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7

McGraw-Hill Education

Advanced Science Program

United Arab Emirates Edition

Activity Lab Manual

Mc Graw Hill Education

Answer Key

McGraw-Hill Education

Advanced Science Program

United Arab Emirates Edition

GRADE 7 • VOLUME 2

Activity Lab Manual

Mc Graw Hill Education

Brief Contents

Lesson 1 Using the Periodic Table

Skim *Lesson 1 in your book. Read the headings, and look at the photos and illustrations. Identify three things you want to learn more about as you read the lesson. Record your ideas in your Science Journal.*

Main Idea

What is the periodic table?

Developing a Periodic Table

Accept all reasonable responses. Sample answers are shown.

Students might also cite reactivity.

Details

Define periodic table.

The periodic table is a chart of the elements arranged into rows and columns according to their physical and chemical properties.

Organize *information about the* periodic table *in the chart below.*

There are more than 100 known elements.	Scientists use a table to organize the elements.	The periodic table is a chart of the elements arranged into rows and columns according to their physical and chemical properties and used to determine relationships among the elements.

Discuss *information about Mendeleev.*

Dimitri Mendeleev

Who he was:	What he developed:
Russian chemist and teacher who lived in the 1800s	periodic table of the elements; a system for organizing the elements

Name *four properties of elements that Mendeleev studied when developing his* periodic table.

1. density
2. melting or boiling point
3. color
4. atomic mass

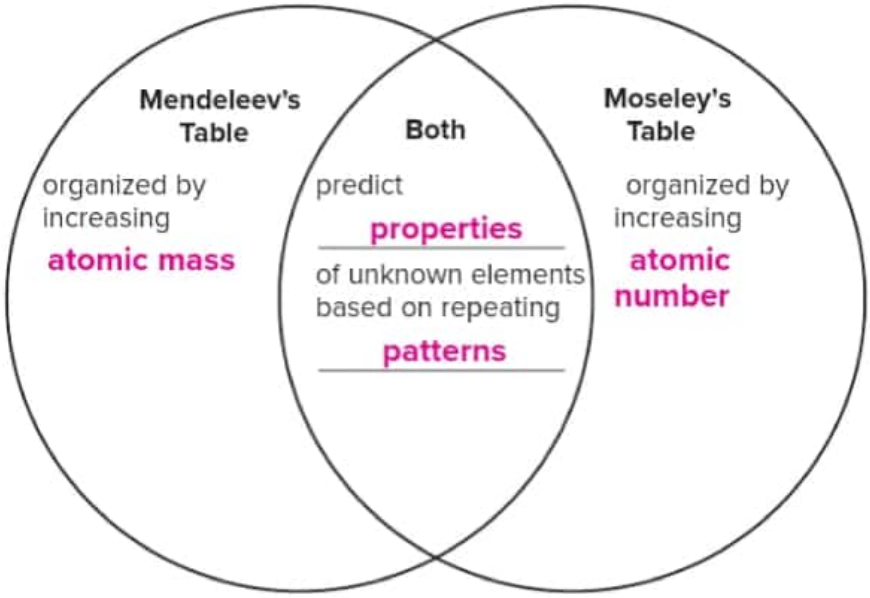
Main Idea

Details

Recall *the definition of atomic number.*

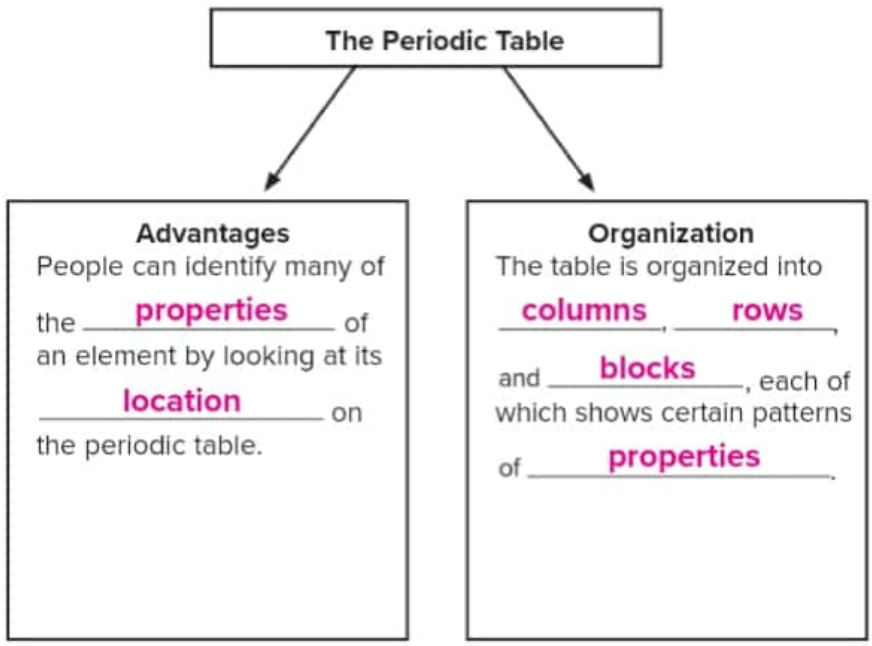
The atomic number of an element is the number of protons in the nucleus of each of that element's atoms.

Compare *Mendeleev's* periodic table *with that of Moseley by completing the Venn diagram.*



Today's Periodic Table

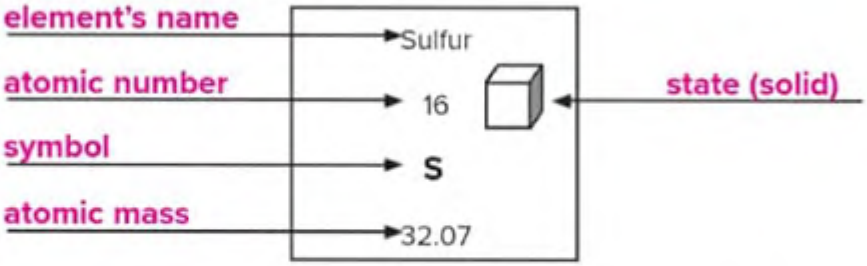
Discuss *today's* periodic table *in the organizer below.*



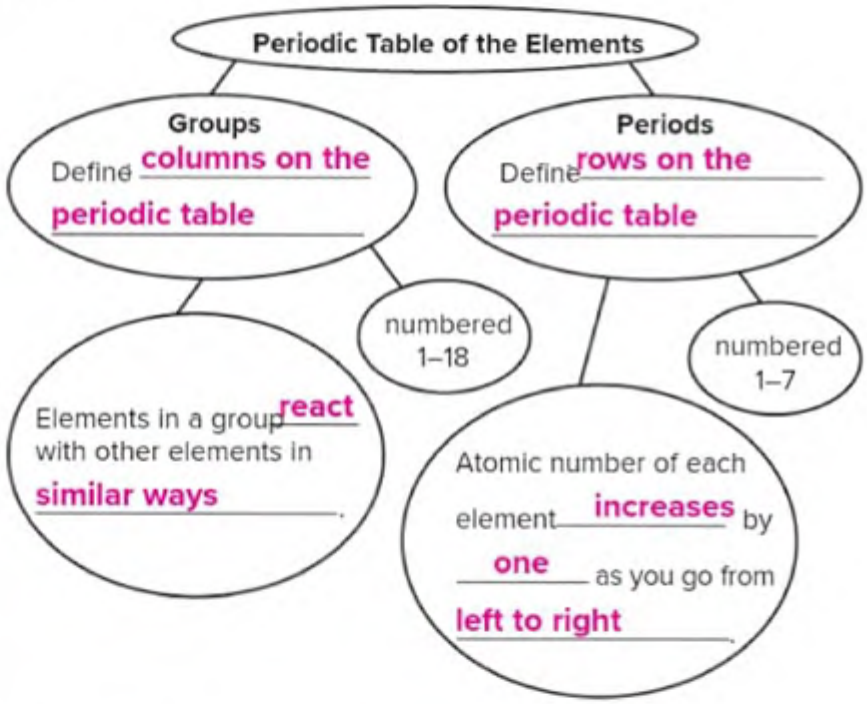
Main Idea

Details

Interpret *the symbols on the element key below. Identify what each symbol stands for.*



Organize *information about how the* periodic table *is arranged by completing the concept map.*



Classify *elements by completing the chart.*

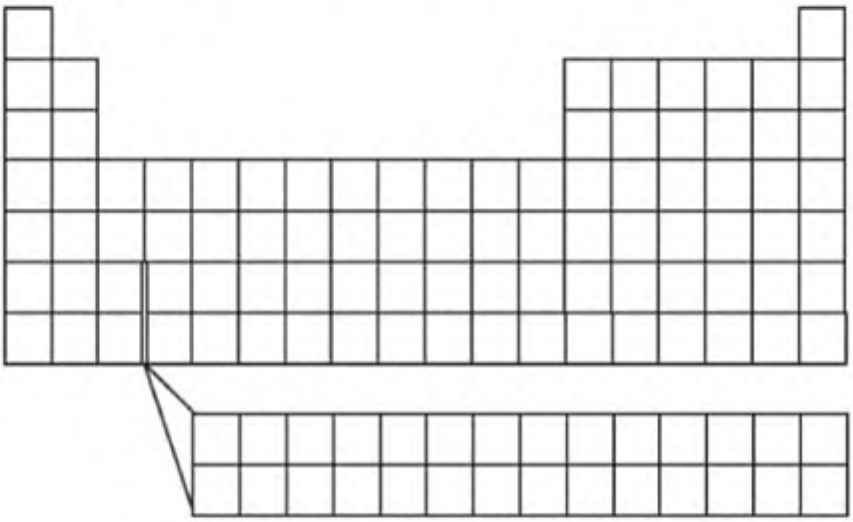
	Position on the Periodic Table	Properties
Metals	left side and middle of table	shiny; conduct heat and electricity
Nonmetals	except for hydrogen, on right side of table	often occur as gases; do not conduct heat or electricity
Metalloids	between the metals and nonmetals	have properties of both metals and nonmetals

Main Idea

Students should color this periodic table in a manner similar to Figure 4 in their texbooks.

Details

Identify *the regions of the* periodic table *as metals, nonmetals, or metalloids. Color each region with a different color. Label each area that you shade.*



How Scientists Use the Periodic Table

Assess *information about the* periodic table. *Read the statement below. If the statement is true, write* true *on the line. If it is false, rewrite the underlined portion of the statement so that it is true.*

Whenscientists produce a few atoms of a synthetic element in the laboratory, they have no way to determine the element's properties.

Sample answer: False; they can use the periodic table to predict the element's properties.

Analyze It Earth's atmosphere is composed mostly of nitrogen and oxygen. In order to float, balloon has to be filled with something that is lighter than air. Use the information on th periodic table to find out which elements might be suitable for making a balloon float. Explai your choice or choices.

Accept all reasonable responses. Sample answer: Six elements on the periodic table are lighter than oxygen and nitrogen. Only two of them are found as gases, so only those two—hydrogen and helium—could be used to make a balloon float in air.

Lesson 2 Metals

Scan *Lesson 2 in your book. In your Science Journal, write three questions you have about metal. Try to answer your questions as you read.*

Main Idea

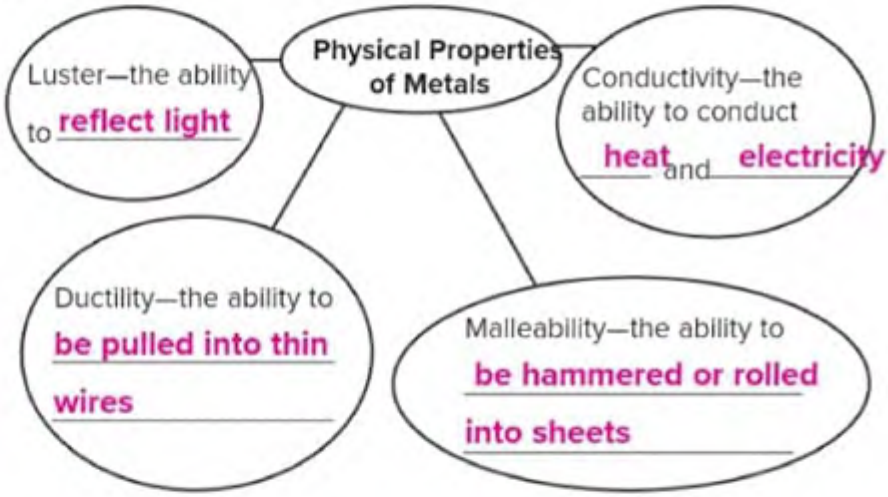
What is a metal?

Sample answers are shown.

Group 1: Alkali Metals

Details

Describe *the physical properties of* metals *by completing the spider map.*



Identify *other physical properties of* metals.

1. gray in color, except gold and copper
2. solid at room temperature, except for mercury
3. greater density, strength, boiling point, melting point than other elements

Name *the 6* alkali metals.

Alkali metals are the elements in group 1 of the periodic table. The six alkali metals are lithium, sodium, potassium, rubidium, cesium, and francium.

Assess *information about* alkali metals. *Circle the correct choice in each set of parentheses.*

Characteristics of Alkali Metals

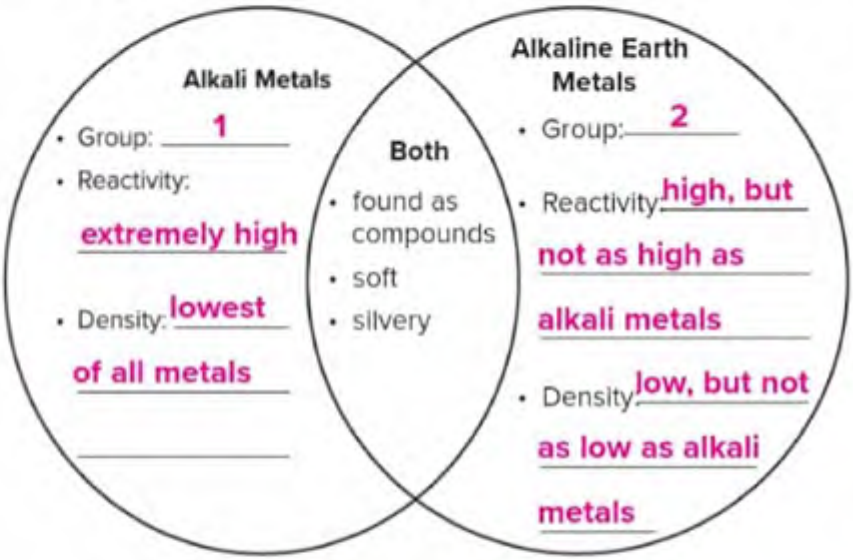
- react (quickly / slowly) with other elements
- found in nature (as elements / compounds)
- have a (dull / shiny) appearance
- (soft / hard)
- have the (highest / lowest) densities of all metals

Main Idea

Group 2: Alkaline Earth Metals

Details

Compare and contrast *the* alkali metals *and the* alkaline earth metals *by completing the Venn diagram.*



Groups 3–12: Transition Elements

Organize information *about* transition elements *by completing the table* Sample answers are shown.

Location on the periodic table	Properties	Uses
in columns (groups) 3–12; in two blocks, one at the center of the table and one below the main table	greater density than alkali or alkaline earth metals; some are free elements; all are metals; somewhat corrosion resistant	building materials, coins, jewelry, electrical wires; form colorful compounds for use in paints and pigments

Help students visualize the location of the lanthanide and actinide series. Copy the table, and then cut out the lanthanide and actinide series. Make a loop from the cutout, and tape the loop to the main table between elements 57 and 72.

Describe *the lanthanide and actinide series.*

Accept all reasonable responses. Sample answers: transition elements found in the two rows below the table; transition elements between lanthanum and hafnium, and between actinium and rutherfordium

Main Idea

Sample answers are shown.

Details

Identify *the periods and uses of the* transition elements *in the chart.*

Elements	Period	Uses
copper	4	coins, cookware, jewelry
gold	6	coins, jewelry
silver	5	coins, jewelry
lanthanides	6	strong magnets
actinides	7	fuel

Categorize *each of these* transition elements. *Use information from a periodic table to match each element's symbol with its description.*

- americium (Am)
- francium (Fr)
- lead (Pb)
- mercury (Hg)

Symbol	Description
Pb	Least metallic of the four elements listed
Am	Metal that has 95 protons
Fr	Element that is more metallic than cesium
Hg	Metal that is liquid at room temperature

Patterns in Properties of Metals

Describe *the arrangement of* metals *in the periodic table in terms of their properties.*

Metallic properties (luster, malleability, and conductivity) decrease from left to right across the periods.

Analyze It Which element are you more likely to find as a free element rather than a compound, lead or calcium? Explain how using the periodic table can help answer this question.

Accept all reasonable responses. Sample answer: Metals to the left of the table are more reactive. Lead (Pb) is on the far right side of the metals; therefore, it is far less reactive than calcium. As a result, you are more likely to find lead as a free element.

Lesson 3 Nonmetals and Metalloids

Predict *three facts you will learn about in Lesson 3. Look at the illustrations in the lesson to give you some clues. Write your facts in your Science Journal.*

Main Idea

The Elements of Life

How are nonmetals different from metals?

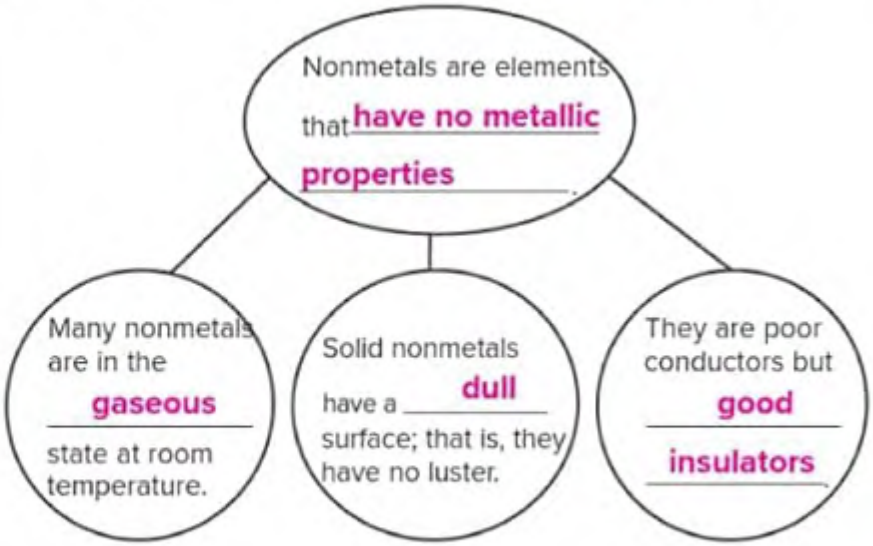
Details

Discuss *the elements of life. Cross out the incorrect words in the parentheses.*

The human body is made up of mostly (~~metals,~~ nonmetals).

Ninety-six percent of the mass of the human body is composed o (oxygen, nitrogen, ~~iron,~~ carbon, ~~silicon, copper~~), and hydrogen.

Explain nonmetals *by completing the spider map.*



Indicate *which elements in groups 14–16 are* nonmetals. *Classify each of these elements as a solid or gas at room temperature.*

Group 14	Group 15	Group 16
carbon; solid	nitrogen; gas	oxygen; gas
	phosphorus; solid	sulfur; solid
		selenium; solid

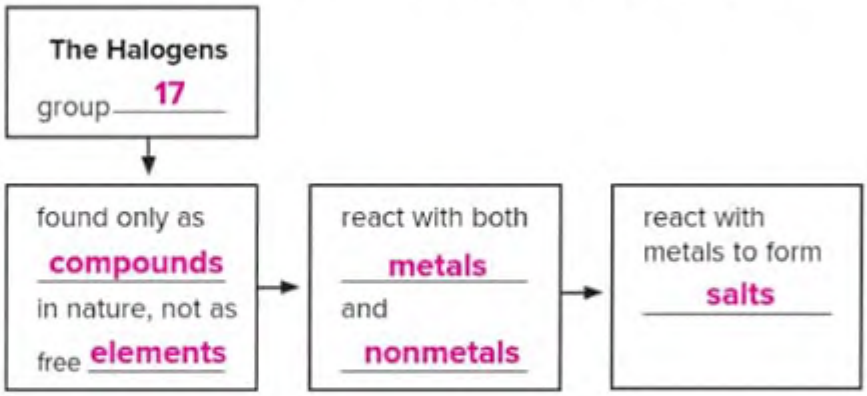
Recall *the feature of the periodic table that helps to locate* nonmetals.

The color coding on the periodic table indicates which elements are nonmetals.

Main Idea

Details

Describe *the* halogens *by completing the graphic organizer.*



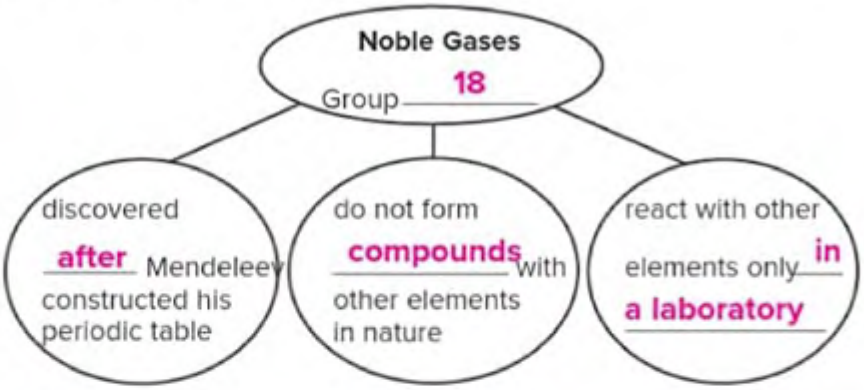
Analyze *the properties of the elements in group 17. Draw an upward or downward arrow and describe how reactivity changes as you move in that direction through the group.*

Students could also draw an upward arrow and write that reactivity increases moving up through the group.

fluorine
chlorine
bromine
iodine
astatine

Reactivity decreases as you move down the group.

Organize *information about the* noble gases *by completing the spider map.*



Explain *how hydrogen shows properties of both metals and* nonmetals.

Sample answer: In its liquid form, hydrogen conducts electricity like a metal. It is very reactive like an alkali metal. Like some nonmetals, hydrogen is a gas at room temperature. Under the conditions found on Earth, hydrogen acts as a nonmetal.

Main Idea	Details
Metalloids	**Define** metalloid. A metalloid is an element that has physical and chemical properties of both metals and nonmetals. **Classify** *characteristics of* metalloids *as like metals and like* nonmetals.

Metalloids	
Like Metals	**Like Nonmetals**
conduct electricity at high temperatures	stop electricity from flowing at low temperatures

Define semiconductor, *and tell how it is useful.*
Sample answer: A semiconductor conducts electricity but not as well as a metal does. A semiconductor is useful in electronic devices, because it conducts electricity well at high temperatures and stops electricity from flowing at lower temperatures.

Metals, Nonmetals, and Metalloids

Explain *how knowing the position of an element on the periodic table can help you find a proper use for an element.*
Accept all reasonable responses. Sample answer: Elements are arranged by properties in the periodic table. If you needed a metal, for example, you would know to choose elements from the left side of the table. Choosing an element from the right side of the table would not provide the properties you were seeking.

Connect It Without actually seeing the elements themselves, what can you infer from th positions of polonium and bismuth on the periodic table? How reactive do you think they mig be? What do you think they might look like?

Accept all reasonable responses. Sample answer: I would expect them to be more metal than the elements above them but not as reactive as the elements to the left of them. They are probably heavy and might have a metallic luster.

Review

The Periodic Table

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned. Complete the **What I Learned** *column of the K-W-L chart at the beginning of this chapter.*

Use this checklist to help you study.

- ❑ Study your *Activity Lab Manual* on this chapter.
- ❑ Study the definitions of vocabulary words.
- ❑ Reread the chapter, and review the charts, graphs, and illustrations.
- ❑ Review the Understanding Key Concepts at the end of each lesson.
- ❑ Look over the Chapter Review at the end of the chapter.

THE BIG IDEA

Summarize It Reread the chapter Big Idea and the lesson Key Concepts. Think of the periodic table as a map, with the top being north, the bottom south, the right side east, and the left side west. How would you describe the locations of hydrogen, the alkali metals, metals, nonmetals, and metalloids?

Accept all reasonable responses. Sample answer: Hydrogen would be in the northwest corner of the map. The alkali metals would be in the western portion. The central portion of the map would be filled with metals until you approach the east. Then you would find metalloids, and finally, on the eastern border, you would find the nonmetals.

Challenge *Create your own periodic table. Organize something other than the elements. Choose a group of items that might exhibit repeating, predictable patterns of characteristics. List those characteristics, and sort the items into columns and rows. Some possible items for your periodic table might be music or food.*

Lesson 1 The Cell Cycle and Cell Division

Scan *Lesson 1. Read the headings and the bold words. Look at the pictures. Identify three facts you discovered about the cell cycle and cell division. Record them in your Science Journal.*

Main Idea

The Cell Cycle

Provide microscope slides of animal and plant cells for students to view.

Details

Explain *the* cell cycle.

Cell cycle: a cycle that most cells in an organism go through; a cycle of growth, development, and division

Organize *information about the 2 main phases of the* cell cycle.

Main Phases of the Cell Cycle

Interphase	Mitotic Phase
Duration: longer shorter	Duration: longer shorter
Description: period of growth and replication of organelles and DNA	Description: phase during which cell reproduces

Complete *the sentence to explain why the length of a* cell cycle *varies.*

The length of a cell cycle depends on the type of cell that is dividing.

Main Idea

Interphase

Details

Represent *the relative length of each stage of* interphase *by labeling the time line.*

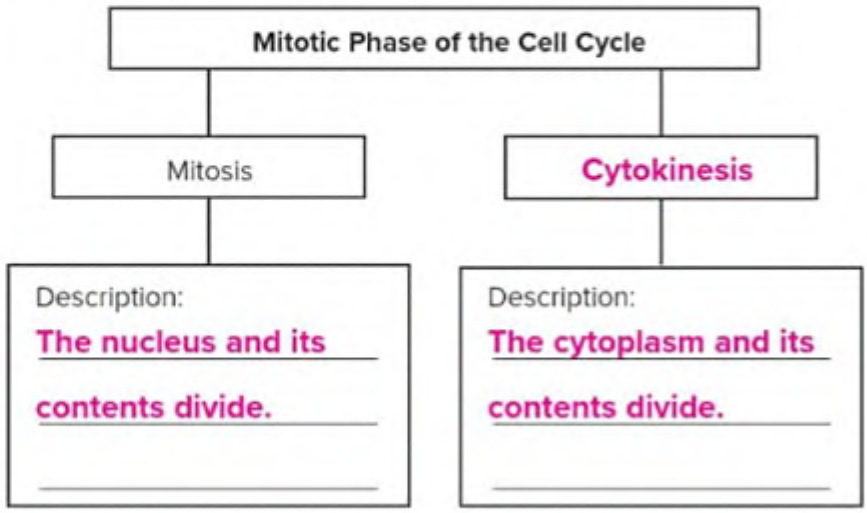
Describe *each stage of* interphase.

Stages of Interphase	
Stage	**Description**
G_1	growth and normal cell functions
S	growth and DNA (or chromosome) replication; The two new strands of DNA are called sister chromatids and are held together by the centromere.
G_2	growth and preparation for mitosis

Assess *information about organelle replication. Read the statement below. If the statement is true, write* **true** *on the line. If it is false, rewrite the underlined portion of the statement so that it is true.*

Organelle replication occurs only during the S stage of interphase. false; during all stages

Organize *information to describe the stages in the mitotic phase of the* cell cycle.



Main Idea

Details

The Mitotic Phase

Identify *each phase of* mitosis.

Prophase
DNA condenses; spindle fibers begin to form.

Metaphase
Chromosomes line up in a single file at the middle of the cell.

Anaphase
Sister chromatids separate and pull to opposite sides.

Telophase
Nuclear membrane reforms; chromosomes unwind.

Describe cytokinesis *in plants and animals.*

In animals: Plasma membrane fibers contract around the cell; the cell divides.

In plants: The cell plate grows and joins the cell wall; two cells form.

Results of Cell Division

Summarize *the results of the* cell cycle.

1. Reproduction	makes new organisms
2. Growth	allows multicellular organisms to grow from one cell to many
3. Replacement	replaces worn-out or damaged cells with new cells
4. Repair	produces new cells that fix damaged areas

Connect It Apply what you have learned to explain what probably happened when the bean plant grew overnight in the story of *Jack and the Beanstalk*.

Accept all reasonable responses. Sample answer: For the plant to grow so rapidly, the cell cycle must have been very short. Rapid cell division would allow the plant to grow to a great height overnight.

Lesson 2 Levels of Organization

Predict *three facts that will be discussed in Lesson 2 after reading the headings. Write your predictions in your Science Journal.*

Main Idea

Life's Organization

Details

Summarize *life's organization.*

All organisms are made of cells .

Unicellular Organisms

Organize *information about unicellular organisms by completing the graphic organizer.*

Unicellular Organisms

Prokaryotes

Description:
- cell without a membrane-bound nucleus
- smaller than eukaryotes ; some live in colonies

Eukaryotes

Description:
- cell has a nucleus surrounded by a membrane
- many specialized organelles

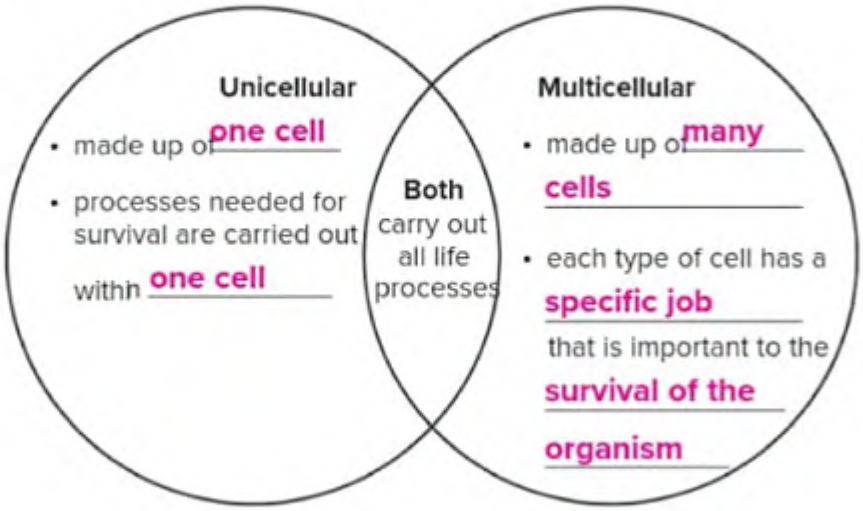
Behavior
- obtain energy
- respond to their environment
- grow
- reproduce

Main Idea

Multicellular Organisms

Details

Compare and contrast *unicellular and multicellular organisms.*



Organize *information about* cell differentiation.

Use an envelope chart to list the levels of cell differentiation for class reference.

Cell Differentiation

Definition: the process by which cells become different types of cells

In plants (meristems)	In animals (stem cells)
located: in different parts of the plant, including the tips of roots and stems	in embryos: unspecialized; develop into all the different cells of the organism
what it does: produces different types of plant cells with specialized structures and functions, such as transporting materials, making food, or protection	in adults: important for repair and replacement

Main Idea

Details

Identify *the 4 main types of animal* tissue.

1. muscle
2. epithelial
3. nervous
4. connective

Identify *3 main types of plant* tissue, *and tell the function of each.*

Plant Tissue	
Type	**Function**
1. Dermal	provides protection and helps reduce water loss
2. Vascular	transports water and nutrients from one part of a plant to another
3. Ground	provides storage and support; location of photosynthesis

Sequence *the organization of cells,* tissues, organs, *and* organ systems *in a multicellular organism.*

Cells are organized in tissues .

Different tissues working together to perform a particular job are called organs .

Groups of organs that work together to complete a series of tasks are called organ systems .

Many organ systems working together make up an organism .

Connect It The cells of all your organs have the same DNA in their nuclei, yet all perform different jobs in your body. Explain how this can be so. Use the term *cellular differentiation* your explanation.

Sample Answer: Different cell types use different parts of the instructions on their chromosomes. Many different types of cells can result from cellular differentiation.

Review

From a Cell to an Organism

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned.

Use this checklist to help you study.

- ❑ Complete your Foldables® Chapter Project.
- ❑ Study your *Science Notebook* on this chapter.
- ❑ Study the definitions of vocabulary words.
- ❑ Reread the chapter, and review the charts, graphs, and illustrations.
- ❑ Review the Understanding Key Concepts at the end of each lesson.
- ❑ Look over the Chapter Review at the end of the chapter.

THE BIG IDEA

Summarize It Reread the chapter Big Idea and the lesson Key Concepts. Draw the 4 phases of mitosis, and label your drawing. Tell how mitosis is important for both unicellular and multicellular organisms.

Students' drawings should show the four phases of mitosis with the terms *prophase*, *metaphase*, *anaphase*, and *telophase* beside the appropriate stages. Students should explain that in unicellular organisms, mitosis results in the production of new organisms. In multicellular organisms, mitosis results in new cells for growth, development, and repair.

Challenge *Unicellular organisms are sometimes called "simple" organisms. Imagine that you are involved in a debate and must argue against this description. What would you say?*

Lesson 1 The Skeletal System

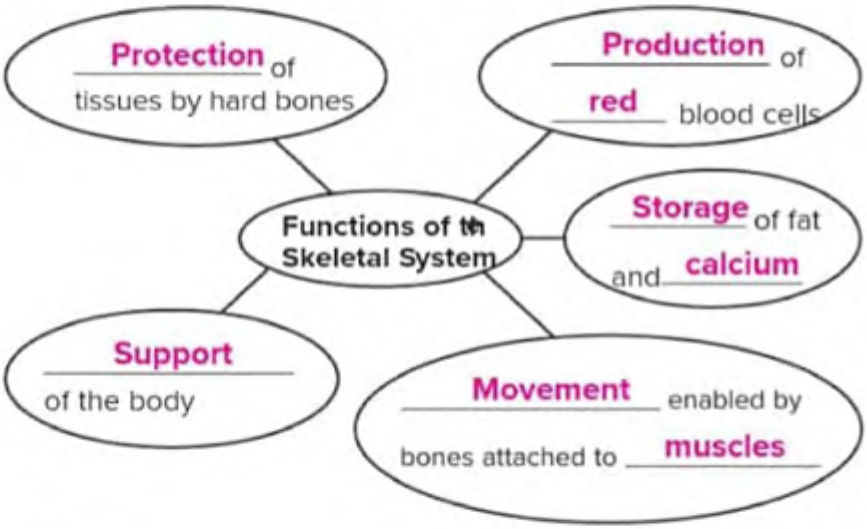
Skim *Lesson 1 in your book. Read the headings, and look at the photos and illustrations. Identify three things you want to learn more about as you read the lesson. Write your ideas in your Science Journal.*

Main Idea

Functions of the Skeletal System

Details

Identify *the functions of the* skeletal system.



Structure of Bones

Describe *2 types of bone tissue and bone marrow.*

Bone Tissue	
Compact	**Spongy**
the hard, outer part of bones; a dense web of fibers	has small holes that make it look like a sponge and make the bone less dense
Bone Marrow	
Red	**Yellow**
where red blood cells are made; found in the spongy ends of long bones and in some flat bones, such as the ribs	found inside the longest bones; stores fat

Main Idea

Details

Describe *the location and function of* cartilage *and* periosteum, *two types of bone coverings.*

Bone coverings

- cartilage: **found at the end of bones; prevents rubbing**
- periosteum: **surrounds bone not covered by cartilage; produces new bone; nourishes bone**

Sequence *the steps in bone formation. Include the purpose of the growth plate.*

Before birth: **The skeleton is made mostly of cartilage.**

↓

Infant: **The cartilage begins to be replaced by bone.**

↓

Children and Young Teens: **Long bones have growth plates, which produce cartilage that is then replaced by bone tissue.**

Joints

Classify *the types of* joints.

Types of Joints

- Immovable
  - Example: **skull**
- Movable
  - **ball and socket**
    - Example: hips
  - hinge
    - Example: **knee**
  - **pivot**
    - Example: **neck**

Main Idea

Bone Injuries and Diseases

Details

Sequence *how bone fractures are treated.*

A bone breaks.

↓

A cast or a metal plate and screws are applied. These materials hold the bone together while it heals.

Define arthritis, *and then draw an outline of a hand and color the location of the joints red.*

arthritis: a disease in which joints become irritated and inflamed, such as when cartilage in joints is damaged or wears away

Drawings should show a hand with the major joints colored red.

Draw *how the backbone of a person with* osteoporosis *changes over time.*

55 years	65 years	75 years
Drawings should show a backbone with normal curve.	Drawings should show a backbone with more curvature.	Drawings should show a backbone with severe curvature.

Main Idea

Healthy Bones

Details

Complete *the cause-and-effect chart to detail the effect of behaviors on bone health.*

Cause	Effect
Eating a balanced diet	provides calcium and vitamin D, which keeps bones strong
Participating in weight bearing exercises	strengthens bones and builds new bone tissue
Not getting enough calcium	causes bones to become weak as the body uses calcium stored in them
Getting enough vitamin D	helps the body use calcium

The Skeletal System and Homeostasis

Identify *how bones contribute to the body's* homeostasis.

Healthy bones supply calcium to nerves, muscles, and heart.

Healthy bones help a person respond to unpleasant stimuli with the ability to move quickly.

A healthy skeletal system is important in maintaining homeostasis.

Analyze It Describe what your body would be like without bones.

Accept all reasonable responses. Sample answer: Without bones, your body would not have the structural support to remain upright. Overall health would suffer because bone supply calcium to the nerves, muscles, and heart. Injuries could be more common becau bones are hard and rigid and protect the soft tissues of the body.

Lesson 2 The Muscular System

Scan *Lesson 2 in your book. Write three questions you have about your muscles in your Science Journal. Try to answer your questions as you read.*

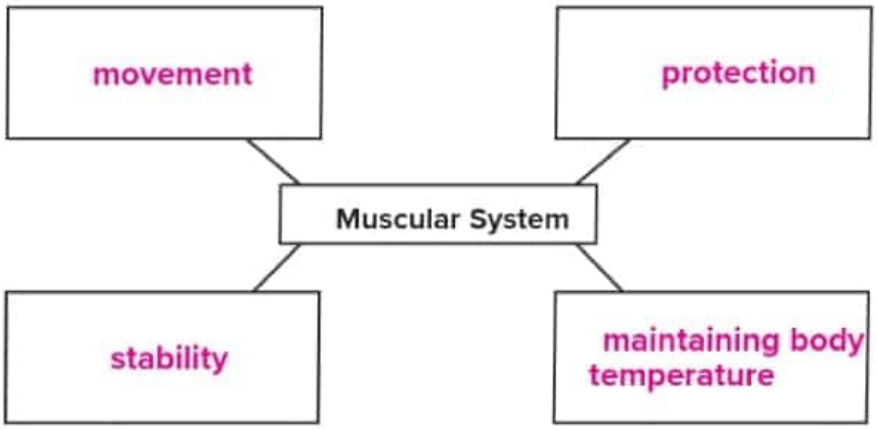
Main Idea

Functions of the Muscular System

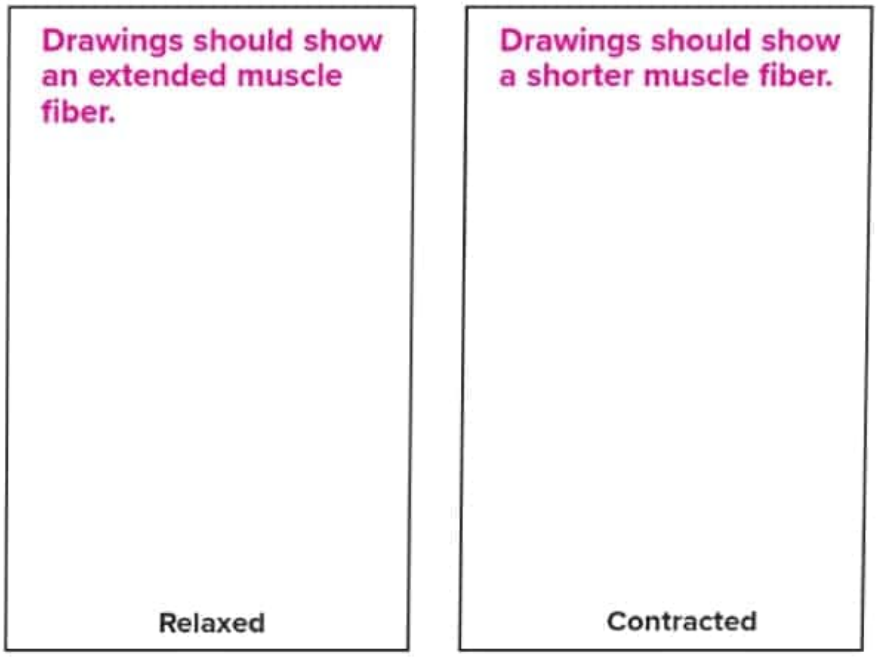
Have students flex their wrists so that they can feel muscle as it contracts and relaxes.

Details

Organize *information about the important functions of the muscular system.*



Draw *a relaxed* muscle *and a contracted* muscle.



Describe *the role of tendons.*

Main Idea

Details

Identify *how* muscle *contractions affect the body's temperatur regulation.*

Muscles contract ⇨ Chemical energy is changed to thermal energy, which warms the body.

Types of Muscles

Summarize *the 3 types of* muscle *tissue. Describe and give an example of each type.*

Type of Muscle	Description	Example
Skeletal , or voluntary	muscles that you can consciously control; attach to bones; work in pairs; can become stronger with exercise	bicep and tricep
Cardiac, or heart	type of involuntary muscle found only in the heart; have discs that enable these muscles to contract in unison	heart
Smooth, or involuntary	named for smooth appearance; shorter and smoother than skeletal muscles	lining of stomach, intestines, and blood vessels

Students can squeeze gelatin or water in long balloons to simulate the movement of smooth muscles.

Main Idea

Details

Healthy Muscles

Detail *the effects of behaviors on* muscle *health.*

Cause	Effect
Eating a healthy diet	provides energy to muscles and helps keep them strong
Not getting enough exercise	causes muscles to lose size and strength; increases risk of heart disease and injuries
Muscle loss	causes increased risk of heart disease and bone injuries; joints become unstable

The Muscular System and Homeostasis

Sequence *how the muscular system helps maintain homeostasis.*

You are playing in a soccer game. The temperature is 10°C. You feel cold.

⇩

The game begins. You start to exercise (or move).

⇩

As you move, your muscles change chemical energy to thermal energy. Your body gets warmer.

⇩

Your muscle cells also need more oxygen and need to get rid of wastes. Cardiac muscles of the heart contract more often and pump more blood. More oxygen is carried to the cells.

Connect It Suppose that you were on a school bus that broke down on a cold winter day. What could you suggest to help keep everyone warm?

Accept all reasonable responses. Sample answer: I know that exercise moves muscles. Muscles convert chemical energy into thermal energy and will help to warm the body. I would try to get everyone to move—jumping, wiggling, or hopping in place.

Main Idea

Structures of the Skin

Details

Organize *information about the structures of the skin. Include at least three facts about each layer.*

Layer	Description of function and structure
Epidermis	outmost layer of skin; only layer in direct contact with the outside environment; produces melanin, which absorbs some ultraviolet rays
Dermis	located below the epidermis; a thick layer that gives skin strength, nourishment, and flexibility; contains sweat glands, nerves, hair follicles, and muscles
Fatty layer	innermost layer of skin; insulates the body, provides a protective padding, and stores energy; can be thin or thick, depending on location on the body

Assess *information about structures of the skin. Read the statements below. If the statement is true, write* true *on the line. If the statement is false, rewrite the sentence so the underlined portion is true.*

The epidermis is tough and thick. False: The epidermis is tough and thin.

The fatty layer insulates the body. True

Melanin is a layer of skin that absorbs some of the Sun's damaging ultraviolet rays. False: Melanin is a pigment that absorbs some of the Sun's damaging ultraviolet rays.

Main Idea — Details

Skin Injuries and Repair

Summarize *three kinds of skin injuries. Write a short description of each kind of injury.*

Skin Injuries

bruise:	cut:	burn:
area in which blood vessels in skin are broken, but the skin is not cut or opened	a break in one or more layers of skin	damage to skin from chemicals, radiation, electricity, or friction; extreme hot or cold temperatures

Healthy Skin

Identify *how behaviors affect skin health.*

Cause	Effect
Exposure to sunlight	can cause permanent damage to the skin, including wrinkles, dry skin, and skin cancer
Lotion and gentle soap	lotion keeps skin moist; gentle soap cleanses the skin

The Skin and Homeostasis

Describe *how the skin helps maintain homeostasis.*

skin + circulatory system = body temperature regulated

skin + nerves + muscles = reaction to stimuli

→ Homeostasis

Connect It Suppose you hit your thumb with a hammer. What would you expect your thumb to look like the next day? What would it look like the next week?

Sample answer: The next day, the skin around the injured area would be black and blue a the red blood cells break down. In a week, the bruise would probably be greenish-yellow, indicating that the bruise is slowly fading away.

Lesson 1 Nutrition

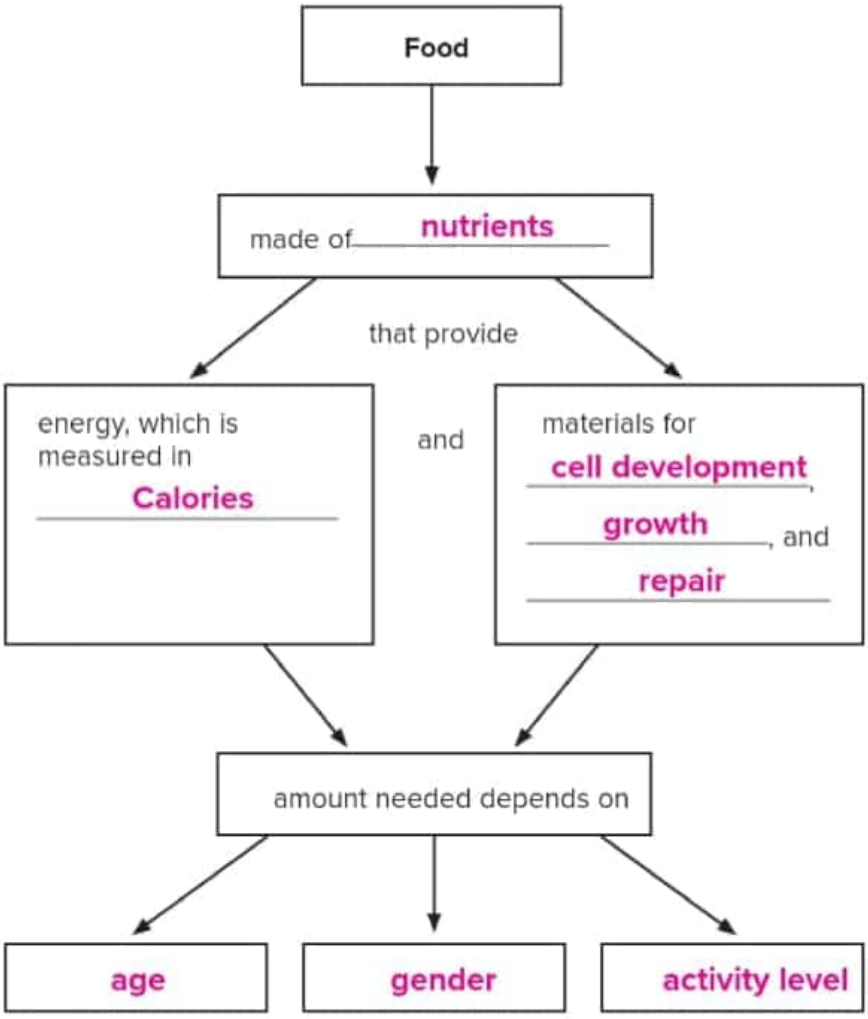
Scan *Lesson 1. Read the lesson titles and bold words. Look at the pictures. Identify three facts that you discovered about nutrition. Record these facts in your Science Journal.*

Main Idea

Why do you eat?

Details

Relate *why your body needs food in the organizer below.*



Groups of Nutrients

Identify *the 6 groups of nutrients.*

1. proteins
2. carbohydrates
3. fats
4. vitamins
5. minerals
6. water

Main Idea

Details

Describe *the 6 groups of nutrients.*

Term	Functions	Source
Proteins	large molecules that contain carbon, hydrogen, and oxygen; made of amino acids	red meat, eggs, beans, peanut butter
Carbohydrates	molecules made of carbon, hydrogen, and oxygen atoms; usually the body's major source of energy 3 forms: a. starches b. sugars c. fibers	red beans, vegetables, fruit
Fats	provide energy and help absorb vitamins; a major part of cell membranes 2 types: a. saturated b. unsaturated	fish, nuts, liquid vegetable oils
Vitamins	needed in small amounts for growth, regulating body functions, and preventing disease	certain foods, supplements
Minerals	help the body regulate many chemical reactions	certain foods, supplements
Water	needed for chemical reactions to occur	food and beverages

Infer *why it is important to eat a variety of foods that contain* proteins.

Eating a variety of foods that contain proteins ensures that the body gets the amino acids that it does not make itself.

Main Idea

Healthy Eating

I found this on page _____.

Details

Organize *information about the major food groups. In the center column, circle your gender, and record the daily amount that you should eat. Give examples of foods from each group in the last column.*

Food Group	Daily Amount (9 to 13-year-old male/ female)	Example
Grains	M: 6 oz F: 5 oz	whole-wheat flour, bread, brown rice
Vegetables	M: 2 1/2 c F: 2 c	broccoli, spinach, carrots
Fruits	M: 1 1/2 c F: 1 1/2 c	apples, strawberries, oranges
Oils	M or F: 5 tsp or less	canola oil, olive oil, avocados
Milk products	M or F: 3 c	milk, cheese, yogurt
Meat and beans	M or F: 5 oz or less	fish, beans, lean beef, lean chicken

I found this on page _____.

Explain *the importance of eating a balanced diet.*

Sample answer: A balanced diet includes food that provides all six nutrients in the proper amounts.

Connect It How can a food label help you eat the correct amount of food? Plan a balanced diet for one day. Include breakfast, lunch, dinner, and a snack. Include the amounts needed to meet the requirements for your age and gender.

Accept all reasonable answers. Food labels show the serving size. If I eat that amount, I get the proper amount of nutrients. Plans should include a variety of foods in the proper amounts that provide all the major nutrients.

Lesson 2 The Digestive System

Predict *three facts that will be discussed in Lesson 2 after reading the headings. Record your predictions in your Science Journal.*

Main Idea

Functions of the Digestive System

I found this on page _____ .

Types of Digestion

I found this on page _____ .

I found this on page _____ .

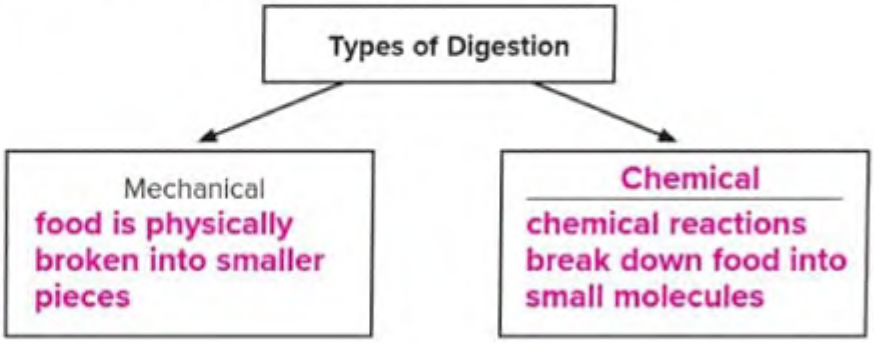
I found this on page _____ .

Details

Sequence *the 4 steps that food follows in the digestive system.*

1 Ingestion:	Food is put into the mouth and eaten.
2 Digestion	Food is broken down into materials that the body can absorb and use.
3 Absorption	Substances are taken in by cells.
4 Elimination	Undigested food is removed from the body.

Identify *the 2 types of* digestion.



Record *two functions of* enzymes *during* digestion.

Enzymes
- speed up the rate of chemical reactions
- break down larger molecules into smaller molecules

Explain *the role of some* enzymes *in* chemical digestion.

Enzyme	Role
Pepsin and papain	break down proteins
Amylase	breaks down carbohydrates
Lipase	breaks down fats

Main Idea

I found this on page _____.

I found this on page _____.

Details

Sequence *how an* enzyme *breaks down food molecules into smaller pieces.*

1. An enzyme attaches to a food particle.
2. The enzyme speeds up a chemical reaction that breaks down the food particle.
3. The enzyme releases the broken-down food particle.

Organs of the Digestive System

Describe *the role of each organ in the digestive system.*

Organ	Description
Mouth	Tongue and teeth: mechanically digest food Salivary glands: begin the chemical breakdown of food
Esophagus	a muscular tube that connects the mouth to the stomach Peristalsis: muscle contractions that move food through the esophagus and the rest of the digestive tract
Stomach	a large, hollow organ that stores food and aids in chemical digestion Chyme: a thin, watery liquid containing food mixed with gastric juices
Small intestine	a long tube connected to the stomach; receives enzymes from pancreas and bile from liver; most chemical digestion occurs in the duodenum; nutrient absorption occurs in remainder of small intestine Villi: fingerlike projections located in the folds of the small intestine
Large intestine	also called colon; absorbs water and solidifies waste products

I found this on page _____.

I found this on page _____.

I found this on page _____.

I found this on page _____.

I found this on page _____.

Main Idea

I found this on page _____ .

The Digestive System and Homeostasis

I found this on page _____ .

Details

Identify *two roles of helpful bacteria in the digestive system.*

Bacteria
- help digest food.
- produce amino acids and important vitamins.

Summarize *how the digestive system interacts with other systems to keep the body healthy.*

Nutrients from **food** are absorbed by the **small intestine**.

Nutrients are necessary to all **body systems**.

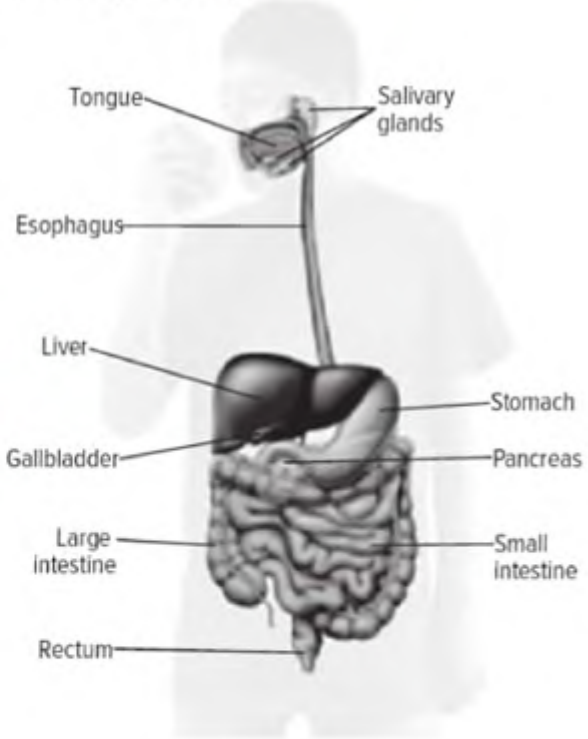
Blood carries the nutrients to all other **body systems**, providing materials and energy.

Homeostasis

Apply It Color and label the parts of the human digestive system.

- Color the organs through which food passes blue.
- Color the accessory organs red.
- Label the mouth, small intestine, pancreas, stomach, gallbladder, liver, tongue, large intestine, teeth, esophagus, and salivary glands.

Students should color the mouth, esophagus, stomach, small intestine, and large intestine blue. They should color all other organs red.



Lesson 3 The Excretory System

Skim *Lesson 3 in your book. Read the headings, and look at the photos and illustrations. Identify three things you want to learn more about as you read the lesson. Record your ideas in your Science Journal.*

Main Idea

Functions of the Excretory System

I found this on page _____

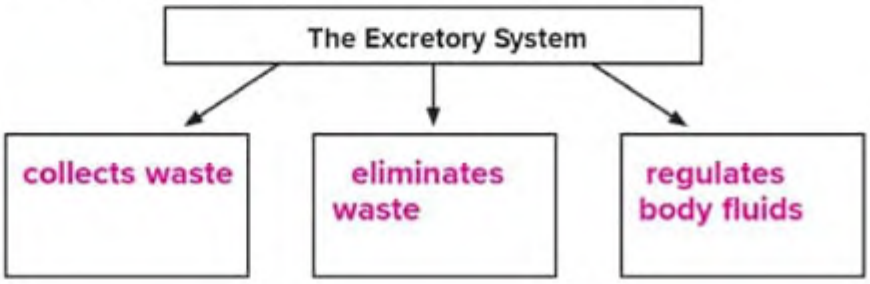
I found this on page _____

Organs of the Urinary System

I found this on page _____

Details

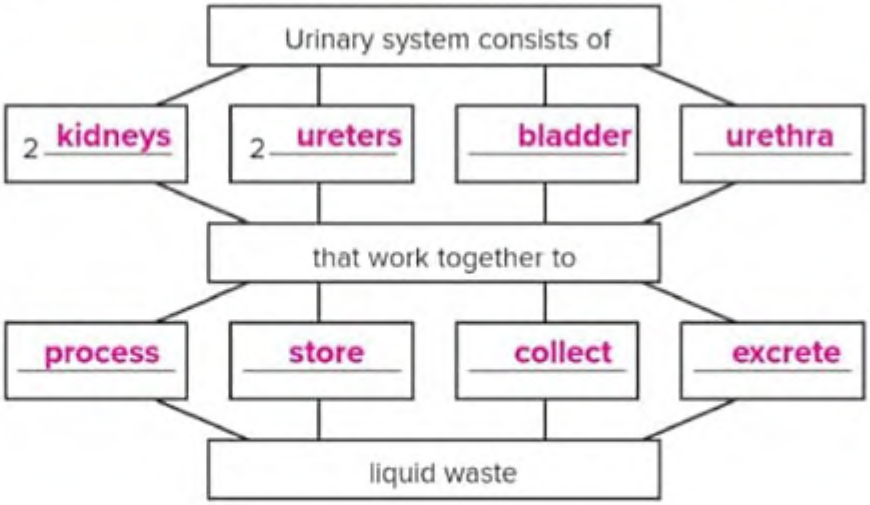
Detail *the 3 functions of the* excretory system.



Identify *the materials excreted from the 4 systems that make up the* excretory system.

System	What It Excretes
Digestive	undigested solids
Urinary	liquid wastes
Respiratory	carbon dioxide and water vapor
Integumentary	excess salt and water

Describe *the organs and function of the urinary system.*



Main Idea

Details

I found this on page _____ .

Describe *the number, size and location of the* kidneys.

Number: 2

Size: about the size of your fist

Location: near the back wall of the abdomen at about waist level and below the rib cage

I found this on page _____ .

Identify *4 functions of the* kidneys.

1. filter or remove wastes from blood
2. produce hormones that stimulate the production of red blood cells
3. control blood pressure
4. help control calcium levels

I found this on page _____ .

Summarize *the components of* kidneys.

Each kidney contains
- blood vessels
- about 1 million nephrons

I found this on page _____ .

Define nephrons.

Nephrons: networks of capillaries and small tubes, or tubules, where filtration of blood occurs

Summarize *how* urine *is produced.*

Blood
- contains → sometimes toxins
- contains → waste products
- contains → salts
- is filtered as it passes through the kidneys and → produces a fluid called urine .

Main Idea

I found this on page _____.

Details

Detail *the 2 stages of filtration and* urine *production.*

First filtration: Nephrons filter water, sugar, salt, and wastes out of the blood.

Second filtration: The liquid is filtered again. Almost 99% of the water and nutrients from the first filtration are separated out and reabsorbed into the blood. The remaining liquid and waste products form urine.

I found this on page _____.

Sequence *the flow of liquid waste through the organs of the urinary system. Detail the function of each organ.*

1. KIDNEYS: produce urine
2. Ureters: tubes leading from kidneys that drain urine into the bladder
3. BLADDER: a muscular sac that holds urine until it is excreted
4. Urethra: a tube through which urine moves from the bladder to the outside of the body

Main Idea

Urinary Disorders

I found this on page _____ .

The Excretory System and Homeostasis

I found this on page _____ .

Details

Summarize *four common urinary disorders and their causes.*

1. kidney disease: damaged nephrons, filtering reduced

   cause: diabetes, high blood pressure, poisons, trauma

2. urinary tract infection: symptoms: burning during urination, small /frequent urinations, blood in urine

   cause: bacteria in the urinary system

3. kidney stones: solids that form in the kidney and pass through the urinary system, painful

   cause: calcium buildup in the kidney

4. bladder control problems: urine is released involuntarily, occurs more often in women

   cause: infection, muscle weakness, enlarged prostate

Summarize *how the* excretory system *interacts with other systems to keep the body healthy.*

Excretory System
works with

Circulatory System
filters waste from blood before it becomes toxic

Digestive System
removes waste that could damage the body

Nervous System
interacts with hypothalamus, which controls secretion of the hormones that help regulate fluid levels in the body

Connect It Describe how the organs of the urinary system work together.

Accept all reasonable responses. Sample answer: The urinary system processes blood through the kidneys twice, using two filtration stages to remove waste, toxins, and salts. Both ureters transport the urine from the kidneys to the bladder, a storage organ, and the urethra uses sphincters to control the release of urine.

Review Digestion and Excretion

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned. Complete the What I Learned column on the first page of the chapter.

Use this checklist to help you study.

- ❑ Complete your Foldables® Chapter Project.
- ❑ Study your *Science Notebook* on this chapter.
- ❑ Study the definitions of vocabulary words.
- ❑ Reread the chapter, and review the charts, graphs, and illustrations.
- ❑ Review the Understanding Key Concepts at the end of each lesson.
- ❑ Look over the Chapter Review at the end of the chapter.

Summarize It Reread the chapter Big Idea and the lesson Key Concepts. Describe how the digestive and excretory systems help maintain the body's homeostasis.

Accept all reasonable responses. Sample answer: The digestive system takes in food, which provides the energy to power the body. The mouth, small intestine, pancreas, stomach, gallbladder, liver, large intestine, esophagus, and salivary glands are all part of the digestive system. These organs digest food by mechanical and chemical means. The excretory systems include the urinary system, which removes liquid wastes; the integumentary system, which removes excess salt and water; the digestive system, which removes undigested food; and the respiratory system, which removes carbon dioxide and water. If wastes were allowed to build up in the body, they would become toxic, or full of poisons. Homeostasis is maintained when the body functions properly.

Challenge *Compare the human digestive and excretory systems with the same systems in another species. How are they alike? How are they different?*

Lesson 1 The Respiratory System

Scan *Lesson 1. Then record three questions that you have about respiration in your Science Journal. Try to answer your questions as you read.*

Main Idea

Functions of the Respiratory System

Details

Identify *the action and functions of the respiratory system.*

Action: breathing

Function: take in oxygen

needed for cellular respiration

Function: eliminate carbon dioxide

a waste product of cellular respiration

Organs of the Respiratory System

Sequence *the path of air through the respiratory system, and write a short definition for each respiratory organ.*

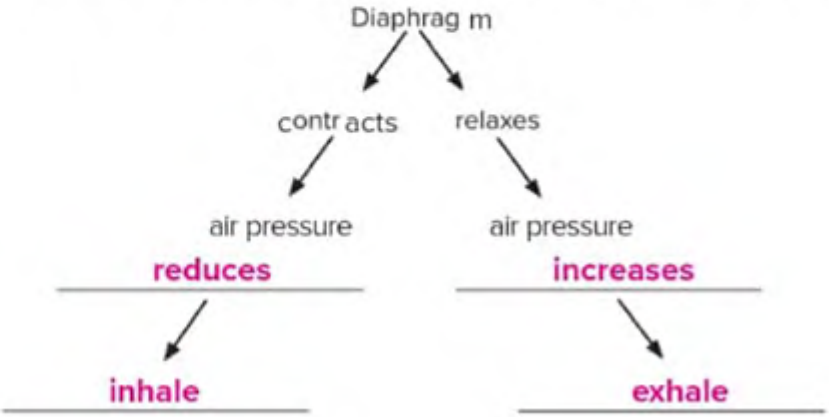
	Definition
1. mouth or nose	entrance through which air enters the system
2. pharynx	tubelike passageway at top of throat
3. larynx	the voicebox
4. trachea	windpipe; a tube made of cartilage rings
5. bronchi	two tubes that branch from trachea and lead into lungs
6. lungs	the main organs of the respiratory system
7. bronchioles	smallest tubes inside lungs
8. alveoli	microscopic pouches inside lungs where gas exchange occurs

Main Idea

Details

Breathing and Air Pressure

Explain *how* breathing *occurs by completing the diagram below.*



Respiratory Health

Classify *respiratory illnesses by the organs they affect.*

Nose and Throat (larynx and pharynx)	Bronchi	Alveoli
colds, flu	bronchitis, asthma	pneumonia, emphysema, lung cancer

The Respiratory System and Homeostasis

Identify *three systems mentioned in Lesson 1 that work together to maintain homeostasis.*

Students might also list the muscular system.

respiratory | nervous | circulatory

Analyze It How do the muscular, nervous, and respiratory systems interact to allow you t breathe?

Accept all reasonable responses. Sample answer: When the lungs fill with carbon dioxide the nervous system sends signals to the diaphragm, part of the muscular system, to rela After the relaxation of the diaphragm increases pressure that forces air out of the lungs, the nervous system signals the diaphragm to contract, causing the lungs to inflate.

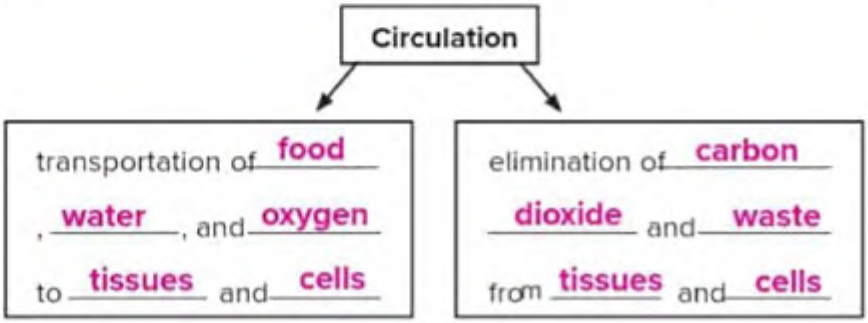
Lesson 2 The Circulatory System

Predict *three facts that will be discussed in Lesson 2 after reading the headings. Record your predictions in your Science Journal.*

Main Idea

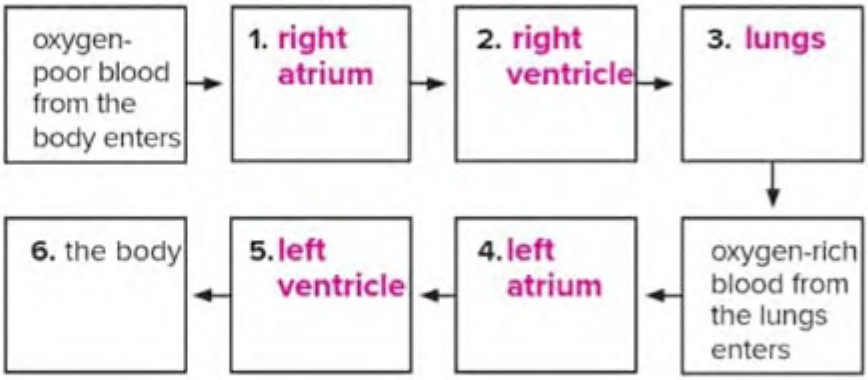
Functions of the Circulatory System

Summarize *the functions of the circulatory system.*



Circulatory System Organs

Sequence *the journey of blood through the heart.*



Distinguish *among types of blood vessels.*

Arteries	Veins	Capillaries
large vessels, carry blood away from heart	large vessels, carry blood toward heart	smallest vessels, deliver materials to and from individual cells

Types of Circulation

Classify *types of circulation.*

Type	Systemic	Coronary	Pulmonary
Delivers blood to and from	the body	the heart	the lungs

Main Idea

Details

Circulatory System Health

Analyze *circulatory system disorders.*

Disorder	What Happens
Hypertension	High blood pressure weakens artery walls and makes them less flexible.
Atherosclerosis	Buildup of fatty material inside vessels blocks blood flow.
Heart attack	Part of heart muscle is damaged or dies because of lack of oxygen.
Stroke	Part of brain dies or is damaged because of lack of oxygen.
Heart failure	Heart does not work efficiently because of a previous heart attack, valve problems, or a disease.

Identify *risk factors for circulatory system diseases.*

The Circulatory System and Homeostasis

Identify *five body systems that work together.*

1. respiratory
2. digestive
3. nervous
4. endocrine
5. circulatory

Connect It The analogy of cars and roads is often used to describe the circulatory system. Use what you have learned in Lesson 2 to discuss a "traffic jam" in the circulatory system.

Accept all reasonable responses. Sample answer: Blood flow through veins and arteries is like a highway full of delivery trucks and garbage trucks. Blockage from atherosclerosis is like stopped traffic blocking lanes of the highway. The congestion prevents blood from making a timely delivery of supplies and pickup of wastes to and from its destinations.

Lesson 3 Blood

Predict *three ideas that will be discussed in Lesson 3 after reading the headings. Record your predictions in your Science Journal.*

Main Idea

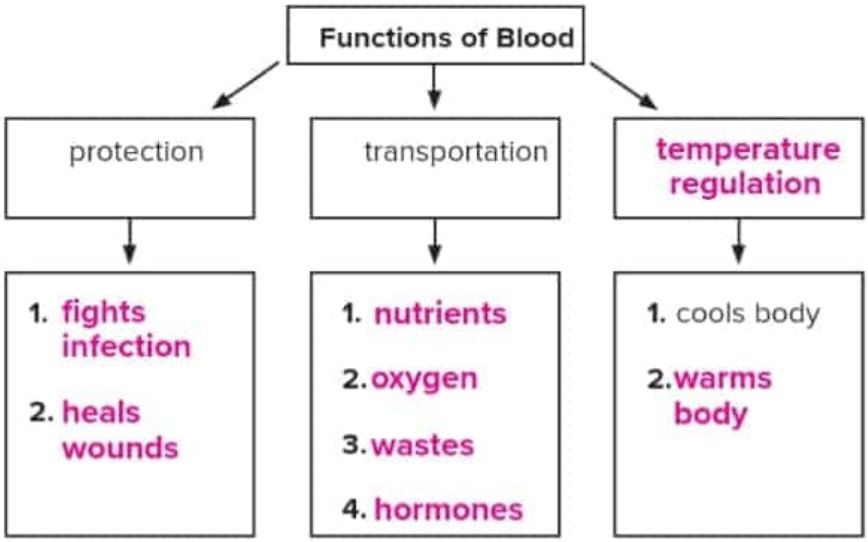
Functions of Blood

Parts of Blood

Blood Types

Details

Summarize *the functions of blood.*



Analyze *the parts of blood and their functions.*

Part	Function
Red blood cells	carry oxygen
White blood cells	attack invaders
Platelets	plug wounds
Plasma	liquid; transports blood cells

Categorize *information about blood types in the table below.*

Type	Can receive from	Can donate to
A	A, O	A, AB
B	B, O	B, AB
AB	A, B, AB, O	AB
O	O	A, B, AB, O

Main Idea

Details

Define *the following terms.*

Universal donor: a person with type O blood who can donate to any recipient blood type

Universal recipient: a person with type AB blood who can receive blood from any donor blood type

Rh factor: a protein chemical marker on red blood cells noted as a positive (+) or negative (–) blood type

Blood Disorders

Identify *and describe blood disorders.*

Disorder	Description
Hemophilia	lack of the protein needed to clot blood; excess bleeding with injury
Anemia	low numbers of red blood cells or too little hemoglobin; poor oxygen supply to tissue
Leukemia	cancer of the bone marrow; slows or prevents blood cell formation
Sickle cell disorder	crescent-shaped red blood cells that clump and block blood vessels

Analyze It Explain why blood is classified as a tissue. Compare and contrast it with other tissues.

Accept all reasonable responses. Sample answer: Blood is classified as a tissue because i is made up of a combination of different cell types. It is similar to all other tissues in this way. However, blood is the only tissue that is a liquid. It has no specific size or location bu is constantly moving and is found throughout the body.

Lesson 4 The Lymphatic System

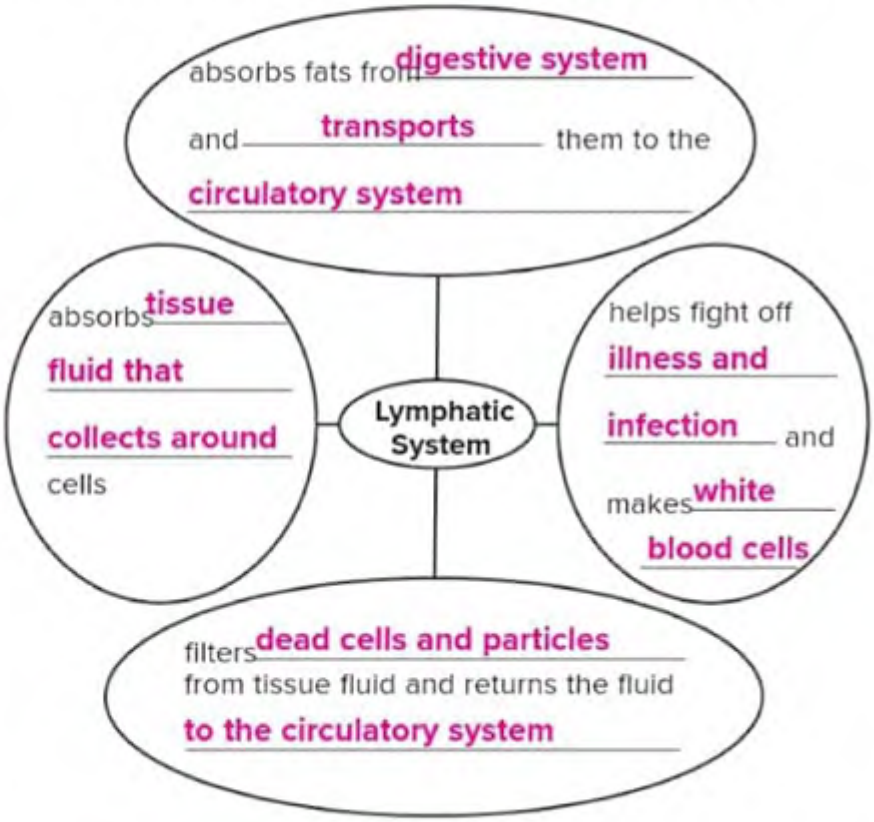
Skim *Lesson 4 in your book. Read the headings, and look at the photos and illustrations. Identify three things you want to learn more about. Record your ideas in your Science Journal.*

Main Idea

Functions of the Lymphatic System

Details

Describe *4 main functions of the* lymphatic system.



Parts of the Lymphatic System

Explain *the functions of the* lymphatic system.

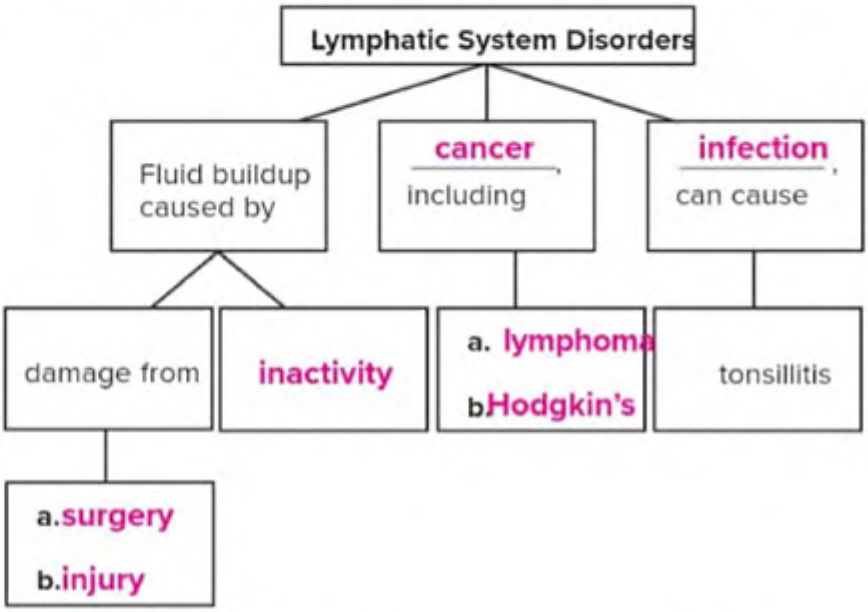
Part	Function
Lymph	holds waste released by cells but not absorbed by capillaries
Lymph vessels	absorb and move lymph
Lymph nodes	filter particles from lymph
Bone marrow	forms lymphocytes
Thymus	completes formation of T cells
Spleen	recycles and stores blood cells; produces and stores lymphocytes
Tonsils	trap and destroy bacteria and other pathogens.

Main Idea

Lymph Diseases and Disorders

Details

Organize *information about* lymphatic system *disorders.*



The Lymphatic System and Homeostasis

Explain *how the* lymphatic system *supports the circulatory system.*

Accept all reasonable responses. Sample answer: The lymphatic system removes and cleans the excess fluids in the body that are not circulated through arteries, veins, or capillaries.

Analyze It Use analogies to describe at least two parts of the lymphatic system.

Accept all reasonable responses. Sample answer: The lymph nodes are like sponges tha trap particles from the lymph fluid. They act like filters in a fish tank. The spleen is like a rest station and recycling center for "tired" red blood cells.

Review Respiration and Circulation

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned. Complete the What I Learned column on the first page of the chapter.

Use this checklist to help you study.

- ❑ Complete your Foldables® Chapter Project.
- ❑ Study your *Science Notebook* on this chapter.
- ❑ Study the definitions of vocabulary words.
- ❑ Reread the chapter, and review the charts, graphs, and illustrations.
- ❑ Review the Understanding Key Concepts at the end of each lesson.
- ❑ Look over the Chapter Review at the end of the chapter.

Summarize It Reread the chapter Big Idea and the lesson Key Concepts. Imagine how the body's systems resemble a team that must work together. Describe how impaired function of any one system can disrupt the functions of at least two other systems.

Accept all reasonable responses. Sample answer: If blockage occurs in the circulatory system, oxygen supplied by the respiratory system will not be delivered properly. If the circulatory system does not properly remove waste fluids from around cells, the lymphatic system can become overloaded, causing swelling.

Challenge *Formulate a health checklist of steps you can take to maintain healthy functions of your respiratory and circulatory systems. Keep a diary for a month, recording how you change your activities and your environment. Also record how well you stick to the changes.*