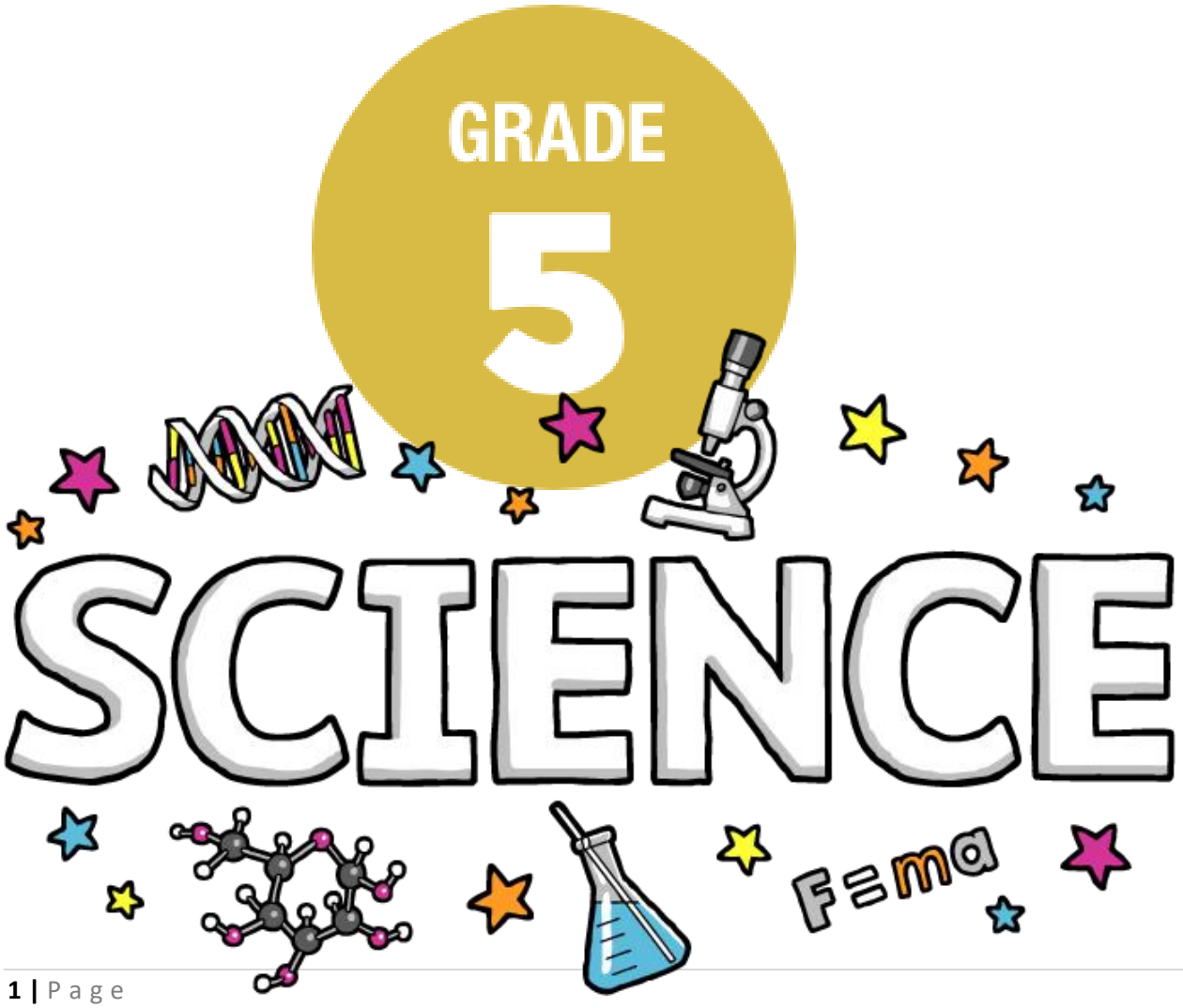
Term 3 EOT 2021-2022



1	SCI.4.2.02.017 conclud that sound is waves that transmit energy from one place to another
	SCI.4.2.02.017 يستنتج أن الصوت موجات تنتقل من مكان إلى آخر

How does sound travel?

Sound can travel through solids, liquids, and gases. In fact, sound tends to travel with the greatest speeds in solids and the slowest speeds in gases. For example, sound travels through steel at almost 6,000 m/s. But sound travels through air at only 343 m/s.

These differences in the speed of sound result from how far apart the particles are. The particles carry sounds energy, and their collisions are how sound energy travels. In a solid, the particles are close together so they quickly collide and move sound. In gases, particles are far apart. Collisions are less frequent, so sound travels more slowly.

The temperature of the medium also affects the speed of sound. In warmer air, particles move faster. As a result they collide more often and transmit sound faster.

Can sound travel in an area without any particles? No, sound cannot travel without a medium. For example, outer space has few particles, so there is no medium for sound to travel through. Outer space is a **vacuum** (VA•kyewm), a region that contains few or no particles.

FACT Sound cannot travel through outer space.

1 **Vocabulary** The substance through which a wave travels is called a(n) Medium

2	SCI.4.2.02.017 conclud that sound is waves that transmit energy from one place to another	الشكل صفحة ٤٢٤
	SCI.4.2.02.017 يستنتج أن الصوت موجات تنتقل من مكان إلى آخر	Figure page 424

How is sound produced?

Have you ever noticed the sound from a low-flying jet rattling the dishes in the kitchen? Perhaps you've noticed something similar when someone plays a stere system too loudly. What causes objects to shake when there are loud sounds nearby?

When an object makes sound, it vibrates back and forth. The vibrations of a drum alternately squeeze air particles and then spread them out. This creates regions of air that have many particles, called **compressions** (kum•PRE•shunz), and regions of air that have few particles, called **rarefactions** (rer•uh•FAK•shunz). The compressions and rarefactions move through the air, carrying sound energy. Each region of the air is only moved back and forth.

Regions of air that have many particles are called

A. rarefactions
B. vibrations
C. compressions
D. energy

424 EXPLAIN

What is the source of a sound wave?

Vibration

Regions of air that have many particles-

Compressions

Regions of air that have few particles

Rarefactions

Sound can travel through-

Solids, liquids and gases

3	SCI.4.2.02.017 conclud that sound is waves that transmit energy from one place to another	الشكل صفحة ٤٣٠
	SCI.4.2.02.017 يستنتج أن الصوت موجات تنتقل من مكان إلى آخر	Figure page430

What is volume?

Pretend you are in a room when someone turns up the volume on a radio too much. Is it easy to hear other noises? What makes a sound so loud?

Volume refers to the strength or weakness of sound. If you hit a drum with force, it produces a loud sound or noise, but if you hit it gently, the sound it produces will be lower.

Sound travels in air as a series of compressions and rarefactions. Compressions are represented by peaks while rarefactions are represented by dips.

The **amplitude** (AM-pluh-tewd) is the maximum displacement moved by particles of the medium away from their equilibrium position. The loudness, or volume, of a sound depends on the amplitude of the sound's waves.

Scientists measure the volume of sounds with **decibels (dB)**. Sounds above 85 decibels damage your hearing. Wear earplugs if you are near loud sounds!

Volume of Sounds

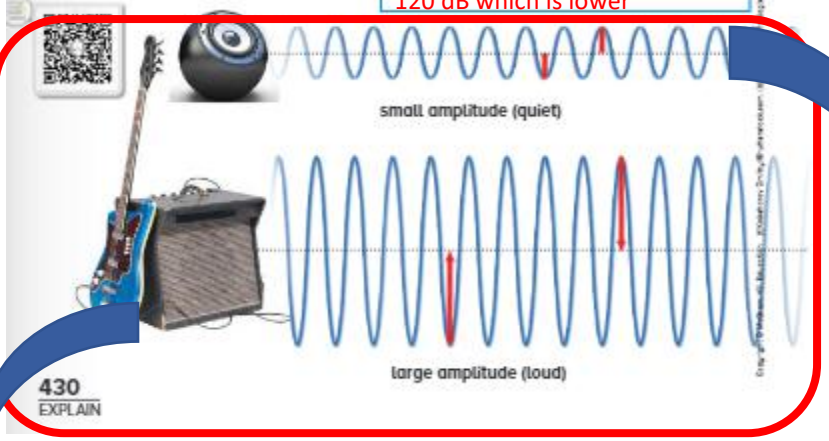
Decibel Level	Sound
180 dB	rocket engine at 30 m (98 feet)
130 dB	threshold of pain, train horn at 10 m (33 feet)
120 dB	rock concert
110 dB	chainsaw at 1 m (3.3 feet)
100 dB	jackhammer at 2 m (6.6 feet)
85 dB	threshold of damaging hearing
80 dB	vacuum cleaner at 1 m
60 dB	normal conversation
50 dB	rainfall
30 dB	theater (without talking)
10 dB	human breathing at 3 m (10 feet)
0 dB	threshold of human hearing (with healthy ears)

Read a Table

Could the sound from a rocket engine 30 m away cause pain in your ears?

Clue: Compare the volume for the rocket engine and the threshold of pain.

Yes, because the volume of the sound of the rocket engine is 180 dB and the threshold of pain is 120 dB which is lower



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EXPLAIN

The maximum displacement moved by particles of the medium away from their equilibrium position

Amplitude

4 Test Prep At what volume do sounds start damaging hearing?

A 10 decibels
B 65 decibels
C 85 decibels
D 150 decibels

3. Which unit is used to measure the volume of sound?

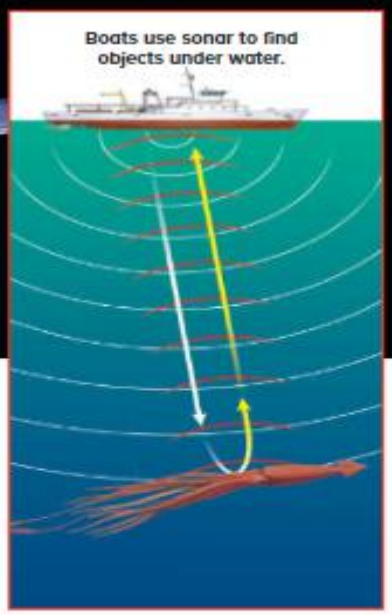
A hertz (Hz)
B ohm (Ω)
C decibel (dB)
D ampere (A)

---------- refer to the strength or weakness of sound

Volume

4		الشكل صفحة ٤٣٢
	SCI.4.2.02.017 يستنتج أن الصوت موجا	Figure page432

A	B
high energy loud sound	low energy quiet sound



What is echolocation?

Echoes can be useful. Bats, for example, make sounds that echo off of their prey. The returning echoes tell the bat where the prey is located. Finding food or other objects in this manner is known as **echolocation**. Whales and dolphins also use echolocation to orient themselves and to find food.

Scientists have developed a system called *sonar* that works like echolocation does for animals. Sonar stands for "sound navigation and ranging." It is used under water to find objects. The sonar system sends out sound waves that reflect off of objects. It then detects the reflected sound waves. The return time and direction of the sonar echoes are used to calculate the location of the object.

Quick Check

5. Could sonar work on land? Why or why not?

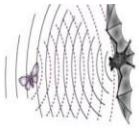
Yes-Sound waves travels through land as well as water, so Sonar could work on the land

Sound waves that have reflected back to the speaker(source)

Echoes

The original sound is louder that its echo because some of the energy from the original sound wave is ----------

Absorbed



Test Prep An echo is an example of a sound wave being

A transmitted.
B absorbed.
C reflected.
D surfed.

9	SCI.4.2.02.018 conclud that light is waves that transmit energy and it travels in straight lines, explaining the different behavior of various objects when it falls on them	الشكل صفحة ٤٤٤
	SCI.4.2.02.018 يستنتج أن الضوء موجات تنقل الطاقة وأن الضوء ينتقل في خطوط مستقيمة مفسراً اختلاف سلوك الأجسام المختلفة	Figure page 444

How does light make shadows?

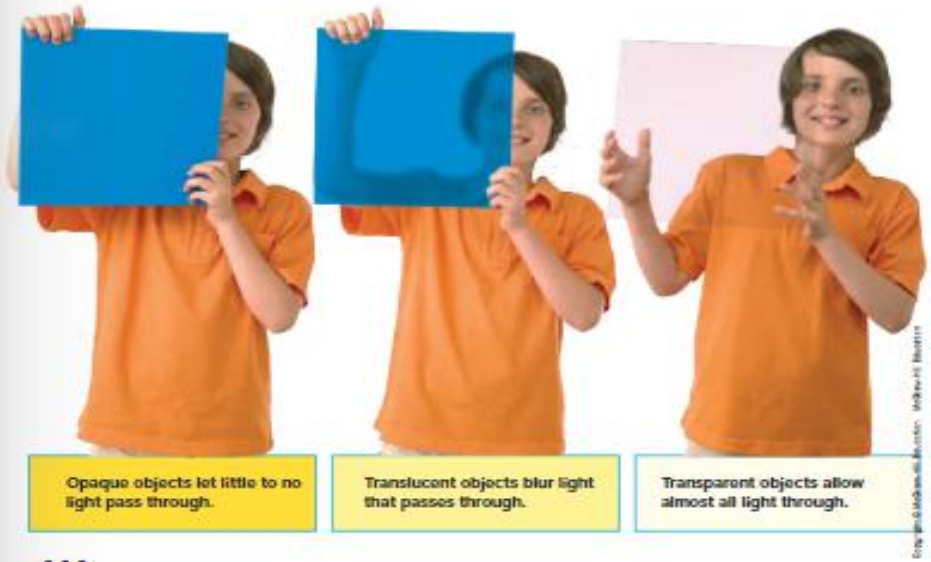
When light strikes an object's surface, photons bounce off at random angles. This is called **scattering** (SKA•tuh•ring) light. We see objects because light has scattered off them and entered our eyes.

Sometimes when light hits an object, a photon is absorbed. These objects gain energy. The light that is absorbed is usually transformed into heat energy. Darker objects absorb more light than lighter objects.

Light may also pass through objects. Objects that allow most light through are called **transparent** (trans•PER•unt). Objects that blur light as it passes through are called **translucent** (trans•LEW•sunt). If an object allows little to no light through, it is called **opaque** (oh•PAYK).

Whether an object is opaque, translucent, or transparent depends on its material, its thickness, and the color of the light. Thicker objects have more particles to absorb photons, so they are more likely to be opaque. Someobjects will be opaque, transparent, or translucent in only one color of light.

Opaque and translucent objects block light. The area behind these objects is darker—they have a shadow. Shadows are the absence of light.



Opaque objects let little to no light pass through.

Translucent objects blur light that passes through.

Transparent objects allow almost all light through.

2. Unlike sound waves, light waves can travel through a
   - A vacuum.
   - B liquid.
   - C solid.
   - D gas.

What type of matter allows light to pass directly through it?

Transparent

What type of matter completely reflects light?

Opaque

What type of matter completely scatters light?

Translucent

Vocabulary A material or an object that blocks light completely is

Opaque

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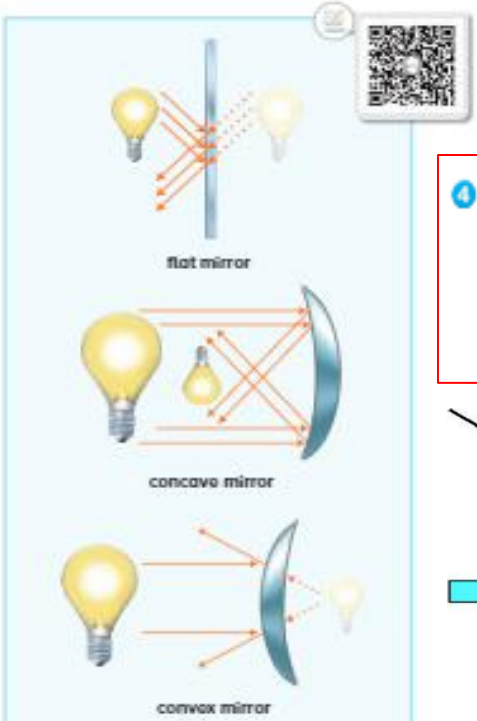
7	SCI.4.2.02.018 conclud that light is waves that transmit energy and it travels in straight lines, explaining the different behavior of various objects when it falls on them SCI.4.2.02.018 يستنتج أن الضوء موجات تنقل الطاقة وأن الضوء ينتقل في خطوط مستقيمة مفسراً اختلاف سلوك الأجسام المختلفة

How does light bounce and bend?

When you look into a mirror, you see an image. An **image** is a "picture" of the light source that light makes when it bounces off a shiny surface. The image in a mirror is clear because most of the light wave reflects the same way off the mirror's smooth surface. Reflection is the organized scattering of a wave.

When light hits a mirror, it obeys the **law of reflection**: the angle of an incoming light ray equals the angle of the reflected light ray. An image in a flat mirror appears to be behind the mirror. The distance to the image is equal to the distance the light traveled from the object to the mirror.

This girl's image was enlarged and reversed by using a convex mirror.

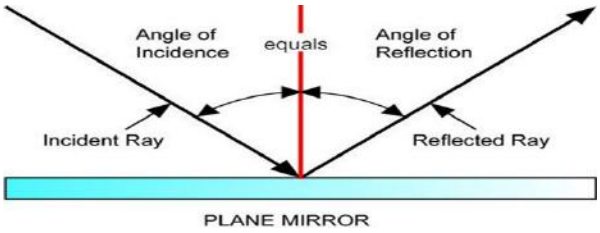


Reflected images may appear behind the mirror (faded bulbs) or be projected in front of the mirror (bright bulbs).

Mirrors can also be made with curved surfaces. If they curve in, they are **concave** (kahn•KAYV). If they curve out, they are **convex** (kahn•VEKS). Curved mirrors can form many kinds of images. They may be upright or upside down. They may also be enlarged or reduced. Convex mirrors always produce images that are upright and reduced.

4 Test Prep The law of reflection states that incoming and outgoing angles are

A always the same.
B never the same.
C always large.
D always small.



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EXPLAIN

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6	SCI.4.2.02.018 conclud that light is waves that transmit energy and it travels in straight lines, explaining the different behavior of various objects when it falls on them
	SCI.4.2.02.018 يستنتج أن الضوء موجات تنقل الطاقة وأن الضوء ينتقل في خطوط مستقيمة مفسراً اختلاف سلوك الأجسام المختلفة

Light Can Bend

When you place an object in a glass of water, it appears to bend. Yet, if you pull the object out, it is still straight. How is this possible? The light from the object is bending, not the object itself.

When light changes mediums, it also changes speed. When waves change speed, they refract. **Refraction** (ri-FRAK-shun) is the bending of waves as they pass from one substance into another. Although refraction is not noticeable with sound waves, it is easily seen with light waves.


A pencil in a glass of water shows light refraction.

Rays entering a denser medium bend to make a bigger angle with the surface. However, rays leaving a denser medium bend in the opposite direction.

Lenses use refraction to shape images. Convex lenses work like concave mirrors, and concave lenses work like convex mirrors.

Lenses are used in eyeglasses to make objects appear in focus. We also use lenses in cameras and telescopes to change the size of the image we see. The image's size and location depends on where the object and the lens are in relation to each other.


Eyeglasses focus light to help your vision.

Quick Check

3. What properties do images have if they are formed by concave lenses or convex mirrors?

They are smaller than the original object and upright

4. Which process causes the straw below to appear broken?

A reflection
B absorption
C refraction
D electromagnetism

What is it called when light bends or turns when it enters a new medium?

Refraction

Which of the following is a practical use of refraction?

Telescope

Microscope

Glasses

True or False: Light travels at different speeds in different kinds of matter.

TRUE

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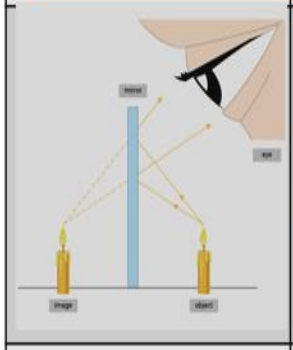
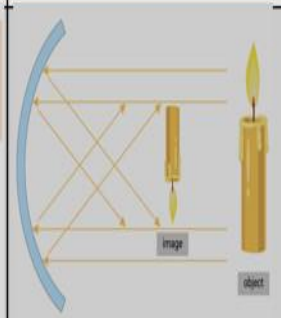
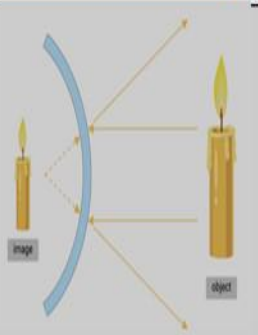
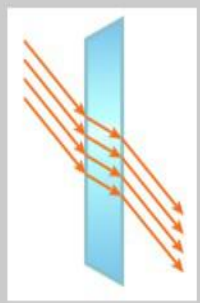
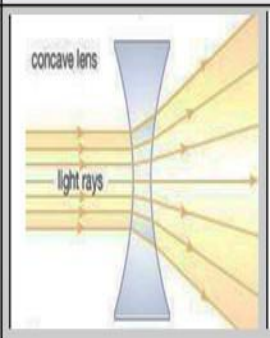
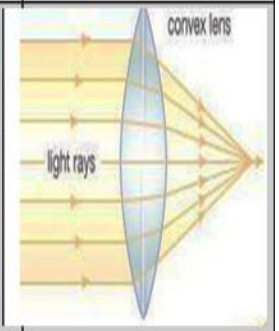
How do different mirrors and lens images?

Flat Mirror	Concave Mirror	Convex Mirror	Flat iens	Concave lens	Convex lens
Mirrors use reflection to form images			Images are also formed by lenses using refraction.		
					
produces right-side up images the same size as the object	produces upright or upside down images that are larger or smaller	produces images that are upright and smaller than the object	produces images that appear the same as the object	produces images that are upright and smaller than the object	can produce upright or upside down images that are larger or smaller
			-	A door peephole 	magnifying glas 

11	SCI.2.3.03.007 Conduct a variety of experiments to determine minerals physical properties.	
	SCI.2.3.03.007 يجري تجار ب متنوعة لتحديد الخصائص الفيزيائية للمعادن	
12	SCI.2.3.03.007 Conduct a variety of experiments to determine minerals physical properties.	الشكل صفحة ٤٦٨
	SCI.2.3.03.007 يجري تجار ب متنوعة لتحديد الخصائص الفيزيائية للمعادن	Figure page 468

Read and Respond

What are minerals?

If you collect rocks, you might find a rock with red chunks in it. The red chunks are minerals. A **mineral** is a solid, natural material made from nonliving substances in Earth's crust.

Minerals, like all kinds of matter, are made up of elements. An element is a pure substance that cannot be broken down into a simpler substance. Gold is an element, as are aluminum, oxygen, sulfur, and iron. Some minerals, such as copper, are made of a single element. Other minerals are made of two or more elements. For example, the mineral pyrite is made of iron and sulfur. Topaz, feldspar, and quartz are examples of other minerals that are made up of two or more elements.

Minerals form naturally. Materials made by people are not considered minerals. Diamonds that form deep beneath Earth's surface are minerals. However, people can make diamonds in a laboratory. These diamonds are not minerals.

Although minerals are found in nature, they do not contain anything that was once alive, such as plant parts. Coal, for example, is made of ancient compressed plant material. Because the plants that turned into the coal were once alive, coal is not a mineral.

Draw a circle around the minerals that are made of two or more elements.

Emeralds are minerals that occur naturally in some rocks. Emeralds are cut and polished to be used for jewelry.

Which properties are most helpful in identifying minerals?

. Luster and streak

. A pure substance that cannot be broken down into simpler substance----

. Element

A solid, natural material made from nonliving substance in Earth's crust---

. Mineral

13	SCI.2.3.03.008 Explain properties used to determine minerals	الشكل صفحة ٤٧١
	SCI.2.3.03.008 يشرح الخصائص المستخدمة في تحديد المعادن	Figure page 471

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Properties of Minerals

Mineral or Mineral Group	Color (more common colors)	Luster (type of shine)	Streak (porcelain-plate test)	Cleavage (number of planes)	Hardness (on Mohs' scale)	Density (compared to water)
Gypsum	colorless, gray, white, brown	pearly	white	varies	2	2.3
Quartz	colorless, various colors	glassy or greasy	white	none	7	2.6
Pyrite	brassy, yellow	metallic	greenish black	none	6	5.0
Calcite	varies widely: colorless, white, pale blue, green	glassy	colorless, white	3	3	2.7
Galena	steel gray	metallic	gray to black	3	2.5	7.5
Feldspar	pink, gray, green, yellow, white	glassy or pearly	colorless	2	6	2.6
Mica	colorless, silver, black	pearly or metallic	white	1 (thin sheets)	2–3	3.0
Hornblende	green to black	glassy or pearly	gray to white	2	5–6	3.4
Bauxite rock	gray, red, brown, white	none	gray	none	1–3	2.0–2.5
Hematite	black, gray, reddish brown	metallic	red, reddish brown	none	5–6	5.3

Luster (LUS-tur) is the way a mineral reflects light. Minerals with a metallic luster appear shiny, like metal. Minerals with a nonmetallic luster look dull. These minerals can be described as glassy, pearly, oily, earthy, waxy, or silky. Graphite has a metallic luster. Quartz has a glassy luster, and talc has an oily luster.

Some minerals have other special properties that can be used to help identify them. For example, arsenic gives off an odor of garlic when it is heated. Calcite fluoresces, or glows, when it is exposed to ultraviolet light. Copper is a good conductor of electricity and heat. Quartz gives off sparks when its surface is scratched with a steel pin. Calcite fizzes when acid is dropped on it. Magnetite is magnetic and attracts steel objects.

Magnetite, or lodestone, attracts these metal objects.

Quick Check

2. Why should you test several properties when identifying minerals?

Two different minerals might share more than one property.

You should test several properties to make sure you can properly distinguish the minerals

Test Prep Which property describes minerals that break along smooth surfaces?

A hardness C fracture
B color D cleavage

Vocabulary The color of a mineral's powder is called its Streak

3. A student tested the hardness of four mineral samples by using each sample to scratch the others. Mineral 1 scratched Mineral 2 but would not scratch Mineral 3. Mineral 2 would not scratch any of the others. Mineral 4 scratched Mineral 3. Which list shows the mineral samples in order from softest to hardest?

A 1, 2, 3, 4
B 1, 3, 4, 2
C 2, 1, 3, 4
D 2, 4, 1, 3

4. Which properties are most helpful in identifying minerals?

A weight and shape
B size and ability to float
C luster and streak
D shape and color

6. Study the table below.

Hardness	Mineral
1	talc
2	gypsum
3	calcite
4	fluorite
5	apatite
6	feldspar
7	quartz
8	topaz
9	corundum
10	diamond

Copper has a hardness of 3. Which minerals would copper most likely scratch?

A topaz and talc
B apatite and diamond
C gypsum and talc
D feldspar and quartz

7. You are trying to find out what kind of mineral you have. You will need a white tile to find out which property?

A color
B hardness
C luster
D streak

9. A student placed a liquid on a mineral and the mineral began to fizz and bubble. What property was the student investigating?

A cleavage
B hardness
C luster
D reaction to acid

1. Which mineral property describes how easily a mineral can be scratched?

A streak
B hardness
C cleavage
D reaction to acid

14	SCI.2.3.03.008 Explain properties used to determine minerals
	SCI.2.3.03.008 يشرح الخصائص المستخدمة في تحديد المعادن

Lesson Review

Visual Summary

Complete the lesson summary in your own words.

Properties of Minerals: Possible answer: Minerals have properties, such as color and streak, by which they can be identified.

Hardness of Minerals: Possible answer: Hardness is a measure of how well a mineral resists scratching.

Crystals: Possible answer: Minerals exhibit many different crystal shapes.

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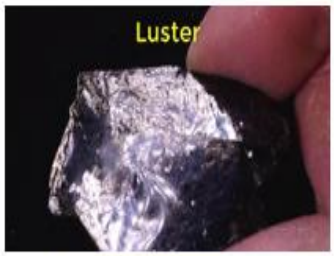
EVALUATE

Minerals can be identified by their properties.



Luster: the way a mineral reflects light

Cleavage: describes the way minerals break along smooth surfaces

Color: can be used to identify minerals that always have one unique color

The red-brown streak of the mineral hematite

Properties of Minerals

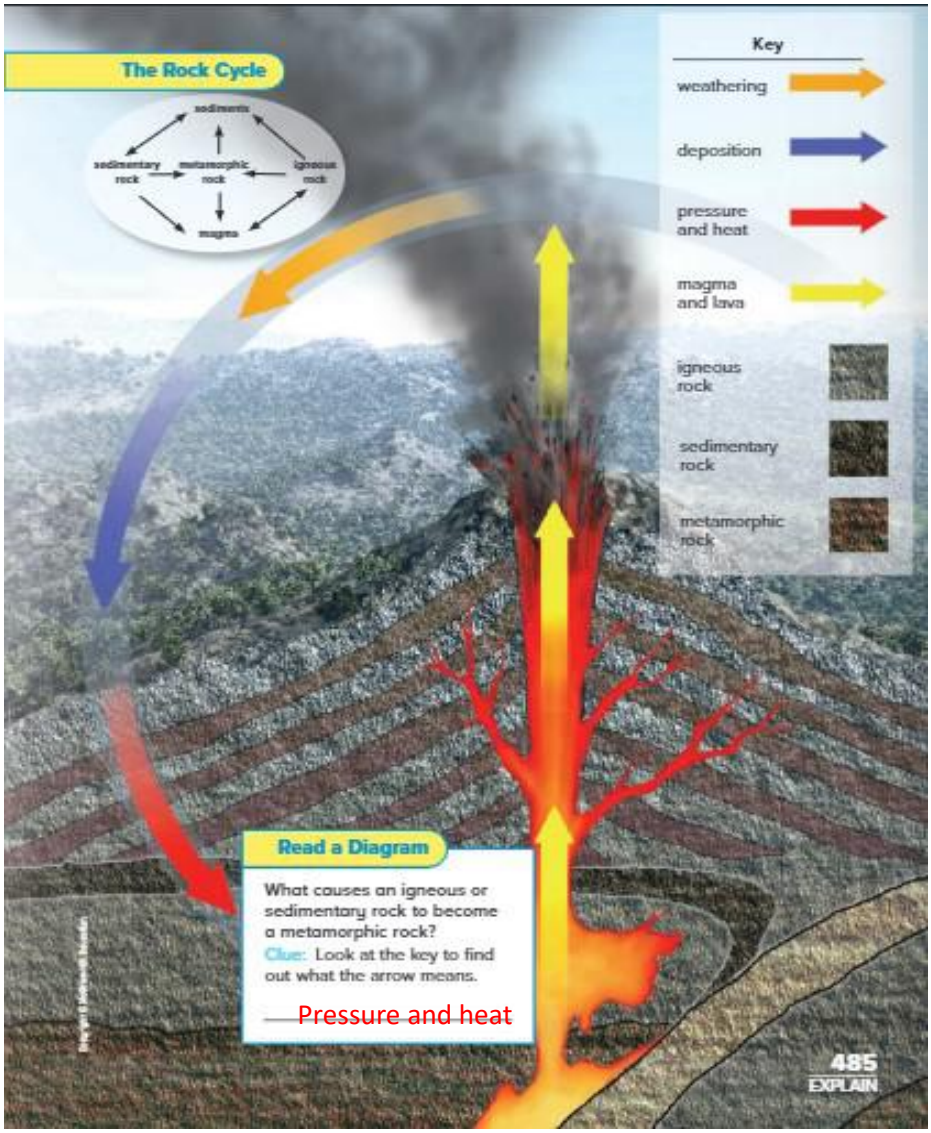
Streak: the powder left behind after rubbing a mineral on a rough surface

Hardness: how easily a mineral can be scratched or scratch another

Fracture: describes the way a mineral breaks along rough surfaces

Mohs scale arranges minerals in order from softest to hardest.(1-10)

15	SCI.2.3.03.009 Describe the properties of the three types of rocks and connect these porperties according its formation	الشكل صفحة ٤٨٥
	SCI.2.3.03.009 يصف خواص الأنواع الثلاثة للصخور ، ويربط هذه الخصائص بمنشأ هذه الصخور الأصلي	Figure page485



2. All are changes that happen in the rock cycle EXCEPT _____.

A magma → sedimentary rock
B igneous rock → sediments
C metamorphic rock → magma
D sediments → sedimentary rock

Use the chart below to answer question 5.

Rock Group	Characteristics
	forms as melted rock cools and hardens into a solid
	forms when rocks are exposed to increases in heat and pressure
	forms when pieces of rocks and minerals are cemented together

5. The chart above lists characteristics of the three main rock groups. Which order correctly fills in the left column (top to bottom)?

A igneous, sedimentary, metamorphic
B lava, igneous, metamorphic
C sedimentary, metamorphic, igneous
D igneous, metamorphic, sedimentary

16	SCI.2 .3.03.009 Describe the properties of the three types of rocks and connect these porperties according its formation
	SCI.2.3.03.009 يصف خواص الأنواع الثلاثة للصخور ، ويربط هذه الخصائص بمنشأ هذه الصخور الأصلي

What are igneous and sedimentary rocks?

Since at least 50,000 years ago, people have used rocks to make weapons and start fires. How did these rocks form? What other uses have people found for rocks?

Igneous Rocks

When an igneous rock forms from magma inside Earth, it is called an *intrusive* (in•TREW•siv) *rock*. Below Earth's surface, intrusive rocks cool slowly. They may take 100 years or more to cool a few degrees. This often produces large crystals. If you find an igneous rock with large crystals in it, you can conclude that the rock is intrusive.

Granite is a common intrusive rock. It is often used as a building material. The minerals that make up gems, such as rubies, may form in intrusive rocks. They can also be used to make jewelry.

Pink granite is an intrusive igneous rock, while obsidian is an extrusive igneous rock.

An igneous rock that forms from lava on Earth's surface is called an *extrusive* (ik•STREW•siv) *rock*. On Earth's surface, lava is exposed to air or water, causing it to cool and harden very rapidly. Lava may cool in minutes when it spills into the sea or in a number of days as it flows over land. Large crystals do not have time to form. The crystals that form in these rocks are very small and difficult to see. **Basalt,** the most common extrusive rock, is made of many small crystals.

Some extrusive rocks develop so quickly that they do not contain any crystals. **Obsidian,** which is also called volcanic glass, is an example of an extrusive rock that has no crystals. Its surface is smooth and glassy. People have used **obsidian** to make sharp tools and weapons. **Rhyolite** is another example of an extrusive igneous rock.

Pumice is another type of extrusive rock. As pumice forms, gases bubble through the rock. The holes that are left behind make pumice light and rough. Because it is rough, pumice is often used for grinding or polishing.

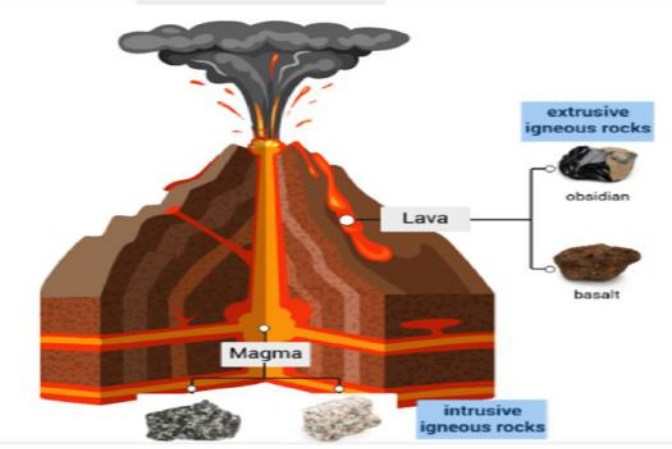
Because of its rough surface, people use pumice to remove dead skin cells.

1 Vocabulary When magma or lava hardens, Igneous rock is produced.

2 Test Prep From which material does an extrusive rock form?

A magma C mineral

B Lava D sediment



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EXPLAIN

17	SCI.2 .3.03.010 Classify rocks and minerals according to their different physical properties
	SCI.2.3.03.010 يصنف الصخور والمعادن وفقاً لخصائصها الفيزيائية المختلفة

Sedimentary Rocks

Sedimentary rocks are made of different materials that have been compacted and cemented together. Some sedimentary rocks contain minerals that were once dissolved in water. The minerals formed crystals among the sediments that came together to form the rock.

Some sedimentary rocks are made from smaller rounded stones that have been cemented together. This type of rock is called a ***conglomerate*** (kun•GLAHM•rut) *rock*.

Sedimentary rocks are often used in buildings. **Limestone** and **sandstone** are two types of sedimentary rocks that are used on the outside of buildings. They are also used for making statues and other decorations. Ground limestone is an ingredient in concrete.

Quick Check

5. You are driving along a highway cut through walls of rock made of layers. What type of rock is this?

Sedimentary Rock

This building is covered with sandstone and limestone.

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EXPLAIN

5 Test Prep A conglomerate is an example of which type of rock?

A intrusive igneous

B extrusive igneous

C sedimentary

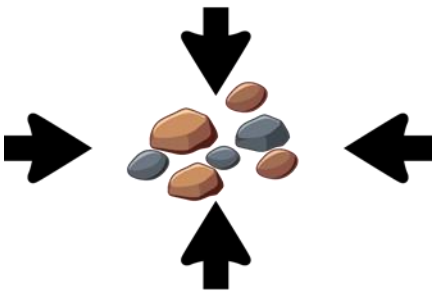
D metamorphic

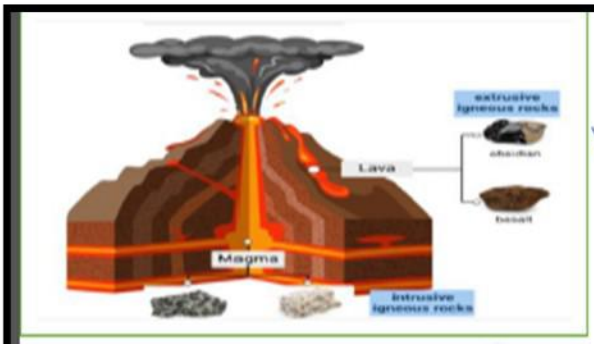
What type of rock is limestone and sandstone?

Sedimentary

Which characteristic is found in sedimentary rocks?

Fossils





Igneous rocks: form from magma or lava in or on Earth.

formed by:
- melting and cooling

Intrusive (granite--)

Extrusive(basalt---obsidian---rhyolite---pumice)

Magma

cooling

melting

Igneous rocks

weathering and erosion

heat and pressure

melting

Sediments

weathering and erosion

compaction and cementation

weathering and erosion

Metamorphic rocks

Sedimentary rocks

Metamorphic rocks: form deep below the Earth's surface.

formed by:
- heat and pressure

Limonston----------marble

Shale-----slate------gneiss

Sedimentary rocks: are made of pieces of sediment and minerals.

formed by:
- weathering and erosion
- compaction and cementaion

Conglomerate

Limestone

sandstone

18	SCI.2.3.03.010 Classify rocks and minerals according to their different physical properties
	SCI.2.3.03.010 يصنف الصخور والمعادن وفقاً لخصائصها الفيزيائية المختلفة

What are metamorphic rocks?

If sedimentary and igneous rocks are put under heat and pressure, the shape or the size of the crystals within them can change. The crystals may also change position to form layers. Heat and pressure may even change one of the minerals in the rock into another mineral. The high pressure also squeezes the particles in the original rock more tightly together.

If you look closely at limestone, you can often see fossil fragments in the rock. As limestone changes into marble under heat and pressure, the fossils are usually crushed. **Marble** is a more compact rock than limestone, with crystals that are locked together like pieces of a jigsaw puzzle. The color in marble comes from the minerals in the original piece of limestone.

Slate is a type of metamorphic rock in which the minerals are tightly packed together, making it waterproof. When **slate** is broken, it shows cleavage as it breaks into thin sheets. This makes **slate** useful as a roofing material as well as for stepping stones and outside floors.

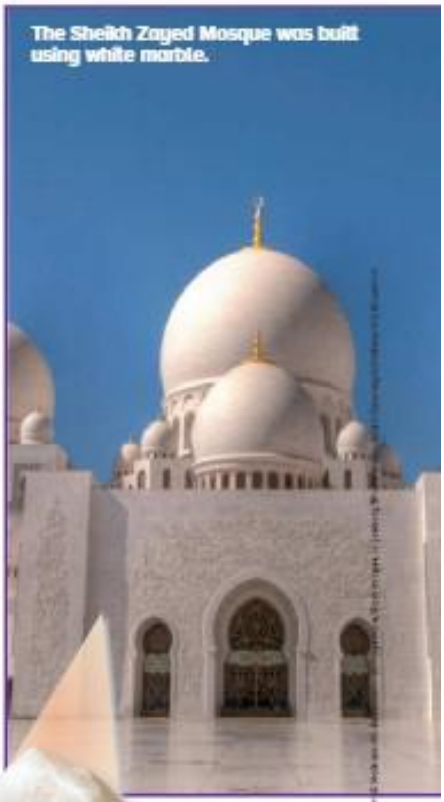
Marble is a shiny metamorphic rock that contains minerals that give it brilliant colors. Marble is easy to carve or shape, making it useful for fashioning statues, floors, kitchen counters, and monuments.

Quick Check

6. What happens to the fossils in limestone as the limestone turns into marble?

The Fossils are crushed

The color in this marble was caused by mineral impurities in the limestone from which it formed.



The Sheikh Zayed Mosque was built using white marble.

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EXPLAIN

8. What causes an igneous rock to change into a metamorphic rock?
   - A weathering and erosion
   - B heat and pressure
   - C compaction and cementation
   - D melting and cooling

marble is an example of a ----

Metamorphic

19	SCI.2.3.03.011 Explain how the interaction between earth systems leads to the formation of sedimentary,igneous and metamorphic rocks	الشكل صفحة ٤٩٩
	SCI.2.3.03.011 يفسر كيف يؤدي التفاعل بين الأنظمة الأرضية الي تشكل الصخور النارية والرسوبية والمتحولة والتربة	Figure page499

Soil Horizons

Each layer of soil is called a **soil horizon** (huh-RYE-zuhn). In some places, the layers of soil might look like the ones on this page.

The **A** horizon, which holds the most nutrients, contains humus (HYEW-mus). **Humus** is the part of the soil that is made of decayed organic materials. These materials are the remains of dead plants and animals that are decayed by microscopic organisms. Humus contains nutrients that feed plants. Humus also soaks up and holds water more easily than bits of rock.

The soil in this horizon is called **topsoil**. Most plant roots grow in this soil. The roots absorb nutrients and water from humus.

The **B** horizon is called subsoil. You will find less humus in subsoil and lots of fine particles of rock, such as the particles that make up clay.

Next is the **C** horizon, which is made mostly of larger pieces of weathered rock. These soil horizons rest on solid, unweathered bedrock.

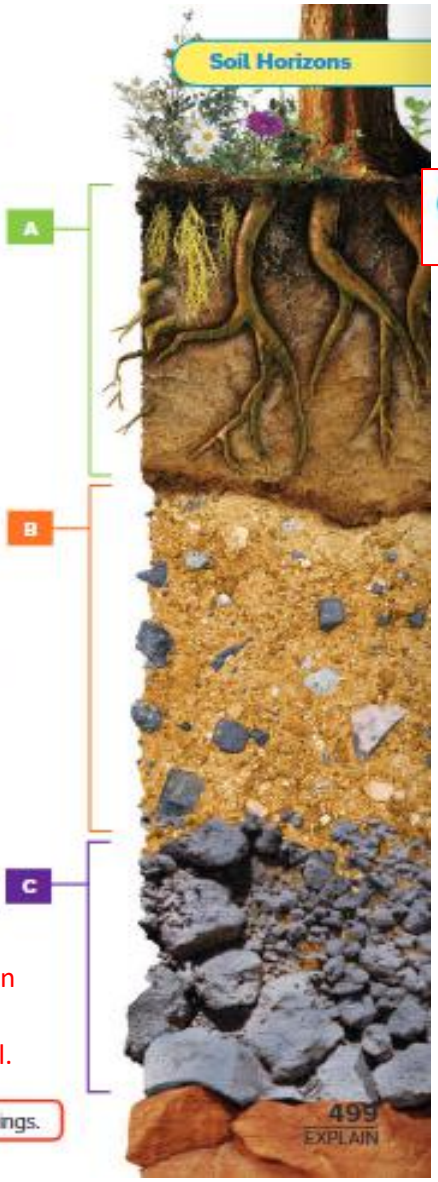
Different areas will have different depths of soil horizons. Some areas may not have one of these soil horizons.

Quick Check

1. What are the main steps in the formation of soil?

Weathering of rock, breaking down of rock by microorganism, plant growth, decay of plant and animal.

FACT Soil is made of nonliving and once-living things.



1 Vocabulary The part of soil that is made of decayed organic materials is called _____.

Humus

4 Test Prep Which is the C horizon of soil made of?

A clay C bedrock

B humus D large rocks

What is another name for the layers of soil?

Horizons

What layer is considered the 'B' layer of soil?

Subsoil

What layer is the primary layer of soil where plants and animals live?

Topsoil

https://www.liveworksheets.com/rk719886hx

21	SCI2.3.03.011 Explain how the interaction between earth systems leads to the formation of sedimentary,igneous and metamorphic rocks
	SCI.2.3.03.011 يفسر كيف يؤدي التفاعل بين الأنظمة الأرضية التي تشكل الصخور النارية والرسوبية والمتحولة والتربة

How is soil conserved?

The preservation or protection of natural resources, including soil, is called **conservation** (kahn•sur•VAY•shun). Listed below are some methods of conserving soil:

Fertilization Fertilizers containing one or more nutrients can be added to soil to replace nutrients used up by previous crops.

Crop Rotation Farmers can plant different crops on the same land in different years. They can choose crops that add the nutrients that have been removed by other crops.

Strip Farming Plant roots help prevent soil from being washed or blown away. For this reason, farmers may plant grasses between rows of other crops.

Contour Plowing Rainwater flows swiftly down hills and can carry away rich topsoil. Farmers can slow the speed of water flowing down the hill by contour plowing. Instead of plowing up and down the slope of the hill, farmers plow furrows across the slope.

Terracing Terraces are flat shelves that are cut into a hillside. Crops are planted along each terrace. This also slows the speed of water flowing down a slope.

Wind Breaks Farmers plant tall trees along the edges of farmland to slow the speed of wind across the ground. Where there are trees, the wind is less likely to blow away topsoil.

Laws Governments may pass laws to stop the pollution of soil.

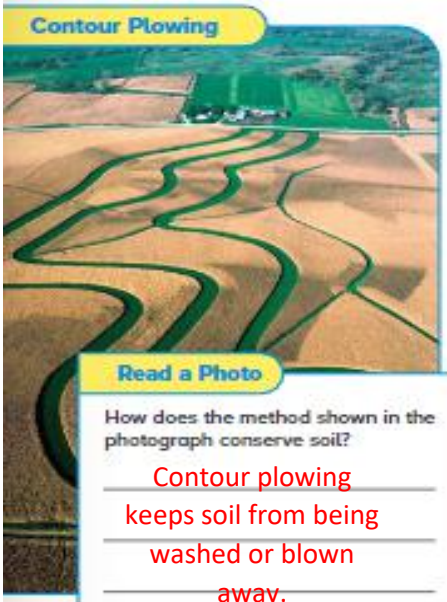
Individual Efforts You can avoid polluting soil with trash and help clean up land that has already been polluted.

Education You can help inform people of the value of soil and how to conserve it.

Test Prep Which is strip farming?

A adding fertilizer to soil
B cutting shelves in hills
C planting grasses between crop rows
D planting trees around crops

Contour Plowing



Read a Photo

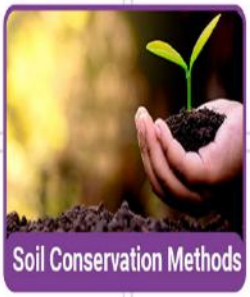
How does the method shown in the photograph conserve soil?

Contour plowing keeps soil from being washed or blown away.

Quick Check

3. What might cause mountaintops to have little or no topsoil?

Rain can easily wash soil down the slope



Replacing nutrients:
- fertilization
- crop rotation

Preventing water erosion:
- contour plowing
- terracing

Preventing wind erosion:
- wind breaks
- strip farming

Education:
- effects of pollution
- laws against pollution

Strip Farming	Fertilizer	Wind Breaks	Education
			
reduces both water and wind erosion	adds nutrients back into the soil	reduces wind erosion	teaches people how to take care of soil

23	SCI.1.2.01.008 Recognize the impact of tech nological evolution on the changing desires and needs of people with time SCI.1.2.01.008 يبين أثر التطور التكنولوجي على تغير رغبات وحاجات الناس مع الزمن	تمرين ٢ exercise 2

The invention of the microscope allowed cells to be discovered.

You may have noticed that the words *science* and *technology* are often used together. This is because technology depends on science. Before a solution to a problem can be developed, humans must understand the scientific principles behind the problem. For example, doctors have to understand the causes of diseases before they can treat them.

Humans also use technology to gain more scientific knowledge. For example, technology like computers, CAT scans, and MRIs allow doctors to learn more about the human body. This allows people to develop new technology to treat diseases. Science and technology go hand in hand.

Quick Lab

To learn more about the factors that change the brightness of a lightbulb, do the Quick Lab in the Activity Lab Manual.

Quick Check

1. How is technology involved in scientific advances?

Science allows us to improve the technology. Technology allows us to gain more scientific knowledge

2. Why are pencils and paper considered technology?

Its meet humans need and help to solve a problem and thus are technology

Test Prep Which is an example of technology?

A lumber C soil
B apple D tree

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EXPLAIN

24	SCI.1.2.01.005 Analyze and interpret the technological and engineering problems	الشكل صفحة ٥٣٤
	SCI.1.2.01.005 يحلل ويفسر المشكلات التكنولوجية والهندسية	Figure page534
25	SCI.1.2.01.005 Analyze and interpret the technological and engineering problems	
	SCI.1.2.01.005 يحلل ويفسر المشكلات التكنولوجية والهندسية	

Read and Respond

How can technology mimic nature?

When you think of technology, computer chips, robots, televisions, and spacecraft might come to mind. Nature seems to have nothing to do with technology—or does it? In fact, nature plays an essential role in the invention of many new technologies.

Many types of technology are created to mimic, or imitate, objects that occur in nature. Artificial lungs "breathe" air like real lungs. An electronic implant, such as a hearing aid, enhances the ear's ability to hear. A pacemaker helps a heart maintain its correct rhythm.

Technology does not necessarily have to be complex to be effective. A pair of tweezers or forceps, for example, is very simple. It doesn't have a motor, wires, or a computer chip in it. Yet when we use tweezers or forceps to grasp a small object, they mimic the motion of two fingers.

Underline three objects that imitate objects that occur in nature.

These technologies are designed to mimic nature. A pacemaker regulates a human's heartbeat. An artificial heart can replace a person's natural heart.

Test Prep A device that replaces the function of the musculoskeletal system of a missing limb is a
A pylon. C prosthesis
B bionic. D robot.

2. What need does a robot that performs surgery most likely meet?
A It mimics a human arm.
B It is able make precise movements that the human hand cannot.
C It makes scientific discoveries.
D It performs a dangerous job that a human cannot do.

3. A patient has an irregular heartbeat. Which technology might she benefit from?
A a prosthesis
B a bionic lung
C a pacemaker
D a robotic muscle

5. The tool shown below is used to pick up small objects.

Which human body part was the tool most likely designed to mimic?
A hands
B feet
C arms
D fingers

9. Complete the graphic organizer below with the parts of a prosthetic limb that represent the human body systems listed.

Body System	Part of Prosthetic Limb
Muscular	Cables and motor
Skeletal	Hingers and pylons