBLEMS USING MULTIPLICATION pp. 143–148

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.6

Objective Use models and strategies to solve word problems.

Essential Understanding Using a bar diagram and writing an equation are two strategies that can be used to solve multi-step problems.

Vocabulary Variable

ELL Speaking: Express opinions.

Materials None

On-Level and Advanced Activity Centers
- Center Games

TOPIC RESOURCES

Digital

Start of Topic
- Steps to Fluency Success
- Math and Science Project
- Home-School Connection
- Review What You Know
- My Word Cards

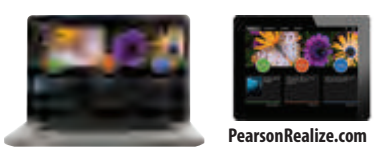
End of Topic
- Fluency Practice Activity
- Vocabulary Review
- Reteaching
- Topic Assessment
- Topic Performance Assessment

Print

Digital

Start of Topic
- Topic Overview PD Video

End of Topic
- Math Practices Animations
- Online Topic Assessment
- ExamView® Test Generator
- Practice Buddy/Fluency Practice/Assessment



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TOPIC 3

TOPIC PLANNER

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

Lesson 3-7

MATH PRACTICES AND PROBLEM SOLVING: CRITIQUE REASONING
pp. 149–154

Mathematical Practices MP.3 Also MP.1, MP.2, MP.6
Content Standard 5.NBT.B.5

Objective Critique the reasoning of others by asking questions, looking for flaws, and using prior knowledge of estimating products.

Essential Understanding Good math thinkers use math to explain why they are right. They can talk about the math that others do, too.

Vocabulary None

ELL Listening: Learn content area vocabulary.

Materials None

On-Level and Advanced Activity Centers
- Math and Science Activity

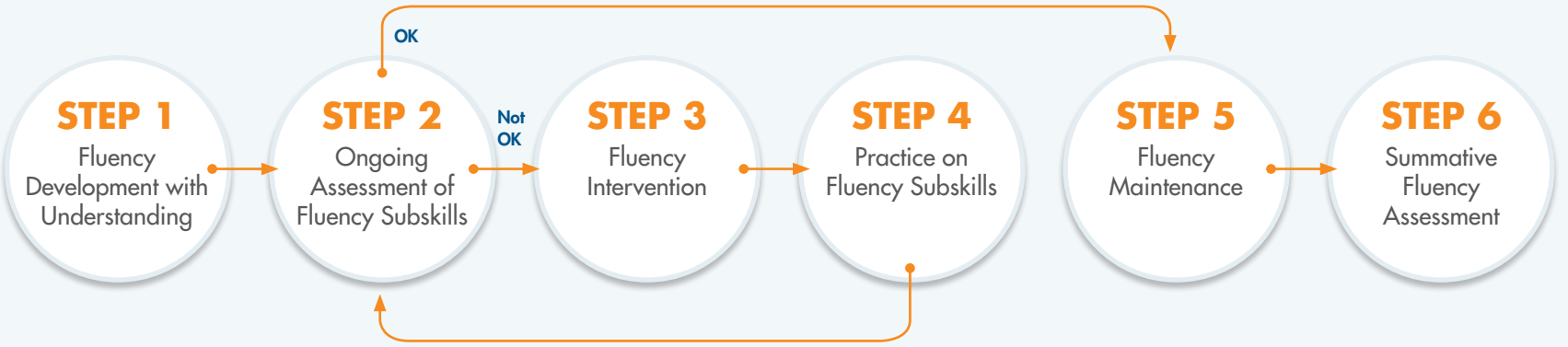
Notes

TOPIC 3

STEPS TO FLUENCY SUCCESS

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

In Grade 5, students are expected to fluently multiply multi-digit whole numbers using the standard algorithm. (5.NBT.B.5) To help all students achieve fluency by the end of the year, follow the 6 steps outlined below and use the support materials described on pages 109F, 109G, 109H.



Resources	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Student's Edition Resources						
Topic 3 Lessons	●					
Fluency Practice Activities					●	
Fluency Practice/Assessment Worksheets						
Teacher's Resource Masters		●		●	●	●
ExamView® CD-ROM		●		●	●	●
Math Diagnosis and Intervention System 2.0						
Diagnostic Tests			●			
Intervention Lessons			●			
Online Practice/Assessment						
Auto-Scored Items		●		●	●	●
On-Screen Help			●			
Game Center Online						
Games					●	
"My Fluency Progress" Form						
Teaching Tool 29		●				

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Practice Buddy

Games

Student's Edition Resources

- **Topic 3 Lessons** Topic 3 provides the development with understanding that students need to fluently multiply multi-digit whole numbers using the standard algorithm. This work builds on foundations for fluency from earlier work.

Foundations For Fluency

Grade 1, Topic 10 Use Models and Strategies to Add with Tens and Ones

Grade 2, Topic 3 Add Within 100 Using Strategies

Grade 2, Topic 4 Fluently Add Within 100

Grade 2, Topic 10 Add Within 1,000 Using Models and Strategies

Grade 3, Topic 8 Use Strategies and Properties to Add and Subtract

Grade 3, Topic 9 Fluently Add and Subtract Within 1,000

Grade 4, Topic 2 Fluently Add and Subtract Multi-Digit Whole Numbers

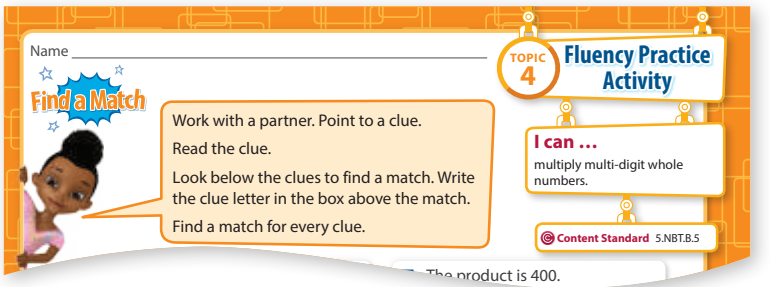
Grade 4, Topic 3 Use Strategies and Properties to Multiply by 1-Digit Numbers

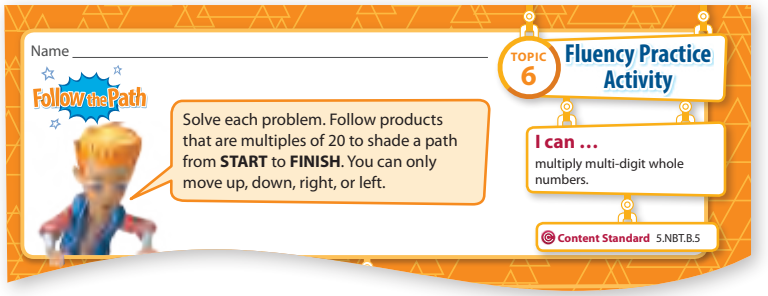
Grade 4, Topic 4 Use Strategies and Properties to Multiply by 2-Digit Numbers

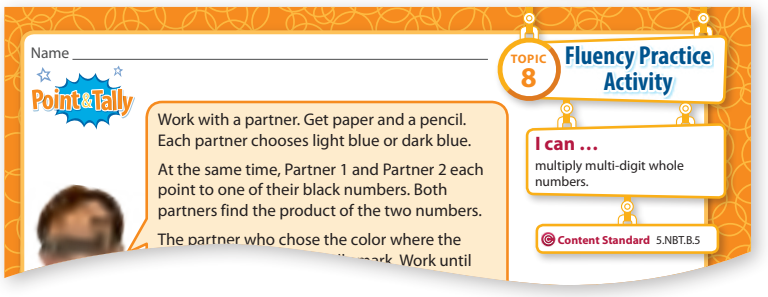
Grade 5, Topic 3 Fluently Multiply Multi-Digit Whole Numbers

- **Fluency Practice Activities** To support fluency for 5.NBT.B.5 use the fluency activity found at the end of each of Topics 3–16. Students can collaborate on these activities to help each other as needed.

Each Fluency Practice Activity is in one of the following formats: *Follow the Path, Find a Match, or Point & Tally.*







Fluency Practice/Assessment Worksheets

- **Teacher's Resource Masters** Teacher's Resource Masters for Fluency Practice/Assessment are organized around four subskills of 5.NBT.B.5. These worksheets can be used for practice on fluency subskills, for maintenance, or for assessment.

- **ExamView® CD-ROM** You can use ExamView to generate worksheets that cover the same content as the items on the Fluency Practice/Assessment Masters.

Go to pages 109G–109H to see the Fluency Practice/Assessment Masters and a list of the subskills for 5.NBT.B.5.

TOPIC 3

STEPS TO FLUENCY SUCCESS

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

Math Diagnosis and Intervention System 2.0

- **Diagnostic Tests** After covering Topic 3, if a student cannot fluently multiply multi-digit whole numbers, you might want to give a *Math Diagnosis and Intervention System 2.0* Diagnostic Test. These tests can diagnose the need for remediation of on-level content as well as prerequisite content such as multiplication facts, place value, and regrouping.
- **Intervention Lessons** For MDIS intervention lessons related to 5.NBT.B.5, see the chart at the bottom of the page.

Online Practice/Assessment

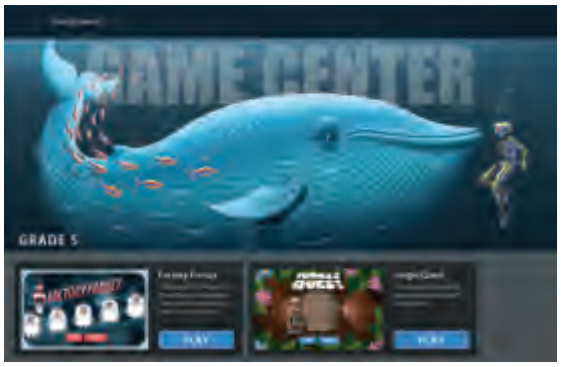
Practice Buddy

- **Auto-Scored Items** The online practice/assessment includes items on subskills of 5.NBT.B.5. Items are auto-scored to give students instant feedback, and a report is sent to the teacher.
- **On-Screen Help** If students are uncertain how to complete an item, or if they answer incorrectly, intervention is available through on-screen help. This includes "Help Me Solve This," which guides the student through a solution, and "View an Example," which shows a worked-out solution for a similar item.

Game Center Online

Games

- **Games** The Game Center at PearsonRealize.com provides opportunities for practicing fluency skills.



"My Fluency Progress" Form

- **Teaching Tool 29** To help students become personally responsible for monitoring their progress on 5.NBT.B.5, have them use the "My Fluency Progress" Form, Teaching Tool 29. This form gives students a place to record progress on fluency subskills.

Item Analysis for Diagnosis and Intervention

RtI

Item	Fluency Subskills for 5.NBT.B.5		MDIS
1–4	**A**	Multiply Two Two-Digit Numbers	G68
5–8	**B**	Multiply Three-Digit Numbers by Two-Digit Numbers	G69
9–12	**C**	Multiply Four-Digit Numbers by Two-Digit Numbers	G69
13–16	**D**	Multiply Across Zeros	G67, G68, G69

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Practice Buddy

Games

Fluency Practice/Assessment Worksheets

Name _____ Topic 3 Fluency Practice/Assessment

Multiply Multi-Digit Whole Numbers

1. 18 × 75 90 + 1260 1,350	**2.** 55 × 59 495 + 2750 3,245	**3.** 24 × 68 192 + 1440 1,632	**4.** 99 × 24 396 + 1980 2,376
5. 821 × 14 3284 + 8210 11,494	**6.** 775 × 27 5425 + 15500 20,925	**7.** 716 × 17 5012 + 7160 12,172	**8.** 177 × 82 354 + 14160 14,514
9. 2,631 × 83 7893 + 210480 218,373	**10.** 3,231 × 27 22617 + 64620 87,237	**11.** 9,222 × 26 55332 + 184440 239,772	**12.** 1,445 × 87 10115 + 115600 125,715
13. 65 × 20 1,300	**14.** 80 × 43 240 + 3200 3,440	**15.** 613 × 40 24,520	**16.** 8,701 × 45 43505 + 348040 391,545

17. Insert one digit in each box to complete the multiplication problem. You will not use the same digit twice.

206 × 45 = 1030 + 8240 = 9,270

Name _____ Topic 3 Fluency Practice/Assessment

Multiply Multi-Digit Whole Numbers

1. 65 × 57 455 + 3250 3,705	**2.** 51 × 17 357 + 510 867	**3.** 71 × 34 284 + 2130 2,414	**4.** 46 × 26 276 + 920 1,196
5. 413 × 94 1652 + 37170 38,822	**6.** 714 × 35 3570 + 21420 24,990	**7.** 144 × 69 1296 + 8640 9,936	**8.** 633 × 11 633 + 6330 6,963
9. 1,452 × 14 5808 + 14520 20,328	**10.** 8,645 × 29 77805 + 172900 250,705	**11.** 5,177 × 12 10354 + 51770 62,124	**12.** 1,869 × 98 14952 + 168210 183,162
13. 47 × 60 2,820	**14.** 950 × 23 2850 + 19000 21,850	**15.** 564 × 80 45,120	**16.** 7,183 × 30 215,490

17. Insert one digit in each box to complete the multiplication problem. You will not use the same digit twice.

642 × 38 = 5136 + 19260 = 24,396

Name _____ Topic 3 Fluency Practice/Assessment

Multiply Multi-Digit Whole Numbers

1. 64 × 45 320 + 2560 2,880	**2.** 54 × 17 378 + 540 918	**3.** 66 × 23 198 + 1320 1,518	**4.** 21 × 38 168 + 630 798
5. 791 × 12 1582 + 7910 9,492	**6.** 634 × 79 5706 + 44380 50,086	**7.** 587 × 57 4109 + 29350 33,459	**8.** 341 × 35 1705 + 10230 11,935
9. 8,719 × 55 43595 + 435950 479,545	**10.** 4,517 × 89 40653 + 361360 402,013	**11.** 8,251 × 39 74259 + 247530 321,789	**12.** 8,878 × 42 17756 + 355120 372,876
13. 90 × 78 720 + 6300 7,020	**14.** 610 × 61 610 + 36600 37,210	**15.** 4,880 × 67 34160 + 292800 326,960	**16.** 3,791 × 90 341,190

17. Insert one digit in each box to complete the multiplication problem. You will not use the same digit twice.

578 × 37 = 4046 + 17340 = 21,386

Name _____ Topic 3 Fluency Practice/Assessment

Multiply Multi-Digit Whole Numbers

1. 49 × 87 343 + 3920 4,263	**2.** 62 × 62 124 + 3720 3,844	**3.** 91 × 28 728 + 1820 2,548	**4.** 73 × 53 219 + 3650 3,869
5. 884 × 95 4420 + 79560 83,980	**6.** 573 × 88 4584 + 45840 50,424	**7.** 535 × 28 4280 + 10700 14,980	**8.** 877 × 86 5262 + 70160 75,422
9. 4,764 × 36 28584 + 142920 171,504	**10.** 9,396 × 39 84564 + 281880 366,444	**11.** 8,976 × 58 71808 + 448800 520,608	**12.** 6,253 × 99 56277 + 562770 619,047
13. 88 × 20 1,760	**14.** 40 × 79 360 + 2800 3,160	**15.** 719 × 90 64,710	**16.** 9,101 × 15 45505 + 91010 136,515

17. Insert one digit in each box to complete the multiplication problem. You will not use the same digit twice.

839 × 79 = 7551 + 58730 = 66,281

Name _____ Topic 3 Fluency Practice/Assessment

Multiply Multi-Digit Whole Numbers

1. 17 × 93 51 + 1530 1,581	**2.** 83 × 28 664 + 1660 2,324	**3.** 79 × 85 395 + 6320 6,715	**4.** 69 × 35 345 + 2070 2,415
5. 615 × 89 5535 + 49200 54,735	**6.** 889 × 35 4445 + 26670 31,115	**7.** 455 × 28 3640 + 9100 12,740	**8.** 624 × 21 624 + 12480 13,104
9. 7,279 × 27 50953 + 145580 196,533	**10.** 8,983 × 75 44915 + 628810 673,725	**11.** 3,538 × 93 10614 + 318420 329,034	**12.** 3,476 × 15 17380 + 34760 52,140
13. 42 × 50 2,100	**14.** 505 × 64 2020 + 30300 32,320	**15.** 634 × 50 31,700	**16.** 8,265 × 40 330,600

17. Insert one digit in each box to complete the multiplication problem. You will not use the same digit twice.

4005 × 13 = 12015 + 40050 = 52,065

Name _____ Topic 3 Fluency Practice/Assessment

Multiply Multi-Digit Whole Numbers

1. 47 × 51 47 + 2350 2,397	**2.** 61 × 59 549 + 3050 3,599	**3.** 37 × 12 74 + 370 444	**4.** 48 × 13 144 + 480 624
5. 449 × 83 1347 + 35920 37,267	**6.** 779 × 78 6232 + 54530 60,762	**7.** 517 × 82 1034 + 41360 42,394	**8.** 812 × 26 4872 + 16240 21,112
9. 4,363 × 47 30541 + 174520 205,061	**10.** 5,853 × 38 46824 + 175590 222,414	**11.** 2,433 × 99 21897 + 218970 240,867	**12.** 2,835 × 58 22680 + 141750 164,430
13. 90 × 84 360 + 7200 7,560	**14.** 703 × 92 1406 + 63270 64,676	**15.** 1,910 × 14 7640 + 19100 26,740	**16.** 3,613 × 30 108,390

17. Insert one digit in each box to complete the multiplication problem. You will not use the same digit twice.

685 × 44 = 2740 + 27400 = 30,140

TOPIC 3

TOPIC OPENER

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

TOPIC ESSENTIAL QUESTION

What are the standard procedures for estimating and finding products of multi-digit numbers?

Revisit the Topic Essential Question throughout the topic, and see a note about answering the question in the Teacher's Edition for the Topic Assessment.

MATH AND SCIENCE PROJECT STEM

Science Theme The science theme for this topic is **Water Usage**. This theme will be revisited in the Math and Science Activities in Lessons 3-1 and 3-7 and in some lesson exercises.

Have students help you list sources of fresh water. Then discuss the importance of conservation.

Explain that renewable resources are natural resources that can be replenished over time. Ask for examples of other natural resources that are renewable and some that are non-renewable.

Project-Based Learning Have students work on the **Math and Science Project** over the course of several days.

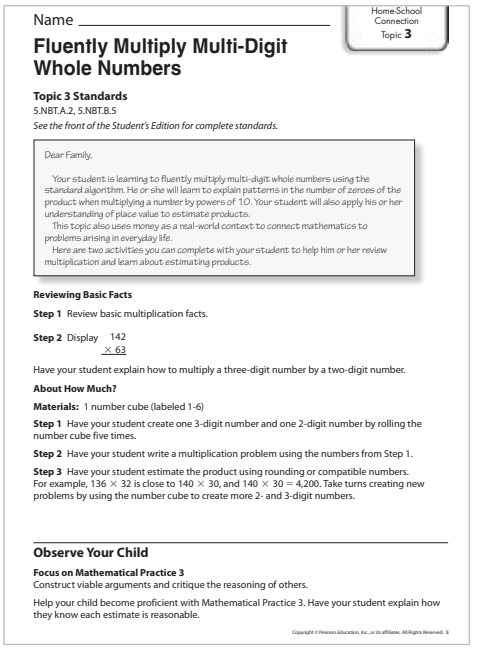
EXTENSION

Have students gather information about their family's water bills. Ask them to estimate the cost of the water used for the three household activities they researched and add this information to their report.

Sample Student Work for Math and Science Project

Activity	Water Used	Each Week	Total Water Used
showering	25 gal per shower	28 showers	About 600 gal
Washing Car	140 gal per wash	2 washes	About 280 gal
Laundry	40 gal per load	12 loads	About 400 gal

Home-School Connection


Name _____

Home-School Connection Topic 3

Fluently Multiply Multi-Digit Whole Numbers

Topic 3 Standards
5.NBT.A.2, 5.NBT.B.5
See the front of the Student's Edition for complete standards.

Dear Family,

Your student is learning to fluently multiply multi-digit whole numbers using the standard algorithm. He or she will learn to explain patterns in the number of zeroes of the product when multiplying a number by powers of 10. Your student will also apply his or her understanding of place value to estimate products.

This topic also uses money as a real-world context to connect mathematics to problems arising in everyday life.

Here are two activities you can complete with your student to help him or her review multiplication and learn about estimating products.

Reviewing Basic Facts

Step 1 Review basic multiplication facts.

Step 2 Display 142 × 63

Have your student explain how to multiply a three-digit number by a two-digit number.

About How Much?

Materials: 1 number cube (labeled 1-6)

Step 1 Have your student create one 3-digit number and one 2-digit number by rolling the number cube five times.

Step 2 Have your student write a multiplication problem using the numbers from Step 1.

Step 3 Have your student estimate the product using rounding or compatible numbers. For example, 136 × 32 is close to 140 × 30, and 140 × 30 = 4,200. Take turns creating new problems by using the number cube to create more 2- and 3-digit numbers.

Observe Your Child

Focus on Mathematical Practice 3
Construct viable arguments and critique the reasoning of others.

Help your child become proficient with Mathematical Practice 3. Have your student explain how they know each estimate is reasonable.

Send this page home at the start of Topic 3 to give families an overview of the content in the topic.

Name _____

Review What You Know

Vocabulary

Choose the best term from the box. Write it on the blank.

- equation
- exponent
- factor
- multiple
- power
- product

1. The answer to a multiplication problem is the **product**.
2. A number sentence that shows two expressions with the same value is a(n) **equation**.
3. A(n) **exponent** tells the number of times the base is used as a(n) **factor**.
4. 50 is a(n) **multiple** of 10 because $5 \times 10 = 50$.

Operations

Find each sum or difference.

5. 9,007 + 3,128 — **12,135**
6. 7,904 − 3,199 — **4,705**
7. 27,924 − 13,868 — **14,056**
8. 9.27 + 3.128 — **12.398**
9. 119.04 − 86.5 — **32.54**
10. 165.2 − 133.18 — **32.02**

Round Whole Numbers and Decimals

Round each number to the place of the underlined digit.

11. $1\underline{4}.3$ — **14**
12. $38\underline{5}.7$ — **390**
13. $0.\underline{5}45$ — **0.5**
14. $49\underline{6}.533$ — **497**
15. $49\underline{6}.353$ — **496**
16. $1{,}857.20\underline{5}$ — **1,857.21**

Compare Decimals

17. Write the numbers in order from least to greatest. 8.062 8.26 8.026 8.6
8.026 8.062 8.26 8.6
18. Write the numbers in order from greatest to least. 0.115 0.15 0.005 0.5
0.5 0.15 0.115 0.005

Item Analysis for Diagnosis and Intervention

Item	Standard	MDIS
1–4	5.NBT.A.2, 5.NBT.B.5	F17, G20
5–7	5.NBT.B.5	G18, G19
8–10	5.NBT.B.7	H54
11–16	5.NBT.A.4	H28
17–18	5.NBT.A.3b	H31

Topic 3 Vocabulary Words Activity

Use the Topic 11 activity on p. 632 with the Topic 3 words at the right.

My Word Cards

Use the examples for each word on the front of the card to help complete the definitions on the back.

underestimate

70×30 is an underestimate for 72×34 because $70 < 72$ and $30 < 34$.

overestimate

50×20 is an overestimate for 45×19 because $50 > 45$ and $20 > 19$.

partial products

$$\begin{array}{r} 57 \\ \times\ 14 \\ \hline 228 \\ +\ 570 \\ \hline 798 \end{array}$$

228 ← partial products

570 ← partial products

variable

$25 + n = 37$

n ← variable

My Word Cards

Complete the definition. Extend learning by writing your own definitions.

The result of using greater numbers to estimate a sum or product is called an **overestimate**.

The result of using lesser numbers to estimate a sum or product is called an **underestimate**.

A letter, such as n, that represents a number in an expression or an equation is called a **variable**.

Partial products are products found by breaking one of two factors into ones, tens, hundreds, and so on, and then multiplying each of these by the other factor.

110–112

LESSON 3-1

MULTIPLY GREATER NUMBERS BY POWERS OF 10

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.A Understand the place value system.

Content Standard 5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Mathematical Practices MP.1, MP.3, MP.5, MP.6, MP.7

Objective: Use place-value understandings and patterns to mentally multiply whole numbers and powers of 10.

Essential Understanding Place-value patterns and mental math can be used to write the product of a whole number and a power of 10 by simply annexing the correct number of zeros to the whole number factor.

Materials Place-value blocks (or Teaching Tools 4 and 5)

COHERENCE

In Grade 4, students learned patterns in multiplying one-digit numbers by multiples of 10. They also learned patterns in multiplying two multiples of 10. In Topic 1, they learned how to write powers of 10 with exponents and found products such as 5×10^4, where the number of zeros in the product was the same as the exponent. In this lesson, they will learn to use these generalizations to multiply two-digit numbers by powers of 10.

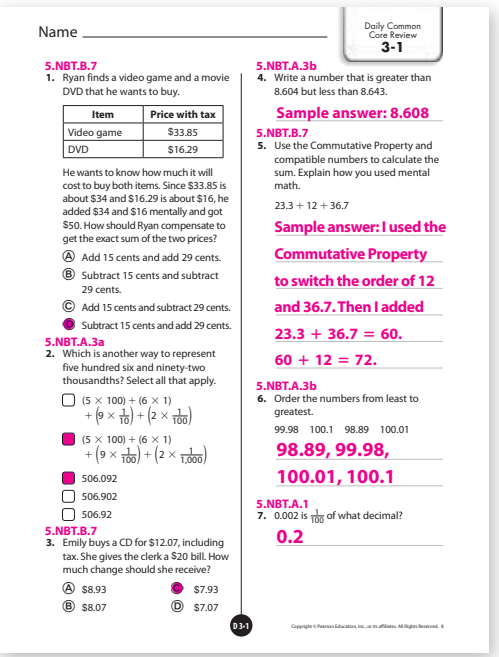
RIGOR

This lesson emphasizes **conceptual understanding** with **procedural skill**. Students use their understanding of the role of ten in our numeration system to develop and understand procedural skill for multiplying two-digit numbers by powers of ten.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 3-1

5.NBT.B.7
1. Ryan finds a video game and a movie DVD that he wants to buy.

Item	Price with tax
Video game	$33.85
DVD	$16.29

He wants to know how much it will cost to buy both items. Since $33.85 is about $34 and $16.29 is about $16, he added $34 and $16 mentally and got $50. How should Ryan compensate to get the exact sum of the two prices?

Ⓐ Add 15 cents and add 29 cents.
Ⓑ Subtract 15 cents and subtract 29 cents.
Ⓒ Add 15 cents and subtract 29 cents.
● Ⓓ Subtract 15 cents and add 29 cents.

5.NBT.A.3a
2. Which is another way to represent five hundred six and ninety-two thousandths? Select all that apply.

☐ $(5 \times 100) + (6 \times 1) + \left(9 \times \frac{1}{10}\right) + \left(2 \times \frac{1}{100}\right)$
■ $(5 \times 100) + (6 \times 1) + \left(9 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1{,}000}\right)$
■ 506.092
☐ 506.902
☐ 506.92

5.NBT.B.7
3. Emily buys a CD for $12.07, including tax. She gives the clerk a $20 bill. How much change should she receive?

Ⓐ $8.93 ● Ⓒ $7.93
Ⓑ $8.07 Ⓓ $7.07

5.NBT.A.3b
4. Write a number that is greater than 8.604 but less than 8.643.
Sample answer: 8.608

5.NBT.B.7
5. Use the Commutative Property and compatible numbers to calculate the sum. Explain how you used mental math.
23.3 + 12 + 36.7
Sample answer: I used the Commutative Property to switch the order of 12 and 36.7. Then I added 23.3 + 36.7 = 60. 60 + 12 = 72.

5.NBT.A.3b
6. Order the numbers from least to greatest.
99.98 100.1 98.89 100.01
98.89, 99.98, 100.01, 100.1

5.NBT.A.1
7. 0.002 is $\frac{1}{100}$ of what decimal?
0.2

03-1

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Today's Challenge

Think Use the Topic 3 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Listening Demonstrate listening comprehension by retelling.

Use with the Visual Learning Bridge on Student's Edition p. 114.

Read Box A. Ask students if they notice patterns that help solve the problem. *You can annex the zero to simplify the problem.* Read Box B.

Beginning Reread Box B to students. Write: 32 × 10,000. *Simplify the problem.* Using paper, cover 0,000. *Rewrite the problem 32 × 1 = 32.* Uncover the first 0 in 0,000. *Rewrite the problem 32 × 10 = 320, or 32 tens.* Point to 0 in 32 × 10 and slide your finger to 0 in 320. *I annex the zero to the right side of the expression.* Ask students to retell information by using the sentence stem: I can _____ [annex] the 0s to find the product.

Intermediate Reread Box B with students. Write: 32 × 10,000. *Simplify the problem.* Using paper, cover 0,000. *Rewrite the problem as 32 × 1 = 32.* Uncover the first 0 in 0,000. *Rewrite the problem as 32 × 10 = 320, or 32 tens.* Point to 0 in 32 × 10 and slide your finger to 0 in 320. *One 0 on the left side of the equation. I annex it to the right side of the equation.* Continue the process through 32 × 10,000 = 320,000. Ask students to retell the information.

Advanced Instruct students to reread Box B with partners. Instruct students to retell the information using *annex*.

Summarize What does it mean to *annex* the zero?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students apply their knowledge of place value to find products of whole numbers and powers of 10 using patterns and mental math.

10–15 min

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Solve

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
MP.5 Use Appropriate Tools Strategically Listen and look for students who use tools, such as place-value blocks (or Teaching Tools 4 and 5), to solve a real-world problem involving multiplying with powers of 10.

2. **Build Understanding**
What operation will you use? [Multiplication] *Why?* [I need to join equal groups.]

Small Group DURING

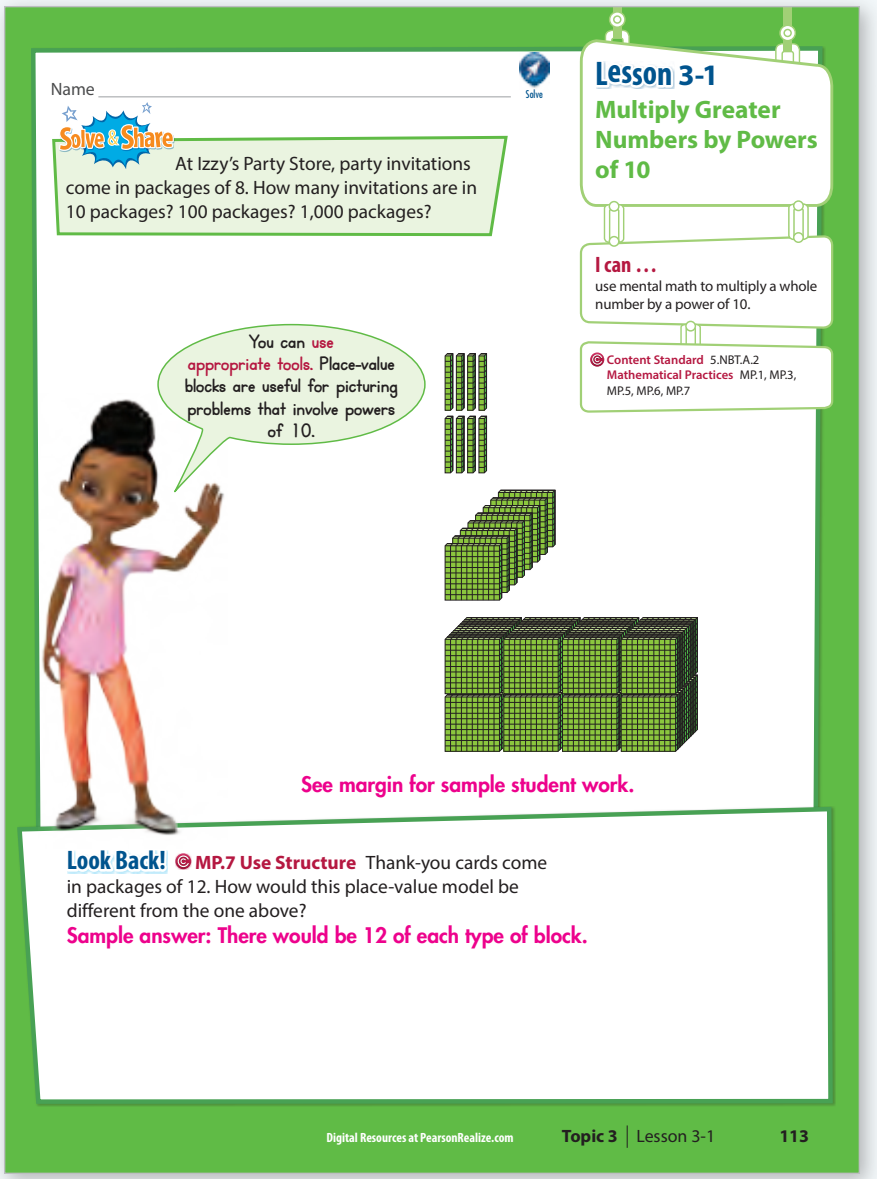
3. **Ask Guiding Questions As Needed**
What multiplication expression represents 8 blocks of 10? [8 × 10] *What multiplication expression represents 8 blocks of 100?* [8 × 100]

Whole Class AFTER

4. **Share and Discuss Solutions**
Solve Start with students' solutions. If needed, project and analyze Harrison's work to show how place-value blocks can be used to represent multiplication with powers of 10.

5. **Transition to the Visual Learning Bridge**
Patterns can be used to multiply whole numbers by powers of 10. Place-value blocks can be used to model these products.

6. **Extension for Early Finishers**
Use or draw place-value blocks to help you find these products: 5 × 10, 5 × 100, and 5 × 1,000. [50; 500; 5,000]


Name _____ Solve

Solve & Share
At Izzy's Party Store, party invitations come in packages of 8. How many invitations are in 10 packages? 100 packages? 1,000 packages?

Lesson 3-1
Multiply Greater Numbers by Powers of 10

I can ...
use mental math to multiply a whole number by a power of 10.

Content Standard 5.NBT.A.2
Mathematical Practices MP.1, MP.3, MP.5, MP.6, MP.7

You can use appropriate tools. Place-value blocks are useful for picturing problems that involve powers of 10.

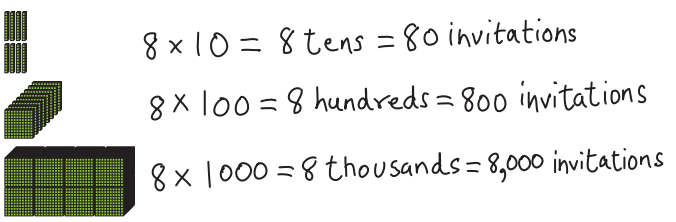
See margin for sample student work.

Look Back! MP.7 Use Structure Thank-you cards come in packages of 12. How would this place-value model be different from the one above?
Sample answer: There would be 12 of each type of block.

Digital Resources at PearsonRealize.com Topic 3 | Lesson 3-1 113

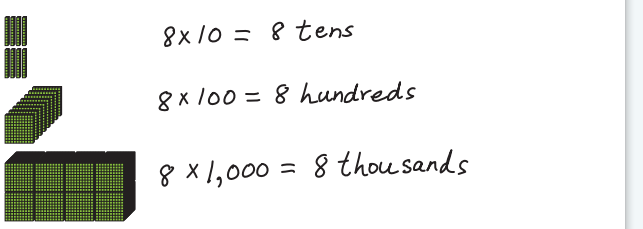
Analyze Student Work

Harrison's Work



Harrison uses place-value blocks to represent each product. He counts the blocks and uses place-value understanding to write each product in standard form.

Lena's Work



Lena uses place-value blocks to represent each product, but she does not write the products in standard form.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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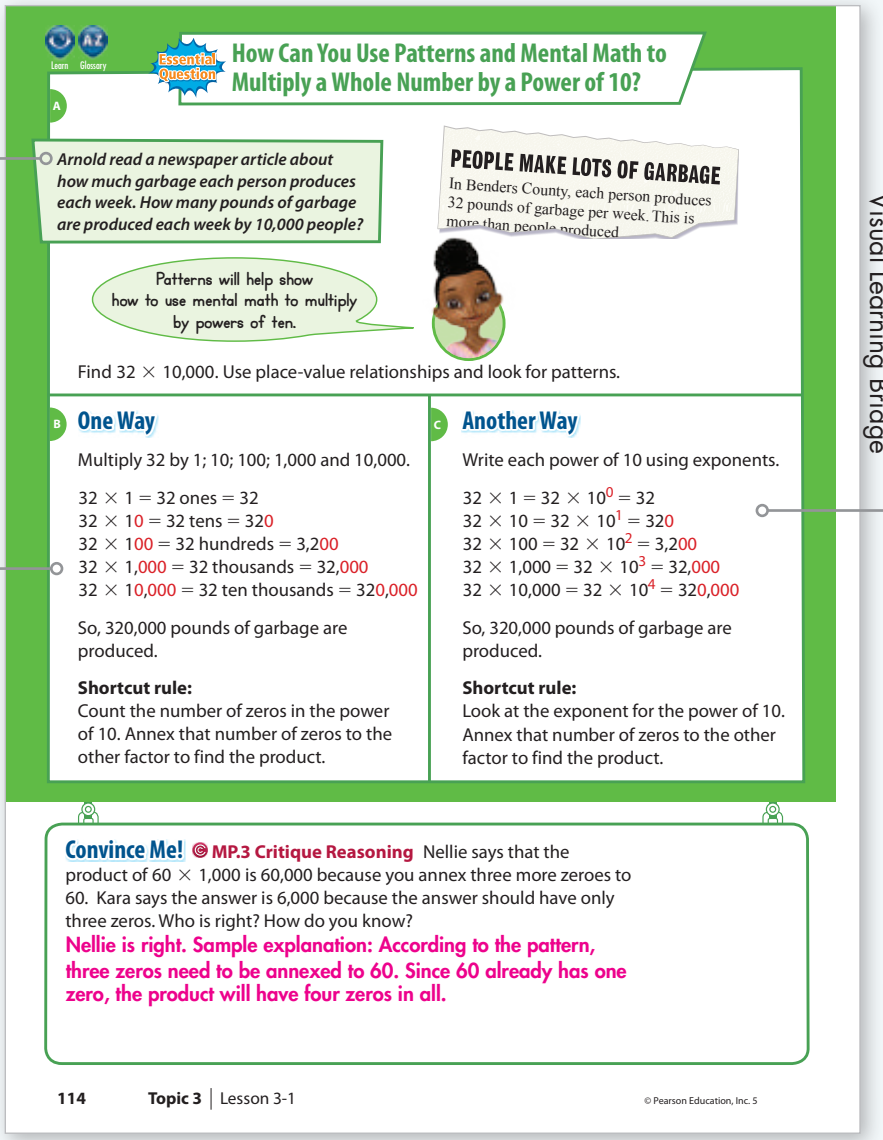
Learn Glossary

MP.1 Make Sense and Persevere
What information from the newspaper clipping do you need to solve the problem? [Each person produces 32 pounds of garbage each week.] *What operation should you use to solve the problem?* [Multiplication] *Why?* [I need to join 10,000 equal groups of 32.]

MP.7 Use Structure
What relationships do you see between the factors and the products? [Each product has the digits of the factor 32 followed by the same number of zeros as in the power of 10.]



Learn Glossary

Essential Question **How Can You Use Patterns and Mental Math to Multiply a Whole Number by a Power of 10?**

A

Arnold read a newspaper article about how much garbage each person produces each week. How many pounds of garbage are produced each week by 10,000 people?

PEOPLE MAKE LOTS OF GARBAGE
In Benders County, each person produces 32 pounds of garbage per week. This is more than people produced

Patterns will help show how to use mental math to multiply by powers of ten.

Find 32 × 10,000. Use place-value relationships and look for patterns.

B **One Way**

Multiply 32 by 1; 10; 100; 1,000 and 10,000.

32 × 1 = 32 ones = 32
32 × 10 = 32 tens = 320
32 × 100 = 32 hundreds = 3,200
32 × 1,000 = 32 thousands = 32,000
32 × 10,000 = 32 ten thousands = 320,000

So, 320,000 pounds of garbage are produced.

Shortcut rule:
Count the number of zeros in the power of 10. Annex that number of zeros to the other factor to find the product.

C **Another Way**

Write each power of 10 using exponents.

$32 \times 1 = 32 \times 10^0 = 32$
$32 \times 10 = 32 \times 10^1 = 320$
$32 \times 100 = 32 \times 10^2 = 3{,}200$
$32 \times 1{,}000 = 32 \times 10^3 = 32{,}000$
$32 \times 10{,}000 = 32 \times 10^4 = 320{,}000$

So, 320,000 pounds of garbage are produced.

Shortcut rule:
Look at the exponent for the power of 10. Annex that number of zeros to the other factor to find the product.

Convince Me! MP.3 Critique Reasoning Nellie says that the product of 60 × 1,000 is 60,000 because you annex three more zeroes to 60. Kara says the answer is 6,000 because the answer should have only three zeros. Who is right? How do you know?
Nellie is right. Sample explanation: According to the pattern, three zeros need to be annexed to 60. Since 60 already has one zero, the product will have four zeros in all.

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Visual Learning Bridge

Why do the rules in One Way and Another Way produce the same solution to the problem? [10,000 = 10^4, so no matter which rule you follow, you need to annex 4 zeros.]

Convince Me! MP.3 Critique Reasoning Remind students that zeros are annexed to the first factor, not just the non-zero digit in that factor. If necessary, ask: *What is 10 × 10?* [100] *So, was a zero annexed to the 1 or the 10?* [10] [Yes, the product has as many zeros as the power of ten and one more zero if the whole number factor ends in a zero.]

Coherence In finding how much garbage 10,000 people produce, students learn how to multiply two-digit numbers by powers of 10. This connects to Grade 4 where students multiplied numbers such as 40 × 30 by annexing 2 zeros to the product of 3 × 4. It also uses what they learned in Topic 1 about multiplying one-digit numbers by multiples of 10 written with exponents.

Essential Question Revisit the Essential Question. Place-value patterns and mental math can be used to find products of a whole number and a power of 10 by annexing zeros to a whole number factor.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 22 and 30 are worth 1 point. Item 29 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

Do You Understand?

1. How many zeros will there be in the product of 39 × 1,000? How many zeros will there be in the product of 50 × 1,000?
   3; 4

2. Explain how to find the product of 90×10^4.
   Sample answer: The exponent in the power of 10 is 4, so annex 4 zeros to 90. The product is 900,000.

Do You Know How?

In **3** and **4**, write the products.

3. 60 × 1 **60**
   60 × 10 **600**
   60 × 100 **6,000**
   60 × 1,000 **60,000**
   60 × 10,000 **600,000**

4. 13×10^0 **13**
   13×10^1 **130**
   13×10^2 **1,300**
   13×10^3 **13,000**
   13×10^4 **130,000**

Independent Practice

Leveled Practice In **5–24**, find each product.

5. 89 × 1 **89**
   89 × 10 **890**
   89 × 100 **8,900**
   89 × 1,000 **89,000**
   89 × 10,000 **890,000**

6. 30 × 1 **30**
   30 × 10 **300**
   30 × 100 **3,000**
   30 × 1,000 **30,000**
   30 × 10,000 **300,000**

7. 41×10^0 **41**
   41×10^1 **410**
   41×10^2 **4,100**
   41×10^3 **41,000**
   41×10^4 **410,000**

8. 90×10^0 **90**
   90×10^1 **900**
   90×10^2 **9,000**
   90×10^3 **90,000**
   90×10^4 **900,000**

9. 4×10^3 **4,000**

10. 85 × 100 **8,500**

11. 16×10^2 **1,600**

12. $10^3 \times 38$ **38,000**

13. 52×10^5 **5,200,000**

14. 4×10^4 **40,000**

15. 29 × 10,000 **290,000**

16. 10 × 6,837 **68,370**

17. 1,000 × 10 **10,000**

18. $10^1 \times 615$ **6,150**

19. 250×10^0 **250**

20. 382 × 10,000 **3,820,000**

21. 1,000 × 57 **57,000**

22. 80×10^3 **80,000**

23. $10^3 \times 374$ **374,000**

24. 194 × 100 **19,400**

*For another example, see Set A on page 157.

Math Practices and Problem Solving

25. **MP.7 Use Structure** At a football championship game, the home team gave a football to each of the first 100 fans who arrived at the stadium. Each football cost the team $28. How much did the team pay for the footballs it gave away?
    $2,800

26. **MP.3 Construct Arguments** Which expression is greater, 93×10^3 or 11×10^4? How do you know?
    11×10^4; $93 \times 10^3 = 93{,}000$, and $11 \times 10^4 = 110{,}000$

27. A truck is carrying 10^2 bushels of onions, 10^1 bushels of peaches, and 10^3 bushels of corn. What is the total weight of the crops?
    76,200 pounds

DATA

Crop	Weight per bushel (pounds)
Apples	48
Onions	57
Peaches	50
Ears of corn	70

28. **MP.1 Make Sense and Persevere** Norman bought a 16-pound bag of charcoal for $7.89 and a 10.4-pound bag of charcoal for $5.69. What was the total weight of the two bags of charcoal?
    26.4 pounds

29. **Higher Order Thinking** There are 2,000 pounds in 1 ton. In the United States, the weight limit for a truck and its cargo is 40 tons. How many pounds is that? How did you find the answer?
    80,000 pounds; Sample explanation: Multiply 2,000 × 40 = 80,000.

Common Core Assessment

30. Choose all equations that are true.
    - ☐ 48 × 1,000 = 4,800
    - ☑ $48 \times 10^2 = 4{,}800$
    - ☑ $48 \times 10^4 = 480{,}000$
    - ☐ $48 \times 10^3 = 4{,}800$
    - ☑ $48 \times 10^3 = 48{,}000$

31. Choose all equations that are true.
    - ☑ 20 × 100 = 2,000
    - ☑ $20 \times 10^3 = 20{,}000$
    - ☐ 20 × 1,000 = 2,000
    - ☐ 20 × 10 = 2,000
    - ☑ $20 \times 10^5 = 2{,}000{,}000$

Error Intervention: Item 3

If students omit a zero in each product,

then remind them that they need to annex the correct number of zeros to 60, not to 6.

Item 4 Students may not be sure what to do with 10^0. Discuss with them how the pattern remains the same. 10^2 has 2 zeros, 10^1 has 1 zero, and 10^0 has no zeros. So, 10^0 is equal to 1.

Items 7–8 Have students write the power of 10 in standard form before multiplying. This way they can make the connection between the exponent, the number of zeros in the standard form of the power of 10, and the number of zeros in the product.

RtI **Reteaching** Assign Reteaching Set A on p. 157.

Item 26 MP.3 Construct Arguments Students can use number sense to explain that a two-digit number multiplied by 10^4 will be greater than any two-digit number multiplied by 10^3 because 10^4 is 10 times as much as 10^3.

Item 27 Coherence Students use understanding of place value and expanded form to solve this problem. They multiply by powers of ten and then add the products. This process is used in the multiplication algorithm developed later in this topic.

Item 28 MP.1 Make Sense and Persevere *What information do you need to solve this problem?* [The weights of the bags of charcoal] *What information is not needed?* [The prices]

Item 29 Higher Order Thinking Discuss with students how 2,000 can be rewritten as 2 × 1,000. Then the Associative Property can be used to rewrite 40 × 2,000 as (40 × 2) × 1,000.

Multi-Step Problems *Page 116 Items 26 and 27; Page 118 Items 19 and 21*

115–116

STEP 3

ASSESS AND DIFFERENTIATE

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

Multiply Greater Numbers by Powers of 10

Materials

Paper and a red pencil

- Write the following problems on the board. Have students copy the problems using a red pencil to write the exponent or the zeros in each power of 10.
  1. 14×100 [1,400]
  2. 5×10^4 [50,000]
  3. $70 \times 10{,}000$ [700,000]
  4. $10^2 \times 66$ [6,600]
  5. $86 \times 1{,}000$ [86,000]
  6. $10^3 \times 30$ [30,000]
- Have students write each product by following these steps.

(1) Use your regular pencil to write the factor that is not a power of 10.

(2) Count the zeros or look at the exponent that you wrote in red.

(3) In the product, use your red pencil to write that number of zeros after the other factor.

(4) Check that the number of red zeros in the product matches the number of red zeros or the red exponent in the problem.

1. $14 \times 100 = 1{,}400$
2. $5 \times 10^4 = 50{,}000$
3. $70 \times 10{,}000 = 700{,}000$

Reteach I

Name _____

Reteach to Build Understanding 3-1

Vocabulary

1. A **power** is a product that results from multiplying the same number over and over again. A **power of 10** is the product of 10 multiplied by itself a certain number of times.

$10^2 = 10 \times 10 = 100$

$10^3 = 10 \times 10 \times 10 =$ 1,000

$10^4 =$ 10 × 10 × 10 × 10 = 10,000

$10^5 = 10 \times 10 \times 10 \times 10 \times 10 =$ 100,000

2. The heaviest ball made by a bowling ball company weighs 16 pounds. Last week, the company shipped 10,000 of these balls. What was the total weight of the bowling balls?

Multiply 16 by 1 to find the weight of 1 bowling ball.

16 × 1 = 16 ones = 16

Then use a pattern to multiply 16 by 10, 100, 1,000, and 10,000.

16 × 10 = 16 tens = 160

16 × 100 = 16 hundreds = 1,600

16 × 1,000 = 16 thousands = 16,000

16 × 10,000 = 16 ten thousands = 160,000

So, the total weight of the bowling balls is 160,000 pounds.

3. The company charges $85 for each 16-pound bowling ball. Over the past several months, the company sold 100,000 bowling balls. How much did the company earn for these sales?

85 × 100,000 = 85 × 10^5 = 8,500,000

The company earned $ 8,500,000

On the Back!

4. Find 23×10^3. Then find 230×10^3. 23,000; 230,000

R 3-1

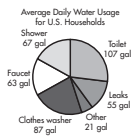
On-Level and Advanced Activity Centers O A

Name _____

Math and Science Activity 3-1

Water Usage

Did You Know? If every household in the U.S. had water-saving fixtures and appliances, we would use 5.4 million fewer gallons of water each day. We would spend about 11.3 million dollars less for water each day! In a year, the savings could reach 2 billion gallons or over 4 billion dollars. Water-saving appliances limit the flow so less water is used. Fresh water is a renewable resource but our supply of clean, useable water is decreasing faster than it is being replaced.



1. The product 48×10^3 represents the number of gallons of water a family of four could save in one year by installing a water-saving showerhead. Find the product 48×10^3.

48,000

2. The product 12×10^4 represents the number of gallons of water one household could save in five years by installing one low-flow toilet. Find the product 12×10^4.

120,000

3. One household could save 60×10^3 gallons of water in ten years by installing one high-efficiency washing machine. Find the product 60×10^3.

60,000

4. **Extension** A faucet aerator mixes air into the water. This reduces the flow of water from the faucet. Some low-flow aerators reduce the flow of water by 16 cups per minute. If a family runs the faucets for 10,000 minutes, how much water could they save with low-flow aerators? Explain how you found your answer.

160,000 cups of water; Sample explanation: Since 10,000 has 4 zeros, I added 4 zeros to 16 to find 16 × 10,000.

Math and Science Activity 3-1

Math and Science Activity STEM

This activity revisits the science theme **Water Usage,** introduced on page 109 in the Student's Edition.

Sample Student Work

3. $60 \times 10^3 = ?$

$60 \times 10 = 600$
$60 \times 100 = 6{,}000$
$60 \times 1{,}000 = 60{,}000$
So, $60 \times 10^3 = 60{,}000$.

3. 60×10^3.
Annex 3 zeros to 60.
$60 \times 10^3 = 60{,}000$.

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–9, 13–16, 20–22, 24, 25

O Items 1, 2, 5–18, 20–25

A Items 6, 11–18, 19–25

Name _____

Help Practice Buddy Tools Games

Another Look!

Patterns can help you multiply by powers of 10.

$53 \times 1 = 53$
$53 \times 10 = 530$
$53 \times 100 = 5{,}300$
$53 \times 1{,}000 = 53{,}000$
$53 \times 10{,}000 = 530{,}000$

$70 \times 10^0 = 70$
$70 \times 10^1 = 700$
$70 \times 10^2 = 7{,}000$
$70 \times 10^3 = 70{,}000$
$70 \times 10^4 = 700{,}000$

Look at the number of zeros or the exponent for the power of 10. Annex that number of zeros to the other factor.

Homework & Practice 3-1
Multiply Greater Numbers by Powers of 10

1. To find $61 \times 1{,}000$, annex 3 zeros to 61 to form the product 61,000.

2. To find 20×10^4, annex 4 zeros to 20 to form the product 200,000.

In **3–6**, use patterns to find each product.

3. 75×1 75; 75×10 750; 75×100 7,500; $75 \times 1{,}000$ 75,000; $75 \times 10{,}000$ 750,000
4. 50×1 50; 50×10 500; 50×100 5,000; $50 \times 1{,}000$ 50,000; $50 \times 10{,}000$ 500,000
5. 60×10^0 60; 60×10^1 600; 60×10^2 6,000; 60×10^3 60,000; 60×10^4 600,000
6. 18×10^0 18; 18×10^1 180; 18×10^2 1,800; 18×10^3 18,000; 18×10^4 180,000

In **7–18**, find each product.

7. 84×100 8,400
8. 90×10 900
9. 54×10^2 5,400
10. $10^3 \times 12$ 12,000
11. 72×10^5 7,200,000
12. $278 \times 1{,}000$ 278,000
13. 36×10^4 360,000
14. $10^2 \times 539$ 53,900
15. 4×10^1 40
16. $3{,}510 \times 10^0$ 3,510
17. 100×17 1,700
18. 102×10^4 1,020,000

19. **MP.3 Construct Arguments** Ms. O'Malley's cousin lives 1,650 miles away. Ms. O'Malley won a gift card for 100 gallons of gas. If her car can travel 35 miles on each gallon, can she drive roundtrip to see her cousin on the free gas? Explain how you know.
Yes; She can drive 3,500 miles on the free gas. The roundtrip distance is only 3,300 miles.

20. Each beehive on Larson's Honey Farm usually produces 85 pounds of honey per year. About how many pounds of honey will 10^3 hives produce in a year?
85,000 pounds

21. **MP.1 Make Sense and Persevere** A hotel chain is ordering new furnishings. What is the total cost of 1,000 sheet sets, 1,000 pillows, and 100 desk chairs?
$42,400

DATA

Item	Price
Towel sets	$18
Sheet sets	$24
Pillows	$7
Desk chair	$114

22. **MP.6 Be Precise** Which number is greater: 87 or 13.688? How do you know?
87; Sample explanation: The greatest place value for both numbers is the tens place. 87 has a greater digit in the tens place than does 13.688.

23. **Higher Order Thinking** The weight of an elephant is 10^3 times the weight of a cat. If the elephant weighs 14,000 pounds, how many pounds does the cat weigh? How did you find the answer?
14 pounds; Sample explanation: I needed to find a number that when multiplied by 10^3 equals14,000. Since 3 zeros were annexed to find the product, work backwards and remove the 3 zeros.

Common Core Assessment

24. Choose all equations that are true.
- ☐ $14 \times 1{,}000 = 1{,}400$
- ☑ $95 \times 10 = 950$
- ☐ $30 \times 100 = 300$
- ☑ $6 \times 10{,}000 = 60{,}000$
- ☐ $50 \times 100 = 50{,}000$

25. Choose all equations that are true.
- ☑ $72 \times 10^2 = 7{,}200$
- ☑ $40 \times 10^3 = 40{,}000$
- ☐ $164 \times 10 = 16{,}400$
- ☐ $55 \times 10^2 = 55{,}000$
- ☑ $97 \times 10^4 = 970{,}000$

LESSON 3-2

ESTIMATE PRODUCTS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

Mathematical Practices MP.1, MP.2, MP.3

Objective Use rounding and compatible numbers to estimate products.

Essential Understanding Estimating products is a useful technique to quickly solve mathematical problems and understand the value of numbers used in real-world situations. There is more than one way to estimate a product.

Vocabulary Underestimate, Overestimate

Materials Place-value blocks (or Teaching Tools 4 and 5)

COHERENCE

Students have been estimating computations with whole numbers since Grade 3. For different operations, they learned to use either rounding or compatible numbers. In this lesson, they will learn to use these techniques to estimate products of multi-digit numbers.

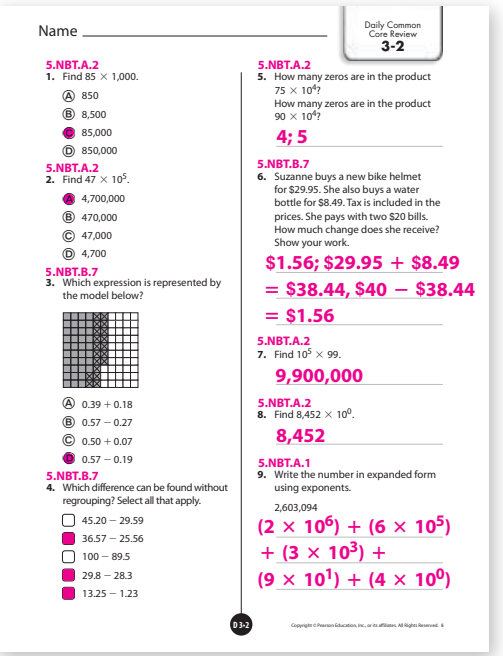
RIGOR

This lesson emphasizes number sense, **conceptual understanding,** and **procedural skill** for estimating the products of multi-digit numbers. Not only do students estimate products, but they also look at the process they used to decide whether the estimate is over or under the actual product.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 3-2

5.NBT.A.2
1. Find 85 × 1,000.
Ⓐ 850
Ⓑ 8,500
Ⓒ 85,000
Ⓓ 850,000

5.NBT.A.2
2. Find 47 × 10^5.
Ⓐ 4,700,000
Ⓑ 470,000
Ⓒ 47,000
Ⓓ 4,700

5.NBT.B.7
3. Which expression is represented by the model below?

Ⓐ 0.39 + 0.18
Ⓑ 0.57 − 0.27
Ⓒ 0.50 + 0.07
Ⓓ 0.57 − 0.19

5.NBT.B.7
4. Which difference can be found without regrouping? Select all that apply.
☐ 45.20 − 29.59
☑ 36.57 − 25.56
☐ 100 − 89.5
☑ 29.8 − 28.3
☑ 13.25 − 1.23

5.NBT.A.2
5. How many zeros are in the product 75 × 10^4?
How many zeros are in the product 90 × 10^4?
4; 5

5.NBT.B.7
6. Suzanne buys a new bike helmet for $29.95. She also buys a water bottle for $8.49. Tax is included in the prices. She pays with two $20 bills. How much change does she receive? Show your work.
$1.56; $29.95 + $8.49 = $38.44, $40 − $38.44 = $1.56

5.NBT.A.2
7. Find 10^5 × 99.
9,900,000

5.NBT.A.2
8. Find 8,452 × 10^0.
8,452

5.NBT.A.1
9. Write the number in expanded form using exponents.
2,603,094
$(2 \times 10^6) + (6 \times 10^5) + (3 \times 10^3) + (9 \times 10^1) + (4 \times 10^0)$

03-2

Today's Challenge

Think Use the Topic 3 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Strategies Use nonverbal cues when speaking.

Use with the Visual Learning Bridge on Student's Edition p. 120.

As you introduce the new vocabulary, have students say the term *underestimate*. *What smaller words are parts of the term* underestimate*?* [Under and estimate] *The term* under *means "below."* Make a hand gesture moving your hand position from a higher level to a lower level. *So what might it mean to underestimate something?* [Find a close amount less than the actual amount.] Repeat with the term *overestimate*. *The term* over *means "above."* Make a hand gesture moving your hand position from a lower level to a higher level.

Beginning Display 23 × 104. *What term means "to find a close amount using 20 × 100"?* [Underestimate]

Intermediate Display 18 × 276. *What numbers could we use to overestimate the answer?* [Sample answer: 20 × 300] *How do hand motions help you understand what* underestimate *and* overestimate *mean?*

Advanced Have students write a multiplication example. Partners trade examples and tell how they would make an underestimate and an overestimate.

Summarize How do you say, define, and use the terms *underestimate* and *overestimate?*

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use their knowledge of rounding and compatible numbers to estimate the total cost of shirts for a club.

10–15 min

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Solve

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
MP.2 Reason Quantitatively Listen and look for students who use estimating to find the answer.

2. **Build Understanding**
Why might you estimate when buying items? [Sample answers: To see if you have enough money; because you can find estimates using mental math.]

Small Group DURING

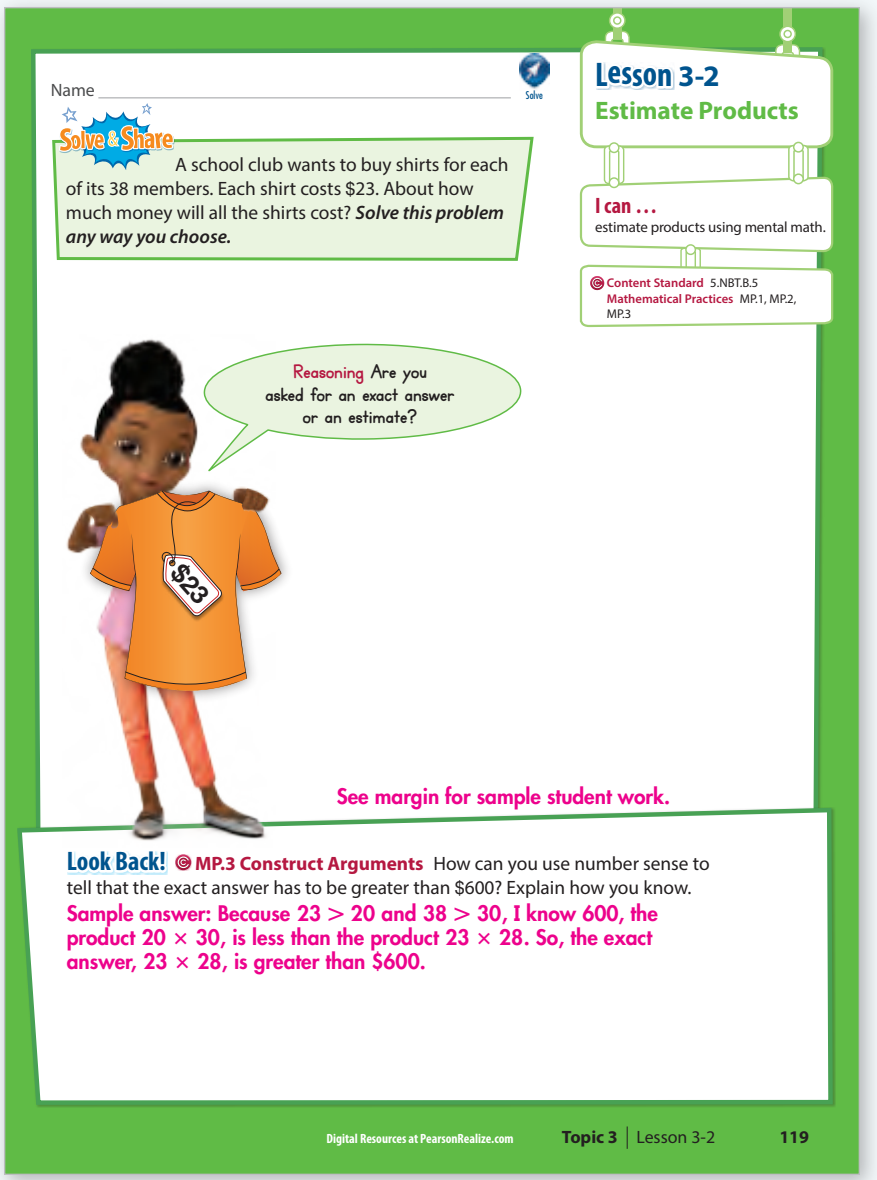
3. **Ask Guiding Questions As Needed**
Do you need to find an exact amount? Explain. [No; The problem asks about how much.] *How can you estimate 38 × 23?* [Sample answer: Round to the nearest 10 or by using compatible numbers that are easy to multiply together.]

Whole Class AFTER

4. **Share and Discuss Solutions**
Solve Start with students' solutions. If needed, project Ana's work to discuss how to use rounding to estimate the products.

5. **Transition to the Visual Learning Bridge**
There is more than one way to estimate a product. Each estimation technique gives one way to estimate by replacing numbers with other numbers that are close and easy to compute mentally.

6. **Extension for Early Finishers**
What are two numbers with an estimated but not exact product of 4,500? Explain your answer. [Sample answer: 89 and 51 round to 90 and 50. I know that 9 × 5 = 45, and 90 × 50 = 4,500.]


Name _____ Solve

Solve & Share
A school club wants to buy shirts for each of its 38 members. Each shirt costs $23. About how much money will all the shirts cost? ***Solve this problem any way you choose.***

Lesson 3-2
Estimate Products

I can ...
estimate products using mental math.

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3

See margin for sample student work.

Look Back! MP.3 Construct Arguments How can you use number sense to tell that the exact answer has to be greater than $600? Explain how you know.
Sample answer: Because 23 > 20 and 38 > 30, I know 600, the product 20 × 30, is less than the product 23 × 28. So, the exact answer, 23 × 28, is greater than $600.

Digital Resources at PearsonRealize.com Topic 3 | Lesson 3-2 119

Analyze Student Work

Ana's Work

I used rounding
40 × $20 = s
$800

Ana uses rounding to estimate the products.

David's Work

I used compatible numbers.
40 x $25 = ?
$1,000

David uses compatible numbers to estimate the products.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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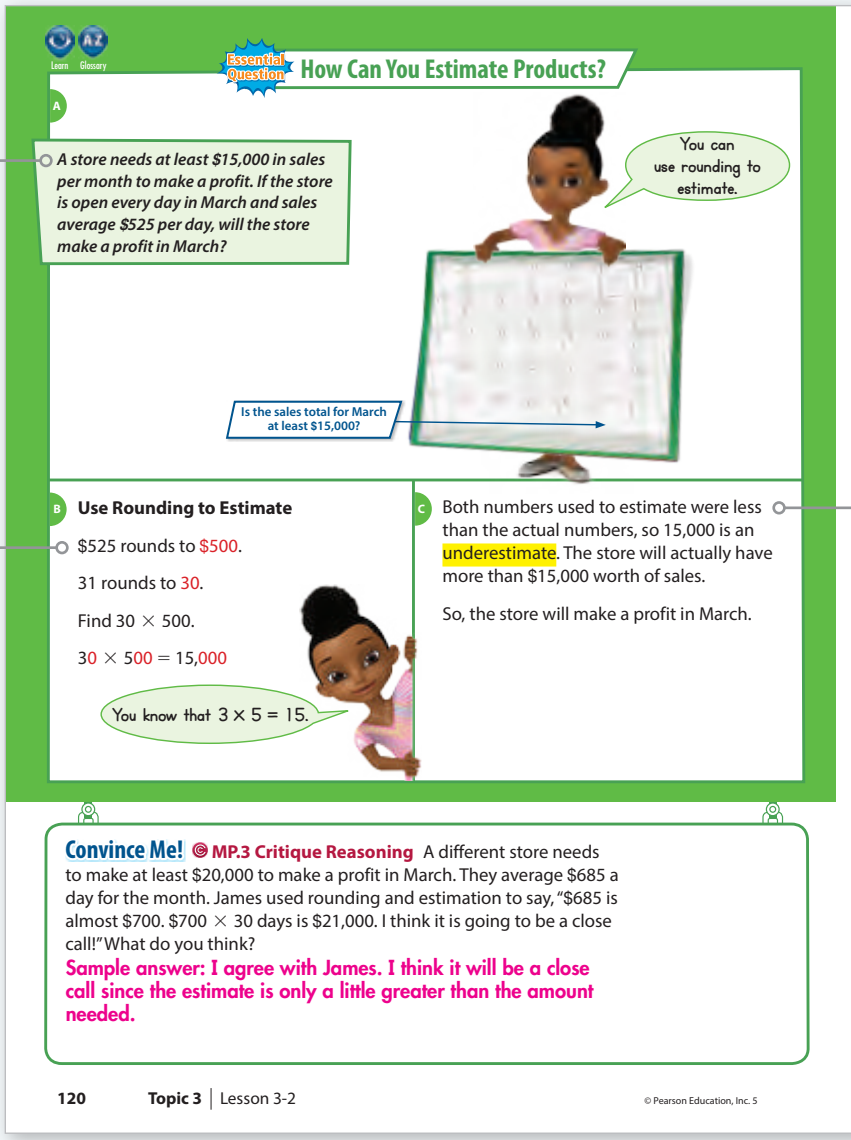
Learn Glossary

MP.1 Make Sense and Persevere
What information from the calendar do you need to solve the problem? [You need to know that there are 31 days in March.]

MP.2 Reason Quantitatively
Why were 30 and 500 used to estimate the solution to the problem? [31 rounded to the nearest 10 is 30, and 525 rounded to the nearest 100 is 500.]



Visual Learning Bridge

Based on the estimate, will the store make a profit? [Yes] *How do you know?* [Since both numbers were rounded to lesser numbers, the actual sales will be greater than the estimate.]

Prevent Misconceptions RtI

Remind students that if an overestimate had been found, you might not be able to conclude that the store would make a profit.

Convince Me! MP.3 Critique Reasoning *How can you analyze the reasoning James used?* [Sample answer: I agree with him because 685 is close to 700. So the actual product will be a little less than $21,000 and very close to $20,000.]

Coherence In determining whether the store will make a profit, students round both factors to estimate the product of a two-digit number and a multi-digit number. This links back to work in Grade 4 where students used rounding to estimate computations with all four operations. They then use what they learned in Lesson 3-1 to find the product of the resultant powers of 10.

Essential Question

Revisit the Essential Question. Students can use rounding and compatible numbers to estimate products when seeking solutions to real-world problems involving multiplication.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 6 and 24 are worth 1 point. Item 22 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Another Example

Estimate 24 × 398.

25 and 4 are compatible numbers because their product is easy to compute mentally.

25 × 4 = 100

25 × 40 = 1,000

25 × 400 = 10,000

So, 10,000 is a good estimate for 24 × 398.

Both numbers used to estimate were greater than the actual numbers.

So, 10,000 is an overestimate.

Guided Practice*

Do You Understand?

1. **Number Sense** Each egg carton holds one dozen eggs. Michael's chicken farm fills 121 egg cartons. He thinks that there were over 1,500 eggs. Is he correct? Use an estimate to find out.
   No, 120 × 12 = 1,440; less than 1,500.

Do You Know How?

In **2–5**, estimate. Then, tell if your estimate is an overestimate or underestimate.

Sample answers are given.

2. 29 × 688 **21,000 overestimate**
3. 210 × 733 **140,000 underestimate**
4. 43 × 108 **4,300 underestimate**
5. 380 × 690 **280,000 overestimate**

Independent Practice

Leveled Practice In **6–17**, estimate each product. **Sample answers are given.**

6. 180 × 586 **120,000**	7. 300 × 118 **30,000**	8. 19 × 513 **10,000**	9. 38 × 249 **10,000**
10. 11 × 803 **8,000**	11. 44 × 212 **10,000**	12. 790 × 397 **320,000**	13. 42 × 598 **24,000**
14. 25 × 191 **5,000**	15. 408 × 676 **280,000**	16. 290 × 12 **2,900**	17. 854 × 733 **630,000**

*For another example, see Set B on page 157.

Math Practices and Problem Solving*

18. **MP.2 Reasoning** Estimate 530 × 375. Is the estimated product closer to 150,000 or 200,000? Explain. **Sample answer: 200,000; 500 × 400 = 200,000**

19. **Vocabulary** Is 500 an underestimate or overestimate for the product of 12 and 53?
Underestimate

20. **MP.3 Construct Arguments** Samuel needs to estimate the product of 23 × 395. Explain two different methods Samuel can use to estimate.
Samuel can round: 20 × 400 = 8,000. He can use compatible numbers: 25 × 400 = 10,000.

21. Rebekah said that 10^3 is 30 because 10 + 10 + 10 = 30. Do you agree? Explain.
No, 10^3 = 10 × 10 × 10 = 1,000.

22. **Higher Order Thinking** Abby counts 12 large boxes and 18 small boxes of pencils in the supply cabinet. Each large box contains 144 pencils. Each small box contains 24 pencils. Estimate the total number of pencils. Is your estimate an overestimate or an underestimate? Explain why it might be better to have an underestimate rather than an overestimate.
Sample answer: 1,800; underestimate. An underestimate is better to make sure there will be enough pencils.

23. **MP.3 Critique Reasoning** Susan used rounding to estimate 24 × 413 and found 20 × 400. Jeremy used compatible numbers and found 25 × 400. Whose method gives an estimate closer to the actual product? Explain.
Jeremy; 25 × 400 = 10,000 His compatible numbers were closer to the actual numbers.

Common Core Assessment

24. Lance has 102 packages of sports cards. Each package has 28 cards. Use rounding to estimate. About how many cards does Lance have?
   Ⓐ 2,000
   Ⓑ 2,500
   ● 3,000
   Ⓓ 3,500

25. Which does NOT show a reasonable estimate of 24 × 338?
   Ⓐ 6,000
   Ⓑ 7,000
   Ⓒ 7,500
   ● 10,000

Another Example *Why is it better to use 25 and 400 than 20 and 395?* [Because 25 and 400 are easy to multiply together.]

Items 2–5 Coherence Students use previously learned skills to estimate each product. Then they use number sense to decide whether their result is an overestimate or an underestimate.

Error Intervention: Item 5

If students are not sure if their estimate is an overestimate or an underestimate,

then ask: *Is the number you rounded 380 to greater or less than 380? Is the number you rounded 690 to greater or less than 690?* [Sample answer: I rounded 380 to 400 and 690 to 700.] *So, will multiplying 400 × 700 result in an overestimate or an underestimate?* [Overestimate]

Reteaching Assign Reteaching Set B on p. 157.

Item 18 MP.2 Reason Quantitatively Encourage students to provide reasons for why the product of the factors they used to estimate was closer to 150,000 or to 200,000.

Item 20 MP.3 Construct Arguments *Did each of your methods of estimating the product have the same answer? Why or why not?* [Sample answer: No, the rounded factors were less than the actual factors, so the product was an underestimate. The compatible numbers gave an overestimate.]

Item 22 Higher Order Thinking *What are the hidden questions that need to be answered to solve this problem?* [About how many pencils are in all of the large boxes? About how many pencils are in all of the small boxes?]

Item 23 MP.3 Critique Reasoning Help students notice that Susan and Jeremy both used 400, so they only need to compare the other factor.

Multi-Step Problems *Page 122 Item 22; Page 124 Item 20*

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

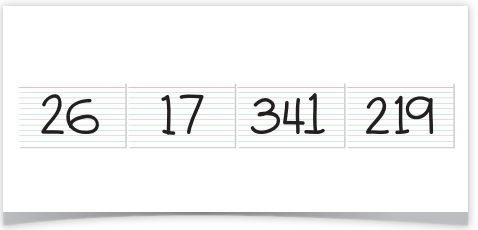
A Advanced
5 points on the Quick Check

Intervention Activity I

Estimate Products
Materials

Index cards, markers

- Have students write on an index card either a two-digit number that does not end in zero or a three-digit number that does not end in zero.
- Collect the cards and place them at the front of the class.
- Pick a card and call on a volunteer to come to the front of the class and say the number and round it to the nearest 10 or the nearest 100.
- After the student rounds the number on the card, have the student call on another student to repeat the process.
- Have the two students work together to estimate the product of the two numbers by using their rounded numbers.



Reteach I

Name _____

Reteach to Build Understanding 3-2

Vocabulary

1. When you use numbers less than the actual factors to estimate a product, the estimate is less than the actual product. This is called an **underestimate**. For example, to estimate 82 × 204, round 82 to 80 and 204 to 200.
   80 × 200 = 16,000
   The rounded numbers are **less than** the actual factors.
   The estimate of 16,000 is **less than** the actual product.
2. When you use numbers greater than the actual factors to estimate a product, the estimate is greater than the actual product. This is called an **overestimate**.
   Estimate 685 × 28.
   700 × 30 = 21,000
   The estimate of 21,000 is **greater than** the actual product.
3. **Compatible numbers** are numbers that are easy to compute mentally.
   Estimate 23 × 406.
   Replace 23 with **25** and 406 with **400**.
   25 × 400 = 10,000. So, 23 × 406 is about **10,000**.
4. To estimate 192 × 18, you can round 192 to **200** and 18 to **20**.
5. Now multiply the rounded numbers. **200** × **20** = **4,000**
6. Is your estimate in Problem 5 an underestimate or an overestimate?
   overestimate

On the Back!

Cost of Computers

Laptop	$392
PC	$196
Tablet	$632

7. About how much would it cost to buy 86 laptop computers? Is this an overestimate or an underestimate?
   Sample answer: $36,000; overestimate

R3-2

On-Level and Advanced Activity Centers O A

Problem-Solving Reading Mat

Have students read the Problem-Solving Reading Mat for Topic 3 and then complete Problem-Solving Reading Activity 3-2.

See the Problem-Solving Reading Activity Guide for other suggestions on how to use this mat.

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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PearsonRealize.com

Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–4, 16, 21–22

O Items 1, 5–9, 16, 18, 21–22

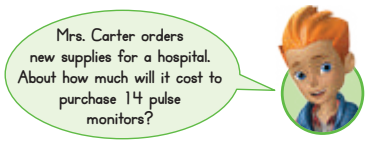
A Items 1, 10–15, 17–22

Name _____

Help Practice Buddy Tools Games

Another Look!

Homework & Practice 3-2
Estimate Products



DATA

Supplies	
Electronic thermometers	$19 each
Pulse monitors	$189 each
Pillows	$17 each
Telephones	$19 each

Use rounding to estimate.

Estimate 14 × 189.

You can round 14 to 10 and 189 to 200.

10 × 200 = 2,000

Use compatible numbers to estimate.

Estimate 14 × 189.

Replace 14 with 15 and 189 with 200.

15 × 200 = 3,000

The 14 pulse monitors will cost between $2,000 and $3,000.

1. About how much would it cost to buy 18 MP3 players? About how much would it cost to buy 18 CD/MP3 players?
Sample answers: $2,000; $3,600

DATA

Electronics Prices	
CD player	$74.00
MP3 player	$99.00
CD/MP3 player	$199.00
AM/FM radio	$29.00

In **2–15**, estimate each product. **Sample answers are given.**

2. 184 × 210
Round 184 to 200.
Round 210 to 200.
Multiply 200 × 200 = 40,000.

3. 77 × 412
Round 77 to 80.
Round 412 to 400.
Multiply 80 × 400 = 32,000.

4. 87 × 403 **36,000**

5. 19 × 718 **14,000**

6. 888 × 300 **270,000**

7. 352 × 20 **7,000**

8. 520 × 797 **400,000**

9. 189 × 46 **10,000**

10. 560 × 396 **240,000**

11. 498 × 47 **25,000**

12. 492 × 22 **10,000**

13. 928 × 89 **81,000**

14. 308 × 18 **6,000**

15. 936 × 410 **360,000**

16. **MP.2 Reasoning** Laura's family is going on a vacation. They will drive 4,180 miles over the next two weeks. About how many miles will they drive on average each week?
Sample answer: 2,000 miles per week

17. **MP.1 Make Sense and Persevere** A bus service drives passengers between Milwaukee and Chicago every day. They travel from city to city 8 times each day. The distance between the two cities is 89 miles. In February, there are 28 days. The company's budget allows for 28,000 total miles for February. Do you think the budget is reasonable? Explain. **Yes.**
28 × 10 × 100 = 280 × 100 = 28,000
Because this is an overestimate, there are enough miles.

18. **Higher Order Thinking** Explain whether rounding or compatible numbers gives a closer estimate for the product below.
48 × 123 = 5,904
Sample answer: They are the same. 50 × 120 = 6,000 is the estimate that results from rounding to the nearest 10 and using compatible numbers.

19. A case of 24 pairs of the same kind of sports shoes costs a little more than $800. Explain whether $28 per pair with tax included is a good estimate of the price.
No; Sample explanation: Use compatible numbers: 25 × 30 = 750. Since this is an overestimate, $28 is too low.

20. The number of Adult tickets is the same as the number of Child (age 5–12) tickets. A total of 38 tickets was purchased. What is the total cost of the tickets? Explain.
Sample answer: $760; $23 + $17 = $40; There are 19 of each kind of ticket sold, so you can just multiply 19 × $40 = $760.

DATA

Ticket	Price (in $)
Adult	23
Child, age 5–12	17
Under 5	8

Common Core Assessment

21. Which does **NOT** show a reasonable estimate of 360 × 439?
- 100,000
- Ⓑ 140,000
- Ⓒ 160,000
- Ⓓ 180,000

22. A club orders 124 T-shirts at a cost of $18 each. Which is the best estimate of the total cost of the order?
- Ⓐ $1,000
- $2,000
- Ⓒ $3,000
- Ⓓ $4,000

LESSON 3-3

MULTIPLY 3-DIGIT BY 2-DIGIT NUMBERS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain **5.NBT** Number and Operations in Base Ten

Cluster **5.NBT.B** Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard **5.NBT.B.5** Fluently multiply multi-digit whole numbers using the standard algorithm.

Mathematical Practices **MP.1, MP.2, MP.3, MP.7, MP.8**

Objective Multiply 3-digit by 2-digit numbers by combining equal groups and adding partial products.

Essential Understanding Multiplying a three-digit number by a two-digit number can be accomplished by combining equal groups. Rounding to the nearest 10 or using compatible numbers will help you estimate with greater accuracy when multiplying with greater numbers.

Vocabulary Partial products

Materials Place-value Chart (or Teaching Tool 3)

COHERENCE

In Grade 4, students learned how to multiply one-digit numbers by numbers with up to 4 digits. They also learned how to multiply 2 two-digit numbers. In this lesson, they will learn to extend these skills to multiplying a two-digit number times a three-digit number. To do this, they will use the understanding of multiplying by powers of 10 developed in Lesson 3-1.

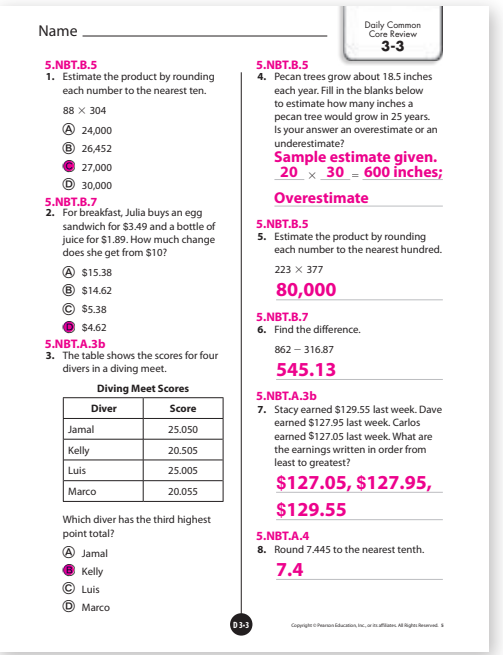
RIGOR

This lesson emphasizes **conceptual understanding** with **procedural skill**. As students learn to multiply products like 14×163, emphasize that after multiplying 4×163, they should multiply 10×163, not 1×163. This conceptual understanding is an important part of developing the procedural skill needed to use the algorithm.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 3-3

5.NBT.B.5
1. Estimate the product by rounding each number to the nearest ten.
88 × 304
Ⓐ 24,000
Ⓑ 26,452
Ⓒ 27,000
Ⓓ 30,000

5.NBT.B.7
2. For breakfast, Julia buys an egg sandwich for $3.49 and a bottle of juice for $1.89. How much change does she get from $10?
Ⓐ $15.38
Ⓑ $14.62
Ⓒ $5.38
Ⓓ $4.62

5.NBT.A.3b
3. The table shows the scores for four divers in a diving meet.

Diving Meet Scores

Diver	Score
Jamal	25.050
Kelly	20.505
Luis	25.005
Marco	20.055

Which diver has the third highest point total?
Ⓐ Jamal
Ⓑ Kelly
Ⓒ Luis
Ⓓ Marco

5.NBT.B.5
4. Pecan trees grow about 18.5 inches each year. Fill in the blanks below to estimate how many inches a pecan tree would grow in 25 years. Is your answer an overestimate or an underestimate?
Sample estimate given.
20 × 30 = 600 inches;
Overestimate

5.NBT.B.5
5. Estimate the product by rounding each number to the nearest hundred.
223 × 377
80,000

5.NBT.B.7
6. Find the difference.
862 − 316.87
545.13

5.NBT.A.3b
7. Stacy earned $129.55 last week. Dave earned $127.95 last week. Carlos earned $127.05 last week. What are the earnings written in order from least to greatest?
$127.05, $127.95, $129.55

5.NBT.A.4
8. Round 7.445 to the nearest tenth.
7.4

D3-3

Today's Challenge

Think Use the Topic 3 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Speaking Speak using content area vocabulary in context.

Use with the Visual Learning Bridge on Student's Edition p. 126.

Review place value and introduce the term *partial products*. Discuss what it means. Write 237×14 on the board. *First, we multiply the ones of 14 by each digit in 237.* Together, multiply 4 ones by 7 ones. *What is the partial product?* [28] Next, multiply 4 ones by 3 tens. *What is the partial product?* [120] *What values do we multiply next?* [4 ones × 2 hundreds] *After these 3 steps, we get partial products. Why do you think the word partial is used?* [We only multiplied the ones of 14.] Repeat for multiplying the tens of 14.

Beginning Display 156×12 in vertical form. Circle the ones. *What values are multiplied in the circles?* [2 ones × 6 ones]

Intermediate Display 284×13 in vertical form. *What are the steps for multiplying the tens of 13?* [1 ten × 4 ones, 1 ten × 8 tens, 1 ten × 2 hundreds] *What kind of product is 2,840?* [Partial]

Advanced *Write a multiplication example with a 3-digit number and a 2-digit number. Explain the steps to get each partial product.*

Summarize How do you describe the steps for finding partial products?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use their prior knowledge of multiplying whole numbers to learn how to multiply greater numbers.

10–15 min

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Solve

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
   MP.1 Make Sense and Persevere Listen and look for students who find partial products and add them to find the answer.
2. **Build Understanding**
   Why can you multiply 163 by 10 and then multiply 163 by 4? [Sample answer: The Distributive Property says that $163 \times 14 = (163 \times 10) + (163 \times 4)$.]

Small Group DURING

3. **Ask Guiding Questions As Needed**
   What multiplication sentences can you write for each of the partial products? [$4 \times 100 = 400$; $4 \times 60 = 240$; $4 \times 3 = 12$; $10 \times 100 = 1{,}000$; $10 \times 60 = 600$; $10 \times 3 = 30$.]

Whole Class AFTER

4. **Share and Discuss Solutions**
   Solve Start with students' solutions. If needed, project Jared's work to discuss how to multiply to find the partial products and then add them to find the final product.
5. **Transition to the Visual Learning Bridge**
   The properties of multiplication can be used to simplify computation and to verify mental math and standard algorithms.
6. **Extension for Early Finishers**
   Find 25×342 using partial products. [8,550]

Name _____ Solve

Solve & Share
A local charity collected 163 cans of food every day for 14 days. How many cans did they collect in the first 10 days? How many did they collect in the remaining 4 days? How many cans did they collect in all? ***Solve this problem any way you choose!***

Lesson 3-3
Multiply 3-Digit by 2-Digit Numbers

I can ...
multiply 3-digit by 2-digit numbers.

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3, MP.7, MP.8

See margin for sample student work.

Look Back! MP.2 Reasoning How can you check that your answer is reasonable?
Sample answer: Use compatible numbers to estimate: 163×14 is about 150×15. $150 \times 15 = 15 \times 15 \times 10 = 225 \times 10 = 2{,}250$. Then I can check to see that my answer is close to this estimate.

Analyze Student Work

Jared's Work

	100	60	3	
4	4 × 100 = 400	4 × 60 = 240	4 × 3 = 12	→ 652
10	10 × 100 = 1,000	10 × 60 = 600	10 × 3 = 30	→ 1,630

1,630 cans were collected in the first 10 days. Another 652 cans were collected in the next 4 days.

652 + 1,630 = 2,282

2,282 cans were collected in all.

Jared draws a picture and multiplies to find the partial products, then adds them to find the final product.

Aisha's Work

$14 \times 3 = 42$
$14 \times 60 = 840$
$14 \times 100 = 1{,}400$
$42 + 840 + 1{,}400 = 2{,}282$

Aisha multiplies to find the partial products and then adds them to find the final product.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

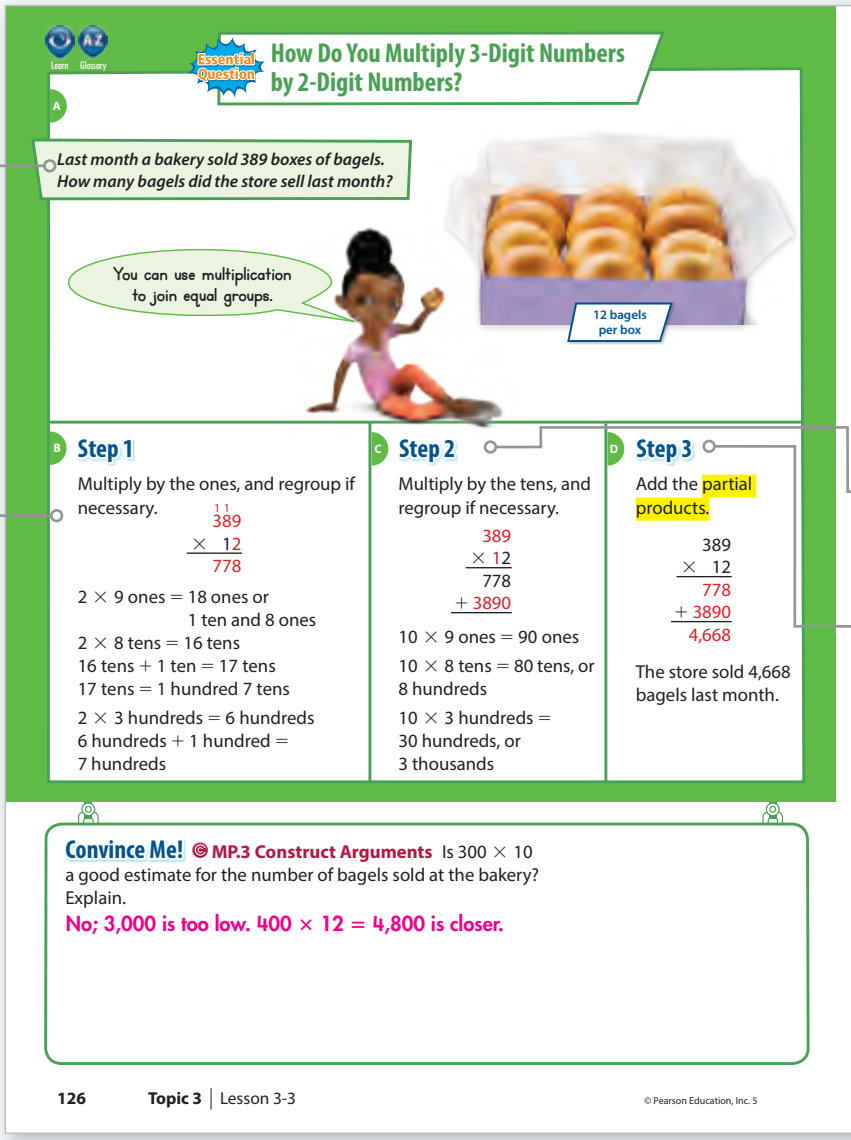
Visual Learning

PEARSON realize. PearsonRealize.com

Learn Glossary

Why do you multiply 389 by 12 to solve this problem? [There are 12 bagels per box and 389 boxes. You are combining equal groups.]

MP.1 Make Sense and Persevere *In Step 1, what partial products make up the product of 778?* [2 × 9 = 18; 2 × 80 = 160; and 2 × 300 = 600]



Visual Learning Bridge

In Step 2, what partial products make up the product of 3,890? [10 × 9 = 90; 10 × 80 = 800; and 10 × 300 = 3,000]

MP.2 Reason Quantitatively *How can you check that this answer is reasonable?* [Sample answer: Use estimation: 10 × 400 = 4,000, which is close to the actual product.]

Prevent Misconceptions RtI

If students forget that when they multiply by 12, they are multiplying by 10 + 2, not by 1 and 2, their product will be much smaller than their estimate. So, using estimation to check answers for reasonableness is a good strategy to use in checking their work.

Convince Me! MP.3 Construct Arguments If students are not sure if 300 × 10 is a good estimate, have them compare each factor in the estimate with the actual factors. *Is 10 close to 12?* [Yes.] *Is 300 close to 389?* [No, 400 is much closer.]

Coherence In determining the number of bagels sold, students learn to multiply a two-digit number times a three-digit number. This links back to work in Grade 4 where students multiplied 2 two-digit numbers using the standard algorithm involving regrouping and the Distributive Property. Using that same process and distributing (10 + 2) × 389 gives the standard algorithm taught here. If students have difficulty, you can use an area model and more fully distribute (10 + 2) × (300 + 80 + 9). This leads to the sum of 6 partial products and can help students transition to the standard algorithm.

Essential Question

Revisit the Essential Question. Students can multiply 3-digit numbers by 2-digit numbers by combining equal groups. They can also round to the nearest 10 or use compatible numbers to help them estimate with greater accuracy when multiplying with larger numbers.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 8 and 27 are worth 1 point. Item 26 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Guided Practice*

Do You Understand?

1. **MP.7 Use Structure** A theater can seat 540 people at one time. How many tickets are sold if the theater sells out every seat for one 30-day month?
   16,200 tickets
2. **Number Sense** Is 500 × 30 a good estimate for the number of tickets sold at the theater in one month?
   Yes; 15,000 is a good estimate.

Do You Know How?

In **3–6**, find each product. Estimate to check that your answer is reasonable.

3. 236 × 46 = **10,856**
4. 61 × 25 = **1,525**
5. 951 × 62 = **58,962**
6. 185 × 5 = **925**

Independent Practice

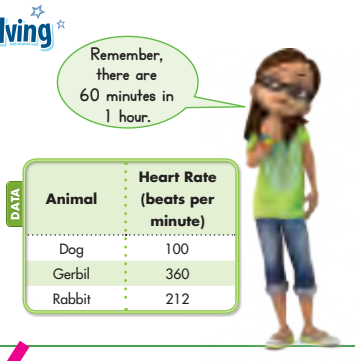
Leveled Practice In **7–22**, find each product. Estimate to check that your answer is reasonable.

7. 51 × 10 = **510**
8. 892 × 18 = **16,056**
9. 946 × 33 = **31,218**
10. 735 × 41 = **30,135**
11. 25 × 100 = **2,500**
12. 81 × 11 = **891**
13. 106 × 7 = **742**
14. 90 × 59 = **5,310**
15. 18 × 360 = **6,480**
16. 75 × 222 = **16,650**
17. 481 × 35 = **16,835**
18. 659 × 17 = **11,203**
19. 340 × 89 = **30,260**
20. 439 × 22 = **9,658**
21. 273 × 9 = **2,457**
22. 64 × 475 = **30,400**

*For another example, see Set C on page 157.

Math Practices and Problem Solving

23. **Math and Science** How many times does a rabbit's heart beat in 1 hour?
    12,720
24. **MP.1 Make Sense and Persevere** In 1 hour, how many more times does a rabbit's heart beat than a dog's heart? Write an equation to show your work.
    6,720; 12,720 − 6,000 = 6,720



DATA

Animal	Heart Rate (beats per minute)
Dog	100
Gerbil	360
Rabbit	212

25. **MP.3 Construct Arguments** Is 3,198 a reasonable product for 727 × 44? Why or why not?
    Sample answer: No, the answer should be much greater than 3,198. It takes about four 700s to get up to 3,000 and there are 44 of them. A better estimate would be 700 × 40 = 28,000. This is closer to the actual product, 31,988.
26. **Higher Order Thinking** A garden store sells plants in flats. There are 6 plants in each tray. Each flat has 6 trays. The garden store sold 18 flats on Saturday and 21 flats on Sunday. How many plants did the garden store sell in all?
    1,404 plants

Common Core Assessment

27. Tricia is building a rectangular patio. The patio will be 108 bricks wide and 19 bricks long. She has 2,000 bricks. Does she have enough bricks to build the patio? Explain. Show your work in the box.

No, she does not have enough. She actually needs 2,052, so she needs 52 more.

$$\begin{array}{r} {\scriptstyle 7}\\ 108\\ \times\ 19\\ \hline 972\\ +\ 1080\\ \hline 2{,}052 \end{array} \qquad \begin{array}{r} 2052\\ -\ 2000\\ \hline 52 \end{array}$$

Error Intervention: Item 1

If students are not sure how to multiply the two numbers,

then ask: *Which number should be on top?* [540] *What places can we line up?* [the ones and tens]

Items 3–22 Coherence Students use the estimation skills they learned in earlier lessons to check that their answers are reasonable. An error students sometimes make when multiplying by two-digit numbers with the standard algorithm is to multiply by the digit in the tens place as if it were in the ones place. This results in a product that is not close to an appropriate estimate and is easily detected when students check for reasonableness.

RtI **Reteaching** Assign Reteaching Set C on p. 157.

Item 24 MP.1 Make Sense and Persevere If necessary, help students identify the steps needed to solve this problem. *How can you find the number of times a dog's heart beats in one hour?* [Multiply 100 by 60.] *Then what do you need to do?* [Subtract that product from 12,720.]

Item 25 MP.3 Construct Arguments After the students understand that 3,198 is not a reasonable estimate, ask them to find the actual product. [31,988]

Item 26 Higher Order Thinking *What are hidden questions that need to be answered to solve this problem?* [How many plants are in each flat? How many plants were sold on Saturday? How many plants were sold on Sunday?]

Multi-Step Problems *Page 128 Items 26 and 27; Page 130 Items 14 and 15*

STEP 3

ASSESS AND DIFFERENTIATE

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

2 RtI

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

Multiply 3-Digit by 2-Digit Numbers

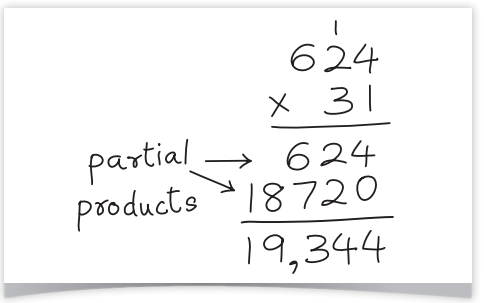
Materials

markers

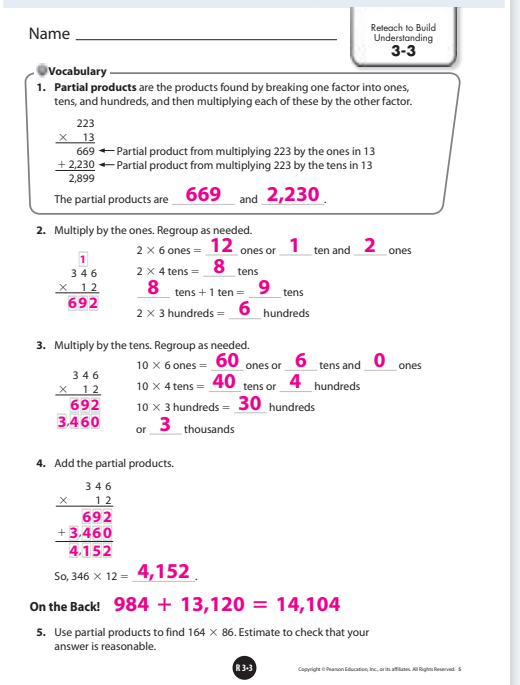
- Write the following three problems on the board:

  624×31; 815×19; 437×52

- Tell students that you are going to work together to solve each problem. Remind students what *partial products* are and have students label them in their work.
- Write each step on the board, so that students may reference them as needed.
- Begin by asking students to help you line up the ones and tens in the first problem as you write it vertically.
- Then encourage them to help you find the first partial product in the first problem.
- Have them find the second partial product in the first problem.
- Finally, ask them to add the partial products to find the final product.
- Repeat with the other problems.



Reteach I



Name _____

Reteach to Build Understanding 3-3

Vocabulary

1. **Partial products** are the products found by breaking one factor into ones, tens, and hundreds, and then multiplying each of these by the other factor.

223 × 13
669 ← Partial product from multiplying 223 by the ones in 13
+ 2,230 ← Partial product from multiplying 223 by the tens in 13
2,899

The partial products are 669 and 2,230.

2. Multiply by the ones. Regroup as needed.

1
346 × 12
692

2 × 6 ones = 12 ones or 1 ten and 2 ones
2 × 4 tens = 8 tens
8 tens + 1 ten = 9 tens
2 × 3 hundreds = 6 hundreds

3. Multiply by the tens. Regroup as needed.

346 × 12
692
3,460

10 × 6 ones = 60 ones or 6 tens and 0 ones
10 × 4 tens = 40 tens or 4 hundreds
10 × 3 hundreds = 30 hundreds
or 3 thousands

4. Add the partial products.

346 × 12
692
+ 3,460
4,152

So, 346 × 12 = 4,152.

On the Back! 984 + 13,120 = 14,104

5. Use partial products to find 164 × 86. Estimate to check that your answer is reasonable.

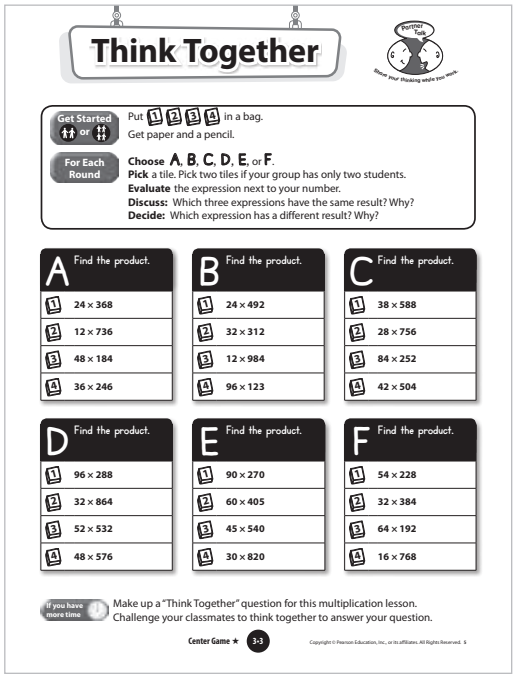
R 3-3

On-Level and Advanced Activity Centers O A

Center Games

Students work in pairs or small groups to explain how they decided which three expressions have the same result. Have students write the partial products for each multiplication expression.

★ On-Level



Think Together

Partner Talk — Show your thinking while you work.

Get Started — Put 1 2 3 4 in a bag. Get paper and a pencil.

For Each Round — Choose A, B, C, D, E, or F.
Pick a tile. Pick two tiles if your group has only two students.
Evaluate the expression next to your number.
Discuss: Which three expressions have the same result? Why?
Decide: Which expression has a different result? Why?

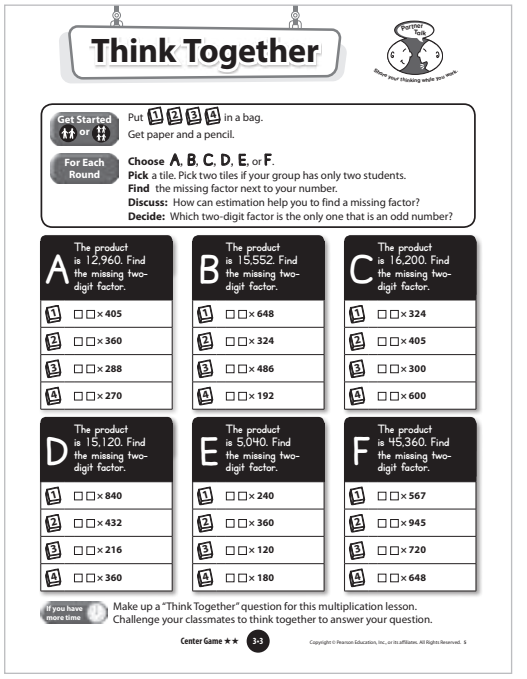
A Find the product.	B Find the product.	C Find the product.
1 24 × 368	1 24 × 492	1 38 × 588
2 12 × 736	2 32 × 312	2 28 × 756
3 48 × 184	3 12 × 984	3 84 × 252
4 36 × 246	4 96 × 123	4 42 × 504

D Find the product.	E Find the product.	F Find the product.
1 96 × 288	1 90 × 270	1 54 × 228
2 32 × 864	2 60 × 405	2 32 × 384
3 52 × 532	3 45 × 540	3 64 × 192
4 48 × 576	4 30 × 820	4 16 × 768

If you have more time — Make up a "Think Together" question for this multiplication lesson. Challenge your classmates to think together to answer your question.

Center Game ★ 3-3

★★ Advanced



Think Together

Partner Talk — Show your thinking while you work.

Get Started — Put 1 2 3 4 in a bag. Get paper and a pencil.

For Each Round — Choose A, B, C, D, E, or F.
Pick a tile. Pick two tiles if your group has only two students.
Find the missing factor next to your number.
Discuss: How can estimation help you to find a missing factor?
Decide: Which two-digit factor is the only one that is an odd number?

A The product is 12,960. Find the missing two-digit factor.	B The product is 15,552. Find the missing two-digit factor.	C The product is 16,200. Find the missing two-digit factor.
1 □□ × 405	1 □□ × 648	1 □□ × 324
2 □□ × 360	2 □□ × 324	2 □□ × 405
3 □□ × 288	3 □□ × 486	3 □□ × 300
4 □□ × 270	4 □□ × 192	4 □□ × 600

D The product is 15,120. Find the missing two-digit factor.	E The product is 5,040. Find the missing two-digit factor.	F The product is 45,360. Find the missing two-digit factor.
1 □□ × 840	1 □□ × 240	1 □□ × 567
2 □□ × 432	2 □□ × 360	2 □□ × 945
3 □□ × 216	3 □□ × 120	3 □□ × 720
4 □□ × 360	4 □□ × 180	4 □□ × 648

If you have more time — Make up a "Think Together" question for this multiplication lesson. Challenge your classmates to think together to answer your question.

Center Game ★★ 3-3

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

PEARSON realize.
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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–4, 9–11, 13, 15

O Items 4–8, 12, 14, 15

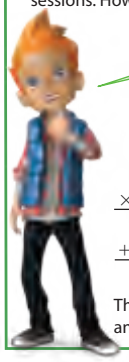
A Items 7–8, 11–15

Name _____ Help Practice Buddy Tools Games

Homework & Practice 3-3
Multiply 3-Digit by 2-Digit Numbers

Another Look!

Last year, 23 students in fifth grade were assigned a kindergarten student as a reading buddy. Each student read for 1 hour during each reading session and for a total of 128 sessions. How many hours in all did the fifth-grade students read?



Estimate: 130 times 20 is 2,600

Step 1 Multiply by the ones. Regroup as needed.

Step 2 Multiply by the tens. Regroup as needed.

Step 3 Add the partial products.

$$\begin{array}{r} {}^{2}128 \\ \times\ 23 \\ \hline {}^{1}384 \\ +\ 2{,}560 \\ \hline 2{,}944 \end{array} \qquad \begin{array}{r} {}^{2}128 \\ \times\ 3 \\ \hline 384 \end{array} \qquad \begin{array}{r} {}^{1}128 \\ \times\ 20 \\ \hline 2{,}560 \end{array}$$

The fifth-grade students read for 2,944 hours in all. The answer is reasonable because it is close to the estimate.

In **1–10**, find each product. Estimate to check that your answer is reasonable.

1.
$$\begin{array}{r} 282 \\ \times\ 19 \\ \hline 2{,}538 \\ +\ 2{,}820 \\ \hline 5{,}358 \end{array}$$
2,538 ← Multiply by the ones.
2,820 ← Multiply by the tens.
5,358 ← Add the partial products.

2.
$$\begin{array}{r} 538 \\ \times\ 46 \\ \hline 3{,}228 \\ +\ 21{,}520 \\ \hline 24{,}748 \end{array}$$
3,228 ← Multiply by the ones.
21,520 ← Multiply by the tens.
24,748 ← Add the partial products.

3. $\begin{array}{r} 395 \\ \times\ 76 \end{array}$ = 30,020

4. $\begin{array}{r} 83 \\ \times\ 57 \end{array}$ = 4,731

5. $\begin{array}{r} 628 \\ \times\ 33 \end{array}$ = 20,724

6. $\begin{array}{r} 154 \\ \times\ 35 \end{array}$ = 5,390

7. 682 × 25 = 17,050

8. 324 × 71 = 23,004

9. 158 × 6 = 948

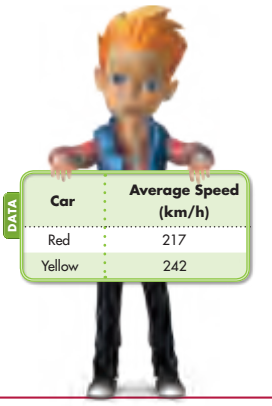
10. 16 × 29 = 464

11. MP.3 Critique Reasoning Is 2,750 a reasonable answer for 917 × 33? Explain.
No; Sample explanation: If you round 917 to 900 and 33 to 30, the product is 900 × 30 or 27,000, so 2,750 is not reasonable.

12. Vocabulary What two partial products would you add to find 513 × 46?
3,078 and 20,520

13. How many kilometers could the red car travel in 12 hours? Write an equation to show your work.
2,604 km; 217 × 12 = 2,604

14. Higher Order Thinking In 12 hours, how many more kilometers could the yellow car go than the red car? Show your work.
300 km; 242 × 12 = 2,904; 2,904 − 2,604 = 300



DATA

Car	Average Speed (km/h)
Red	217
Yellow	242

Common Core Assessment

15. Katie is building a rectangular wall. The wall will be 332 bricks wide and 39 bricks tall. She has 15,000 bricks. Does she have enough bricks to build the wall? Explain. Show your work in the box.

Yes, she does have enough. She will actually have 2,052 more bricks than she needs.

$$\begin{array}{r} {}^{21} \\ 332 \\ \times\ 39 \\ \hline 2988 \\ +\ 9960 \\ \hline 12{,}948 \end{array} \qquad \begin{array}{r} {}^{4}\cancel{5}\,{}^{9}\cancel{0}\,{}^{9}\cancel{0}\,{}^{10}\cancel{0} \\ -\ 2{,}052 \\ \hline 12{,}948 \end{array}$$

LESSON 3-4

MULTIPLY WHOLE NUMBERS WITH ZEROS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.7

Objective Use knowledge about place value and multiplying with 2-digit and 3-digit numbers to multiply with zeros.

Essential Understanding The process for multiplying factors with zeros is always the same regardless of the size of the numbers with zeros. Estimation is a strategy that can be used to check the final product for reasonableness.

COHERENCE

As in Lesson 3-3, students multiply a two-digit number times a three-digit number. However, in this lesson, the whole numbers have at least one zero. Continue to emphasize the place-value relationships developed throughout this topic. Common errors students make when finding products like 24×103 can be avoided with careful attention to the place value of each digit when multiplying.

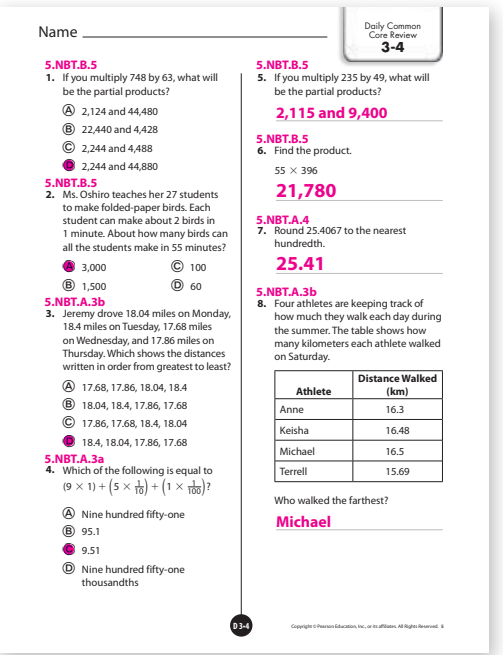
RIGOR

This lesson emphasizes **procedural skill**. Students apply the algorithm for multiplying two-digit by three-digit numbers to numbers that have at least one zero in a factor.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 3-4

5.NBT.B.5
1. If you multiply 748 by 63, what will be the partial products?
Ⓐ 2,124 and 44,480
Ⓑ 22,440 and 4,428
Ⓒ 2,244 and 4,488
Ⓓ 2,244 and 44,880

5.NBT.B.5
2. Ms. Oshiro teaches her 27 students to make folded-paper birds. Each student can make about 2 birds in 1 minute. About how many birds can all the students make in 55 minutes?
Ⓐ 3,000 Ⓒ 100
Ⓑ 1,500 Ⓓ 60

5.NBT.A.3b
3. Jeremy drove 18.04 miles on Monday, 18.4 miles on Tuesday, 17.68 miles on Wednesday, and 17.86 miles on Thursday. Which shows the distances written in order from greatest to least?
Ⓐ 17.68, 17.86, 18.04, 18.4
Ⓑ 18.04, 18.4, 17.86, 17.68
Ⓒ 17.86, 17.68, 18.4, 18.04
Ⓓ 18.4, 18.04, 17.86, 17.68

5.NBT.A.3a
4. Which of the following is equal to $(9 \times 1) + \left(5 \times \frac{1}{10}\right) + \left(1 \times \frac{1}{100}\right)$?
Ⓐ Nine hundred fifty-one
Ⓑ 95.1
Ⓒ 9.51
Ⓓ Nine hundred fifty-one thousandths

5.NBT.B.5
5. If you multiply 235 by 49, what will be the partial products?
2,115 and 9,400

5.NBT.B.5
6. Find the product.
55×396
21,780

5.NBT.A.4
7. Round 25.4067 to the nearest hundredth.
25.41

5.NBT.A.3b
8. Four athletes are keeping track of how much they walk each day during the summer. The table shows how many kilometers each athlete walked on Saturday.

Athlete	Distance Walked (km)
Anne	16.3
Keisha	16.48
Michael	16.5
Terrell	15.69

Who walked the farthest?
Michael

B3-4

Today's Challenge

Think Use the Topic 3 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Strategies Use prior knowledge to understand problems.

Use with the Visual Learning Bridge on Student's Edition p. 132.

You can use what you already know to help understand problems. Discuss words on the page: *train, each day, seat, filled, trip, passengers. Have you ever ridden on a fair ride? Could only a certain number of riders be seated? If a ride is full with 200 riders, how do you find the total number of riders in 6 trips?* [Multiply]

Beginning *What do you know about buses and the number of riders they hold?* Read this problem: *A bus was filled with 43 riders each trip. It made 102 trips. How many riders in all rode the bus?* [4,386] Students complete: To solve, I will use _____. [Multiplication]

Intermediate *What do you know about paying for items monthly?* Read this problem: *Eva has paid $32 each month for 108 months for Web service. How will you find out how much she has paid?* [Multiply]

Advanced Students write a problem that might happen in their family's life using $12 \times \$309$. Partners defend their examples.

Summarize How can you use what you already know to help you understand problems?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students extend their understanding of multiplication to find the product of a 3-digit number by a 2-digit number.

10–15 min

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Solve

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
   MP.7 Use Structure Listen and look for students who use their existing knowledge of multiplying by a zero to multiply a 3-digit number with a zero by a 2-digit number.

2. **Build Understanding**
   What strategy can you use to make this problem simpler? [Sample answers: You can break apart one factor and then multiply.] *What is a reasonable estimate for the number of desks needed?* [Sample answer: 2,500 desks]

Small Group DURING

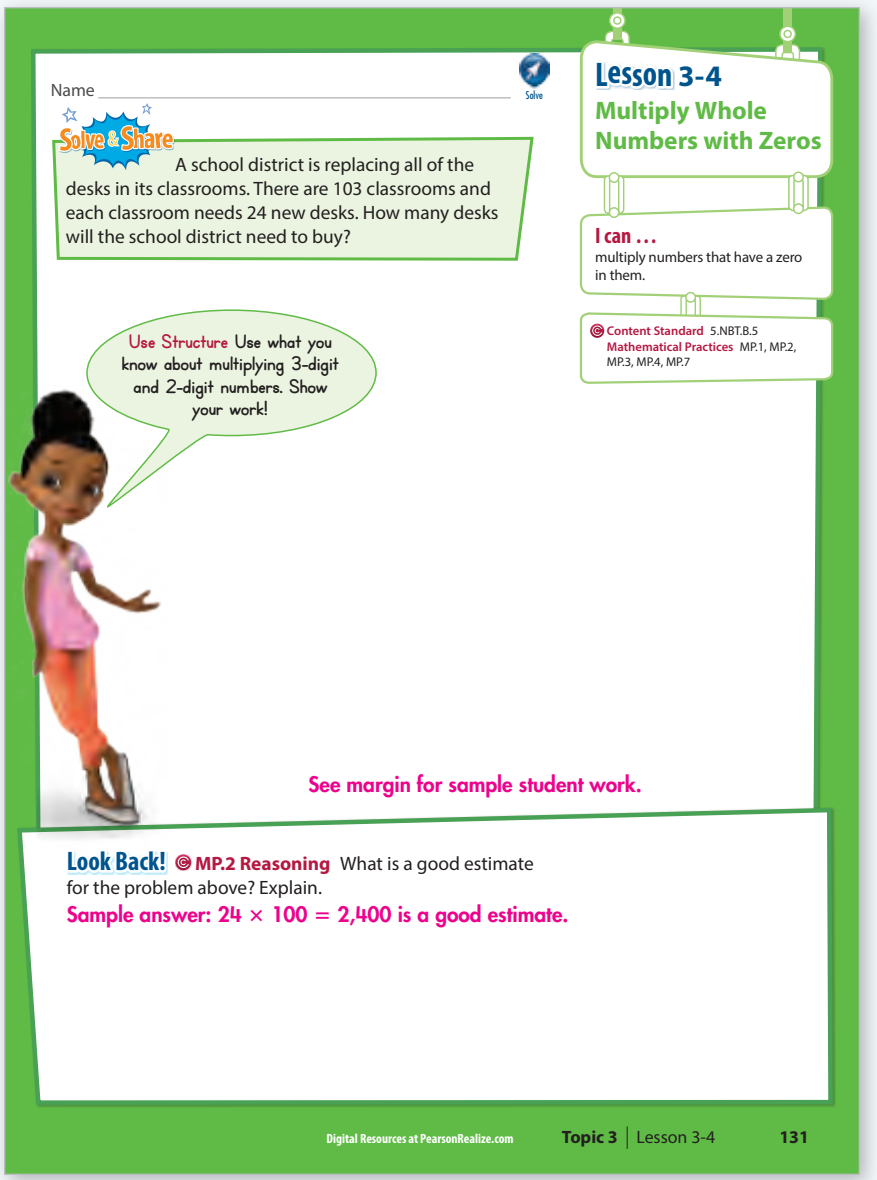
3. **Ask Guiding Questions As Needed**
   How can you break apart a number in this problem to find the actual product? [Sample answer: Break 103 into 100 + 3.]

Whole Class AFTER

4. **Share and Discuss Solutions**
   Solve Start with students' solutions. If needed, project David's work to show how to use the standard algorithm to find the product.

5. **Transition to the Visual Learning Bridge**
   The process for multiplying multi-digit numbers is the same regardless of the size of the factors or if a zero is a digit in one of the factors. The partial product that involves the zero must be included in finding the final product.

6. **Extension for Early Finishers**
   Find 35 × 230. [8,050]


Name _____ Solve

Solve & Share

A school district is replacing all of the desks in its classrooms. There are 103 classrooms and each classroom needs 24 new desks. How many desks will the school district need to buy?

Use Structure Use what you know about multiplying 3-digit and 2-digit numbers. Show your work!

See margin for sample student work.

Lesson 3-4
Multiply Whole Numbers with Zeros

I can ...
multiply numbers that have a zero in them.

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.7

Look Back! MP.2 Reasoning What is a good estimate for the problem above? Explain.
Sample answer: 24 × 100 = 2,400 is a good estimate.

Digital Resources at PearsonRealize.com Topic 3 | Lesson 3-4 131

Analyze Student Work

David's Work

$$\begin{array}{r} {\scriptstyle 1} \\ 103 \\ \times\ \ 24 \\ \hline 412 \\ +2060 \\ \hline 2{,}472 \end{array}$$

David uses the standard algorithm to find the answer.

Kelly's Work

103 = 100 + 3
100 × 24 = 2,400
3 × 24 = 72
2,400 + 72 = 2,472

Kelly breaks the 3-digit factor apart, then multiplies each part by the 2-digit factor and adds the partial products.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

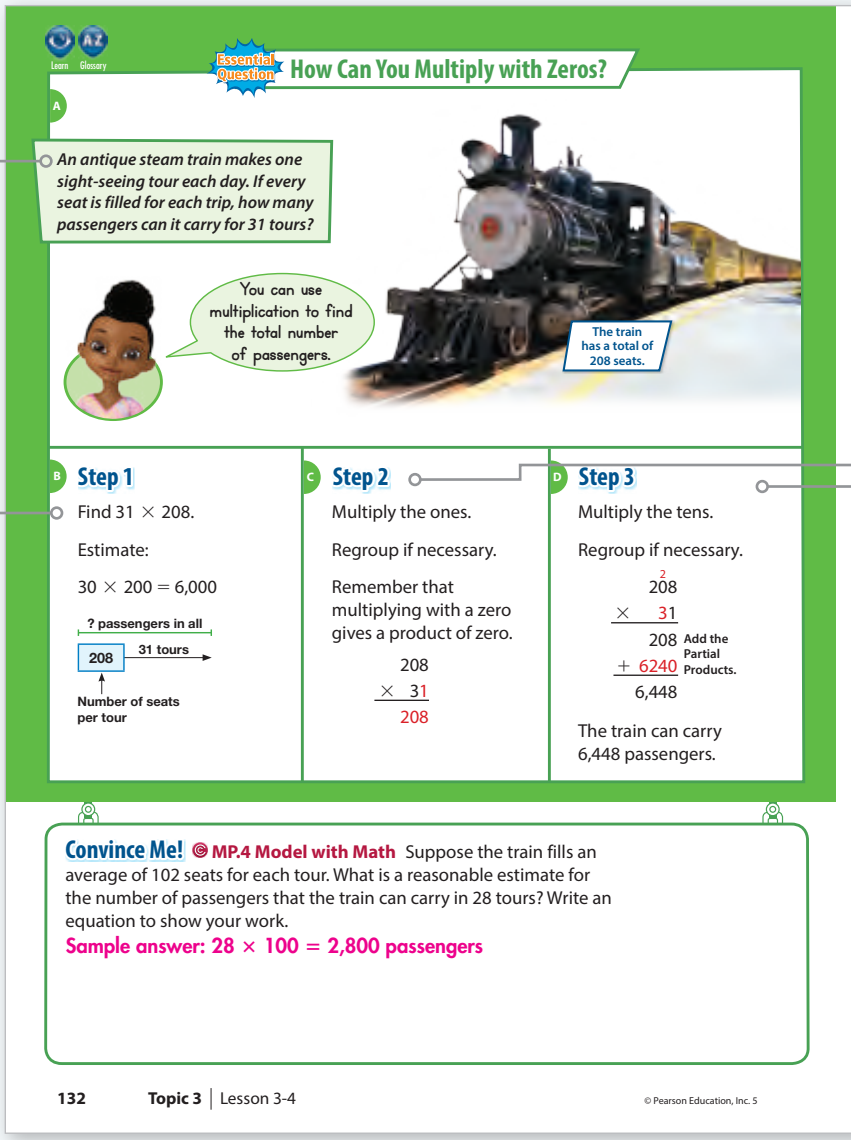
Visual Learning

PEARSON realize. PearsonRealize.com

Learn Glossary

MP.4 Model with Math
What number sentence represents this problem? [31 × 208 = ?] *Why would you multiply to solve this problem?* [The train makes 31 trips with the same number of passengers on each trip.]

MP.2 Reason Quantitatively
Will the actual number of passengers be greater than or less than the estimate? [Greater] *Why?* [Both numbers used to estimate are less than the actual factors.]



Visual Learning Bridge

MP.8 Generalize
In Step 2, why is the product the same as the 3-digit factor? [208 is multiplied by 1; The product of any number and 1 is that number.]

In Step 3, how did you calculate the partial product 6,240? [First, I multiplied 30 × 8 = 240 and regrouped 2 hundreds. Then I multiplied 30 × 0 = 0 and added the regrouped 2 hundreds. Last, I multiplied 30 × 200 = 6,000.]

Convince Me! MP.4 Model with Math *Would you use rounding or compatible numbers in the equation you write to estimate this product? Explain.* [Sample answer: Compatible numbers. It is easy to multiply any number by 100, so I used 28 × 100 = 2,800.]

Coherence In determining the total number of passengers, students use the standard algorithm learned in Lesson 3-3 to multiply a two-digit number times a three-digit number with zeros in at least one of the factors. This links back to previous work with place value and multiplying powers of ten. If necessary, remind students of the Zero Property of Multiplication learned in Grade 3.

Essential Question

Revisit the Essential Question. Students can use the same process to multiply multi-digit numbers with a zero in one of the factors that they used to multiply multi-digit numbers. They can also use estimation as a strategy for checking their answers for reasonableness.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 7 and 25 are worth 1 point. Item 22 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Guided Practice*

Do You Understand?

1. In an auditorium, there are 104 rows with 24 seats in each row. How many seats are available?
   2,496 seats

2. **MP.2 Reasoning** Why is it important to "estimate to check for reasonableness"?
   Sample answer: Estimating tells you that your answer makes sense.

Do You Know How?

In **3–6**, multiply to find the product. Estimate to check for reasonableness.

3. 205 × 23 = **4,715**
4. 108 × 34 = **3,672**
5. 410 × 44 = **18,040**
6. 302 × 30 = **9,060**

Independent Practice

Leveled Practice In **7–18**, find each product. Estimate to check for reasonableness.

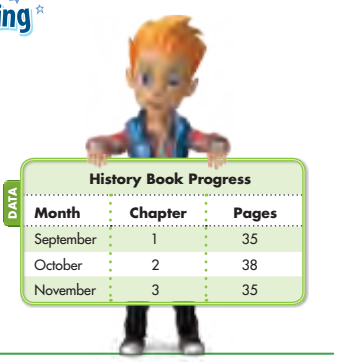
7. 302 × 17 = **5,134**
8. 608 × 23 = **13,984**
9. 109 × 47 = **5,123**
10. 510 × 72 = **36,720**
11. 902 × 35 = **31,570**
12. 207 × 61 = **12,627**
13. 108 × 58 = **6,264**
14. 505 × 77 = **38,885**
15. 407 × 39 = **15,873**
16. 280 × 66 = **18,480**
17. 105 × 24 = **2,520**
18. 360 × 48 = **17,280**

*For another example, see Set C on page 157.

Math Practices and Problem Solving

19. **MP.1 Make Sense and Persevere** There are 27 students in Mr. Mello's class. Find the total number of pages the students read by the end of November.
    2,916 pages

20. Each student read 41 pages in December. How many total pages did the students read by the end of December?
    4,023 pages



DATA

History Book Progress

Month	Chapter	Pages
September	1	35
October	2	38
November	3	35

21. **MP.3 Critique Reasoning** Meredith says that 15.17 is greater than 15.8 because 17 is greater than 8. Do you agree? Explain your reasoning.
    I disagree. Sample explanation: Both numbers have the same number of tens and ones, but 15.17 has only 1 tenth, and 15.8 has 8 tenths. So, 15.17 is less than 15.8.

22. **MP.7 Use Structure** Trudy wants to multiply 66 × 606. She says that all she has to do is find 6 × 606 and then double that number. Explain why Trudy's method will not give the correct answer. Then show how to find the correct product. **Sample answer: Multiplying by 6 and then doubling the product is the same as multiplying by 12, not by 66; 606 × 6 × 2 = 7,272 and 606 × 66 = 39,996.**

23. **Higher Order Thinking** Maria needs a trombone for only 12 months. Renting the trombone costs $34 per month. She can buy the trombone for $495. Should she buy or rent the trombone? Explain. How much does she pay? **Sample answer: Rent; since she needs the trombone for only 12 months, the total cost will be 12 × $34 or $408, and $408 < $495.**

24. **MP.2 Reasoning** Another music store rents trombones for $30 per month plus a yearly fee of $48. Which deal is better? Should Maria change her rental plan? **Sample answer: No; total rental costs are equal. The $48 yearly fee accounts for $4 saved each month.**

Common Core Assessment

25. What are two partial products you would add to find 41 × 709? Write those partial products in the box.

41 × 709						
709				**28,360**		
709	710	719	2,836	3,545	28,360	28,760

Error Intervention: Item 2

If students are not able to express why it is important to estimate to check for reasonableness,

then provide an example of a problem with an incorrect product and an estimate that shows that the original product is incorrect.

RtI **Reteaching** Assign Reteaching Set C on p. 157.

Item 19 MP.1 Make Sense and Persevere Remind them that the total number of pages read in September and October need to be counted and then multiplied by 27 students. Remind them that they need to read questions carefully in order to correctly solve problems.

Item 21 MP.3 Critique Reasoning Discuss with students that Meredith is correct in saying that 17 is greater than 8, because 1 ten is greater than 8 ones. But 15.8 is greater than 15.17 because 8 tenths is greater than 1 tenth. *Always use place value to compare numbers, whether they are whole numbers or decimals.*

Item 22 MP.7 Use Structure Remind students to look at the place-value structure of 66. *The 6 in the tens place is ten times as great as the 6 in the ones place, so 66 × 606 is not twice the value of 6 × 606.*

Item 23 Higher Order Thinking *What is the hidden question you need to answer to be able to solve the problem?* [How much would it cost to rent the trombone for 12 months?] *What is the answer to the hidden question?* [12 × $34 = $408] *What is the next step in solving the problem?* [Compare the total cost of renting to how much it would cost to buy it.]

Item 25 Coherence Students can think of the standard algorithm to solve this problem or they can use the Distributive Property, first introduced in Grade 3. 41 × 709 = (40 + 1) × 709 = (40 × 709) + (1 × 709) = 28,360 + 709. An alternative approach which does not fit the answer choices given involves breaking apart 709 instead of 41. 41 × 709 = 41 × (700 + 9) = (41 × 700) + (41 × 9) = 28,700 + 369.

Multi-Step Problems *Page 134, Items 23 and 24; Page 136 Item 10*

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

Multiply Whole Numbers with Zeros

Paper, pencils

- Have pairs of students write out the following sets of expressions on a piece of paper:

527 × 34	507 × 34
962 × 58	902 × 58

- Check that each student pair has properly lined up the ones and tens.
- Remind the class that multiplying with a zero in one place value is the same as multiplying with all nonzero digits.
- Ask students to find the first partial product in each problem. Call on a volunteer from each pair to explain how they determined the partial product for each problem. Repeat with the second partial product.
- Check students' products. When students finish, call on volunteers to explain how they arrived at the product.

Reteach I

Name _____

Reteach to Build Understanding 3-4

Vocabulary

1. The **Zero Property of Multiplication** states that when you multiply any number by zero, the product is zero.
   Any number × 0 = 0 — 9 tens × 0 = 0 tens
2. The **Zero Property of Addition** states that when you add any number to zero, the sum is the original number.
   Any number + 0 = original number — 6 tens + 0 = 6 tens

3. Estimate 308 × 23. Sample answer: 300 × 25 = 7,500

4. Multiply the ones. Regroup if necessary.

```
  2
  308
×  23
  924
```

3 × 8 ones = 24 ones or 2 tens and 4 ones
3 × 0 tens = 0 tens
0 tens + 2 tens = 2 tens
3 × 3 hundreds = 9 hundreds

5. Multiply the tens. Regroup if necessary. Then add the partial products.

```
  1
  308
×  23
  924
+6,160
 7,084
```

20 × 8 ones = 160 ones or 1 hundred and 60 ones
20 × 0 tens = 0 tens or 0 hundreds
0 hundreds + 1 hundred = 1 hundred
20 × 3 hundreds = 60 hundreds or 6 thousands

6. Look back at your estimate. Is your answer close to your estimate?
   Answers will vary.

On the Back!

7. Use a place-value chart to multiply 12 × 206. Record each partial product in the correct place in the chart.
   2,472

R3-4

On-Level and Advanced Activity Centers O A

Problem-Solving Reading Mat

Have students read the Problem-Solving Reading Mat for Topic 3 and then complete Problem-Solving Reading Activity 3-4.

See the Problem-Solving Reading Activity Guide for other suggestions on how to use this mat.

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

PEARSON realize.
PearsonRealize.com

Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–5, 9, 11, 13, 15 O Items 4–7, 10–12, 14, 15 A Items 6–9, 10–15

Name _____ Help Practice Buddy Tools Games

Another Look!

Find the product of 304 × 23.

$$\begin{array}{r} {\scriptstyle 1}\\ 304\\ \times\ 23\\ \hline 912\\ +\ 6080\\ \hline 6{,}992 \end{array}$$

Step 1: First, multiply 304 by 3 ones.

Step 2: Then, multiply 304 by 2 tens.

Step 3: Finally, add the partial products.

Homework & Practice 3-4
Multiply Whole Numbers with Zeros

1. Use the place-value chart at the right to multiply 36 × 405. Record each partial product in the correct place in the chart.
14,580

			thousands period			ones period	
			hundred thousands	ten thousands	one thousands	hundreds	tens	ones	
				4	0	5	
×					3	6	What I Multiply
		2	4	3	0	
	1	2	1	5	0	
	1	4	5	8	0	

In **2–9**, find each product. Estimate to check for reasonableness.

2. $\begin{array}{r} 203\\ \times\ 12\\ \hline 406\\ +\ 2030\\ \hline 2{,}436 \end{array}$

3. $\begin{array}{r} 306\\ \times\ 21\\ \hline 306\\ +\ 6120\\ \hline 6{,}426 \end{array}$

4. $\begin{array}{r} 109\\ \times\ 73\\ \hline 327\\ +\ 7630\\ \hline 7{,}957 \end{array}$

5. $\begin{array}{r} 601\\ \times\ 45\\ \hline 3005\\ +\ 24040\\ \hline 27{,}045 \end{array}$

6. $\begin{array}{r} 708\\ \times\ 34\\ \hline 24{,}072 \end{array}$

7. $\begin{array}{r} 520\\ \times\ 63\\ \hline 32{,}760 \end{array}$

8. $\begin{array}{r} 405\\ \times\ 70\\ \hline 28{,}350 \end{array}$

9. $\begin{array}{r} 802\\ \times\ 94\\ \hline 75{,}388 \end{array}$

10. **MP.2 Reasoning** The Memorial Middle School Band has 108 members. They want to buy jackets with the name of the band on the back. What is the difference in the total price of the screen-print and the embroidered jackets?
$1,404

DATA

Jackets	Price (in $)
Screen print name	35
Embroidered name	48

11. **MP.3 Critique Reasoning** Wildlife protection groups build bat houses to help save bats. One bat house holds about 300 bats. Larry says that 12 bat houses can hold about 4,500 bats. Do you agree? Explain.
Sample answer: No; Since 12 × 300 = 3,600, 12 bat houses can hold about 3,600 bats. Larry's estimate of 4,500 bats is much higher than 3,600.

12. **Higher Order Thinking** Replace the *a*, *b*, *c*, and *d* with the digits 2, 4, 6, 8 to form the greatest product. Each digit can only be used once. Explain your substitutions.

$$\begin{array}{r} a\,0\,b\\ \times\ c\,d\\ \hline 51{,}328 \end{array}$$

$a = 8$, $b = 2$, $c = 6$, $d = 4$; Sample answer: The greatest digits need to be in the higher place values to get the greatest product.

13. A packing crate can hold 205 avocados. There were 7,000 avocados picked at a large grove. The owner has 36 packing crates. Does he have enough crates to ship out the avocados? Explain.
Yes; 205 × 36 = 7,380. The owner has more crates than he needs.

14. **MP.3 Construct Arguments** Sarah found that the product of 49 and 805 is 3,165. How would finding an estimate help her know that the answer is NOT reasonable?
Sample answer: Using estimation, she could find 50 × 800 = 40,000. 3,165 is not close to the estimate of 40,000.

Common Core Assessment

15. What are two partial products you could add to find 990 × 37? Write those partial products in the box.

990 × 37			
6,930	**29,700**		
297	2,970	6,930	69,300
693	6,330	29,700	

LESSON 3-5

MULTIPLY MULTI-DIGIT NUMBERS

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

Mathematical Practices MP.1, MP.2, MP.3, MP.4

Objective Use properties and the standard algorithm for multiplication to find the product of multi-digit numbers.

Essential Understanding The meaning of multiplication is the same, no matter the size of the numbers. The standard algorithm for multiplying whole numbers is based on properties of operations and can be used to solve problems.

COHERENCE

So far in Topic 3, students have learned to multiply two-digit numbers by three-digit numbers. In this lesson, they will learn to extend this to include two-digit numbers times four-digit numbers. The standard multiplication algorithm uses the Distributive Property. For example, 36×208 is found by changing $(30 + 6) \times 208$ to $(30 \times 208) + (6 \times 208)$. Similarly, $2{,}525 \times 37$ is found by changing $2{,}525 \times (30 + 7)$ to $(2{,}525 \times 30) + (2{,}525 \times 7)$.

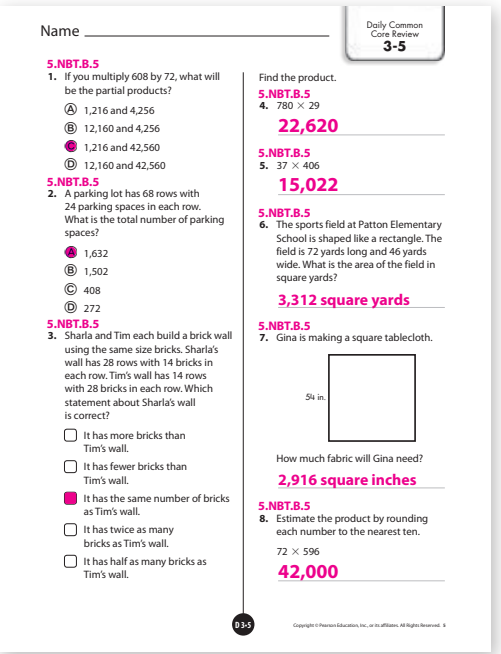
RIGOR

This lesson emphasizes **procedural skill**. Students continue to develop **fluency** in multiplying two-digit by multi-digit numbers.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____ Daily Common Core Review 3-5

5.NBT.B.5
1. If you multiply 608 by 72, what will be the partial products?
Ⓐ 1,216 and 4,256
Ⓑ 12,160 and 4,256
Ⓒ 1,216 and 42,560
Ⓓ 12,160 and 42,560

5.NBT.B.5
2. A parking lot has 68 rows with 24 parking spaces in each row. What is the total number of parking spaces?
Ⓐ 1,632
Ⓑ 1,502
Ⓒ 408
Ⓓ 272

5.NBT.B.5
3. Sharla and Tim each build a brick wall using the same size bricks. Sharla's wall has 28 rows with 14 bricks in each row. Tim's wall has 14 rows with 28 bricks in each row. Which statement about Sharla's wall is correct?
- ☐ It has more bricks than Tim's wall.
- ☐ It has fewer bricks than Tim's wall.
- ☑ It has the same number of bricks as Tim's wall.
- ☐ It has twice as many bricks as Tim's wall.
- ☐ It has half as many bricks as Tim's wall.

Find the product.

5.NBT.B.5
4. 780 × 29
22,620

5.NBT.B.5
5. 37 × 406
15,022

5.NBT.B.5
6. The sports field at Patton Elementary School is shaped like a rectangle. The field is 72 yards long and 46 yards wide. What is the area of the field in square yards?
3,312 square yards

5.NBT.B.5
7. Gina is making a square tablecloth.

How much fabric will Gina need?
2,916 square inches

5.NBT.B.5
8. Estimate the product by rounding each number to the nearest ten.
72 × 596
42,000

3-5

Today's Challenge

Think Use the Topic 3 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Reading Demonstrate comprehension by responding to questions.

Use with the Visual Learning Bridge on Student's Edition p. 138.

Sometimes the information needed to solve a problem is found in places other than in the words. Show me how to find this. Read the question on the page. *What solution is needed?* [Cell phone amount for 1 year] *Does the sentence give all that we need?* [No.] *Where else can we find what we need?* [In the picture] *What is given there?* [Monthly bills, amounts]

Beginning Read Item 23 on p. 140. *Where do we find more information to solve this?* [In the table] *What is needed from the table?* [Ticket cost for Chicago]

Intermediate Read Item 13 on p. 142. *What missing infomation is needed to solve this?* [How many pizzas Westland sold] *Where can you find this information?* [In the table] *Why do you need the table?* [To solve the problem]

Advanced Display a store flyer or draw pictures with prices. Give a problem, such as: *I bought six shirts. What was the total cost? What is needed to solve the problem?* [The cost of a shirt] *Where can you find this?* [In the flyer] *Tell how to use the flyer to solve the problem.*

Summarize How can you find and describe all the information needed to solve a problem?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

PEARSON realize. PearsonRealize.com

Solve

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students use what they know about multi-digit multiplication to write and solve a real-world problem for a multiplication equation.

10–15 min

Whole Class BEFORE

1. Pose the Solve-and-Share Problem

MP.2 Reason Abstractly Listen and look for students who apply their understanding of multiplication to connect a real-world situation to a multiplication equation.

2. Build Understanding

What have you already learned that will help you solve this problem? [How to use multiplication of two-digit numbers times three-digit numbers to solve real-world problems]

Small Group DURING

3. Ask Guiding Questions As Needed

What kinds of situations can be represented with multiplication? [Sample answers: Situations where groups of equal size are being joined, finding the area of a rectangle]

Whole Class AFTER

4. Share and Discuss Solutions

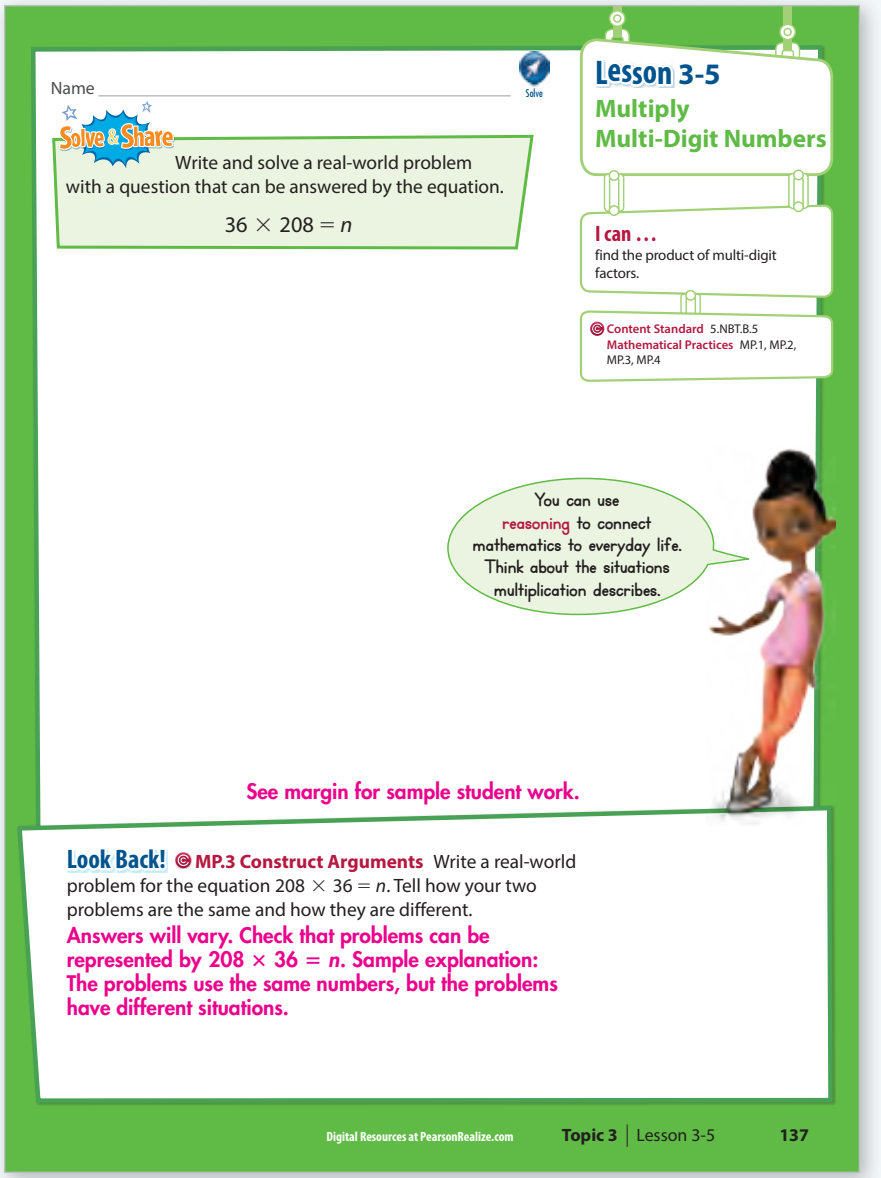
Solve Start with students' solutions. If needed, project and analyze Rachel's work to show how to write and solve a real-world problem for $36 \times 208 = n$.

5. Transition to the Visual Learning Bridge

Real-world problems that involve joining equal groups, no matter the size of the numbers involved, can be solved using multiplication.

6. Extension for Early Finishers

Create your own multiplication equation and write another situation that can be modeled by it. [Answers will vary.]



Name _____ Solve

Solve & Share

Write and solve a real-world problem with a question that can be answered by the equation.

$36 \times 208 = n$

Lesson 3-5
Multiply Multi-Digit Numbers

I can ...
find the product of multi-digit factors.

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3, MP.4

You can use reasoning to connect mathematics to everyday life. Think about the situations multiplication describes.

See margin for sample student work.

Look Back! MP.3 Construct Arguments Write a real-world problem for the equation $208 \times 36 = n$. Tell how your two problems are the same and how they are different.

Answers will vary. Check that problems can be represented by $208 \times 36 = n$. Sample explanation: The problems use the same numbers, but the problems have different situations.

Digital Resources at PearsonRealize.com Topic 3 | Lesson 3-5 137

Analyze Student Work

Rachel's Work

Larry did 208 sit-ups every day for 36 days. How many sit-ups did he do?

$$\begin{array}{r} 208 \\ \times\ 36 \\ \hline 1248 \\ 6240 \\ \hline 7488 \end{array}$$

Larry did 7,488 sit-ups.

Rachel writes a problem that involves joining 36 groups of 208 and asks an appropriate question. She also solves correctly and states the answer as a complete sentence.

Jill's Work

Monica had 208 notebooks and timesed them by 36.

Jill uses the numbers 208 and 36, but doesn't write a problem involving a real-world application of multiplication. She doesn't solve the problem.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

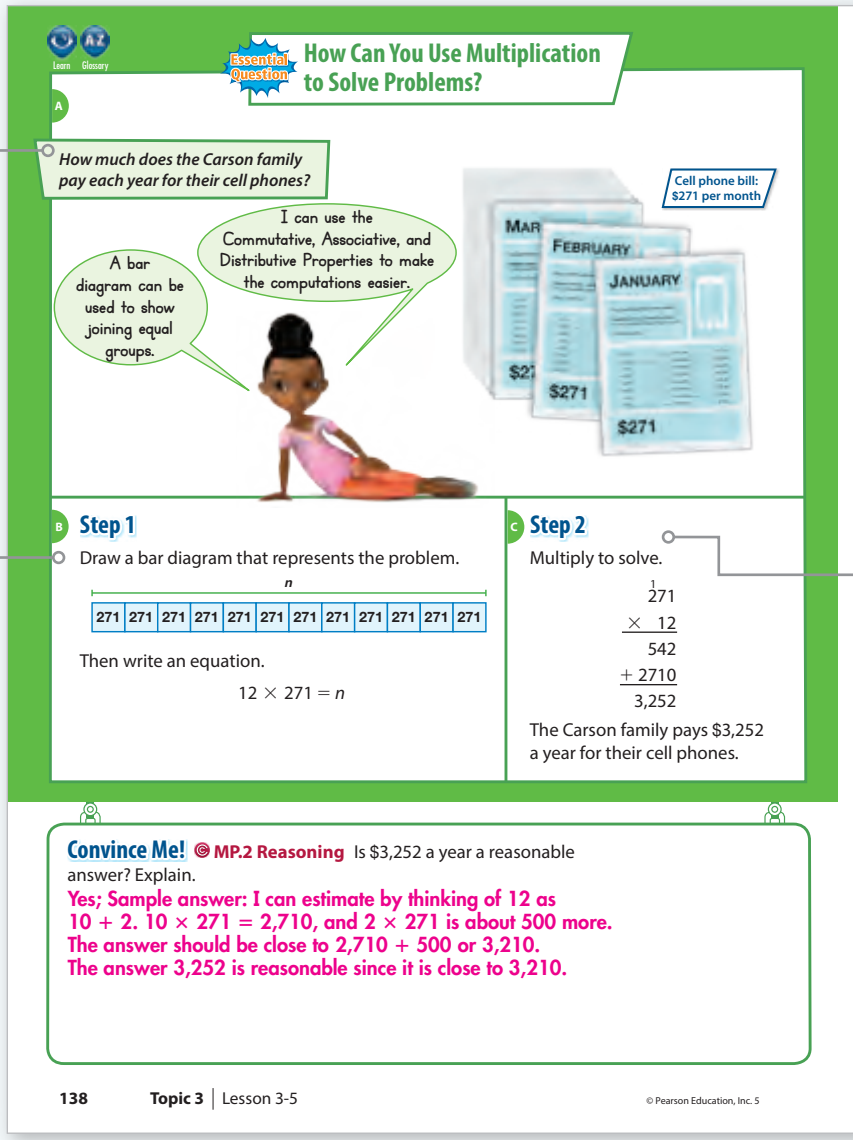
Visual Learning

PEARSON realize. PearsonRealize.com

Learn Glossary

MP.1 Make Sense and Persevere
What does the problem ask you to find? [The amount of money the family spends on cell phones in a year.] *Does the Carson family pay the same amount each month?* [Yes]

What information do you need to know to write the multiplication equation? [How many groups there are (12) and how many are in each group (271).] *What information do you need to know that is not in the problem?* [That there are 12 months in a year.]



Visual Learning Bridge

MP.8 Generalize
How can you use the Distributive Property to find the product? [Think of 12 as 10 + 2 and multiply 10 × 271 and 2 × 271. Then, add the partial products.]

Prevent Misconceptions RtI

Make sure that students either put a zero in the second partial product or leave a space. Remind them that they are multiplying by 10, not 1.

Convince Me! MP.2 Reason Quantitatively *What are some different ways you can check this answer for reasonableness?* [Sample answers: Use rounding: 10 × 300 = 3,000; use compatible numbers: 10 × 250 = 2,500; use the Distributive Property to break 12 apart into tens and ones and then estimate.]

Coherence In finding the annual phone bill, students continue to practice the standard algorithm for multiplying two-digit numbers by multi-digit whole numbers, which has been developed throughout this topic. In Lesson 3-6, they focus on using this skill to solve problems.

Essential Question

Revisit the Essential Question. Students can use multiplication and equations when seeking answers to real-world problems involving combining equal groups.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 11 and 23 are worth 1 point. Item 28 is worth up to 3 points.

20–30 min

PEARSON realize. PearsonRealize.com

Practice Buddy | Tools | Assessment

Name _____

Practice Buddy | Tools | Assessment

Guided Practice*

Do You Understand?

1. Carlos saves 18 cents every day of the year. If there are 365 days this year, how many cents will he have saved by the end of the year? Write an equation that represents the problem. Then solve the equation.
18 × 365 = *n*; *n* = 6,570; Carlos will save 6,570 cents.
2. **MP.4 Model with Math** Lila drives 129 kilometers round trip to work. How many kilometers does she drive in 31 days? Write an equation that represents the problem. Then solve the equation.
31 × 129 = *n*; *n* = 3,999; 3,999 kilometers

Do You Know How?

In **3–6**, estimate each product. Then complete each calculation. Check that your answer is reasonable.

3. 134 × 11 = 134 + 1340 = 1,474
4. 208 × 26 = 1248 + 4160 = 5,408
5. 428 × 35 = 2140 + 12840 = 14,980
6. 275 × 56 = 1650 + 13750 = 15,400

Independent Practice

Leveled Practice In **7–22**, estimate and then compute each product. Check that your answer is reasonable.

7. 531 × 47 = 3717 + 21240 = 24,957
8. 759 × 68 = 6072 + 45540 = 51,612
9. 367 × 92 = 734 + 33030 = 33,764
10. 817 × 45 = 4085 + 32680 = 36,765
11. 1,206 × 77 = **92,862**
12. 543 × 18 = **9,774**
13. 908 × 62 = **56,296**
14. 750 × 81 = **60,750**
15. 6,755 × 9 = **60,795**
16. 869 × 46 = **39,974**
17. 922 × 81 = **74,682**
18. 783 × 14 = **10,962**
19. 684 × 15 = **10,260**
20. 650 × 22 = **14,300**
21. 2,525 × 37 = **93,425**
22. 615 × 41 = **25,215**

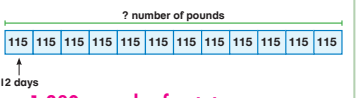
*For another example, see Set C on page 157.

Math Practices and Problem Solving

For **23** and **24**, use the table.

23. **MP.4 Model with Math** Jason frequently travels for work. This year he plans to make 15 trips to Chicago. What is the total cost for the airfare? Write an equation that represents the problem. Then solve the equation.
$489 × 15 = *n*; *n* = $7,335
24. **MP.2 Reasoning** Which would cost more: 15 trips to Boston or 11 trips to New York? Explain.
15 trips to Boston would cost more; 15 × $178 = $2,670; 11 × $225 = $2,475

25. A cook at a restaurant is planning her food order. She expects to use 115 pounds of potatoes each day for 12 days. How many pounds of potatoes will she order?



1,380 pounds of potatoes

26. **Higher Order Thinking** Carolyn bought a gallon of paint that covers 250 square feet. She wants to paint a wall that is 16 feet wide and 12 feet high. Explain whether or not she will need more than one gallon of paint.
Carolyn needs only one gallon of paint. 16 × 12 = 192 and 192 < 250.

Common Core Assessment

27. Jack estimates the product 257 × 29 is less than 6,000. Marta disagrees. She estimates the product is more than 7,000. Whose estimate is better? Explain your thinking.
Marta's estimate is better; Sample answer: The product is more than 7,000 since 250 × 30 = 7,500.
28. When you multiply a 3-digit number by a 2-digit number, what is the greatest number of digits the product can have? Explain.
5; Sample answer: The greatest 3-digit number is 999 and the greatest 2-digit number is 99. Their product has 5 digits, so no other product of a 2-digit and a 3-digit number could have more digits.

Error Intervention: Item 1

If students aren't sure how to represent the problem as an equation, **then** ask: *What are the factors in the problem?* [18 and 365] *Is the problem asking us to add, subtract, multiply, or divide?* [Multiply] *If n represents the product, how do we show the rest of the equation?* [18 × 365]

Item 2 MP.4 Model with Math If needed, remind students that *round trip* means the combined distance to work and back home. So, the expression that represents the distance is 31 × 129 (not 31 × 129 × 2).

Items 7–10 Remind students to place the 0 in the ones place of the partial product when multiplying the tens digit of the lower factor.

RtI **Reteaching** Assign Reteaching Set C on p. 157.

Item 23 MP.4 Model with Math Have students show you their equations before solving the problem.

Item 24 MP.2 Reason Quantitatively Help students get started by asking what expressions they need to compare. *What expression represents the total cost of the trips to Boston?* [15 × 178] *What expression represents the total cost of the trips to New York?* [11 × 225] *Can you compare these expressions without multiplying?* [Sample answer: No, because 15 is greater than 11 but 178 is less than 225.]

Item 26 Higher Order Thinking *What is the hidden question you need to answer to be able to solve the problem?* [What is the area of the wall?] *What is the answer to the hidden question?* [16 × 12 = 192] *What is the next step in solving the problem?* [Compare the area of the wall to the area that 1 gallon of paint will cover.]

Item 27 Coherence Students use the number sense developed in Lesson 3-2 when they estimated and then decided whether their results were an overestimate or an underestimate.

Multi-Step Problems *Page 140 Items 24 and 26; Page 142 Items 12, 15, and 16*

139–140

STEP 3

ASSESS AND DIFFERENTIATE

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

Multiply Multi-Digit Numbers

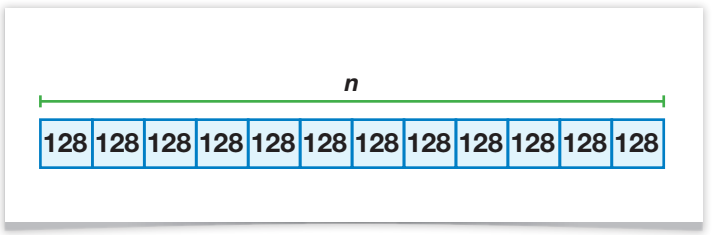
- Write the following on the board:

Anthony rides his bike 128 miles every month. How many miles does he ride each year?

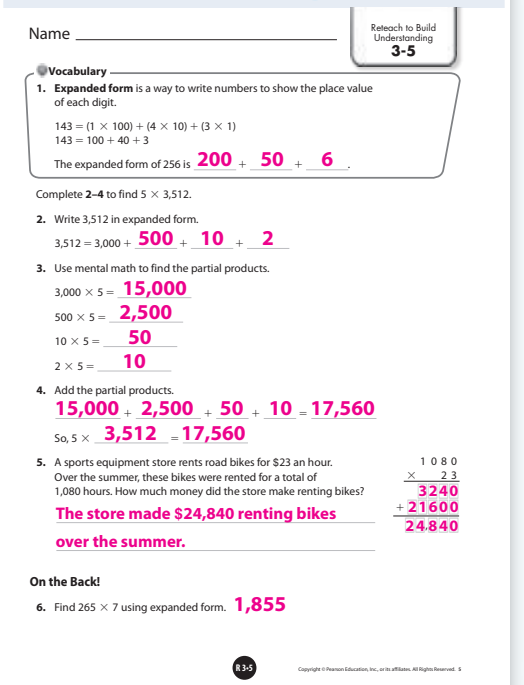
- Guide students in writing an equation or drawing a bar diagram for the problem:

  $12 \times 128 = n$; $n = ?$

- Encourage students to say what n represents [the number of miles Anthony rides each year].
- Write the problem, aligning the tens and ones places. Ask students to help you.
- Ask students to use the standard algorithm and partial products to solve the equation [$n = 1{,}536$].
- Finally, ask students to answer the original question by saying "Anthony bikes 1,536 miles in one year."



Reteach I



Name _____

Reteach to Build Understanding 3-5

Vocabulary

1. **Expanded form** is a way to write numbers to show the place value of each digit.

   $143 = (1 \times 100) + (4 \times 10) + (3 \times 1)$
   $143 = 100 + 40 + 3$

   The expanded form of 256 is 200 + 50 + 6.

Complete **2–4** to find $5 \times 3{,}512$.

2. Write 3,512 in expanded form.

   $3{,}512 = 3{,}000 +$ 500 + 10 + 2

3. Use mental math to find the partial products.

   $3{,}000 \times 5 =$ 15,000
   $500 \times 5 =$ 2,500
   $10 \times 5 =$ 50
   $2 \times 5 =$ 10

4. Add the partial products.

   15,000 + 2,500 + 50 + 10 = 17,560

   So, $5 \times$ 3,512 = 17,560

5. A sports equipment store rents road bikes for $23 an hour. Over the summer, these bikes were rented for a total of 1,080 hours. How much money did the store make renting bikes?

   The store made $24,840 renting bikes over the summer.

   1080 × 23 = 3240 + 21600 = 24840

On the Back!

6. Find 265 × 7 using expanded form. 1,855

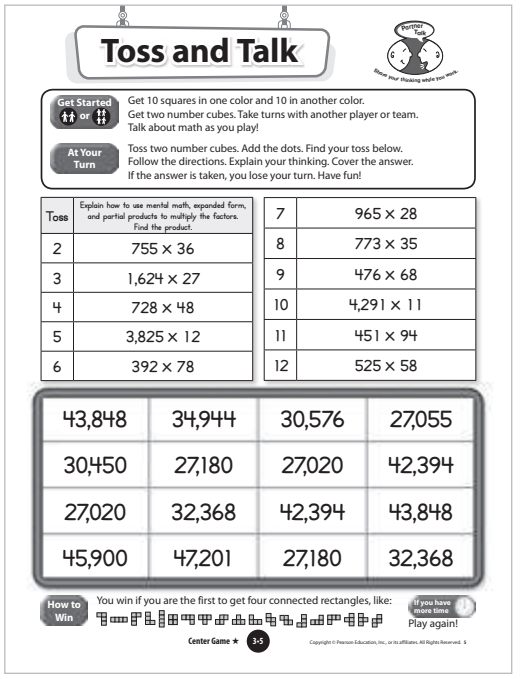
R3-5

On-Level and Advanced Activity Centers O A

Center Games

Students work in pairs or small groups to solve problems related to multi-digit multiplication. Have students record the partial products as they work.

★ On-Level



Toss and Talk

Partner Talk — Show your thinking while you work.

Get Started (1 or 2) Get 10 squares in one color and 10 in another color. Get two number cubes. Take turns with another player or team. Talk about math as you play!

At Your Turn Toss two number cubes. Add the dots. Find your toss below. Follow the directions. Explain your thinking. Cover the answer. If the answer is taken, you lose your turn. Have fun!

Toss	Explain how to use mental math, expanded form, and partial products to multiply the factors. Find the product.
2	755 × 36
3	1,624 × 27
4	728 × 48
5	3,825 × 12
6	392 × 78
7	965 × 28
8	773 × 35
9	476 × 68
10	4,291 × 11
11	451 × 94
12	525 × 58

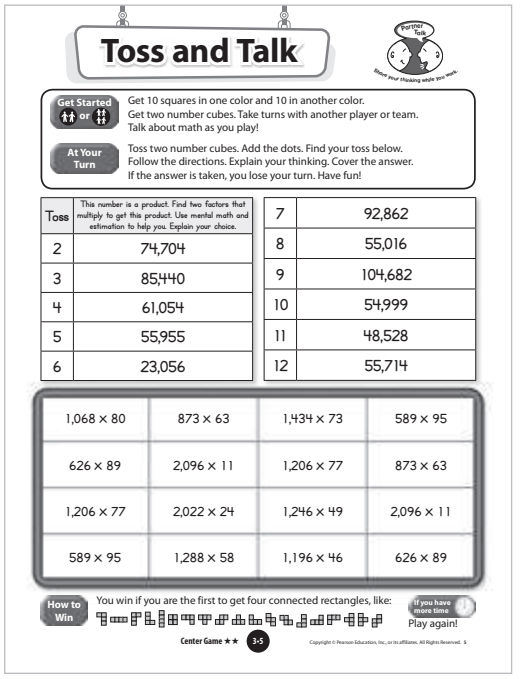
43,848	34,944	30,576	27,055
30,450	27,180	27,020	42,394
27,020	32,368	42,394	43,848
45,900	47,201	27,180	32,368

How to Win You win if you are the first to get four connected rectangles, like:

If you have more time: Play again!

Center Game ★ 3-5

★★ Advanced



Toss and Talk

Partner Talk — Show your thinking while you work.

Get Started (1 or 2) Get 10 squares in one color and 10 in another color. Get two number cubes. Take turns with another player or team. Talk about math as you play!

At Your Turn Toss two number cubes. Add the dots. Find your toss below. Follow the directions. Explain your thinking. Cover the answer. If the answer is taken, you lose your turn. Have fun!

Toss	This number is a product. Find two factors that multiply to get this product. Use mental math and estimation to help you. Explain your choice.
2	74,704
3	85,440
4	61,054
5	55,955
6	23,056
7	92,862
8	55,016
9	104,682
10	54,999
11	48,528
12	55,714

1,068 × 80	873 × 63	1,434 × 73	589 × 95
626 × 89	2,096 × 11	1,206 × 77	873 × 63
1,206 × 77	2,022 × 24	1,246 × 49	2,096 × 11
589 × 95	1,288 × 58	1,196 × 46	626 × 89

How to Win You win if you are the first to get four connected rectangles, like:

If you have more time: Play again!

Center Game ★★ 3-5

TIMING
The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

PEARSON realize.
PearsonRealize.com

Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools | Games

Math Tools and Math Games
A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment

I Items 1–5, 11, 13, 14, 17–18
O Items 2, 6–9, 16–18
A Items 6, 8–10, 12, 15–18

Name _____

Help | Practice Buddy | Tools | Games

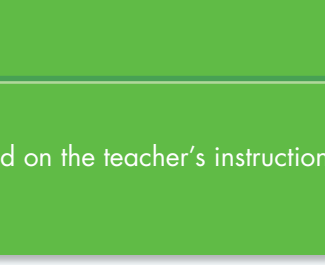
Homework & Practice 3-5
Multiply Multi-Digit Numbers

Another Look!

A sports store sells skateboards for $112. Last month the store sold 45 skateboards. How much money did the store make from selling them?

Use mental math to multiply.
112 = 100 + 10 + 2
2 × 45 = 90
10 × 45 = 450
100 × 45 = 4,500
90 + 450 + 4,500 = 5,040

The store made $5,040 from selling skateboards.



1. Find 1,206 × 5 using expanded form.

1,206 = 1,000 + 200 + 0 + 6
1,000 × 5 = 5,000
200 × 5 = 1,000
6 × 5 = 30
5,000 + 1,000 + 30 = 6,030
So, 1,206 × 5 = 6,030.

2. Find 240 × 15 using partial products.

240 × 5 = 1,200
240 × 10 = 2,400
1,200 + 2,400 = 3,600
So, 240 × 15 = 3,600.

For **3–10**, find each product.

3. 423 × 18 = 7,614	**4.** 914 × 12 = 10,968	**5.** 125 × 15 = 1,875	**6.** 425 × 82 = 34,850
7. 185 × 24 = 4,440	**8.** 1,288 × 33 = 42,504	**9.** 6,301 × 47 = 296,147	**10.** 3,440 × 75 = 258,000

11. A–Z **Vocabulary** Circle all the **partial products** below.

452
× 12
904
+4,520
5,424

12. **MP.2 Reasoning** Tomika plans to run 84 miles in 4 weeks. If she continues the pattern, how many miles will she run in 1 year? Explain.

Sample answer: 84 ÷ 4 = 21, so she runs 21 miles each week. 21 mi per wk × 52 wk per yr = 1,092 mi per yr.

13. Pete owns several pizza restaurants. He sells cheese pizzas for $12 each. How much money was made in January at the Westland location? $21,888

DATA

Cheese Pizza Sales for January

Location	Number Sold
Downtown	1,356
Center City	998
Westland	1,824

14. How many more pizzas did the Downtown location sell than the Center City location? Write an equation to show your work.
358 more pizzas; 1,356 − 998 = 358

15. **MP.1 Make Sense and Persevere** How many more pizzas does the Westland location need to sell to equal the total number of pizzas sold by the Downtown and Center City locations? Explain your work.
530 pizzas; 1,356 + 998 = 2,354; 2,354 − 1,824 = 530

16. **Higher Order Thinking** A farmer grows 128 red tomato plants and 102 yellow tomato plants. Each plant produces about 32 tomatoes. The farmer plans to sell each tomato for $2. Explain how to find a reasonable estimate for the total amount of money the farmer will earn if she sells all of the tomatoes.
Sample answer: About $13,800; 102 + 128 is 230 tomato plants; 230 × 32 is about 6,900 tomatoes; 6,900 × $2 = $13,800

Common Core Assessment

17. Jane multiplied 825 × 22 and got 3,300. Flynn multiplied the same numbers and got 18,150. Which student is correct? What mistake did the other student make?
Flynn; Jane multiplied 825 by 2 two times, instead of adding 825 × 2 to 825 × 20.

18. Lisa estimates the product 351 × 34 is more than 10,000. Gene disagrees. He estimates the product is less than 10,000. Whose estimate is better? Explain your thinking.
Lisa's estimate is better; Sample answer: The product is more than 10,000 since 350 × 30 is 10,500.

141–142

LESSON 3-6

SOLVE WORD PROBLEMS USING MULTIPLICATION

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Domain 5.NBT Number and Operations in Base Ten

Cluster 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard 5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.6

Objective Use models and strategies to solve word problems.

Essential Understanding Using a bar diagram and writing an equation are two strategies that can be used to solve multi-step problems. Once the problem has been solved, you can represent the problem again using a different strategy to check your answer(s) for reasonableness.

Vocabulary Variable

COHERENCE

In Topic 2, students learned to draw bar diagrams and write equations to solve problems involving adding and subtracting decimals. In fourth grade, they learned to do the same to solve problems involving multiplying and dividing whole numbers. In this lesson, they will learn to extend their work in order to solve problems involving multiplying two-digit numbers by multi-digit whole numbers.

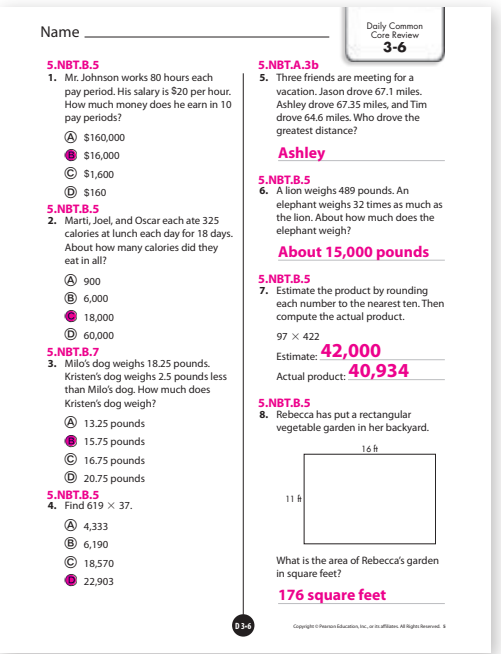
RIGOR

This lesson emphasizes **application** and **fluency**. Students have had a chance to draw bar diagrams and use them to write equations in order to solve problems involving multiplying different size whole numbers. This lesson uses the same process with slightly greater numbers than students have used before.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 3-6

5.NBT.B.5
1. Mr. Johnson works 80 hours each pay period. His salary is $20 per hour. How much money does he earn in 10 pay periods?
Ⓐ $160,000
Ⓑ $16,000
Ⓒ $1,600
Ⓓ $160

5.NBT.B.5
2. Marti, Joel, and Oscar each ate 325 calories at lunch each day for 18 days. About how many calories did they eat in all?
Ⓐ 900
Ⓑ 6,000
Ⓒ 18,000
Ⓓ 60,000

5.NBT.B.7
3. Milo's dog weighs 18.25 pounds. Kristen's dog weighs 2.5 pounds less than Milo's dog. How much does Kristen's dog weigh?
Ⓐ 13.25 pounds
Ⓑ 15.75 pounds
Ⓒ 16.75 pounds
Ⓓ 20.75 pounds

5.NBT.B.5
4. Find 619 × 37.
Ⓐ 4,333
Ⓑ 6,190
Ⓒ 18,570
Ⓓ 22,903

5.NBT.A.3b
5. Three friends are meeting for a vacation. Jason drove 67.1 miles. Ashley drove 67.35 miles, and Tim drove 64.6 miles. Who drove the greatest distance?
Ashley

5.NBT.B.5
6. A lion weighs 489 pounds. An elephant weighs 32 times as much as the lion. About how much does the elephant weigh?
About 15,000 pounds

5.NBT.B.5
7. Estimate the product by rounding each number to the nearest ten. Then compute the actual product.
97 × 422
Estimate: 42,000
Actual product: 40,934

5.NBT.B.5
8. Rebecca has put a rectangular vegetable garden in her backyard.
16 ft, 11 ft
What is the area of Rebecca's garden in square feet?
176 square feet

03-6

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Today's Challenge

Think Use the Topic 3 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Speaking Express opinions.

Use with the Visual Learning Bridge on Student's Edition p. 144.

You can tell us your opinion about how to estimate to check an answer. An opinion is what you personally believe. Together, brainstorm and list examples of opinions. [Sample answers: Adding decimals is easy. Spring is the best season.] Discuss how opinions can be different from person to person. *Does your way of estimating need to be the same as my way? Explain.* [No. Sample answer: There are different ways to estimate.].

Beginning Ask students to complete the sentence to show an opinion: Using 100 × 3 is an easy way to _____ 117 × 3. [Estimate]

Intermediate Give the students the sentence: Rounding to the nearest hundred is an easy way to find an estimate for 253 × 4. Explain why this is an opinion.

Advanced Students work in small groups. *Share your opinion on how you would estimate the quotient of 5 × 1,575. Compare and discuss how your opinions are the same or different.*

Summarize How can you tell us your opinion about how to estimate?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students write and solve an equation to solve a real-world problem.

10–15 min

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Solve

Whole Class BEFORE

1. Pose the Solve-and-Share Problem
MP.4 Model with Math Listen and look for students who make connections between what they know and what they are trying to find out when solving word problems.

2. Build Understanding
What are some ways that you can represent a problem? [Sample answers: With a bar diagram, with an equation] *What does the problem ask you to find?* [The number of photos Marco's family took]

Small Group DURING

3. Ask Guiding Questions As Needed
How can you break apart one of the factors to simplify this problem? [Sample answer: Break apart 12 into 10 + 2]

Whole Class AFTER

4. Share and Discuss Solutions
Solve Start with students' solutions. If needed, project Gabriel's work to show how to represent and solve a word problem.

5. Transition to the Visual Learning Bridge
Information in a problem can often be shown using a bar diagram to solve the problem. Writing an equation can help represent and solve problems.

6. Extension for Early Finishers
Kim's family took 25 times as many pictures as Kevin's family. How many pictures did Kim's family take? [5,975 pictures]


Name _____ Solve

Solve & Share

Kevin's family took 239 photos on their summer vacation. Marco and his family took 12 times as many photos on their vacation. How many photos did Marco's family take? ***Solve this problem any way you choose.***

Lesson 3-6
Solve Word Problems Using Multiplication

I can ...
solve word problems involving multiplication.

Content Standard 5.NBT.B.5
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.6

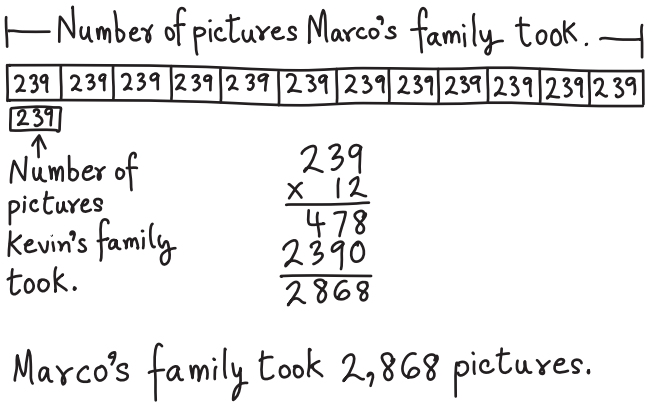
See margin for sample student work.

Look Back! MP.3 Construct Arguments How can you use estimation to tell if your answer is reasonable? Explain.
Sample answer: Kevin's family took about 240 photos, and Marco took 12 times as many. I know 240 × 10 is 2,400. My answer is close to my estimate, so it is reasonable.

Digital Resources at PearsonRealize.com Topic 3 | Lesson 3-6 143

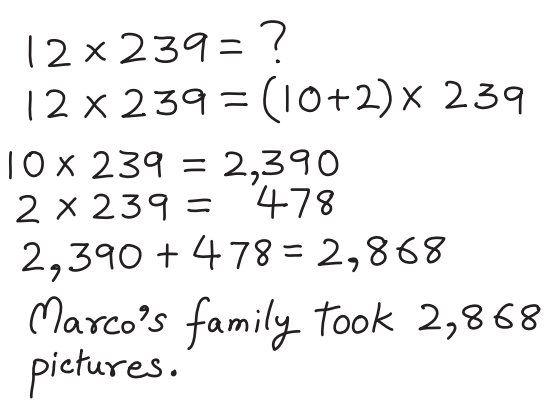
Analyze Student Work

Gabriel's Work



Gabriel correctly uses a bar diagram to represent the problem.

Dina's Work



Dina correctly uses the Distributive Property to solve the problem.

STEP 2

DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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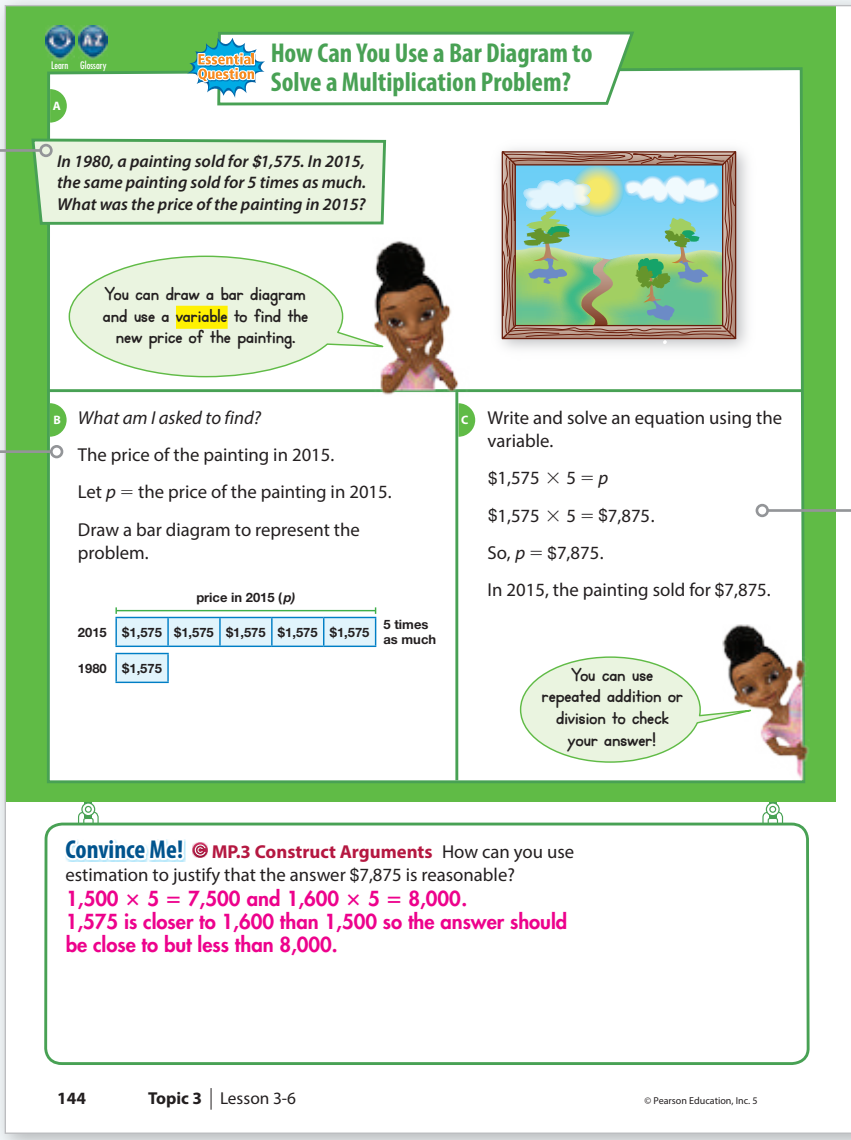
Learn Glossary

MP.1 Make Sense and Persevere
What numbers will not be used to solve the problem? [1980 and 2015]

MP.4 Model with Math
How does the bar diagram represent the problem? [It shows that the price in 2015 is equal to 5 times the amount the painting sold for in 1980.] *How can you use the bar diagram to write the equation?* [The number of same-size groups times the number in each group equals the product.]



Visual Learning Bridge

MP.7 Use Structure
How can you use a simpler problem and patterns to check this answer for reasonableness? [Sample answer: I know that 15 × 5 = 75, so 150 × 5 = 750 and 1,500 × 5 = 7,500. The product 7,875 is close to 7,500 so my answer is reasonable.]

Convince Me! MP.3 Construct Arguments *Can you determine an underestimate and an overestimate to help you check this answer for reasonableness?* [Sample answer: Yes, 5 × 1,500 will be an underestimate and 5 × 1,600 will be an overestimate.]

Coherence In finding the new price of the painting, students use a variable in a bar diagram and in an equation. Although students were introduced to variables in Grade 4, this is the first time variables are used in Grade 5. Make sure students understand that the letter represents an unknown number.

Essential Question

Revisit the Essential Question. Students can use bar diagrams and write equations to solve multiplication problems. Once the problem has been solved, they can use a different strategy, such as estimation, to check that their answer is reasonable.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 3 and 10 are worth 1 point. Item 8 is worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Guided Practice*

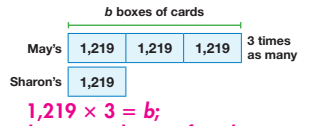
Do You Understand?

1. **MP.4 Model with Math** Write a real-world problem that uses multiplication. Then draw a bar diagram and write an equation to solve your problem.
Check students' problems.

Do You Know How?

In **2**, write and solve an equation.

2. Sharon's Stationery Store has 1,219 boxes of cards. May's Market has 3 times as many boxes of cards. How many boxes of cards does May's Market have?



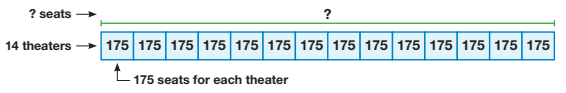
$1{,}219 \times 3 = b$;
$b = 3{,}657$ boxes of cards

Independent Practice

In **3–5**, draw a bar-diagram to model the situation. Then write and solve an equation.

Check students' diagrams.

3. There are 14 theaters at the mall. Each theater has 175 seats. How many seats are there in all?



$14 \times 175 = s$; $s = 2{,}450$
There are 2,450 seats in all.

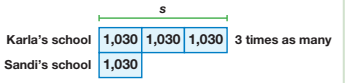
4. Brad lives 12 times as far away from the ocean as Jennie. If Jennie lives 48 miles from the ocean, how many miles from the ocean does Brad live?
$48 \times 12 = m$; $m = 576$
576 miles

5. A hardware store ordered 13 packs of nails from a supplier. Each pack contains 155 nails. How many nails did the store order?
$13 \times 155 = x$; $x = 2{,}015$
2,015 nails

*For another example, see Set D on page 158.

Math Practices and Problem Solving

6. **Algebra** Sandi's school has 1,030 students. Karla's school has 3 times as many students as Sandi's school. Write an equation to find s, the number of students in Karla's school. Then solve your equation.



$1{,}030 \times 3 = s$
$s = 3{,}090$ students

7. **Math and Science** Jupiter is about 5 times the distance Earth is from the Sun. Earth is about 93,000,000 miles from the Sun. About how far is Jupiter from the Sun?
$93{,}000{,}000 \times 5 = d$;
$d = 465{,}000{,}000$ miles

8. **Higher Order Thinking** William travels only on Saturdays and Sundays and has flown 1,020 miles this month. Jason travels every weekday and has flown 1,200 miles this month. If each man travels about the same number of miles each day, who travels more miles per day for this month? Explain.
William; he travels 2 days a week, but has flown almost the same number of miles as Jason who flies 5 days a week.

9. **MP.2 Reasoning** Hwong can fit 12 packets of coffee in a small box and 50 packets of coffee in a large box. He has 10 small boxes of coffee and would like to reorganize the packets into large boxes. How many large boxes could he fill? Explain.
He can fill 2 large boxes. Since 10 small boxes is 120 packets of coffee, he can fill 2 large boxes with 20 packets of coffee left.

Common Core Assessment

10. Choose all the expressions that are equal to $25 \times 4{,}060$.

- [x] $4{,}060 \times 25$
- [ ] $20 \times 5 \times 4{,}060$
- [x] $25 \times (4{,}000 + 60)$
- [ ] $25 \times (406 \times 10^2)$
- [x] $(20 + 5) \times 4{,}060$

11. Choose all the expressions that are equal to $38 \times 8{,}500$.

- [ ] $(85 \times 10^3) \times 38$
- [x] $(30 + 8) \times (850 \times 10)$
- [ ] $30 \times 8 \times 8{,}500$
- [x] $8{,}500 \times 38$
- [x] $(30 + 8) \times 8{,}500$

Error Intervention: Item 2

If students are having problems writing and solving the equation,
then ask: *How many boxes of cards does Sharon's Stationery Store have?* [1,219] *How many boxes does May's Market have?* [3 times as many] Guide students to use the bar diagram to write the following equation: $1{,}219 \times 3 = b$; $b = 3{,}657$ boxes.

Items 3–5 Remind students that they can use estimation to check their answers for reasonableness. If the products they calculate are not close to their estimates, they should check their work for accuracy (MP.6).

RtI **Reteaching** Assign Reteaching Set D on p. 158.

Item 8 Higher Order Thinking *William travels only on Saturdays and Sundays each month. About how many days each month does he travel?* [Sample answer: About 8] *So, if he travels about 1,000 miles in 8 days, about how many miles does he travel each day?* [Sample answer: A little over 100.] *Jason travels each weekday, so how many days each month does he travel?* [Sample answer: About 22] *If he flies 1,200 miles in 22 days, about how many miles does he fly each day?* [Sample answer: About 60]

Item 9 MP.2 Reason Abstractly and Quantitatively
Encourage students to use number sense to estimate the answer. Ask: *How can you estimate about how many small boxes of coffee fit in a large box?* [Sample answer: Estimate $50 \div 12$ using compatible numbers: $50 \div 10 = 5$] *So if about 5 small boxes fit in 1 large box, how many large boxes are needed for 10 small boxes?* [2 large boxes]

Item 10 Coherence Students need to use place-value understandings, knowledge of exponents, and their previous work with the Distributive Property to choose the equivalent expressions and to eliminate the others.

Multi-Step Problems *Page 146 Items 8 and 9; Page 148 Items 7 and 8*

145–146

STEP 3

ASSESS AND DIFFERENTIATE

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

RtI 2

I Intervention
0–3 points on the Quick Check

O On-Level
4 points on the Quick Check

A Advanced
5 points on the Quick Check

Intervention Activity I

Solve Word Problems Using Multiplication

- Remind students that one of the first steps in solving a word problem is deciding what operation they need to perform.
- Ask students to brainstorm the operation suggested by the following lead-ins:

  How much more… [subtract]

  How many all together… [add or multiply]

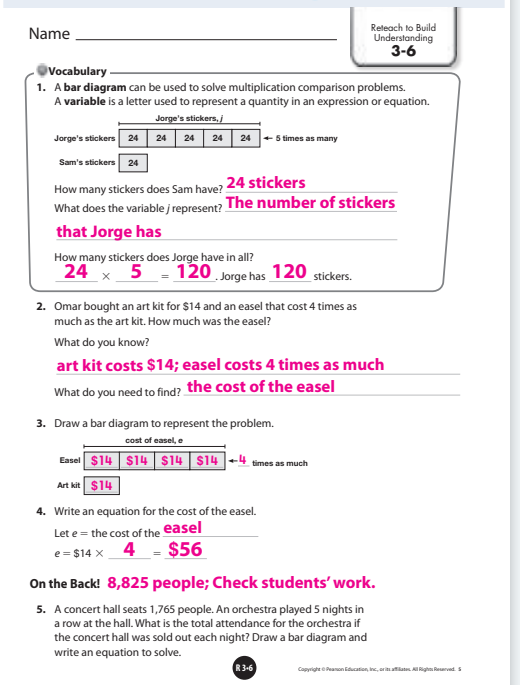
  How many times as many… [multiply]

  How many for each… [divide]

  Twice as many… [multiply]

  Give each an equal amount… [divide]
- Draw an example of a bar diagram to represent each operation.
- Have students work in pairs to choose a lead-in and write a word problem.
- Have pairs trade problems. Have each pair draw a bar diagram and write an equation to solve the problem.

Reteach I



Name _____

Reteach to Build Understanding 3-6

Vocabulary

1. A **bar diagram** can be used to solve multiplication comparison problems. A **variable** is a letter used to represent a quantity in an expression or equation.

Jorge's stickers, *j*: 24 24 24 24 24 ← 5 times as many
Sam's stickers: 24

How many stickers does Sam have? 24 stickers
What does the variable *j* represent? The number of stickers that Jorge has
How many stickers does Jorge have in all?
24 × 5 = 120. Jorge has 120 stickers.

2. Omar bought an art kit for $14 and an easel that cost 4 times as much as the art kit. How much was the easel?
What do you know? art kit costs $14; easel costs 4 times as much
What do you need to find? the cost of the easel

3. Draw a bar diagram to represent the problem.

cost of easel, *e*: $14 $14 $14 $14 ← 4 times as much
Art kit: $14

4. Write an equation for the cost of the easel.
Let *e* = the cost of the easel
e = $14 × 4 = $56

On the Back! 8,825 people; Check students' work.

5. A concert hall seats 1,765 people. An orchestra played 5 nights in a row at the hall. What is the total attendance for the orchestra if the concert hall was sold out each night? Draw a bar diagram and write an equation to solve.

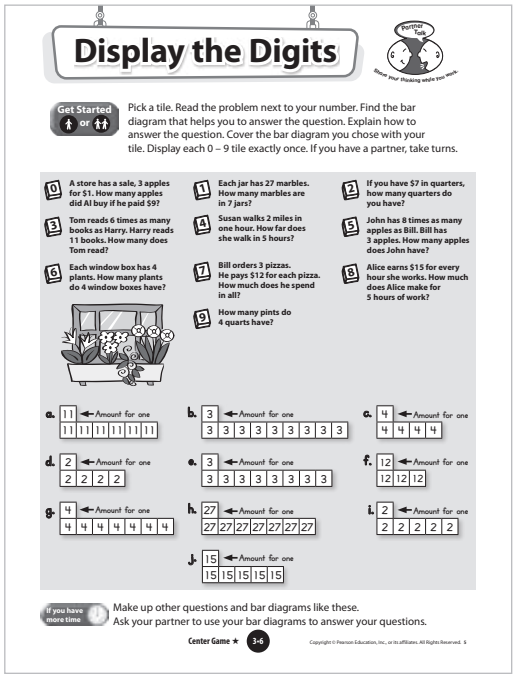
R 3-6

On-Level and Advanced Activity Centers O A

Center Games

Students work in pairs or small groups to use bar diagrams to solve multiplication problems. Have students copy a problem and the bar diagram they used to find the answer.

★ On-Level



Display the Digits

Partner Talk

Get Started

Pick a tile. Read the problem next to your number. Find the bar diagram that helps you to answer the question. Explain how to answer the question. Cover the bar diagram you chose with your tile. Display each 0 – 9 tile exactly once. If you have a partner, take turns.

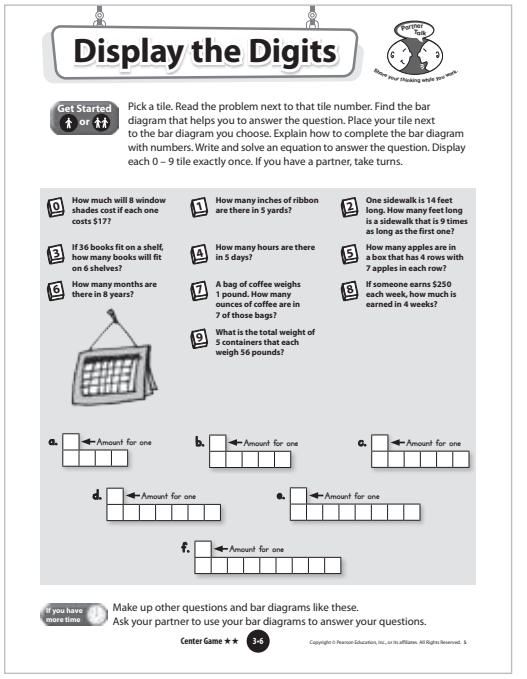
0 A store has a sale, 3 apples for $1. How many apples did Al buy if he paid $9?
1 Each jar has 27 marbles. How many marbles are in 7 jars?
2 If you have $7 in quarters, how many quarters do you have?
3 Tom reads 6 times as many books as Harry. Harry reads 11 books. How many does Tom read?
4 Susan walks 2 miles in one hour. How far does she walk in 5 hours?
5 John has 8 times as many apples as Bill. Bill has 3 apples. How many apples does John have?
6 Each window box has 4 plants. How many plants do 4 window boxes have?
7 Bill orders 3 pizzas. He pays $12 for each pizza. How much does he spend in all?
8 Alice earns $15 for every hour she works. How much does Alice make for 5 hours of work?
9 How many pints do 4 quarts have?

a. 11 ← Amount for one: 11 11 11 11 11 11
b. 3 ← Amount for one: 3 3 3 3 3 3 3 3 3
c. 4 ← Amount for one: 4 4 4 4
d. 2 ← Amount for one: 2 2 2 2
e. 3 ← Amount for one: 3 3 3 3 3 3 3 3 3
f. 12 ← Amount for one: 12 12 12
g. 4 ← Amount for one: 4 4 4 4 4 4 4 4
h. 27 ← Amount for one: 27 27 27 27 27 27 27
i. 2 ← Amount for one: 2 2 2 2 2
j. 15 ← Amount for one: 15 15 15 15 15

If you have more time: Make up other questions and bar diagrams like these. Ask your partner to use your bar diagrams to answer your questions.

Center Game ★ 3-6

★★ Advanced



Display the Digits

Partner Talk

Get Started

Pick a tile. Read the problem next to that tile number. Find the bar diagram that helps you to answer the question. Place your tile next to the bar diagram you choose. Explain how to complete the bar diagram with numbers. Write and solve an equation to answer the question. Display each 0 – 9 tile exactly once. If you have a partner, take turns.

0 How much will 8 window shades cost if each one costs $17?
1 How many inches of ribbon are there in 5 yards?
2 One sidewalk is 14 feet long. How many feet long is a sidewalk that is 9 times as long as the first one?
3 If 36 books fit on a shelf, how many books will fit on 6 shelves?
4 How many hours are there in 5 days?
5 How many apples are in a box that has 4 rows with 7 apples in each row?
6 How many months are there in 8 years?
7 A bag of coffee weighs 1 pound. How many ounces of coffee are in 7 of those bags?
8 If someone earns $250 each week, how much is earned in 4 weeks?
9 What is the total weight of 5 containers that each weigh 56 pounds?

a. ← Amount for one
b. ← Amount for one
c. ← Amount for one
d. ← Amount for one
e. ← Amount for one
f. ← Amount for one

If you have more time: Make up other questions and bar diagrams like these. Ask your partner to use your bar diagrams to answer your questions.

Center Game ★★ 3-6

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

PEARSON realize.
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Help | Practice Buddy | Tools | Games

Technology Center I O A

Tools Games

Math Tools and Math Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment I Items 1–2, 8, 10–12 O Items 3–5, 6–12 A Items 4–5, 6–12

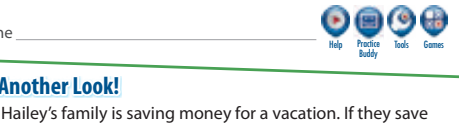
Name _____

Help Practice Buddy Tools Games

Another Look!

Hailey's family is saving money for a vacation. If they save $525 each month for 12 months, how much will they save?

Draw a bar diagram.



Write and solve an equation.

$12 \times 525 = s$

$s = 6{,}300$

Hailey's family will save $6,300 over the 12 months.

Homework & Practice 3-6
Solve Word Problems Using Multiplication

In **1–5**, draw a bar diagram and write an equation. Solve.

Check students' diagrams.

1. A stadium has 7,525 seats. What is the total attendance for 5 games if each game is sold out? Complete the bar diagram to help you.

n total number of people

7,525 | 7,525 | 7,525 | 7,525 | 7,525

$7{,}525 \times 5 = n$; $n = 37{,}625$

The total attendance would be 37,625 people.

2. An aquarium has display tanks that each contain 175 fish. How many fish are on display in 6 tanks?

? fish → ?

6 tanks → 175 | 175 | 175 | 175 | 175 | 175

$175 \times 6 = f$; $f = 1{,}050$ fish

3. Each elephant at the zoo eats 125 pounds of food per day. How many pounds of food will 18 elephants eat?

$125 \times 18 = f$; $f = 2{,}250$ pounds

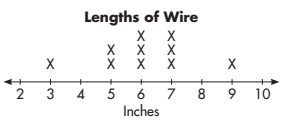
4. Joy travels a lot for her job. She flies 2,840 miles each week for 4 weeks. How many miles in all does she fly?

$2{,}840 \times 4 = m$; $m = 11{,}360$ miles

5. Jerry weighs 105 pounds. If a male brown bear weighs 11 times as much, what is the brown bear's weight?

$105 \times 11 = w$; $w = 1{,}155$ pounds

6. Meg measured the length of some pieces of wire. What is the difference in length between the longest and shortest piece of wire? **6 inches**



7. What is the combined length of all the pieces Meg measured? Write an equation using a variable to show your work.

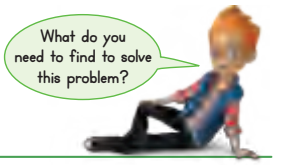
$3 + 2(5) + 3(6) + 3(7) + 9 = h$; $h = 61$ inches

8. Higher Order Thinking Daniel has 102 stamps. Manuel has twice as many stamps as Daniel. Kendra has twice as many stamps as Manuel. How many stamps do they have in all?

714 stamps

9. MP.1 Make Sense and Persevere Caroline has enough pumpkin seeds to cover an area of 350 square feet. Her garden measures 18 feet by 22 feet. Does she have enough pumpkin seeds to fill the whole garden? Explain.

No; $22 \times 18 = 396$; $396 > 350$.



10. MP.6 Be Precise The table shows the number of miles 3 runners ran last week. Order the numbers from least to greatest. Which runner ran the farthest? How do you know?

DATA

Name	Miles
Darla	15.2
Casey	15.25
Juan	15.03

15.03 < 15.2 < 15.25; Casey; 15.25 is the greatest number.

Common Core Assessment

11. Choose all the expressions that are equal to $4{,}300 \times 17$.

- [x] $(43 \times 10^2) \times 17$
- [x] $17 \times 4{,}300$
- [ ] $(43 \times 10) \times (10 + 7)$
- [ ] $10 \times 7 \times 4{,}300$
- [x] $4{,}300 \times (10 + 7)$

12. Choose all the expressions that are equal to $66 \times 7{,}250$.

- [ ] $(725 \times 10^2) \times 66$
- [ ] $(725 \times 10) \times 60 \times 6$
- [x] $7{,}250 \times (60 + 6)$
- [x] $7{,}250 \times 66$
- [ ] $66 \times (7{,}000 + 200)$

MATH PRACTICES AND PROBLEM SOLVING | LESSON 3-7

CRITIQUE REASONING

DIGITAL RESOURCES PearsonRealize.com

- eText — Student and Teacher eTexts
- PD — Listen and Look For Lesson Video
- Think — Today's Challenge
- Solve — Solve and Share
- Learn — Visual Learning Animation Plus
- Glossary — Animated Glossary
- Practice Buddy — Online Personalized Practice
- Tools — Math Tools
- Assessment — Quick Check
- Help — Another Look Homework Video
- Games — Math Games
- MP — Math Practices Animations

LESSON OVERVIEW FCR FOCUS • COHERENCE • RIGOR

FOCUS

Mathematical Practices **MP.3** Critique Reasoning Also **MP.1, MP.2, MP.6**

Domain **5.NBT** Number and Operations in Base Ten

Cluster **5.NBT.B** Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard **5.NBT.B.5** Fluently multiply multi-digit whole numbers using the standard algorithm.

Objective Critique the reasoning of others by asking questions, looking for flaws, and using prior knowledge of estimating products.

Essential Understanding Good math thinkers use math to explain why they are right. They can talk about the math that others do, too.

COHERENCE

Students have used this Mathematical Practice throughout the program. This lesson emphasizes application of the Thinking Habits good problem solvers use when they *critique the reasoning of others.* As they examine problems solved by others using the mathematics learned in this topic, emphasize how they can critique reasoning for any type of problem.

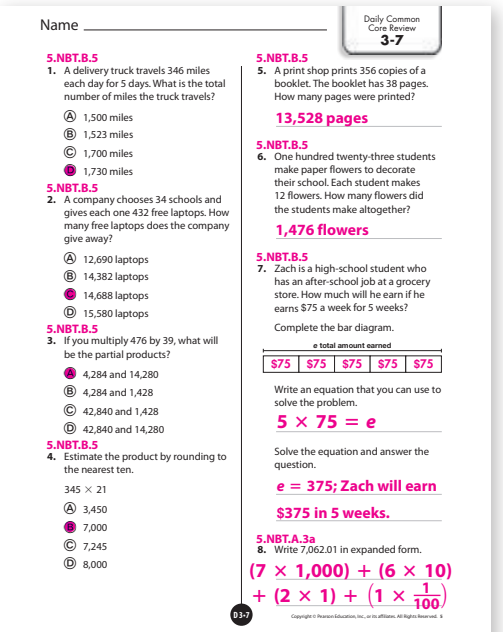
RIGOR

This lesson emphasizes **application**. Students select and use multiple mathematical practices, with an emphasis on MP.3: Critique Reasoning. In order to critique reasoning, students need to be able to solve the problems themselves, using practices such as making sense of problems, persevering in solving them, and modeling with math.

PD Watch the Listen and Look For Lesson Video.

MATH ANYTIME

Daily Common Core Review



Name _____

Daily Common Core Review 3-7

5.NBT.B.5
1. A delivery truck travels 346 miles each day for 5 days. What is the total number of miles the truck travels?
Ⓐ 1,500 miles
Ⓑ 1,523 miles
Ⓒ 1,700 miles
Ⓓ 1,730 miles

5.NBT.B.5
2. A company chooses 34 schools and gives each one 432 free laptops. How many free laptops does the company give away?
Ⓐ 12,690 laptops
Ⓑ 14,382 laptops
Ⓒ 14,688 laptops
Ⓓ 15,580 laptops

5.NBT.B.5
3. If you multiply 476 by 39, what will be the partial products?
Ⓐ 4,284 and 14,280
Ⓑ 4,284 and 1,428
Ⓒ 42,840 and 1,428
Ⓓ 42,840 and 14,280

5.NBT.B.5
4. Estimate the product by rounding to the nearest ten.
345 × 21
Ⓐ 3,450
Ⓑ 7,000
Ⓒ 7,245
Ⓓ 8,000

5.NBT.B.5
5. A print shop prints 356 copies of a booklet. The booklet has 38 pages. How many pages were printed?
13,528 pages

5.NBT.B.5
6. One hundred twenty-three students make paper flowers to decorate their school. Each student makes 12 flowers. How many flowers did the students make altogether?
1,476 flowers

5.NBT.B.5
7. Zach is a high-school student who has an after-school job at a grocery store. How much will he earn if he earns $75 a week for 5 weeks?
Complete the bar diagram.

e total amount earned				
$75	$75	$75	$75	$75

Write an equation that you can use to solve the problem.
5 × 75 = e
Solve the equation and answer the question.
e = 375; Zach will earn $375 in 5 weeks.

5.NBT.A.3a
8. Write 7,062.01 in expanded form.
(7 × 1,000) + (6 × 10) + (2 × 1) + $\left(1 \times \frac{1}{100}\right)$

3-7

Today's Challenge

Think Use the Topic 3 problems any time during this topic.

ENGLISH LANGUAGE LEARNERS ELL

Listening Learn content area vocabulary.

Use with the Visual Learning Bridge on Student's Edition p. 150.

Discuss the terms *exact answer* and *estimate*. Make a chart with these headings: Exact Answer and Estimate. Display and read these examples: 23 × 4 = 92, and 23 × 4 is about 100. *How is an estimate different from an exact answer?* [An estimate is close; an exact answer is precise.] *Which one do you usually find in your head?* [Estimate]

Beginning Display this example: 19 × 3 is about 60. Point to 60. *This is an estimate. Why is it an estimate?* [It says *about*. It is not exact.]

Intermediate Display these examples: 28 × 31 is about 900, and 28 × 31 = 868. Read this problem: Tim made 28 hats each day. About how many hats did he make in July? *Which example would you use to solve the problem?* [28 × 31 is about 900] *Why?* [Because "about how many" means that an estimate, not an exact answer, is needed.]

Advanced *Write a problem that needs either an estimate or an exact answer to solve.* Students trade problems. Each partner tells whether an estimate or exact answer is needed. Students listen and tell whether their partner's answer is correct.

Summarize How do you know if an estimate or exact answer is needed?

STEP 1

DEVELOP: PROBLEM-BASED LEARNING

COHERENCE: Engage learners by connecting prior knowledge to new ideas.
Students determine the appropriateness of problem-solving strategies.

10–15 min

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Solve

Whole Class BEFORE

1. **Pose the Solve-and-Share Problem**
MP.3 Critique Reasoning Listen and look for students who use what they know about estimating to critique the reasoning of others.

2. **Build Understanding**
What is the difference between an exact answer and an estimate? [Sample answer: An exact answer is found by computing with actual problem numbers, while an estimate is a good guess made by computing with numbers close to the actual numbers.]

Small Group DURING

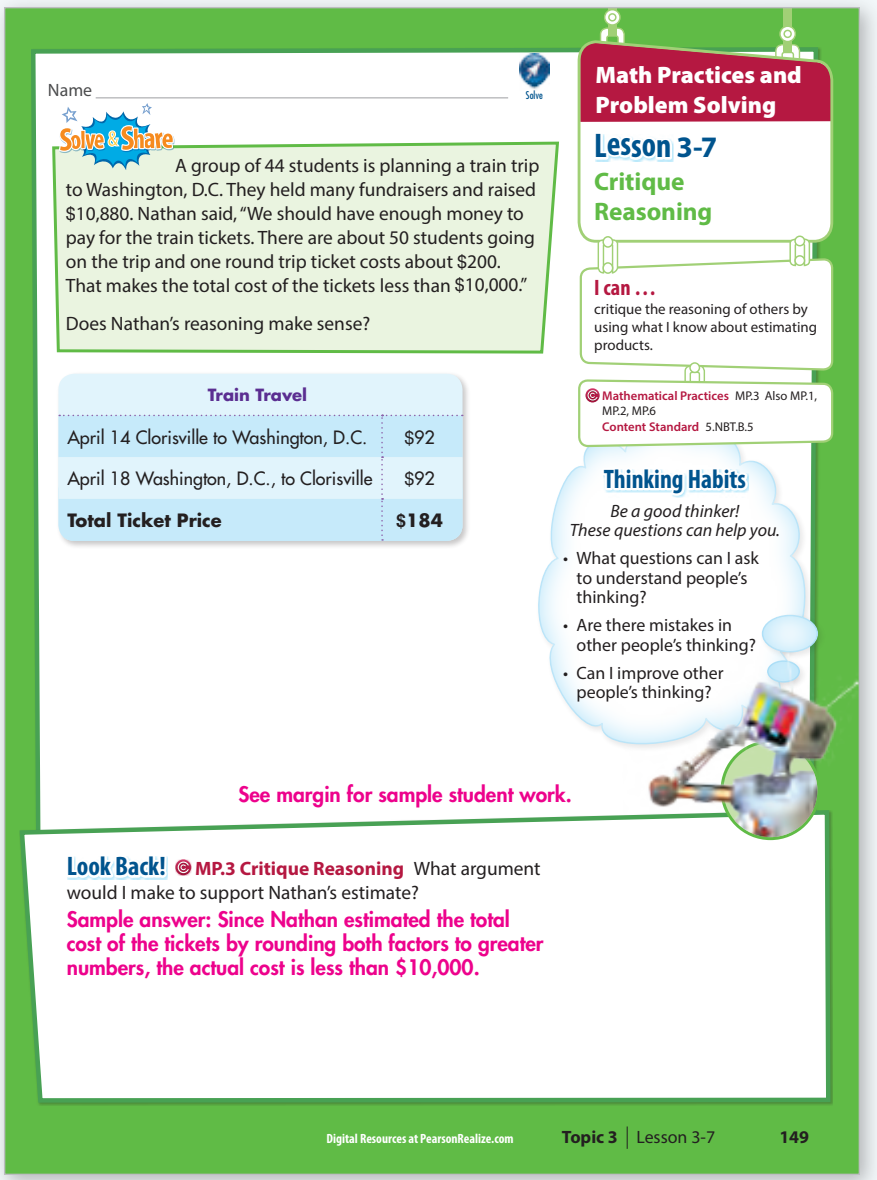
3. **Ask Guiding Questions As Needed**
Is an exact answer or an estimate needed to find the total cost for the trip? [An estimate is needed.]

Whole Class AFTER

4. **Share and Discuss Solutions**
Solve Start with students' solutions. If needed, project Jessica's work to show how to use the standard algorithm to find an estimate.

5. **Transition to the Visual Learning Bridge**
The situation and the nature of the question asked determine whether the answer to a problem needs to be exact or whether an estimate is acceptable.

6. **Extension for Early Finishers**
The total cost of using a shuttle for the group to ride to landmarks around Washington, D.C. is $800. Jack says there will be enough money if every person in the group pays $18. Is Jack's reasoning correct? Justify your answer. [No, there will not be enough money because 44 × $18 = $792.]


Name _____ Solve

Solve & Share

A group of 44 students is planning a train trip to Washington, D.C. They held many fundraisers and raised $10,880. Nathan said, "We should have enough money to pay for the train tickets. There are about 50 students going on the trip and one round trip ticket costs about $200. That makes the total cost of the tickets less than $10,000."

Does Nathan's reasoning make sense?

Train Travel	
April 14 Clorisville to Washington, D.C.	$92
April 18 Washington, D.C., to Clorisville	$92
Total Ticket Price	**$184**

Math Practices and Problem Solving

Lesson 3-7
Critique Reasoning

I can ...
critique the reasoning of others by using what I know about estimating products.

Mathematical Practices MP.3 Also MP.1, MP.2, MP.6
Content Standard 5.NBT.B.5

Thinking Habits
Be a good thinker! These questions can help you.
- What questions can I ask to understand people's thinking?
- Are there mistakes in other people's thinking?
- Can I improve other people's thinking?

See margin for sample student work.

Look Back! MP.3 Critique Reasoning What argument would I make to support Nathan's estimate?
Sample answer: Since Nathan estimated the total cost of the tickets by rounding both factors to greater numbers, the actual cost is less than $10,000.

Digital Resources at PearsonRealize.com Topic 3 | Lesson 3-7 149

Analyze Student Work

Jessica's Work

$$\begin{array}{r} 200 \\ \times\ 44 \\ \hline 800 \\ +8000 \\ \hline 8{,}800 \end{array}$$

So, the cost of the tickets will be $8,800 and $8,800 < $10,000.

Jessica rounds 184 to 200 and uses the standard algorithm to find an estimate.

Kevin's Work

Replace 44 with 45 and keep $200.

45 × 200 = 9,000 and $9,000 < $10,000.

The cost of the tickets is less than $10,000.

Kevin uses compatible numbers to estimate the cost of the tickets.

STEP 2 DEVELOP: VISUAL LEARNING

The *Visual Learning Bridge* connects students' thinking in Solve & Share to important math ideas in the lesson. Use the *Visual Learning Bridge* to make these ideas explicit. Also available as a *Visual Learning Animation Plus* at PearsonRealize.com

Visual Learning

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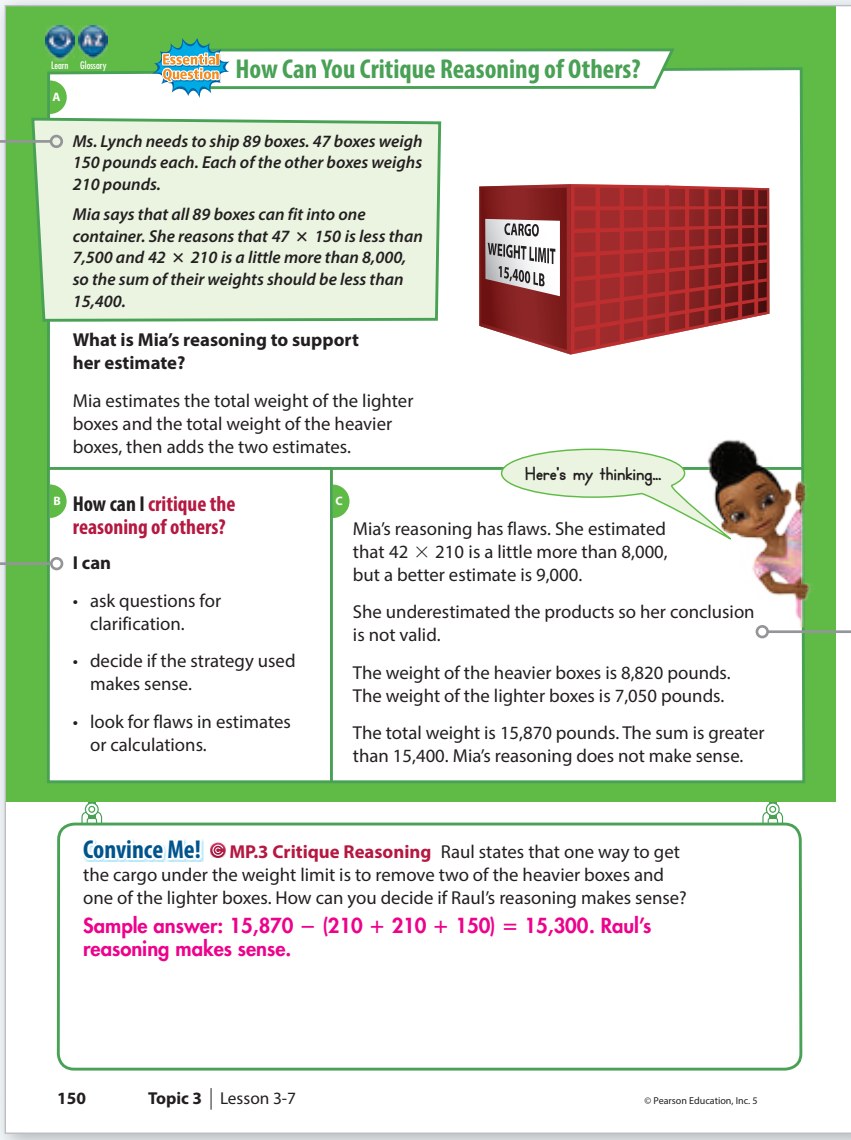
Learn Glossary

Restate this problem using your own words. [Sample answer: There are 89 boxes that need to be shipped. 47 weigh 150 pounds, and the others weigh 210 pounds. Mia says that all 89 boxes can fit into one container. I only need to estimate to tell if the total weight is less than the cargo weight limit, 15,400.]

MP.3 Critique Reasoning *How can you tell that Mia's estimate has flaws?* [She used too great an underestimate. It is very important not to exceed the weight limit, so she should have tried to find a closer estimate.]



Learn Glossary

Essential Question **How Can You Critique Reasoning of Others?**

A

Ms. Lynch needs to ship 89 boxes. 47 boxes weigh 150 pounds each. Each of the other boxes weighs 210 pounds.

Mia says that all 89 boxes can fit into one container. She reasons that 47 × 150 is less than 7,500 and 42 × 210 is a little more than 8,000, so the sum of their weights should be less than 15,400.

CARGO WEIGHT LIMIT 15,400 LB

What is Mia's reasoning to support her estimate?

Mia estimates the total weight of the lighter boxes and the total weight of the heavier boxes, then adds the two estimates.

B **How can I critique the reasoning of others?**

I can

- ask questions for clarification.
- decide if the strategy used makes sense.
- look for flaws in estimates or calculations.

C Here's my thinking...

Mia's reasoning has flaws. She estimated that 42 × 210 is a little more than 8,000, but a better estimate is 9,000.

She underestimated the products so her conclusion is not valid.

The weight of the heavier boxes is 8,820 pounds. The weight of the lighter boxes is 7,050 pounds.

The total weight is 15,870 pounds. The sum is greater than 15,400. Mia's reasoning does not make sense.

Convince Me! MP.3 Critique Reasoning Raul states that one way to get the cargo under the weight limit is to remove two of the heavier boxes and one of the lighter boxes. How can you decide if Raul's reasoning makes sense?

Sample answer: 15,870 − (210 + 210 + 150) = 15,300. Raul's reasoning makes sense.

150 Topic 3 | Lesson 3-7 © Pearson Education, Inc. 5

Visual Learning Bridge

Which strategy should Mia have used to make sure that her estimate was less than the exact weight limit? [She should have found an overestimate or used compatible numbers that were closer to the actual numbers in the problem.]

Convince Me! **MP.3 Critique Reasoning** *How can you analyze Raul's reasoning?* [Sample answer: Calculate what the weight would be without the two heavier and one lighter boxes. Since it is important not to exceed the weight limit, I would use the actual numbers in the problem instead of finding an estimate.]

Coherence Focus the classroom conversation on describing how students can critique the reasoning of others. Ask the question in Box B of the *Visual Learning Bridge*.

Essential Question

Revisit the Essential Question. Students can ask questions, identify mistakes in other people's thinking, and offer suggestions for improving other people's thinking when they critique the reasoning of others.

QUICK CHECK

Check mark indicates items for prescribing differentiation on the next page.
Items 4 and 6 are worth 1 point. Items 7–10 are worth up to 3 points.

20–30 min

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Practice Buddy | Tools | Assessment

Name _____

Guided Practice*

MP.3 Critique Reasoning
A stadium has 58 sections of seats. There are 288 seats in each section. Mary estimated the total number of seats by multiplying 60 × 300. She concluded that the stadium has fewer than 18,000 seats.

1. What is Mary's argument? How does she support it?
   The stadium has fewer than 18,000 seats. She rounded the number of sections and number of seats and multiplied.
2. Describe at least one thing you would do to critique Mary's reasoning.
   Sample answer: I would check if her estimates make sense for her argument.
3. Does Mary's conclusion make sense? Explain.
   Sample answer: Yes; Mary replaced both factors with greater numbers, so her estimate is greater than the actual number of seats. This means that the stadium has fewer than 18,000 seats.

Independent Practice

MP.3 Critique Reasoning
An office manager has $10,000 to spend on new equipment. He planned to purchase 300 lamps for $72 each. He completed the calculations at the right and concluded that there would be plenty of money left to buy additional equipment.

300 × 72 =
(300 × 7) + (300 × 2) =
2,100 + 600 = 2,700

4. What does the office manager do to support his thinking?
   Sample answer: He does a calculation to find the cost of 300 lamps and compares the amount to $10,000.
5. Describe how you could decide if the office manager's calculation is reasonable.
   Sample answer: I could estimate by finding 300 × 70.

When you critique reasoning, you need to explain if the method used by another makes sense.

6. Does the office manager's conclusion make sense? Explain.
   No. The office manager did not use the Distributive Property correctly. 300 × 72 = (300 × 70) + (300 × 2) = 21,000 + 600 = 21,600. The incorrect calculation shows that his conclusion doesn't make sense. The cost of the lamps is $21,600, which is much more than $10,000.

*For another example, see Set E on page 158.

Math Practices and Problem Solving

Common Core Performance Assessment

Buying a Piano
Over the summer Kathleen sold 1,092 jars of jam at outdoor markets. She made a $12 profit on each one. She wants to use the profits to buy the Ivory-5K piano. She said, "Since 1,000 × 12 = 12,000, and 1,092 is greater than 1,000, I know my profits add up to more than $12,000. So, I can buy the piano."

Piano Model	Price with tax
Harmony-2L	$8,675
Ivory-5K	$11,500
Goldtone-TX	$14,250

7. **MP.1 Make Sense and Persevere** Does it make sense for Kathleen to find an overestimate or an underestimate to decide if she has earned enough money? Why?
   Sample answer: She should determine an underestimate of her earnings in order to be sure that she has earned at least as much as the price of the piano.
8. **MP.2 Reasoning** Should Kathleen use multiplication to estimate her total profits? Explain your reasoning.
   Yes; Kathleen needs to join 1,000 equal groups of $12.
9. **MP.6 Be Precise** Is Kathleen's estimate appropriate? Is her calculation correct? Explain.
   Yes; Kathleen rounded 1,092 to 1,000 and did not change the other factor, so the product is an underestimate. Her calculation is accurate and supports her conclusion.
10. **MP.3 Critique Reasoning** Explain whether Kathleen's conclusion is logical. How did you decide? If it is not logical, what can you do to improve her reasoning?
    Kathleen's conclusion is logical. Since Kathleen accurately estimated that she earned at least $12,000, she can conclude that she can buy the piano because $12,000 is greater than $11,500, which is the price of the Ivory-5K model.

When you critique reasoning, ask questions to help understand someone's thinking.

MP.3 Critique Reasoning Listen and look for these behaviors as evidence that students are exhibiting proficiency with MP.3.

- Asks questions to understand other people's thinking
- Identifies mistakes in other people's thinking
- Provides suggestions for improving other people's thinking

Item 3 Coherence Students learned to estimate products of multi-digit numbers earlier in this topic. They also learned how to decide whether they have found an overestimate or an underestimate. They use those skills to find and explain flaws in another student's reasoning.

Reteaching Assign Reteaching Set E on p. 158.

Item 7 MP.1 Make Sense and Persevere Ask students what information is not needed to solve the problem. *Which piano is Kathleen buying?* [The Ivory-5K] *So, do you need the price of the Harmony-2L or the Goldtone-TX?* [No, you don't need either price.]

Item 8 MP.2 Reason Abstractly and Quantitatively *Why is an estimate of her profits enough information for Kathleen?* [She does not need to find the exact amount she earns, she just needs to compare the earnings to $11,500.] *Why is multiplication the right operation to use to find the estimate?* [Sample answers: Because you are combining equal groups; it would be much more work to add 12 one thousand times.]

Item 9 MP.6 Be Precise Discuss with students why an underestimate is better to calculate than an overestimate. *Why would it be better to find an underestimate than an overestimate when Kathleen calculates how much money she has earned?* [Sample answer: Because if she found an overestimate, she might not have actually saved enough money to buy the piano.]

Item 10 MP.3 Critique Reasoning If needed, discuss with students that critiquing someone's reasoning does not always mean that there is an error or something wrong. *Did Kathleen find an appropriate estimate?* [Yes.] *Did Kathleen come to a logical conclusion?* [Yes.] *So, are there flaws in Kathleen's reasoning or work?* [No.]

STEP 3

ASSESS AND DIFFERENTIATE

2 RtI

Use the **QUICK CHECK** on the previous page to prescribe differentiated instruction.

- **I Intervention** — 0–3 points on the Quick Check
- **O On-Level** — 4 points on the Quick Check
- **A Advanced** — 5 points on the Quick Check

Intervention Activity I

Problem Solving: Critique Reasoning

- Write the following problem on the board:

Elmwood School needs history textbooks for each of the five history classes taught there. There are 25 students in each history class and each student needs a textbook. Each textbook costs $20. Elmwood School has a budget of $3,000 to spend on the textbooks. Does the school have enough in its budget for the textbooks that it needs?

- Have students restate the problem in their own words. Discuss how they might find the cost of textbooks for all the students. Then guide the students in writing the equations:

  $5 \times 25 = 125$

  $125 \times \$20 = \$2{,}500$

- Ask, *How much will the textbooks cost?* [$2,500] Encourage students to tell you whether this is an exact answer or an estimate and to explain why. [Exact answer]
- Then say: *$2,500 is less than $3,000. Does the school have enough in its budget for the textbooks?* [Yes]
- Have pairs of students work together to create their own multi-step problems like this one. They can compare the total cost of a number of objects against a predetermined dollar amount. Then they can use number sense to determine whether the total cost is greater than or less than that amount.

Reteach I

Name _____

Reteach to Build Understanding 3-7

Vocabulary

1. An **overestimate** is an estimate that is greater than the exact answer. An **underestimate** is an estimate that is less than the exact answer.

Estimate the product of 700 × 87.
700 × 90 = 63,000
90 > 87, so the estimate is an overestimate.

Estimate the product of 520 × 34.
500 × 30 = 15,000
500 < 520 and 30 < 34, so the estimate is an underestimate.

Estimate the product of 19 × 165.
20 × 170 = 3,400
20 > 19 and 170 > 165, so the estimate is an **overestimate**.

A drama club needs to buy 33 scripts for all of the actors and crew people. The scripts cost $12 each. Kelli said, "$300 should be enough to buy the scripts because $12 rounds to $10 and 33 rounds to 30. $10 × 30 = $300." Does Kelli's reasoning make sense?

2. Was Kelli's estimate an overestimate or an underestimate? **underestimate**

3. Find the actual cost of the scripts. **33** × $ **12** = $ **396**

4. Did Kelli's estimate include enough money to purchase the scripts? Explain.
No; Sample answer: Since 300 < 396, there is not enough money to purchase the scripts.

On the Back!

5. Ms. Marcus' bulletin board is 7 feet long and 4 feet high. She has 26 feet of border to use. Ms. Marcus multiplies 7 × 4 = 28 to find the exact amount of border she needs. She concludes that she does not have enough border for the bulletin board. Do you agree?
No; she found the area instead of the perimeter. The perimeter is 7 + 4 + 7 + 4 = 22 feet. So, she has enough border.

R3-7

On-Level and Advanced Activity Centers O A

Name _____

Math and Science Activity 3-7

Our Water Footprint

Did You Know? It takes 55 gallons of water to produce 1 cup of milk! Cows drink water and eat grass. The grass the cows eat needs water to grow. Water is also needed to process and bottle the milk cows produce. Americans require about 2,000 gallons of water per day. Almost all of this water is hidden in our food, our clothing, and the energy we use. These hidden water costs determine the volume of water we use, our water footprint. We can conserve water by reducing our water footprint!

Hidden Water Costs	
1 Pound of chocolate	= 3,170 gal
1 Ream of paper	= 1,321 gal
1 Gallon of milk	= 880 gal
1 Cotton t-shirt	= 713 gal
1 Hamburger	= 660 gal

Use the table above to solve each problem.

1. Estimate the number of gallons required to produce 22 T-shirts. Is your estimate an overestimate or an underestimate? Explain.
14,000 gallons; Sample answer: I rounded 713 to 700 and 22 to 20. Since 700 < 713 and 20 < 22, the estimate is an underestimate.

2. How many gallons of water are required to produce 15 pounds of chocolate? Write and solve an equation. Let g be the number of gallons.
$15 \times 3{,}170 = g$; $g = 47{,}550$ gallons

3. **Extension** The owner of a company has a goal to reduce the company's water footprint by 100,000 gallons in one year. He estimates that if the company reduces its yearly need for paper by 80 reams, he will meet this goal. Could the owner have estimated correctly? Justify your answer.
Yes; Sample answer: It takes 1,321 gallons of water to produce 1 ream of paper. I can round 1,321 to 1,300 and multiply by the number of reams: 1,300 × 80 = 104,000. 100,000 < 104,000. I know the estimate is an underestimate, because 1,300 < 1,321. So, the owner will more than meet his goal.

Math and Science Activity 3-7

Math and Science Activity STEM

This activity revisits the science theme **Water Usage,** introduced on page 109 in the Student's Edition.

Sample Student Work

3. Goal: Reduce water usage by 100,000 gallons.
80 fewer reams of paper: less than or greater than 100,000 gallons?

1 ream = 1,321 gal. Estimate 80 × 1,321.

80 × 1,321 is about 80 × 1,300.
80 × 1,300 = 104,000. This is an underestimate.

Since 104,000 > 100,000, this will meet the goal.

TIMING

The time allocated to Step 3 will depend on the teacher's instructional decisions and differentiation routines.

15–30 min

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Help | Practice Buddy | Tools | Games

Technology Center I O A

Math Tools and Math Games

Tools Games

A link to a specific math tools activity or math game to use with this lesson is provided at PearsonRealize.com.

Leveled Assignment I Items 1–7 O Items 1–7 A Items 1–7

Name _____ Help Practice Buddy Tools Games

Homework & Practice 3-7
Critique Reasoning

Another Look!

Mr. Jansen needs to order picture frames for his paintings. He has $4,000 to buy 98 frames priced at $42 each. Mr. Jansen says he has enough money because 100 × $40 = $4,000.

Tell how you can critique Mr. Jansen's reasoning.

- I can decide if his strategy makes sense to me.
- I can look for flaws in his estimates.

When you critique reasoning, you explain why someone's thinking is correct or incorrect.

Critique Mr. Jansen's reasoning.

His reasoning does not make sense. He should find an overestimate or an exact amount to be sure he has enough money. An overestimate would be 100 × $42 = $4,200, and the exact amount is 98 × $42 = $4,116.

He does not have enough money.

MP.3 Critique Reasoning

Jason has 75 feet of wallpaper border. He wants to put up a wallpaper border around his rectangular bedroom that measures 12 feet by 14 feet. He multiplies 12 × 14 = 168 to get an exact answer of how much border he needs. He concludes that he does not have enough border for the whole job.

1. Tell how you can critique Jason's reasoning.
   I can look for flaws in his method or calculations.

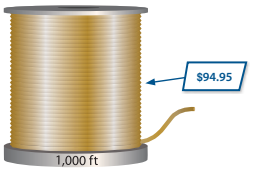
2. Critique Jason's reasoning.
   His reasoning does not make sense. His method is incorrect. He should have calculated the perimeter of his room, not the area. The perimeter is 12 + 14 + 12 + 14 = 52 feet. So, his conclusion should have been that he has enough wallpaper.

3. Jason uses an overestimate to decide how many rolls of wallpaper he needs for another room. Explain why his reasoning to use an overestimate does or does not make sense.
   An overestimate makes sense so he is sure to have enough wallpaper.

Common Core Performance Assessment

A Spool of Wire

Todd has a new spool of wire like the one pictured. He needs 48 pieces of wire, each 22 feet long. He estimates that he needs 50 × 20 = 1,000 feet, and he concludes that 1 spool with 1,000 feet will be enough.



4. **MP.1 Make Sense and Persevere** Does it make sense for Todd to find an overestimate or an underestimate to decide if one spool is enough? Why?
   Overestimate. An overestimate is greater than the actual amount. Todd has to be sure that he needs no more than 1,000 feet.

5. **MP.2 Reasoning** Should Todd use multiplication to estimate the total amount of wire he needs? Explain your reasoning.
   Yes. Todd is joining 50 equal groups of 20 feet.

6. **MP.6 Be Precise** Did Todd correctly calculate the appropriate estimate? Explain.
   No; Todd's calculation is accurate, but he replaced 48 with a greater number and 22 with a lesser number, so you cannot tell whether he found an overestimate or an underestimate.

7. **MP.3 Critique Reasoning** Explain if Todd's conclusion is logical. How did you decide? If it is not logical, what can you do to improve his reasoning?
   Todd's conclusion is not logical. Todd does not know whether his estimate of 1,000 feet is an overestimate or underestimate, so he should not conclude that 1 spool is enough. Since his estimate is so close to 1,000 feet, he should find the exact product to be sure that 1 spool is enough. 48 × 22 = 1,056 feet. One spool is not enough.

When you critique reasoning, you need to carefully consider all parts of an argument.

TOPIC 3

FLUENCY PRACTICE ACTIVITY

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Games | Practice Buddy

FLUENCY PRACTICE ACTIVITY

Students practice fluently multiplying whole numbers during an activity that reinforces mathematical practices.

Common Core Standards

Content Standard **5.NBT.B.5** Fluently multiply multi-digit whole numbers using the standard algorithm.

Mathematical Practices **MP.2, MP.6, MP.7**

Getting Started Ask students to work with a partner. Tell them to record their answers and shade the path on their own page. Tell students to take turns choosing which square to try next. Go over the directions.

As Students Do the Activity Remind students that the path may go up, down, left, or right. There may be several options that they must try before they find the square with the problem that follows the rule. Remind students to compare and discuss answers.

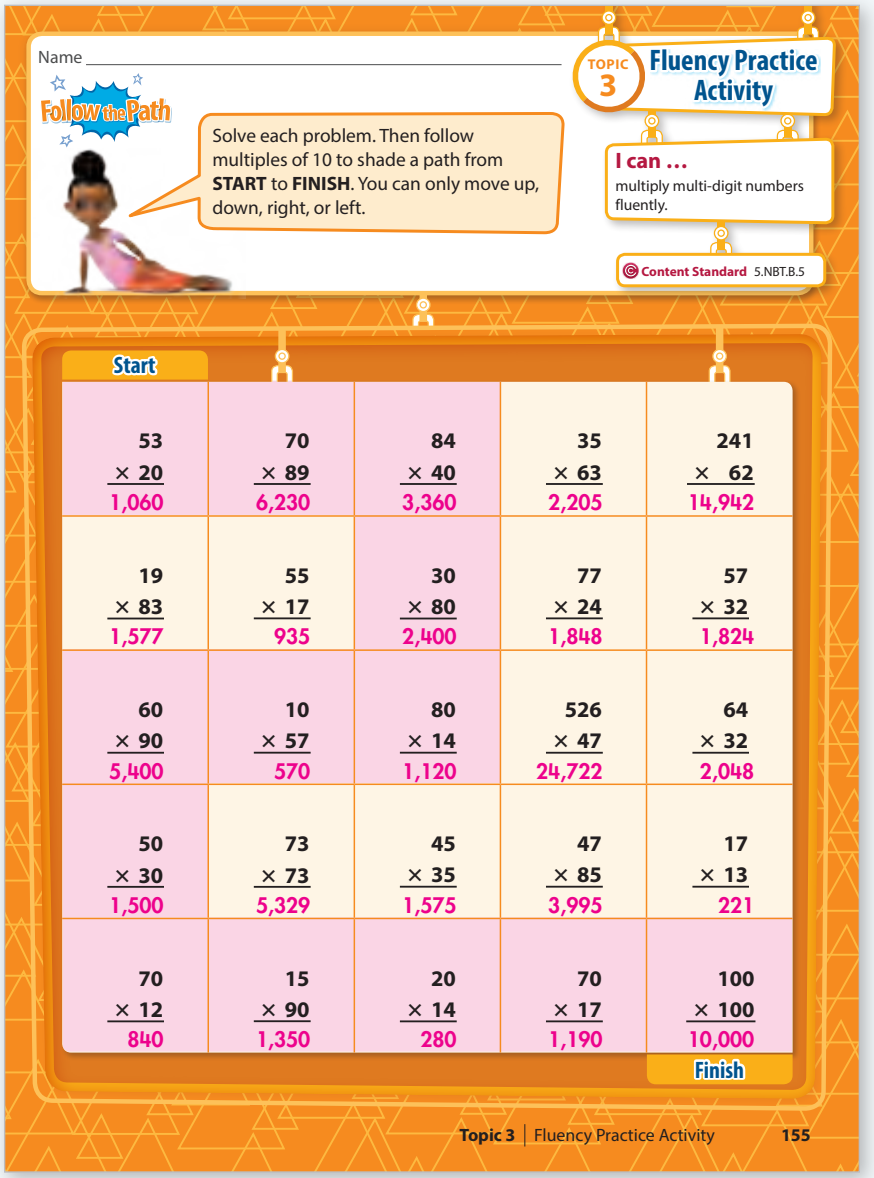
Encourage students to use mental math strategies to help choose the squares that are on the path. Some students may find all of the answers first and then shade the path. Allow this strategy as it provides the same fluency practice.

Another Activity Have students work together to revise problems and write a new rule for a different path from Start to Finish.

Extra Challenge *Create your own Follow the Path activity. Start with a rule. Write problems to fit the rule so that you can shade a path from Start to Finish. Then trade your activity with your partner and complete your partner's Follow the Path activity.*

Games **Online Game** The Game Center at PearsonRealize.com provides opportunities for fluency practice.

Practice Buddy **Steps to Fluency Success** To ensure that all students achieve fluency, see pages 109E–109H for additional resources including practice/assessment masters and online practice/assessment on fluency subskills. You can also use the ExamView® CD-ROM to generate worksheets with multiple-choice or free-response items on fluency subskills.



VOCABULARY REVIEW

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Glossary Games

TOPIC 3 **Vocabulary Review**

Glossary

Word List
- expression
- multiple
- overestimate
- partial products
- power
- underestimate
- variable

For each of these terms, give an example and a non-example.
Sample answers are given.

	Example	Non-example
1. Power of 10	1,000	650
2. Multiple of 10^2	800	130
3. An expression with a variable	$5 + n$	$4.2 + 15$
4. An underestimate of 532×11	5,320	10,640

Write *always*, *sometimes*, or *never*.

5. The sum of partial products is equal to the final product. **always**
6. A multiple of a number is a power of the number. **sometimes**
7. An underestimate results from rounding each factor to a greater number. **never**
8. A power of a number is a multiple of the number. **always**

Write T for *true* or F for *false*.

9. The partial products for 34×321 are 9,630 and 1,284. **T**
10. The partial products for 49×601 are 5,409 and 2,404. **F**
11. $642 \times 12 = 642$ tens $+ 1{,}284$ ones **T**
12. $41 \times 10^6 = 41{,}000{,}000$ **T**
13. $80 \times 10^3 = 8{,}000$ **F**
14. Suppose both factors in a multiplication problem are multiples of 10. Explain why the number of zeros in the product may be different than the total number of zeros in the factors. Include an example.
If the basic fact used in the problem ends in 0, the product will have one more zero than the total number of zeros in the factors. An example is $400 \times 50 = 20{,}000$.

VOCABULARY REVIEW

Students review vocabulary words used in the topic.

Oral Language Before students complete the page, you might reinforce oral language through a class discussion involving one or more of the following activities.

- Have students define the terms in their own words.
- Have students say math sentences or math questions that use the words.
- Ask students to explain how pairs of terms such as *expression* and *equation, multiple* and *power,* or *overestimate* and *underestimate* are alike and how they are different.
- Play a "Right or Wrong?" game in which you or a student says a sentence that uses one of the words correctly or incorrectly. Then, others say "right" or "wrong."

Writing in Math After students complete the page, you might further reinforce writing in math by doing one or more of the following activities.

- Direct students to Items 9–13. Ask them to explain the error and rewrite the false statements to be true.
- Tell students to close their books. Then, say the words and have students write them. Students trade papers to check whether the words are spelled correctly.
- Have students work with a partner. One partner writes each of the terms on an index card. The other partner writes an example of each term on an index card. The index cards are placed face down. The partners take turns trying to match the term and the example.

Games **Online Game** The Game Center at PearsonRealize.com includes a vocabulary game that students can access anytime.

TOPIC 3

RETEACHING

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

RtI Item Analysis for Diagnosis and Intervention

Reteaching Sets	Standard	MDIS
Set A	5.NBT.A.2	F17
Set B	5.NBT.B.5	G65
Set C	5.NBT.B.5	G69
Set D	5.NBT.B.5	G68, G69
Set E	MP.1, MP.2, MP.3, MP.6	G68, J23

Name _____

TOPIC 3 Reteaching

Set A pages 113–118

Find 65×10^3.

Step 1
Look at the exponent for the power of 10. 10^3

Step 2
Annex that number of zeros to the other factor to find the product. 65,000

Remember to look at the number of zeros or the exponent for the power of 10.

1. 12×10^4 120,000
2. 100×815 81,500
3. $10^2 \times 39$ 3,900
4. $6{,}471 \times 10^1$ 64,710
5. 3×10^5 300,000
6. $20 \times 1{,}000$ 20,000

Set B pages 119–124

Estimate 37×88.

Step 1
Round both factors. 37 is about 40 and 88 is about 90.

Step 2
Use mental math and multiply the rounded factors. $40 \times 90 = 3{,}600$

Remember to either round the factors or use compatible numbers.

Estimate each product. Sample answers are given.

1. 7×396 2,800
2. 17×63 1,200
3. 91×51 4,500
4. 70×523 35,000
5. 256×16 5,000
6. 45×806 40,000
7. 27×89 2,700
8. 8×415 3,200

Set C pages 125–130, 131–136, 137–142

Find 53×406.
Estimate: $50 \times 400 = 20{,}000$

Multiply the ones. Multiply the tens. Then add the partial products.

$$\begin{array}{r} {\scriptstyle 3\ 1}\\ 406 \\ \times\ \ 53 \\ \hline 1218 \\ +\ 20300 \\ \hline 21{,}518 \end{array} \quad \begin{array}{l} \\ \\ \\ \leftarrow 3 \times 406 \\ \leftarrow 50 \times 406 \\ \\ \end{array}$$

Remember to regroup if necessary. Estimate to check that your answer is reasonable.

Find each product.

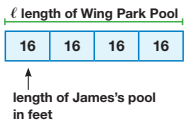
1. 54×9 486
2. 76×59 4,484
3. 47×302 14,194
4. 32×871 27,872
5. $\begin{array}{r} 604 \\ \times\ 55 \\ \hline \end{array}$ 33,220
6. $\begin{array}{r} 7{,}133 \\ \times\ \ 4 \\ \hline \end{array}$ 28,532

Set D pages 143–148

Draw a picture and write an equation. Solve.

The length of James's pool is 16 feet. The length of the pool at Wing Park is 4 times as long. How long is the pool at Wing Park?

Let $\ell =$ the length of Wing Park pool.



$16 \times 4 = \ell$
$\ell = 64$

The length of Wing Park pool is 64 feet.

Remember that pictures and equations can help you model and solve problems.

Write an equation with a variable to model each Exercise. Draw a picture to help you, if needed.

Check students' drawings.

1. Alexandria has a collection of 34 dolls. A toy store has 15 times as many dolls as Alexandria. How many dolls are in the store?
   510 dolls; $34 \times 15 = d$; $d = 510$

2. A store received a shipment of 37 TVs valued at $625 each. What is the total value of the shipment?
   $23,125; $37 \times 625 = t$; $t = 23,125$

3. Jessica saved $1,250 last year. Courtney saved 7 times as much as Jessica saved. How much money did Courtney save last year?
   $8,750; $1,250 \times 7 = s$; $s = 8,750$.

Set E pages 149–154

Think about these questions to help you **critique the reasoning of others**.

Thinking Habits

- What questions can I ask to understand other people's thinking?
- Are there mistakes in other people's thinking?
- Can I improve other people's thinking?

Remember you need to carefully consider all parts of an argument.

Sarah teaches craft classes. She has 214 bags of beads. Each bag has enough beads for 22 bracelets. She estimates that since $200 \times 20 = 4,000$, there are enough beads for at least 4,000 bracelets.

1. Tell how you can critique Sarah's reasoning.
   I can look to see if her estimate makes sense and check her calculations.

2. Does Sarah's argument make sense? Explain.
   Yes. She multiplied correctly and found an underestimate. An underestimate is less than the actual amount, so she can conclude that there are enough beads for at least 4,000 bracelets.

Response to Intervention

Ongoing Intervention

- Lessons with guiding questions to assess understanding
- Support to prevent misconceptions and to reteach

Strategic Intervention

- Targeted to small groups who need more support
- Easy to implement

Intensive Intervention

- Instruction to accelerate progress
- Instruction focused on foundational skills

TOPIC 3

TOPIC ASSESSMENT

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

Name _____

TOPIC 3 Assessment

1. Dr. Peterson works about 178 hours each month. Which of the following is the best estimate of the number of hours she works in a year? **1 point**

Ⓐ 200 × 20
Ⓑ 180 × 10
Ⓒ 100 × 12
Ⓓ 100 × 10

2. A banana contains 105 calories. Last week, Brendan and Lea ate a total of 14 bananas. How many calories does this represent? **1 point**

1,470

3. At a warehouse, 127 delivery trucks were loaded with 48 packages on each truck.

Part A

Estimate the total number of packages on the trucks. Write an equation to model your work. **1 point**

Sample answer:
6,500; 50 × 130 = 6,500

Part B

Did you calculate an overestimate or an underestimate? Explain how you know. **2 points**

Sample answer: Overestimate; 50 > 48 and 130 > 127, so 50 × 130 > 48 × 127.

4. Choose all of the expressions that are equal to 5,600. **1 point**

- [x] 56×10^2
- [ ] 56×10^3
- [ ] 56×10^4
- [x] 100×56
- [ ] $1{,}000 \times 56$

5. The latest mystery novel costs $24. The table shows the sales of this novel by a bookstore.

DATA

Day	Books Sold
Thursday	98
Friday	103
Saturday	157
Sunday	116

Part A

What was the dollar amount of sales of the mystery novel on Saturday? Write an equation to model your work. **1 point**

$3,768; 157 × 24 = 3,768

Part B

What was the dollar amount of sales of the mystery novel on Friday? Write an equation to model your work. **1 point**

$2,472; 103 × 24 = 2,472

6. There are 45 cans of mixed nuts. If each can has 338 nuts, what is the total number of nuts, *n*, in all of the cans? Write and solve an equation for *n*. **1 point**

45 × 338 = *n*; *n* = 15,210

7. There are 36 large fish tanks at the zoo. Each tank holds 205 gallons of water. How many gallons of water would it take to fill all of the tanks? **1 point**

7,380 gallons

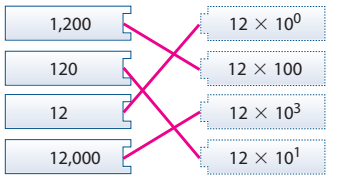
8. Kai ordered 1,012 baseball cards. Sharon ordered 5 times as many cards as Kai. Write and solve an equation to find *b*, the number of baseball cards Sharon ordered. **1 point**

1,012 × 5 = *b*;
b = 5,060

9. Ted's sales goal for this month is $6,000. Ted sells 289 tickets for $16 each. He says, "Since 300 × $20 = $6,000, I made my sales goal." Do you agree with Ted? Explain. **2 points**

No; Sample explanation: Since Ted rounded 289 to 300 and 16 to 20, he found an overestimate. So the actual sales are less than $6,000.

10. Draw lines to match each number on the left to its equivalent expression on the right. **1 point**



11. For questions 11a–11d, choose Yes or No to tell if the number 10^2 will make each equation true. **1 point**

11a. 39 × ☐ = 390 ○ Yes ● No
11b. 4 × ☐ = 400 ● Yes ○ No
11c. 20 × ☐ = 200 ○ Yes ● No
11d. 517 × ☐ = 51,700 ● Yes ○ No

12. Rosanne has 142 songs on her MP3 player. Teresa has 11 times as many songs as Rosanne. How many songs does Teresa have? **1 point**

1,562 songs

ANSWERING THE TOPIC ESSENTIAL QUESTION

What are the standard procedures for estimating and finding products of multi-digit numbers?

Restate the Topic Essential Question from the Topic Opener or project it from the Student's Edition eText.

Ask students to answer the Essential Question (verbally or in writing) and give examples that support their answers. The following are key elements of the answers to the Essential Question. Be sure that these are made explicit when discussing students' answers.

- Products of numbers and powers of 10 can be found mentally using basic facts and patterns of zeros.
  Example: $27 \times 10^3 = 27 \times 1{,}000 = 27{,}000$
  The exponent 3 means the decimal point moves three places to the right.
- Rounding or compatible numbers can be used to estimate products.
  Example: Estimate 372×42.
  Round to the nearest 10: $370 \times 40 = 14{,}800$
  Compatible numbers: $400 \times 40 = 16{,}000$
- You can multiply whole numbers using place value. Multiply the first factor and the ones in the second factor. Then multiply the first factor and the tens in the second factor. Add the partial products.
  Example: $1{,}482 \times 57$
  $7 \times 1{,}482 = 10{,}374$
  $50 \times 1{,}482 = 74{,}100$
  $10{,}374 + 74{,}100 = 84{,}474$
  So $1{,}482 \times 57 = 84{,}474$

ONLINE TOPIC ASSESSMENT

An auto-scored Topic Assessment is provided at PearsonRealize.com.

EXAMVIEW® TEST GENERATOR

ExamView can be used to create a blackline-master Topic Assessment with multiple-choice and free-response items.

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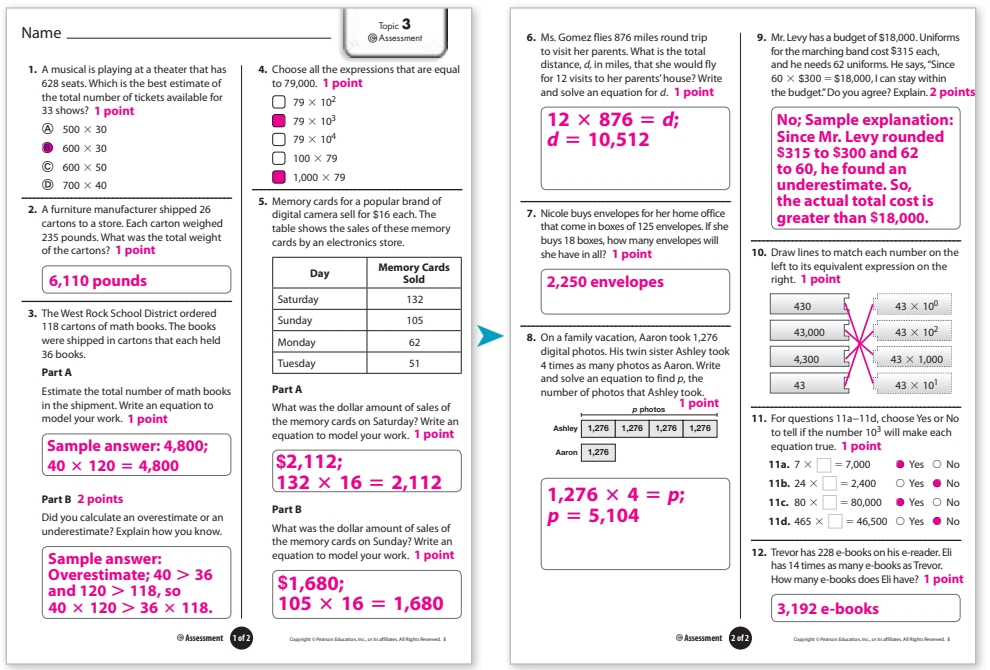
Assessment

Topic Assessment Masters



Name _____ Topic 3 Assessment

1. A musical is playing at a theater that has 628 seats. Which is the best estimate of the total number of tickets available for 33 shows? **1 point**
   - Ⓐ 500 × 30
   - Ⓑ 600 × 30
   - Ⓒ 600 × 50
   - Ⓓ 700 × 40

2. A furniture manufacturer shipped 26 cartons to a store. Each carton weighed 235 pounds. What was the total weight of the cartons? **1 point**

   6,110 pounds

3. The West Rock School District ordered 118 cartons of math books. The books were shipped in cartons that each held 36 books.

   Part A

   Estimate the total number of math books in the shipment. Write an equation to model your work. **1 point**

   Sample answer: 4,800; 40 × 120 = 4,800

   Part B **2 points**

   Did you calculate an overestimate or an underestimate? Explain how you know.

   Sample answer: Overestimate; 40 > 36 and 120 > 118, so 40 × 120 > 36 × 118.

4. Choose all the expressions that are equal to 79,000. **1 point**
   - ☐ 79×10^2
   - ☑ 79×10^3
   - ☐ 79×10^4
   - ☐ 100 × 79
   - ☑ 1,000 × 79

5. Memory cards for a popular brand of digital camera sell for $16 each. The table shows the sales of these memory cards by an electronics store.

Day	Memory Cards Sold
Saturday	132
Sunday	105
Monday	62
Tuesday	51

   Part A

   What was the dollar amount of sales of the memory cards on Saturday? Write an equation to model your work. **1 point**

   $2,112; 132 × 16 = 2,112

   Part B

   What was the dollar amount of sales of the memory cards on Sunday? Write an equation to model your work. **1 point**

   $1,680; 105 × 16 = 1,680

Assessment 1 of 2

6. Ms. Gomez flies 876 miles round trip to visit her parents. What is the total distance, *d*, in miles, that she would fly for 12 visits to her parents' house? Write and solve an equation for *d*. **1 point**

   $12 \times 876 = d$; $d = 10{,}512$

7. Nicole buys envelopes for her home office that come in boxes of 125 envelopes. If she buys 18 boxes, how many envelopes will she have in all? **1 point**

   2,250 envelopes

8. On a family vacation, Aaron took 1,276 digital photos. His twin sister Ashley took 4 times as many photos as Aaron. Write and solve an equation to find *p*, the number of photos that Ashley took. **1 point**

	p photos			
Ashley	1,276	1,276	1,276	1,276
Aaron	1,276			

   $1{,}276 \times 4 = p$; $p = 5{,}104$

9. Mr. Levy has a budget of $18,000. Uniforms for the marching band cost $315 each, and he needs 62 uniforms. He says, "Since 60 × $300 = $18,000, I can stay within the budget." Do you agree? Explain. **2 points**

   No; Sample explanation: Since Mr. Levy rounded $315 to $300 and 62 to 60, he found an underestimate. So, the actual total cost is greater than $18,000.

10. Draw lines to match each number on the left to its equivalent expression on the right. **1 point**

430	43×10^0
43,000	43×10^2
4,300	43 × 1,000
43	43×10^1

11. For questions 11a–11d, choose Yes or No to tell if the number 10^3 will make each equation true. **1 point**

11a. $7 \times \square = 7{,}000$	● Yes	○ No
11b. $24 \times \square = 2{,}400$	○ Yes	● No
11c. $80 \times \square = 80{,}000$	● Yes	○ No
11d. $465 \times \square = 46{,}500$	○ Yes	● No

12. Trevor has 228 e-books on his e-reader. Eli has 14 times as many e-books as Trevor. How many e-books does Eli have? **1 point**

    3,192 e-books

Assessment 2 of 2

Scoring Guide

Item	Points	Topic Assessment (Student's Edition and Masters)
1	1	Correct choice selected.
2	1	Correct answer
3A	1	Correct answer and equation
3B	2	Thorough explanation supports the answer.
	1	The explanation has a minor error.
4	1	All correct choices selected.
5A	1	Correct answer and equation
5B	1	Correct answer and equation
6	1	Correct answer and equation
7	1	Correct answer
8	1	Correct equation and answer
9	2	A correct answer and explanation
	1	The explanation has a minor error.
10	1	All matches correct
11	1	All correct choices selected.
12	1	Correct answer

RtI Item Analysis for Diagnosis and Intervention

Item	© Standard	DOK	MDIS
1	5.NBT.B.5	1	G65
2	5.NBT.B.5	1	G69
3A	5.NBT.B.5	1	G65
3B	5.NBT.B.5	2	G65
4	5.NBT.A.2	1	F17
5A	5.NBT.B.5	1	G69
5B	5.NBT.B.5	1	G69
6	5.NBT.B.5	1	G69
7	5.NBT.B.5	1	G69
8	5.NBT.B.5	1	G69
9	5.NBT.B.5, MP.3	3	G65
10	5.NBT.A.2	1	F17
11	5.NBT.A.2	1	F17
12	5.NBT.B.5	1	G69

The Topic Assessment Masters assess the same content item for item as the Topic Assessment in the Student's Edition.

TOPIC 3

TOPIC PERFORMANCE ASSESSMENT

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

Name _____

TOPIC 3

Performance Assessment

Baseball Apparel

Coach Sandberg wants to buy items for the baseball league. The league already has caps with the league logo on them, but the coach would like to offer the option of purchasing a T-shirt, sweatshirt, sweatpants, or jacket with the logo. Use the information in the table to answer the questions.

Jackie's Sports Store	
Item	**Item Price**
jacket	$53
sweatshirt	$32
T-shirt	$14
sweatpants	$24

1. The players asked their families and friends if they want to buy T-shirts with the league logo. If 254 people want T-shirts, what would be the total cost? Write an equation to model your work. **1 point**

   $254 \times \$14 = t$; $t = \$3{,}556$

2. Coach Sandberg wants to order 127 sweatshirts.

   Part A

   Will the total cost of the sweatshirts be greater than or less than $3,000? Use estimation to decide. Explain your reasoning. **2 points**

   Greater than; Sample explanation: I rounded 127 to 100, and I rounded 32 to 30. $100 \times \$30 = \$3{,}000$. Since $127 > 100$ and $32 > 30$, the exact product is greater than $3,000.

   Part B

   What is the total cost of 127 sweatshirts? **1 point**

   $4,064

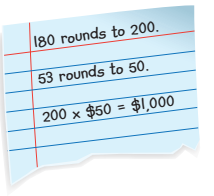
3. Which would cost more, 32 T-shirts or 14 sweatshirts? How can you tell without multiplying? **1 point**

   They would cost the same amount. I can use the Commutative Property: $32 \times 14 = 14 \times 32$.

4. There are 18×10^1 players in the league.

   Part A

   The league raised $1,560 through fundraisers. Trenton estimates the cost of buying jackets for each player in the league. He concludes that the league has raised enough money. Do you agree with Trenton? Explain. **2 points**

   No; He multiplied incorrectly. $200 \times \$50 = \$10{,}000$. Since $\$10{,}000 > \$1{,}560$, the league does not have enough money.

   Part B

   How much would it cost to order sweatpants for each player? Write and solve an equation with a variable to show your work. **1 point**

   $\$4{,}320$; $180 \times \$24 = c$; $c = \$4{,}320$

5. Which costs more: 136 sweatpants or 103 sweatshirts? How much more? **1 point**

   103 sweatshirts cost $32 more; $136 \times \$24 = \$3{,}264$, $103 \times \$32 = \$3{,}296$; $\$3{,}296 - \$3{,}264 = \$32$

6. Coach Sandberg wants to order 115 jackets and 27 caps for $12 each.

   Part A

   Estimate the total cost for his order. Show your work. **2 points**

   $6,300; jackets: $6,000; $120 \times 50 = 6{,}000$. Caps: $300; $30 \times 10 = 300$

   Part B

   What is his total cost? Compare your answer to your estimate. **2 points**

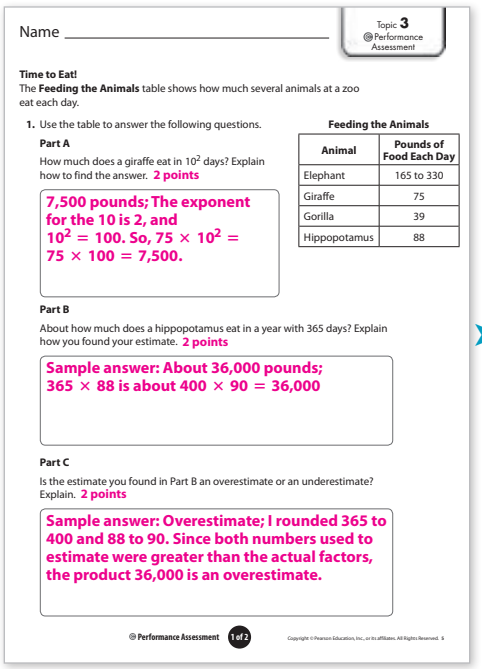
   $6,419; $115 \times \$53 = \$6{,}095$, $27 \times \$12 = \$324$, $\$6{,}095 + \$324 = \$6{,}419$. My answer is reasonable because it is close to my estimate.

Scoring Guide

Item	Points	Topic Performance Assessment in the Student's Edition
1	1	Correct equation and solution
2A	2	Correct answer and thorough explanation
	1	Correct answer but incomplete explanation
2B	1	Correct answer
3	1	Correct answer and explanation
4A	2	Correct answer and thorough explanation
	1	Correct answer and partial explanation
4B	1	Correct equation and solution
5	1	Correct answer
6A	2	Reasonable estimate and correct computation
	1	Reasonable estimate but no work is shown
6B	2	Correct answer and explanation
	1	Error in estimate or in explanation

Item Analysis for Diagnosis and Intervention for the assessment in the Student's Edition is at the upper right of page 162A.

Topic Performance Assessment Masters



Name _____

Topic 3 Performance Assessment

Time to Eat!
The **Feeding the Animals** table shows how much several animals at a zoo eat each day.

1. Use the table to answer the following questions.

Feeding the Animals

Animal	Pounds of Food Each Day
Elephant	165 to 330
Giraffe	75
Gorilla	39
Hippopotamus	88

Part A
How much does a giraffe eat in 10^2 days? Explain how to find the answer. **2 points**

7,500 pounds; The exponent for the 10 is 2, and $10^2 = 100$. So, $75 \times 10^2 = 75 \times 100 = 7{,}500$.

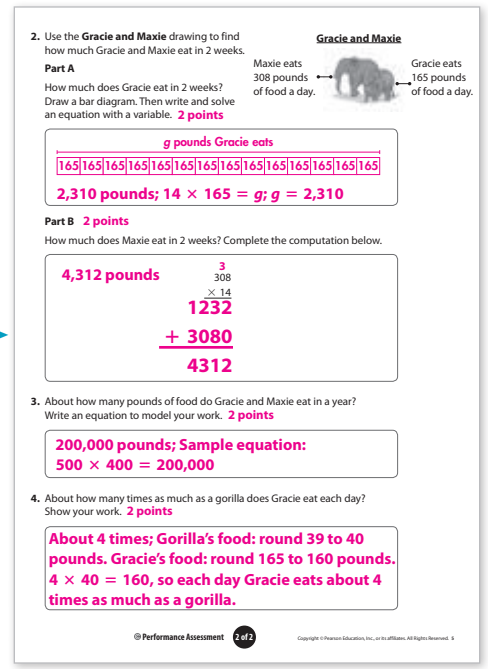
Part B
About how much does a hippopotamus eat in a year with 365 days? Explain how you found your estimate. **2 points**

Sample answer: About 36,000 pounds; 365×88 is about $400 \times 90 = 36{,}000$

Part C
Is the estimate you found in Part B an overestimate or an underestimate? Explain. **2 points**

Sample answer: Overestimate; I rounded 365 to 400 and 88 to 90. Since both numbers used to estimate were greater than the actual factors, the product 36,000 is an overestimate.

Performance Assessment 1 of 2



2. Use the **Gracie and Maxie** drawing to find how much Gracie and Maxie eat in 2 weeks.

Gracie and Maxie

Maxie eats 308 pounds of food a day. Gracie eats 165 pounds of food a day.

Part A
How much does Gracie eat in 2 weeks? Draw a bar diagram. Then write and solve an equation with a variable. **2 points**

g pounds Gracie eats

165	165	165	165	165	165	165	165	165	165	165	165	165	165

2,310 pounds; $14 \times 165 = g$; $g = 2{,}310$

Part B **2 points**
How much does Maxie eat in 2 weeks? Complete the computation below.

4,312 pounds

$$\begin{array}{r} {\scriptstyle 3} \\ 308 \\ \times\ 14 \\ \hline 1232 \\ +\ 3080 \\ \hline 4312 \end{array}$$

3. About how many pounds of food do Gracie and Maxie eat in a year? Write an equation to model your work. **2 points**

200,000 pounds; Sample equation: $500 \times 400 = 200{,}000$

4. About how many times as much as a gorilla does Gracie eat each day? Show your work. **2 points**

About 4 times; Gorilla's food: round 39 to 40 pounds. Gracie's food: round 165 to 160 pounds. $4 \times 40 = 160$, so each day Gracie eats about 4 times as much as a gorilla.

Performance Assessment 2 of 2

Item Analysis for Diagnosis and Intervention

Item	Standard	DOK	MDIS
1	5.NBT.B.5, MP.4	2	G69
2A	5.NBT.B.5, MP.3	2	G65
2B	5.NBT.B.5, MP.1	2	G69
3	5.NBT.B.5, MP.2	3	F39
4A	5.NBT.A.2, 5.NBT.B.5, MP.3	3	G65
4B	5.NBT.B.5, MP.4	2	G69
5	5.NBT.B.5, MP.6	2	F7, G69
6A	5.NBT.B.5, MP.1	2	G65
6B	5.NBT.B.5, MP.6	2	G69

Scoring Guide

Item	Points	Topic Performance Assessment in the Student's Edition
1A	2	Correct answer and explanation
	1	Correct answer or explanation
1B	2	Correct estimate and explanation
	1	Correct estimate or explanation
1C	2	Correct answer and explanation
	1	Correct answer or explanation
2A	2	Correct diagram, equation, and solution
	1	Correct answer and explanation
2B	2	Correct answer and partial products
	1	Correct answer or correct partial products
3	2	Correct answer and equation
	1	Correct answer or correct equation
4	2	Correct answer and explanation
	1	Correct answer or explanation

Item Analysis for Diagnosis and Intervention

Item	Standard	DOK	MDIS
1A	5.NBT.A.2, MP.7	2	F17, G60
1B	5.NBT.B.5, MP.2	2	G65, G69
1C	5.NBT.B.5, MP.3	3	G65
2A	5.NBT.B.5, MP.4	2	F37, J10
2B	5.NBT.B.5, MP.6	2	G69
3	5.NBT.B.5, MP.4	1	G69
4	5.NBT.B.5, MP.1	3	G42