Name _____

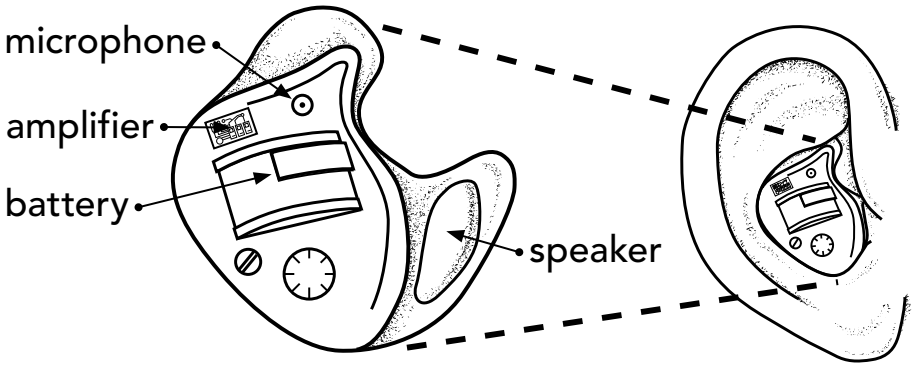
Daily Science
Big Idea 5
WEEK 3

Day 2

Weekly Question

How do hearing aids help people hear?

Modern hearing aids have four main parts: a battery, a **microphone**, an **amplifier**, and a **speaker**. The battery powers the hearing aid. The microphone works by receiving sound waves and changing the vibrations into electric current. The electric current then travels through a circuit in the hearing aid, where it is made stronger by the amplifier. The amplifier sends the stronger current to the speaker, which changes the current back into sound waves. These sound waves then travel into the middle ear or sometimes directly to the inner ear.



Vocabulary

amplifier
AM-plih-fy-ur
a device that increases electric current

microphone
MY-kroh-fone
a device that converts sound waves into electric current

speaker
SPEE-kur
a device that converts electric current into sound waves

A. Number the steps in the correct order to describe how a hearing aid works.

____ The sound waves are transmitted to the inner ear.

____ The amplifier increases the strength of the electric current.

____ The microphone transforms sound waves into electric current.

____ The microphone receives sound waves.

____ The speaker converts electric current into sound waves.

B. Most hearing aids have a control for the volume. Why do you think that is?

_____

_____

Name _____

Daily Science
Big Idea 5
WEEK 3

Day 3

Weekly Question

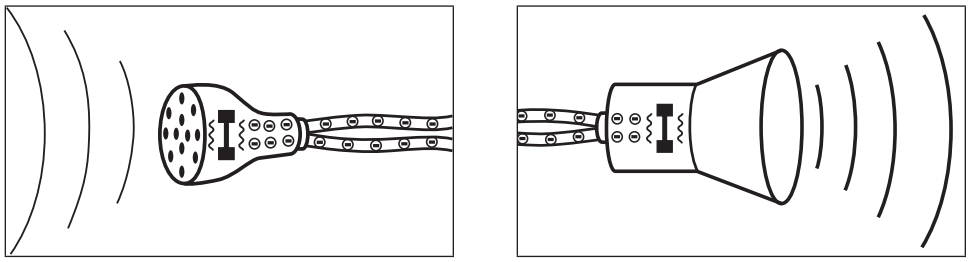
How do hearing aids help people hear?

Both microphones and speakers use magnets and electricity to work. When a microphone receives sound waves, part of it vibrates and pushes a metal coil back and forth quickly over a permanent magnet. This is what changes sound waves into electric current. Then the amplifier makes the current stronger before it travels to the speaker. When the current reaches the speaker, an **electromagnet** turns on and off quickly, creating a changing magnetic field. These pulses in the magnetic field cause the speaker to vibrate and produce new, stronger sound waves.

Vocabulary

electromagnet
ee-LEK-troh-MAG-net
a magnet created by electric current flowing through a wire coil

A. Look at the illustrations. Label the *microphone* and the *speaker*.



_____ _____

B. Use *microphone*, *speaker*, or *amplifier* to answer each question.

1. Which part of a hearing aid creates electric current? _____
2. Which part of a hearing aid uses an electromagnet? _____
3. Which part of a hearing aid uses a permanent magnet? _____
4. Which part of a hearing aid makes the electric current stronger? _____

Name _____

Day 4

Weekly Question

How do hearing aids help people hear?

Although most hearing aids have the same parts, there are different types of hearing aids. One type, called a telecoil, has a metal coil instead of a microphone. Another type of hearing aid, called a digital hearing aid, converts the sound waves into electronic data, the same way music is converted into electronic data in a CD or MP3 player. This kind of hearing aid then translates the data into an electronic signal that is sent to the hearing aid's speaker.

Regardless of the type of hearing aid, they all convert electrical energy into sound waves. And while no hearing aid works as well as a healthy set of ears, hearing aids do make it possible for millions of people to hear better.

A. Write *true* or *false*.

1. Digital hearing aids convert sound waves into data. _____
2. All hearing aids convert electricity into sound waves. _____
3. Hearing aids often work better than healthy ears do. _____
4. Most hearing aids have few parts in common. _____

B. Sound amplifiers are not only used for hearing aids. Name three other devices that you can think of that might use sound amplifiers.

1. _____
2. _____
3. _____

Name _____

Daily Science
Big Idea 5
WEEK 3

Day 5

Weekly Question

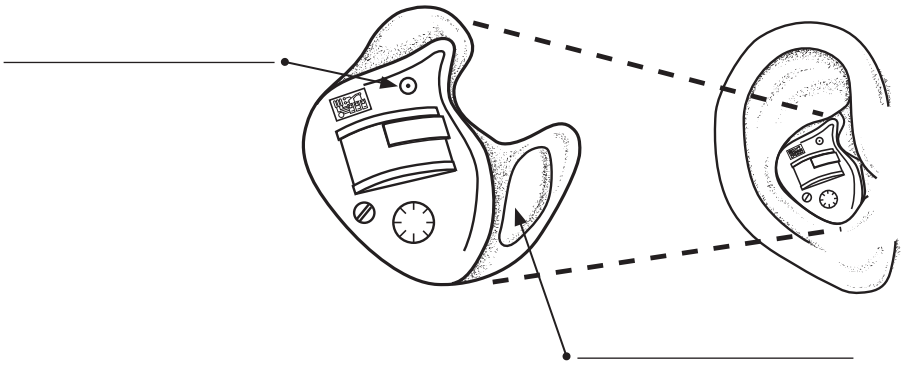
How do hearing aids help people hear?

A. Use the words in the box to complete the paragraph.

microphone	**electromagnet**	**amplifier**
hearing aid	**sound waves**	**speaker**

A _____ is a device that receives and sends _____. The _____ in a hearing aid receives sound waves and turns them into electricity. The _____ makes the electric current stronger. The current travels to an _____ inside the _____, where the electricity becomes new, stronger sound waves.

B. Look at the diagram. Label the *microphone* and *speaker*. Then write a caption that explains how sound waves travel through a hearing aid.



_____

_____

_____

Electrical energy can be converted into heat, light, sound, and motion.

Week 4

How do electric cars work?

Electric cars run by using batteries and electric motors. This week, students learn that electrical energy flows from the battery to the electric motor, where opposing magnetic forces between a permanent magnet and an electromagnet cause a rod to spin. This interaction converts electrical energy into mechanical energy and makes the wheels of a car turn. Students also learn about a device called the controller, which helps speed up and slow down an electric car. Finally, students discover that the same principle of conversion of electrical energy into mechanical energy is at work in familiar machines they use every day.

Day One

Vocabulary: *electric motor, mechanical energy*

Materials: page 147

Discuss with students what they know about how vehicles are powered. (gasoline, diesel fuel, electricity, hybrid) Tell students that this week they will learn how electricity can power cars. After introducing the vocabulary, have students read the passage and complete the activities. Review the answers together.

Day Two

Vocabulary: *electromagnet, magnetic force*

Materials: page 148; pair of magnets

If necessary, review with students how an electromagnet works prior to beginning the lesson. (An electric current runs through a coil of wire around an iron rod, which creates a magnetic field.) Introduce the vocabulary word and use two magnets to demonstrate how they can attract or repel each other. After students read the passage, have them complete the activities. Review the answers together.

Day Three

Vocabulary: *controller*

Materials: page 149; electric fan (optional)

Begin the lesson by explaining that electric motors can run at different speeds. If possible, use an electric fan to demonstrate how it can change speeds, and point out that the buttons on the fan control how fast the motor spins. Then introduce the vocabulary word. After students read the passage, have them complete the activities. Review the answers together.

Day Four

Materials: page 150

Remind students that electric cars are not the only devices that turn electrical energy into mechanical energy. After students read the passage, direct them to complete the activity. You may wish to complete part of the chart as a class. Review the answers together.

Day Five

Materials: page 151

Have students complete the page independently. Then review the answers together.

Name _____

Daily Science
Big Idea 5
WEEK 4

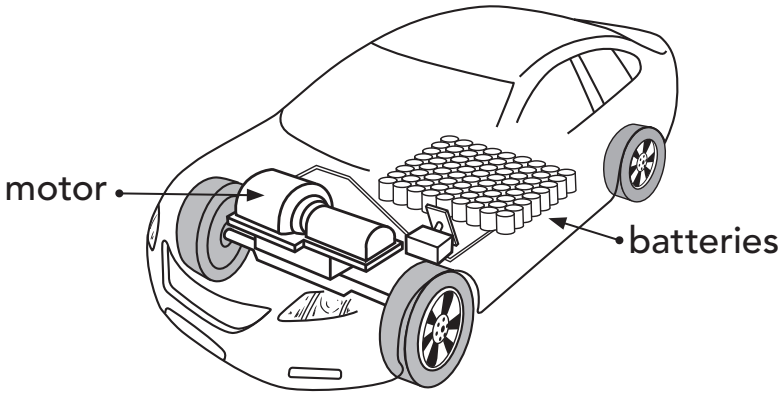
Day 1

Weekly Question

How do electric cars work?

You use electrical energy every day to run your TV, computer, music player, and lots of other devices. But it took scientists a while to figure out a good way to make a car move quickly and for a long period of time by using electricity. Until fairly recently, almost all cars used gasoline. Today, many cars run on both electricity and gas. And some cars run entirely on electricity.

Most electric cars look just like regular cars on the outside, but under the hood they are very different. In an electric car, batteries generate electrical energy that is conducted through a circuit to an **electric motor**. The electric motor converts electricity from the batteries into **mechanical energy**, the energy of motion. This is what causes the wheels of the car to turn.



Vocabulary

electric motor
ee-LEK-trik MOW-tur
a device that converts electrical energy into mechanical energy

mechanical energy
meh-KAN-ih-kull EN-ur-gee
a form of energy expressed as motion

A. Complete the analogy.

Gasoline is to *gas-powered car* as *battery* is to _____.

B. Use information from the passage to complete the sentences.

1. The _____ converts electricity into _____.

2. In an electric car, _____ generate electricity.

3. Mechanical energy can also be called _____.

Name _____

Daily Science Big Idea 5

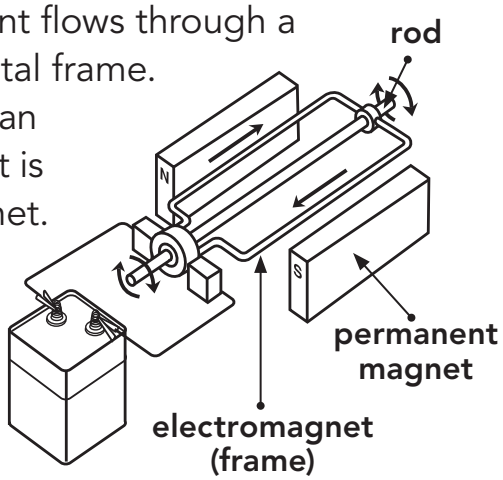
WEEK 4

Day 2

Weekly Question

How do electric cars work?

How does an electric motor convert electricity into mechanical energy? Electric current flows through a coil of wire wrapped around a metal frame. This causes the frame to become an electromagnet. The electromagnet is surrounded by a permanent magnet. The two **magnetic forces** push and pull against each other, making a rod in the middle of the frame spin. That rod is connected to the wheels of a car, and when it rotates, the wheels turn and your car moves.



Inside an electric motor

Vocabulary

magnetic force
mag-NEH-tik forss
the force produced by a magnet that can attract or push away other magnets

A. Complete the sentence that describes how an electric motor creates mechanical energy.

The _____ between the permanent magnet and the _____ inside the motor cause the rod to spin.

B. Number the events in the correct order to explain how electricity makes a car move.

____ The coil and frame become an electromagnet.

____ The wheels turn.

____ The electromagnet spins.

____ Electric current flows through a wire wrapped around a frame.

____ The electromagnet pushes and pulls against a permanent magnet.

Name _____

Daily Science
Big Idea 5
WEEK 4

Day 3

Weekly Question

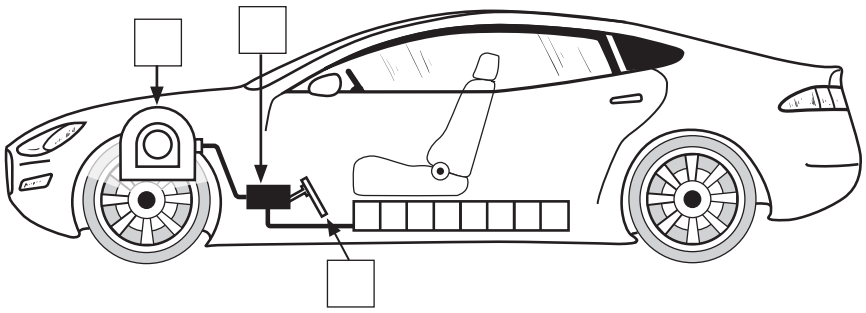
How do electric cars work?

When a person is driving an electric car, he or she can speed up or slow down the car with the help of a device called a **controller**. The controller is located between the car batteries and the electric motor and is connected to a pedal inside the car. When the driver presses down on the pedal, the pedal sends a signal to the controller. The controller then delivers a certain amount of electric current to the electric motor, depending on how far down the driver presses the pedal. The farther down the driver presses the pedal, the more electricity the controller sends to the motor. The more current that is sent to the electric motor, the faster the car goes.

Vocabulary

controller
kun-TROL-er
a device in an electric car that regulates the amount of electric current sent from the battery to the motor

A. Write the number of each description next to the part of the electric car that it describes.



1. This part is used by the driver to send a signal to the controller.

2. This part spins based on how much electric current it receives.

3. This part sends electric current to the motor.

B. When the controller sends electric current to the motor, it causes the rod connected to the wheels to spin. Why would sending more current make the car go faster?

_____

Name _____

Daily Science
Big Idea 5
WEEK 4

Day 4

Weekly Question

How do electric cars work?

Think about how your life would be different without cars, airplanes, refrigerators, or computers. All these inventions that make our lives so much easier are fairly recent. And they all depend on electric motors. The source of electricity for the motor can be a battery or an electric current generated in a power plant and delivered to your home through wires. But all electric motors are alike in that they use electrical energy and magnetic force to produce mechanical energy. If something uses electricity and has a part that spins, it probably has a motor.

All the items in the chart have electric motors. Visualize each device. Then complete the chart.

Machine	Source of electricity (*outlet* or *battery*)	Which parts move?
Blender		
Clothes washer		
Electric toothbrush		
Electric mixer		
Remote-control car		
Electric fan		

Name _____

Daily Science
Big Idea 5
WEEK 4

Day 5

Weekly Question

How do electric cars work?

A. Use the words in the box to complete the sentences.

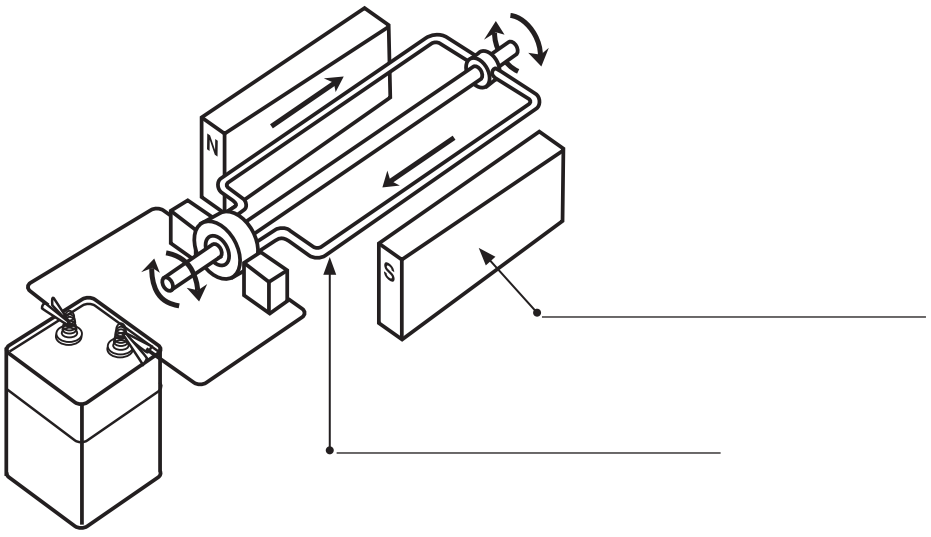
electromagnet	**mechanical energy**	**controller**
electric motor	**magnetic force**	

1. Electrical energy is converted into _____ in the _____ of an electric car.

2. When a driver presses down on the pedal, a _____ delivers the right amount of electric current to the motor.

3. An _____ and a permanent magnet both have _____.

B. Label the *permanent magnet* and the *electromagnet* in the motor.



Name _____

Daily Science
Big Idea 5
WEEK 5

Unit Review

Comprehension

Electrical Energy

Fill in the bubble next to the correct answer.

1. The filament in a toaster acts like a _____ and changes some of the electrical energy into _____.

Ⓐ resistor, heat
Ⓑ conductor, heat
Ⓒ battery, light
Ⓓ circuit, light

2. What does electric current change into after it passes through an LED?

Ⓐ electrons
Ⓑ segments
Ⓒ heat
Ⓓ photons

3. Which machine does NOT use an electromagnet?

Ⓐ LED
Ⓑ electric motor
Ⓒ hearing aid
Ⓓ electric car

4. In a hearing aid, electrical energy is changed into _____.

Ⓐ heat waves
Ⓑ light energy
Ⓒ sound waves
Ⓓ mechanical energy

5. An electric motor changes electrical energy into _____.

Ⓐ heat energy
Ⓑ mechanical energy
Ⓒ light energy
Ⓓ sound energy

6. The source of electricity for an electric car is a _____.

Ⓐ circuit
Ⓑ resistor
Ⓒ battery
Ⓓ LED

Name _____

Unit Review

Vocabulary

Word Energizer

Daily Science Big Idea 5 WEEK 5

Next to each vocabulary word, write the letter of its definition.

____ **1.** circuit

____ **2.** conductor

____ **3.** electric current

____ **4.** electric motor

____ **5.** electromagnet

____ **6.** electron

____ **7.** filaments

____ **8.** LED

____ **9.** magnetic force

____ **10.** mechanical energy

____ **11.** microphone

____ **12.** photon

____ **13.** radiate

____ **14.** resistor

____ **15.** sound waves

____ **16.** speaker

____ **17.** switch

a. the flow of electricity

b. a particle of an atom with a negative charge

c. part of a circuit that starts or stops the flow of electric current

d. something that allows electric current to flow easily

e. something that limits the flow of electric current

f. wires that heat up when they conduct electricity

g. to send out energy in waves or rays

h. a device that converts electrical energy into light

i. a path along which an electric current flows

j. a tiny unit of light energy

k. waves of energy created by vibration

l. a device that converts sound waves into electric current

m. a device that converts electric current into sound waves

n. a magnet created by electricity flowing through a wire coiled around an iron core

o. a device that changes electrical energy into mechanical energy

p. the energy of motion

q. a force that attracts or pushes away other magnets

Name _____

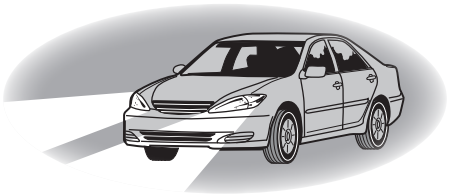
Daily Science
Big Idea 5
WEEK 5

Unit Review

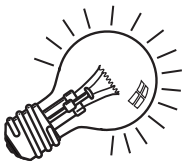
Visual Literacy

Kinds of Energy

For each picture, list the kind or kinds of energy that are being converted from electrical energy (*heat*, *light*, *sound*, or *motion*).

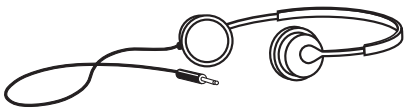
1. 

2. 

3. 

4. 

5. 

6. 

7. 

Name _____

Daily Science
Big Idea 5
WEEK 5

Unit Review

Hands-on Activity

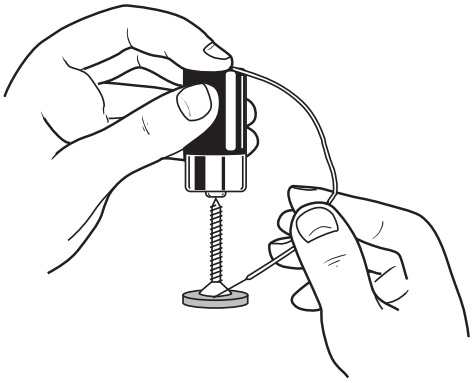
Start Your Motor

When you think about an electric motor, you might imagine a complex machine with many moving parts. But, in fact, you can create your own electric motor using a permanent magnet and an electromagnet.

What You Need

- flat-head metal screw
- disc magnet
- 6 inches of copper wire
- 1.5-volt C battery

1. Set the flat head of the metal screw down on top of the disc magnet.
2. Lower the battery so that it touches the tip of the screw.
3. Lift up the battery.
4. Hold one end of the wire to the top of the battery. Touch the side of the magnet with the other end of the wire.



What Did You Discover?

1. Describe what happened when you lifted up the battery.

_____

2. Describe what happened when you touched the other end of the wire to the magnet.

_____

3. Which part of the device is the electromagnet? Explain.

_____

People invented machines to make work easier.

Key Concept
Simple machines make work easier.

National Standard
People continue inventing new ways of doing things, solving problems, and getting work done.

In this unit, students learn that work is done by exerting a force over a distance. They see that simple machines make work easier, meaning that machines allow you to do work by using less force, but there is a trade-off. When you use less force to do work, you have to spread that force over a longer distance. Students will learn the following:

- an inclined plane decreases the amount of force but increases the distance needed to do work;
- the wedge and the screw change the direction of the force that is applied to them;
- a pulley changes the direction of the force applied to it or changes the amount of force needed to do work; and
- a wheelbarrow is a compound machine made up of the lever and the wheel and axle.

Teacher Background

Machines are everywhere. From buses and cars to elevators and ramps; from scissors to watches to wheelbarrows—we depend on machines to help us do our work.

All machines rely, in part, on the six simple machines: the inclined plane, the lever, the wedge, the wheel and axle, the pulley, and the screw. In fact, most machines are compound machines, which are combinations of simple machines.

Simple machines make it easier to do work by either changing the direction of force so that the force can be better used, or by multiplying the output of force. This latter effect is called mechanical advantage. Some simple machines change the direction of force, some provide mechanical advantage, and some do both.

For specific background information on each week's concepts, refer to the notes on pp. 158, 164, 170, and 176.

Unit Overview

WEEK 1: Why do some building entrances have ramps?

Connection to the Big Idea: Ramps are inclined planes, a kind of simple machine.

This week, students are introduced to simple machines and the inclined plane. They learn that the inclined plane makes work easier. To understand this, students learn how scientists define work, and how force and distance are combined to do work.

Content Vocabulary: *distance, force, inclined plane, simple machine, work*

WEEK 2: What's the difference between a nail and a screw?

Connection to the Big Idea: Screws and wedges are simple machines.

This week, students learn that the screw and wedge are simple machines that change the direction of the force applied to them.

Content Vocabulary: *friction, screw, threads, wedge*

WEEK 3: How do elevators work?

Connection to the Big Idea: Elevators have pulleys, which are a simple machine.

This week, students learn about the pulley. They learn that a fixed pulley changes the direction of force, while a movable pulley reduces the amount of force needed to do work, also called mechanical advantage. Students then learn that elevators use a counterweight to help lift or lower the car.

Content Vocabulary: *counterweight, fixed pulley, load, mechanical advantage, movable pulley, pulley*

WEEK 4: How does a wheelbarrow make work easier?

Connection to the Big Idea: A wheelbarrow is a compound machine made up of the lever and the wheel and axle.

Students learn that a wheelbarrow is a compound machine made up of the lever and a wheel and axle. The lever in a wheelbarrow makes it easier to lift or lower the load, and the wheel and axle overcome friction to let the wheelbarrow roll.

Content Vocabulary: *compound machine, fulcrum, lever, wheel and axle, wheelbarrow*

WEEK 5: Unit Review

You may choose to do these activities to review concepts of simple machines.

p. 182: Comprehension Students answer multiple-choice items about key concepts of the unit.

p. 183: Vocabulary Students complete a crossword puzzle to show that they understand unit vocabulary.

p. 184: Visual Literacy Students identify the simple machines that make up some common compound machines.

p. 185: Hands-on Activity Students experiment with levers to see how moving the fulcrum changes how much force is needed to lift an object. Review the materials and instructions on the student page ahead of time.

People invented machines to make work easier.

Week 1

Why do some building entrances have ramps?

This week's lessons build on students' familiarity with ramps at building entrances to discuss inclined planes and how they make doing work easier. Students will likely need help understanding that the scientific definition of *work*—the use of force to move something over distance—has nothing to do with effort. Depending on your students' ability levels, you may wish to introduce them to the scientific formula used to calculate work: Work = Force x Distance (W = F x D).

Day One

Vocabulary: *inclined plane, simple machine*

Materials: page 159

Direct students' attention to the illustration on the page. Ask them to point out the ramp and to speculate what the ramp is for. (to help people get into buildings) Tell students that a ramp is an example of an inclined plane, which is one of the six simple machines. Introduce the vocabulary, have students complete the page, and then go over the answers together.

Day Two

Vocabulary: *distance, force, work*

Materials: page 160

Because students will likely think that "work" is the same as "effort," take time to use the vocabulary words *force* and *distance* to explain what work is in scientific terms (the use of force to move something over a certain distance). Students may benefit from doing the page as a group.

Day Three

Materials: page 161; heavy book, measuring tape or yardstick, and board or other inclined plane

Have students take turns lifting the heavy book and then pushing it up the inclined plane, measuring the distance the book was lifted versus slid up the inclined plane. When students have completed activity A, review the answers together. Then review the concept of *work* by asking: *Who did more work, Marco or Maria?* (They both did the same amount of work.) *Why is that?* (They both moved their bowling balls to the same place.)

Day Four

Materials: page 162

If students have trouble thinking of places to list in activity A, consider doing the activity as a group. If necessary, review the concept of *gravity* (the natural force that pulls everything to Earth's center) before students complete activity B. You may also wish to explain that the ladder is an inclined plane, because it is tilted at an angle. It would be easier to climb than a ladder that is not tilted. Then review the answers together.

Day Five

Materials: page 163

Have students complete the page independently. Then review the answers together.

Name _____

Daily Science
Big Idea 6
WEEK 1

Day 1

Weekly Question

Why do some building entrances have ramps?

If a building has stairs at the entrance, it probably has a long ramp leading to the door, too. That ramp is an example of an **inclined plane**. One end of an inclined plane is higher than the other. Inclined planes are everywhere. Ramps, playground slides, and ladders are examples of inclined planes. An inclined plane is a **simple machine**. Simple machines are tools that help you do work.

Vocabulary

inclined plane
in-KLINED playn
a flat surface that is tilted at an angle

simple machine
SIM-pull muh-SHEEN
a basic tool that makes work easier to do and has few or no moving parts

A. Complete the analogy.

Inclined plane is to *simple machine* as _____.

❒ *ramp* is to *stairs* ❒ *triangle* is to *shape* ❒ *nails* are to *hammer*

B. Which object in each pair is an *inclined plane*? Write the word or words.

1. a ramp or a table _____

2. a swing set or a slide _____

3. a ladder or a hammer _____

4. an escalator or an elevator _____

5. a trail up a hill or a flat sidewalk _____

Name _____

Daily Science
Big Idea 6
WEEK 1

Day 2

Weekly Question

Why do some building entrances have ramps?

If simple machines help you do work, then what do we mean exactly when we say "work"? Scientists say that **work** is the **force** applied to an object to move it a certain **distance**. When you walk up stairs or along a ramp, you are doing work. You are applying force to move yourself a distance. Scientists don't measure work just by how much force you use or how far a distance you travel. They look at the end result. So whether you use stairs or a ramp to reach the entrance, the amount of work you are doing is the same. You are using less force over a greater distance or more force over a shorter distance.

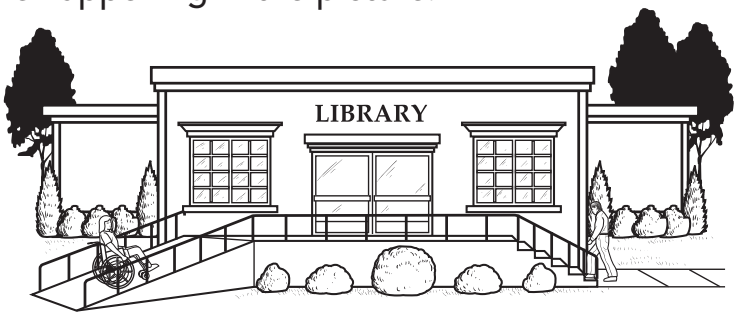
Vocabulary

distance
DIS-tinss
the amount of space between two points

force
forss
a push or pull that can change the position of an object

work
werk
the use of force to move something over a distance

A. Check the box next to the caption that correctly describes what is happening in the picture.



❒ **The person using the stairs is doing more work.**

❒ **Both people are doing the same amount of work.**

❒ **The person using the ramp is doing more work.**

B. Use the vocabulary words to complete the sentences.

1. Lifting and tugging are examples of _____ being applied.
2. The _____ between two places can be measured in inches, feet, or miles.
3. An inclined plane makes it easier for you to do _____.

Name _____

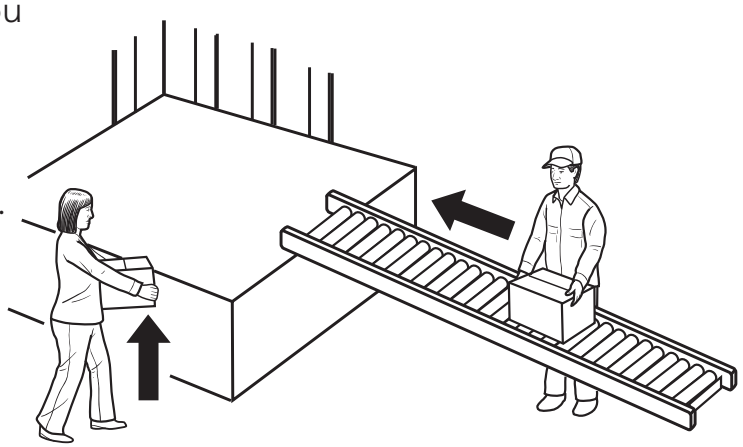
Daily Science
Big Idea 6
WEEK 1

Day 3

Weekly Question

Why do some building entrances have ramps?

An inclined plane makes work easier to accomplish by reducing the amount of force you must use to move something. But there's a trade-off. When you use less force to do work, you have to increase the distance. If you lift a heavy box up to a shelf five feet in the air, the distance is five feet. If you push a box up a ten-foot ramp to the same shelf, the distance is ten feet. The box ends up in the same place. But when you push the box up the ramp, you are using less force over a longer distance. The force you exert is smaller.



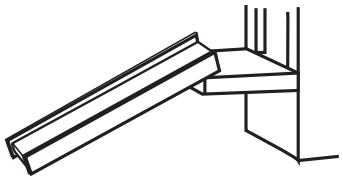
A. Read the sentences. Then answer the questions.

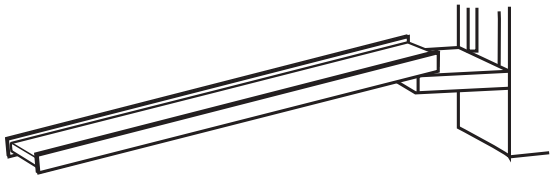
Marco lifts his bowling ball up to a shelf that is three feet high. His sister, Maria, uses an inclined plane that is five feet long to roll her bowling ball up to the same shelf.

1. Who used more force? _____

2. Who moved the ball a longer distance? _____

B. Look at the two inclined planes below. Check the box next to the ramp that requires more force to move things up it. Explain your answer.

❒ 

❒ 

_____

Name _____

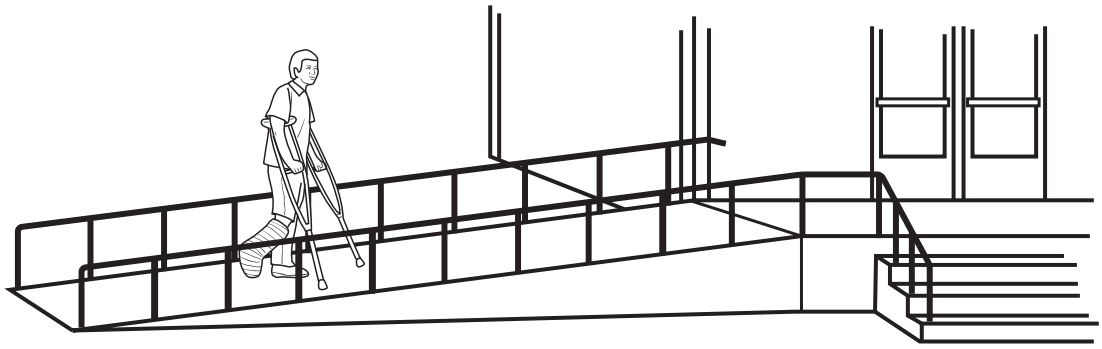
Daily Science
Big Idea 6
WEEK 1

Day 4

Weekly Question

Why do some building entrances have ramps?

Because they are inclined planes, ramps in front of building entrances require less force to go up them than stairs do. This means that people in wheelchairs or people who have difficulty walking can use the ramps to get into buildings. People can also push or carry heavy objects into buildings more easily. Ramps are important because they give everyone access to places such as schools, restaurants, and other public buildings.

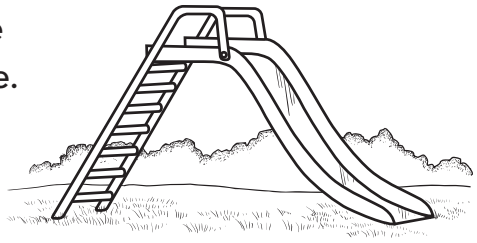


A. Name four places you have been to that have a ramp in front of them.

1. _____ **3.** _____

2. _____ **4.** _____

B. Look at the drawing of a slide. Circle the two inclined planes in the picture. Then answer the questions.



1. Which inclined plane requires you to use force? _____

2. Which inclined plane uses the force of gravity to do work? _____

Name _____

Daily Science
Big Idea 6
WEEK 1

Day 5

Weekly Question

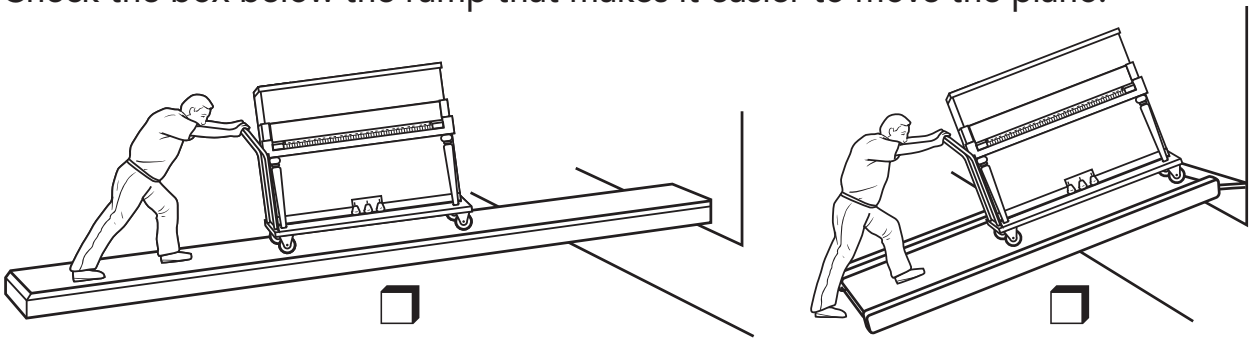
Why do some building entrances have ramps?

A. Use the words in the box to complete the paragraph.

force	**inclined plane**	**distance**
work	**simple machine**	

Chandra needed to carry a heavy box up a flight of stairs. To make the _____ require less effort, she made a ramp. This ramp, or _____, was a board that she laid over the steps. It was an example of a _____. The _____ from the bottom of the ramp to the top was ten feet. Chandra applied _____ and moved the box up the ramp.

B. Check the box below the ramp that makes it easier to move the piano.



C. In your own words, explain how inclined planes make work easier.

_____

_____

People invented machines to make work easier.

Week 2

What's the difference between a nail and a screw?

This week, students increase their understanding of simple machines by learning the difference between nails and screws. Both nails and screws change the direction of the force applied to them, but they differ in how they do this. A screw uses a rotational force. When the screw turns, that force becomes motion along a straight line. A nail, on the other hand, is a kind of wedge. When you hammer a nail, the force starts off traveling in one direction. But some of this force gets redirected sideways, which is why a wedge can split or push away the material into which it is driven.

Day One

Vocabulary: *screw, wedge*

Materials: page 165; variety of nails and screws

Allow students to examine the collection of nails and screws and to make observations about the similarities and differences between them. (e.g., length, width, threads versus smooth sides) Inform students that both a nail and a screw are simple machines, and that this week they will learn about how these simple machines operate. After students have finished reading the passage, complete activity A together and ask volunteers to share their predictions and explain their thinking. Direct students to complete activity B independently.

Day Two

Materials: page 166; nails, hammer, piece of wood

After students have read the passage, have them examine the nails and name the parts. (pole, wedge) Use the hammer to drive a nail into the wood. Then ask students to find the part of the passage that explains what happened. (paragraph 2, sentences 2 through 4) After students have completed the activities, go over the answers together.

Day Three

Vocabulary: *threads*

Materials: page 167

Review how a nail changes the direction of force. Tell students that a screw changes the force applied to it in a different way. Read the passage and do the activities together to ensure understanding.

Day Four

Vocabulary: *friction*

Materials: page 168; 2 pieces of sandpaper

After introducing the vocabulary word, help students understand friction by asking volunteers to rub the pieces of sandpaper together. Ask: *Can you feel the resistance to movement?* Then direct students to read the first paragraph to find out what friction has to do with nails and screws. Explain that the next paragraph sums up the answer to the week's question. You may wish to do the activities together to help students summarize the concepts.

Day Five

Materials: page 169

Have students complete the page independently. Then review the answers together.

Name _____

Daily Science
Big Idea 6
WEEK 2

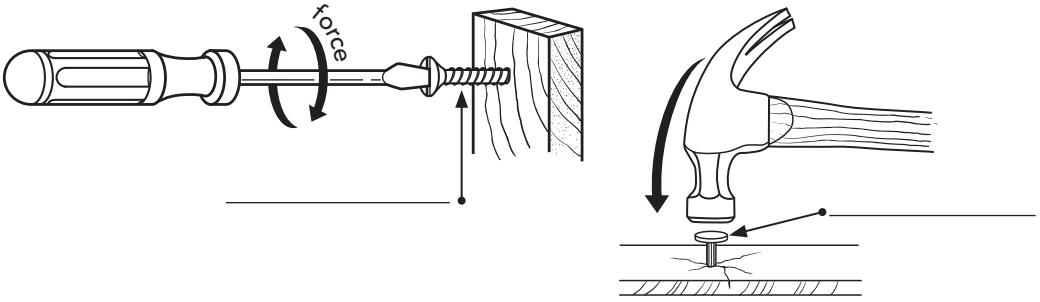
Day 1

Weekly Question

What's the difference between a nail and a screw?

If you've ever looked inside a messy toolbox, you've probably found nails and screws mixed together. Both are tools that help us hold things in place. A nail is an example of a simple machine called a **wedge**. A **screw** is another type of simple machine. Remember that simple machines help us do work, and that work is the use of force to move something a certain distance. When you use a wedge or a screw, the force that you apply changes direction.

A. Look at the pictures. Then follow the directions.



1. Use the vocabulary words to label each simple machine.
2. Draw arrows to show how you think the direction of the force being applied to each simple machine might change.

B. Use words from the passage to complete the sentences.

1. A circular force is applied to a _____.
2. A nail is an example of a _____.
3. Screws and wedges are _____.
4. When you apply force to a nail or a screw,

   the force _____.

Vocabulary

screw
skroo
a simple machine that changes a circular force to an up-or-down force

wedge
wej
a simple machine, such as a nail or an ax, that changes the angle and direction of force

Name _____

Daily Science
Big Idea 6
WEEK 2

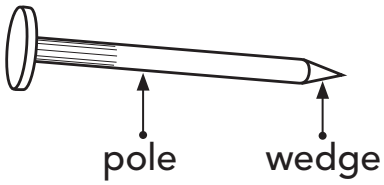
Day 2

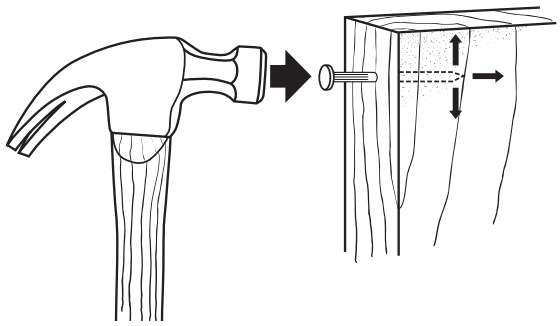
Weekly Question

What's the difference between a nail and a screw?

All wedges have a wide end and a narrow end that comes to a point. When you apply force to the wide end, it travels through the wedge to the narrow end. But as this force travels, something happens. The force splits into different directions. Part of the force is directed sideways to push things out of its way. This is why wedges, such as axes and knives, are able to split things apart.

A nail is a pole with a wedge at the tip. When you hit a nail with a hammer, the force travels through the pole to the wedge, and some of the force changes direction. The force that changes direction pushes the wood out of the way. The other part of the force moves the nail deeper into the wood.





A. All wedges push something out of the way when the force changes direction. Next to each of these wedges, write what is pushed out of the way.

1. shovel _____

2. sewing needle _____

3. your teeth _____

4. ax _____

B. When you hit a nail with a hammer, why does the nail go into the wood? Explain in your own words.

_____

_____

Name _____

Daily Science
Big Idea 6
WEEK 2

Day 3

Weekly Question

What's the difference between a nail and a screw?

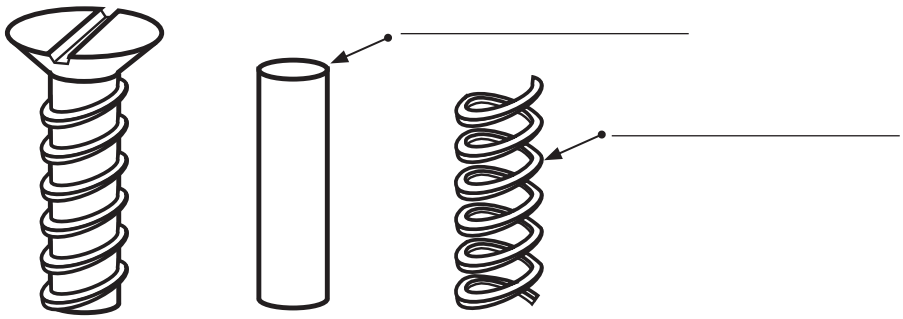
When you use a screwdriver, you turn a screw clockwise (down) or counterclockwise (up). The **threads** on a screw change the direction of the force to move the screw forward or backward.

A screw's threads are actually an inclined plane wrapped around a pole. So the whole screw works like an inclined plane. It allows you to use less force to move the screw. The trade-off is that you have to turn a screw many times to move it forward (down) or backward (up).

Vocabulary

threads
thredz
the grooved, or spiral, edge twisted around the pole of a screw

A. If you could take apart a screw, it would look something like the illustration below. Use information from the passage to label the parts of the screw.



B. Complete the analogy.

Nail is to *wedge* as *screw* is to _____.

❒ pole ❒ inclined plane ❒ screwdriver

C. If you turn a screwdriver one direction and the screw goes into the wood, what will happen if you turn the screwdriver the other direction?

_____

Name _____

Daily Science
Big Idea 6
WEEK 2

Day 4

Weekly Question

What's the difference between a nail and a screw?

Both screws and nails are used to hold things in place. This works because of the **friction** between a nail or screw and the surface it is attached to. Long, thick nails or screws will create more friction than short, thin nails or screws. So longer, thicker nails and screws are best for keeping heavy things in place.

The biggest difference between a nail and a screw is how each tool changes the force we apply to it. Because a nail is a kind of wedge, some of the downward force of the hammer goes sideways. A screw, on the other hand, starts with a force that is applied by turning. The threads on a screw turn circular force into forward or backward force. But both the wedge and the screw change the direction of the force to make work easier.

Vocabulary

friction
FRIK-shun
the resistance to movement caused when two surfaces touch

A. Why do long, thick nails hold up heavier objects better than short, thin nails do?

_____

_____

B. List two similarities between a nail and a screw.

1. _____

2. _____

C. List two differences between a nail and a screw.

1. _____

2. _____

Name _____

Daily Science
Big Idea 6
WEEK 2

Day 5

Weekly Question

What's the difference between a nail and a screw?

A. Use the words in the box to complete the sentences.

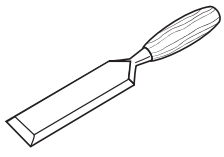
screw	wedge	friction	threads

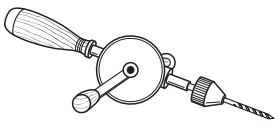
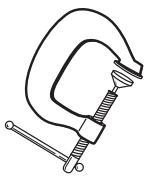
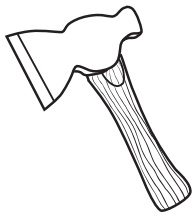
1. A knife is an example of a _____.
2. The _____ on a screw are an inclined plane.
3. You apply circular force to a _____.
4. Nails and screws use the force of _____ to hold things in place.

B. Write *true* or *false*.

1. Both nails and screws have a pole. _____
2. The same direction of force is applied to both a nail and a screw. _____
3. A hammer is used to apply force to a screw. _____
4. A wedge can change downward force to sideways force. _____

C. Write whether each object uses a *screw* or a *wedge*.



_____ _____ _____ _____ _____

People invented machines to make work easier.

Week 3

How do elevators work?

This week, students are introduced to another simple machine, the pulley. Pulleys are wheels with grooves that hold ropes or cables. The grooves keep the rope or cable from slipping off the pulley. A pulley can either be fixed or movable. Fixed pulleys, like those used in elevators, change the direction of the force that is applied to them. They are used to lift and lower objects. Movable pulleys travel with the load. They provide mechanical advantage, which means that they make it easier to lift or lower a load.

Day One

Vocabulary: *load, pulley*

Materials: page 171

Begin by asking students to guess when elevators were invented. Record their guesses on the board. Then introduce the vocabulary and have students read the passage. When students have finished, explain that the pulley, like all simple machines, is very old. Then have students complete the activities. Review the answers together, and direct students to locate information from the passage that supports their answers. For the oral activity, pair students or discuss it as a group.

Day Two

Vocabulary: *fixed pulley*

Materials: page 172

Introduce the vocabulary word and explain that a fixed pulley is fixed in place, so it does not move. If students are having trouble with activity C, prompt them to think about what the two situations have in common. (reaching a place you can't get to)

Day Three

Vocabulary: *mechanical advantage, movable pulley*

Materials: page 173

Introduce the vocabulary. Inform students that *mechanical advantage* means that the amount of force needed to do work is reduced, and that scientists use different formulas to measure the mechanical advantage that different machines provide. Tell students that in a pulley system, each movable pulley further reduces the amount of force needed to do work, making it easy to lift heavy objects. Then do the activity together as a group. If students are having trouble with item 3, provide them with some examples of movable pulleys. (e.g., cranes, flag raisers)

Day Four

Vocabulary: *counterweight*

Materials: page 174

Introduce the vocabulary word and instruct students to look at the diagram before they read the passage and complete the activity. When students have finished, review the answers together. Ask individuals to explain in their own words the action indicated in the drawing. (e.g., The motor turns the pulley and the car lifts or lowers while the weight lowers or lifts.)

Day Five

Materials: page 175

Have students complete the page independently. Then go over answers together.

Name _____

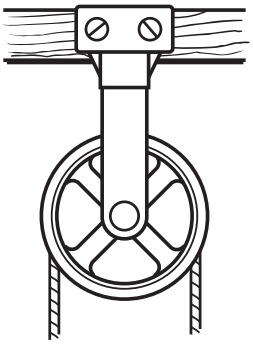
Daily Science
Big Idea 6
WEEK 3

Day 1

Weekly Question

How do elevators work?

The first elevator about 2,000 years ago was probably nothing more than a rope tied to a box and thrown over a branch. Today, elevators are safer, faster, and powered by electricity, but their design hasn't changed much. All elevators have a car that lifts people and things. Most elevators use **pulleys** and cables that are attached to the car.



A pulley is a simple machine. It is a wheel with a deep groove in it. A rope or cable fits into the groove. Pulleys can change the direction of force, the amount of force needed, or both the direction and the amount of force to lift and lower a **load**.

Vocabulary

load
lohd
something that is carried or moved

pulley
PULL-ee
a simple machine made of a wheel with a grooved rim over which a rope or cable is looped

A. Use words from the passage to complete the sentences.

1. The _____ is a simple machine.
2. A pulley is made of a _____ that has a _____ for rope or cable.
3. Today's _____ are powered by electricity.

B. Write *true* or *false*.

1. An elevator uses a pulley and a cable to move a car. _____
2. A pulley is a simple machine. _____
3. Pulleys can change only the direction of force. _____

Talk

According to the passage, how is a pulley like an inclined plane? How is it like a screw? Tell a partner.

Name _____

Daily Science
Big Idea 6
WEEK 3

Day 2

Weekly Question

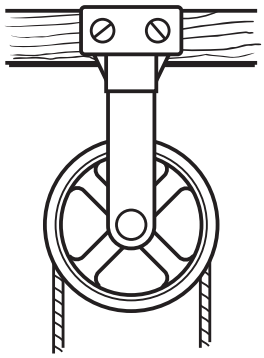
How do elevators work?

The pulley that elevators use is called a **fixed pulley**. A fixed pulley doesn't change the amount of force you need to do work, but it does change the direction of that force. A pulley rotates, or turns, the force. When you pull down, the pulley changes the direction of the force to lift the load up. Fixed pulleys help us do work, because people find it easier to pull down than to lift up. Pulleys can also help us lift or lower things that might be too high or too low for people to reach by themselves.

Vocabulary

fixed pulley
fixt PULL-ee
a pulley that is attached to something and does not move

A. Draw arrows to show how a pulley changes the direction of force.



B. Write *true* or *false*.

1. Fixed pulleys are pulleys that stay in place. _____
2. A fixed pulley reduces the amount of force you need to do work. _____
3. A fixed pulley is best used for lifting or lowering things too heavy to lift by yourself. _____

C. If a fixed pulley doesn't change the amount of force you use to do work, how might a pulley be good to do the following?

1. raise a flag _____
2. lower a bucket into a well _____

_____

Name _____

Daily Science
Big Idea 6
WEEK 3

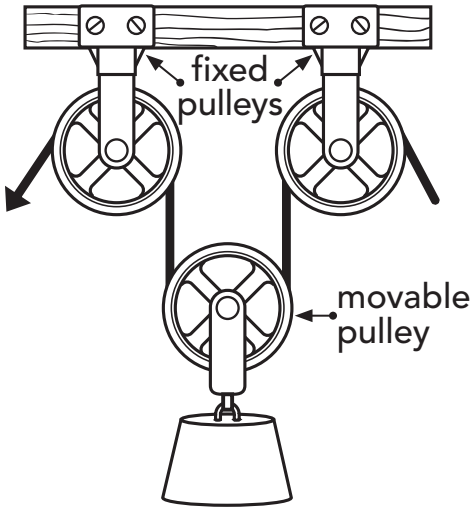
Day 3

Weekly Question

How do elevators work?

Not all pulleys are fixed in place. Some pulleys move with the load they are lifting or lowering. These pulleys, called **movable pulleys**, reduce the amount of force you need to do the work, just like some other simple machines do. We can measure that change in the amount of force needed. When a machine allows you to do work with less force, it provides **mechanical advantage**.

Fixed pulleys and movable pulleys can be used together in pulley systems. Every time you add another movable pulley to a pulley system, you increase the mechanical advantage. But remember, there's a trade-off. You can't decrease the amount of force you need to do the work without increasing the distance. For pulleys, this means you need a lot of rope!



Vocabulary

mechanical advantage
meh-KAN-ih-kul ad-VAN-tej
the number of times a machine multiplies the force put into it

movable pulley
MOO-vuh-bul PULL-ee
a pulley that moves with the load

Answer the questions.

1. How does mechanical advantage help you do work?

_____

2. How would you increase mechanical advantage in a pulley system?

_____

3. A zip line is used to move a person or an object across a gap between high places. Why do you think a zip line uses movable pulleys?

_____

Name _____

Daily Science Big Idea 6 WEEK 3

Day 4

Weekly Question

How do elevators work?

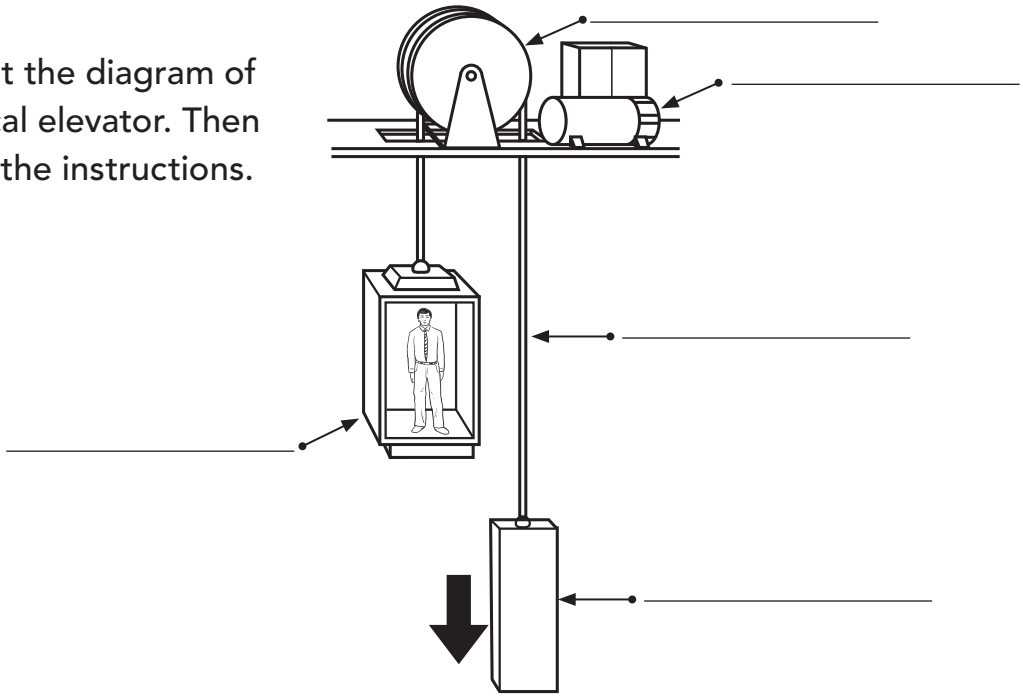
Elevators that use pulleys also use a **counterweight** to balance the weight of the car. The cable is attached to the car on one end and the counterweight on the other end, and it passes through a pulley that is attached to an electric motor.

The counterweight weighs about the same as the car would with an average number of people in it. Gravity pulls on both the counterweight and the car, balancing them. This reduces the amount of force the electric motor needs to move the elevator. The electric motor does the least amount of work when a car has an average number of riders. With more or fewer people, the motor has to work harder to move the car and the counterweight.

Vocabulary

counterweight
KOWN-tur-WAYT
a heavy weight used to balance the weight of an elevator car

Look at the diagram of a typical elevator. Then follow the instructions.



1. Using information from the passage, label the following:

   car pulley cable counterweight motor

2. Draw an arrow next to the elevator car to show the direction in which it is moving.

Name _____

Daily Science
Big Idea 6
WEEK 3

Day 5

Weekly Question

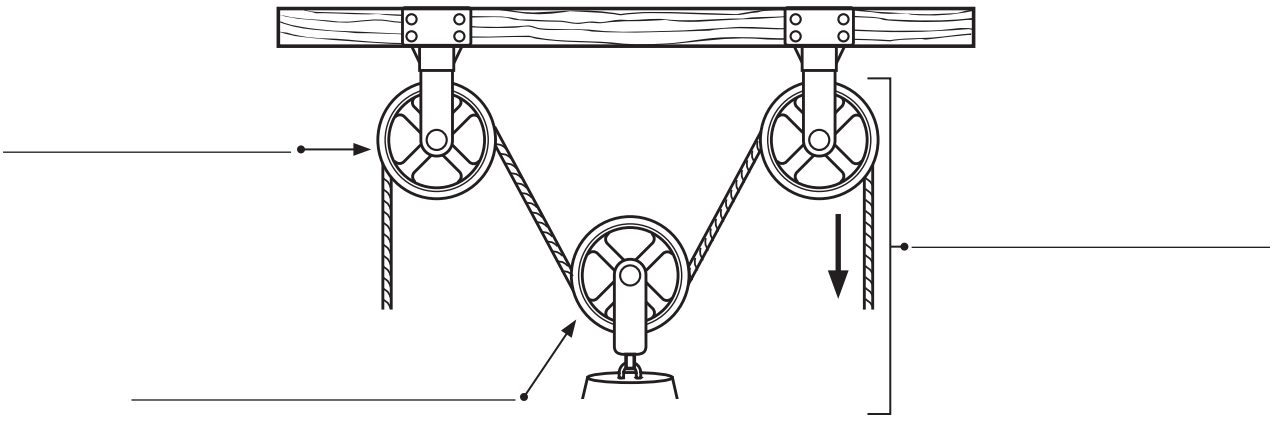
How do elevators work?

A. Use the words in the box to complete the sentences.

fixed	**counterweight**
movable	**mechanical advantage**

1. The weight of an elevator car is balanced by the _____.
2. A _____ pulley moves with the load.
3. Elevators use _____ pulleys.
4. If a machine provides _____, it allows you to use less force to do work.

B. Look at the diagram and then follow the instructions.



1. Label the *fixed pulley*, the *movable pulley*, and the *pulley system*.
2. Circle the pulley that provides the greatest mechanical advantage.
3. Draw an arrow next to each section of rope to show the direction in which the force on that rope is traveling.

People invented machines to make work easier.

Week 4

How does a wheelbarrow make work easier?

This week, students learn about two more simple machines, the lever and the wheel and axle, and how they work together in a wheelbarrow, which is a compound machine. The wheelbarrow is a container that is lifted and lowered by an attached lever and moved with the help of a wheel and axle. The wheelbarrow lever provides mechanical advantage, allowing a person to easily lift and lower a heavy load. The wheel overcomes friction, allowing the load to be easily moved.

Day One

Vocabulary: *lever, wheel and axle, wheelbarrow*

Materials: page 177

Review the definition of *mechanical advantage*, and tell students that this week they will learn how a wheelbarrow provides mechanical advantage. Ask how many students have used a wheelbarrow and what they've used it for. Introduce the vocabulary and explain that the wheelbarrow has two types of simple machines: the lever and the wheel and axle. Have students read the passage and complete the questions. Before students do the oral activity, discuss who uses a wheelbarrow now and whether it was used more in the past. (Since today we use motorized machines to do the heavy lifting and carrying, the wheelbarrow was used more in the past.)

Day Two

Vocabulary: *fulcrum*

Materials: page 178; ruler and eraser

Introduce the vocabulary word by placing the eraser on a desk and placing the ruler on the eraser. Point out that you have made a lever, and the eraser is the fulcrum. As students read the passage, direct their attention to the examples of each type of lever. (seesaw, wheelbarrow, fishing rod) Have students complete the activities. You may want to complete activity B as a group. Invite volunteers to share their answers.

Day Three

Materials: page 179

After students have finished reading the passage, clarify that a bicycle uses gears and chains to transfer energy from the axle to the wheel, and that a tricycle has the pedals attached directly to the wheel. Have students complete the activities. Help them to visualize the machines in activity C. Then review the answers together.

Day Four

Vocabulary: *compound machine*

Materials: page 180; scissors, can opener

After introducing students to the vocabulary word and reading the passage, direct their attention to the three illustrations of compound machines. Allow students to examine an actual pair of scissors and can opener before they complete the activities. Then discuss the answers. You may want to ask students how the tools in activity A demonstrate mechanical advantage.

Day Five

Materials: page 181

Have students complete the page independently. Then review the answers together.

Name _____

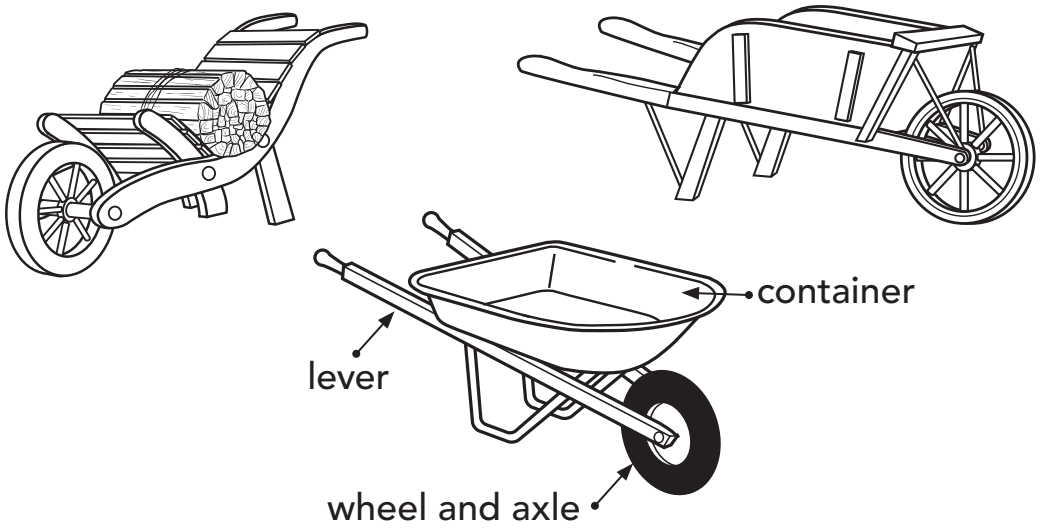
Daily Science
Big Idea 6
WEEK 4

Day 1

Weekly Question

How does a wheelbarrow make work easier?

Wheelbarrows have been used in almost every culture for thousands of years. People recognized that having a container they could easily lift and move would help them do more work. Wheelbarrows provide mechanical advantage by joining a container with two simple machines. The simple machines are the **lever** and **wheel and axle**.



Answer the questions.

1. What are the three parts of a wheelbarrow?

_____

2. Which parts of a wheelbarrow are simple machines?

_____

Vocabulary

lever
LEH-vur
a simple machine with a bar that allows heavy objects to be lifted or moved

wheel and axle
weel and AX-ul
a simple machine made from a wheel rotating around a fixed point

wheelbarrow
WEEL-bare-oh
a machine used for carrying heavy loads, made up of a wheel and axle, a lever, and a container

Talk

Who uses a wheelbarrow now? Do you think wheelbarrows are used more today or hundreds of years ago? Why do you think that? Tell a partner.

Name _____

Daily Science
Big Idea 6
WEEK 4

Day 2

Weekly Question

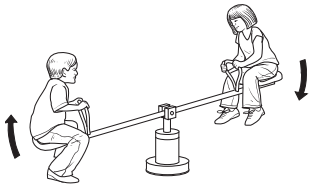
How does a wheelbarrow make work easier?

The handles on a wheelbarrow are examples of a lever. Levers are commonly used to lift a load. A lever sits on a point called the **fulcrum**. The fulcrum is where the lever pivots, or moves. On the wheelbarrow, the fulcrum is the axle of the wheel. When you push down or pull up on the handle, it pivots, or moves, on the fulcrum to raise or lower the load. The positions of the fulcrum and the load change the lever's mechanical advantage and the direction of the force.

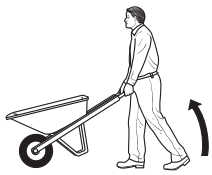
There are three kinds of levers, depending on the positions of the force, the fulcrum, and the load.

Vocabulary

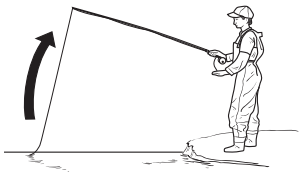
fulcrum
FULL-krum
the point of support on which a lever pivots



When the fulcrum is between you and the load, pushing down will lift the load and lifting up will lower the load.



When the load is between you and the fulcrum, the load is easier to lift or lower, but the direction of the force does not change.



When you are between the load and the fulcrum, a small movement in force causes the load to move farther.

A. Write a sentence that explains how the lever in a wheelbarrow works.

_____

_____

B. Name four examples of levers that you have seen or used.

1. _____ **3.** _____

2. _____ **4.** _____

Name _____

Daily Science
Big Idea 6
WEEK 4

Day 3

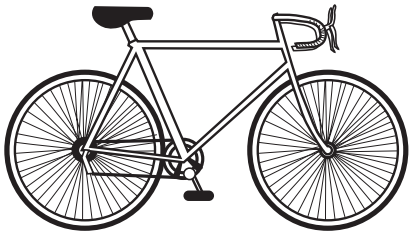
Weekly Question

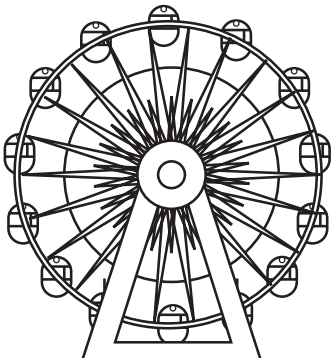
How does a wheelbarrow make work easier?

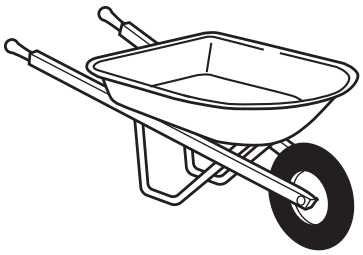
A wheel and axle helps you do work by changing a push or a pull into a force that rotates, or spins. With wheelbarrows, it's much easier to push a load rolling on a wheel than to drag the load along the ground.

A wheel and axle also creates mechanical advantage. When the axle rotates, the wheel moves a greater distance than the axle does. For example, when you ride a bicycle, your foot turns the pedal, which is connected to the axle. The wheel moves more than your foot does. So you contribute less force to move a greater distance than you would move if you walked.

A. Draw arrows pointing to a wheel and axle in each illustration.







B. Write *true* or *false*.

1. A wheel and axle can create mechanical advantage. _____
2. In a bicycle, the wheel moves a shorter distance when more force is applied to the pedal. _____

C. In each example below, tell whether the force applied is directed to the *wheel* or to the *axle*.

1. a faucet handle _____
2. a spinning top _____
3. a steering wheel _____
4. an airplane propeller _____

Name _____

Daily Science
Big Idea 6
WEEK 4

Day 4

Weekly Question

How does a wheelbarrow make work easier?

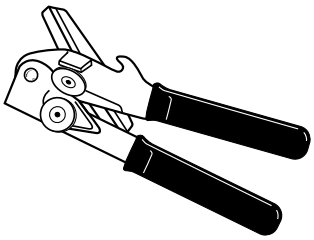
When two or more simple machines are put together, you get a **compound machine**. Compound machines can be basic, such as a wheelbarrow or a can opener, or they can be very complex, such as a car. But even very complicated mechanical tools can be broken down into several simple machines.

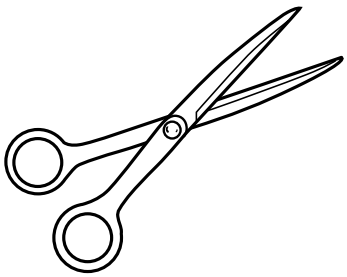
Without machines, life and work would be much more difficult. Simple and compound machines make our lives better by saving us time and energy. For thousands of years, people have depended on machines. The world would not be the same without them.

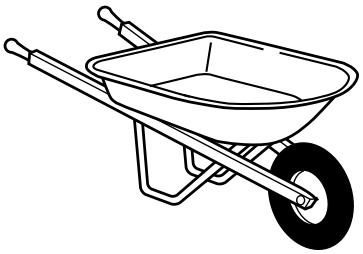
Vocabulary

compound machine
KOM-pound muh-SHEEN
a combination of simple machines used to simplify tasks

A. Name the simple machines that make up each compound machine.







1. _____ **2.** _____ **3.** _____

_____ _____ _____

B. Complete the analogy.

Simple machine is to *compound machine* as _____.

❒ *nail* is to *screw*

❒ *wheelbarrow* is to *car*

❒ *wheelbarrow* is to *lever*

❒ *lever* is to *scissors*

Name _____

Daily Science
Big Idea 6
WEEK 4

Day 5

Weekly Question

How does a wheelbarrow make work easier?

A. Use the words in the box to complete the sentences.

lever	**wheel and axle**
fulcrum	**compound machine**

1. A _____ is what the lever balances on.
2. A seesaw is an example of a _____.
3. A _____ uses two or more simple machines.
4. A bike has more than one _____.

B. Answer *true* or *false*.

1. A wheelbarrow is a simple machine. _____
2. The handles of a wheelbarrow act as a lever. _____
3. A wheel and axle can change the direction of force. _____
4. It is easier to drag something than to carry it in a wheelbarrow. _____

C. In the left box, draw something that has a lever with a fulcrum. In the right box, draw something with a wheel and axle. Then label each simple machine.

Name _____

Daily Science
Big Idea 6
WEEK 5

Unit Review

Comprehension

Simple Machines

Fill in the bubble next to the correct answer.

1. Which of these lists contains ONLY simple machines?

Ⓐ wedge, wheelbarrow, lever, pulley

Ⓑ pulley, wheel and axle, screw, inclined plane

Ⓒ lever, fulcrum, hammer, screw

Ⓓ wheel and axle, inclined plane, scissors, wedge

2. An inclined plane requires less _____ but a greater _____ to do work.

Ⓐ force, load

Ⓑ distance, force

Ⓒ force, distance

Ⓓ load, distance

3. An ax is an example of a(n) _____.

Ⓐ pulley

Ⓑ wedge

Ⓒ screw

Ⓓ axle

4. The simple machine in an elevator is the _____.

Ⓐ pulley

Ⓑ inclined plane

Ⓒ wedge

Ⓓ wheel and axle

5. Mechanical advantage changes the _____.

Ⓐ direction of force

Ⓑ output of force

Ⓒ simple machine being used

Ⓓ amount of work being done

6. The simple machines in a wheelbarrow are _____.

Ⓐ a lever and a pulley

Ⓑ an inclined plane and a wheel

Ⓒ a wheel and axle and a lever

Ⓓ a lever and a wedge

Name _____

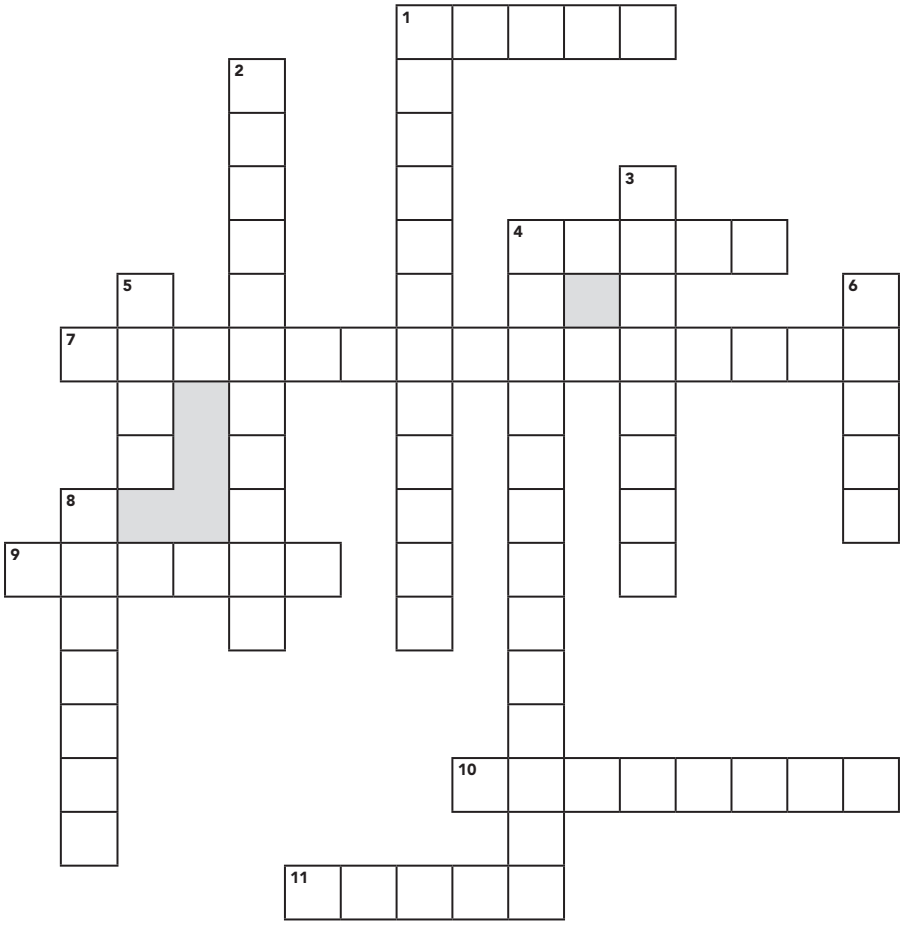
Daily Science
Big Idea 6
WEEK 5

Unit Review

Vocabulary

Puzzle It Out

Select from the list of vocabulary words to complete the puzzle.



compound machine
counterweight
distance
fixed pulley
force
friction
fulcrum
inclined plane
lever
load
mechanical advantage
movable pulley
pulley
screw
simple machine
threads
wedge
wheel and axle
wheelbarrow
work

ACROSS

1. An ax is an example of this.

4. an inclined plane wrapped around a post

7. a combination of simple machines

9. a simple machine made of a wheel with a grooved rim

10. the space between two places

11. a push or a pull that can change something's position

DOWN

1. the simple machine found on a bicycle

2. a pulley that does not move with the load

3. resistance to movement when two surfaces touch

4. one of six tools that makes work easier

5. the use of force to move a load a distance

6. A seesaw is an example of this.

8. the point on which a lever pivots or turns

Name _____

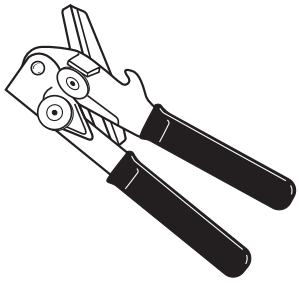
Daily Science
Big Idea 6
WEEK 5

Unit Review

Visual Literacy

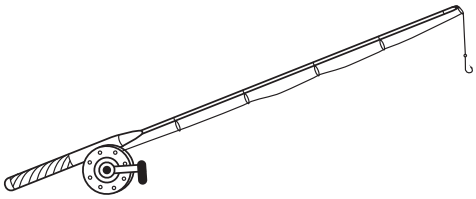
Looking at Compound Machines

Identify the simple machines that make up each of the compound machines below.



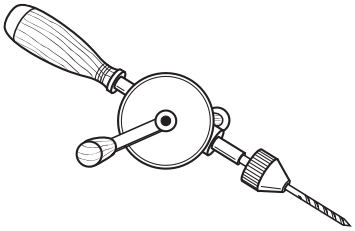
can opener

1. _____
2. _____
3. _____



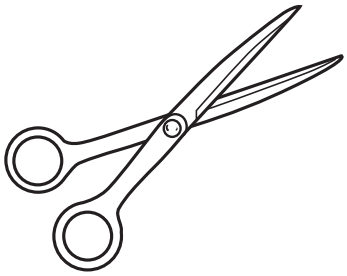
fishing pole

1. _____
2. _____



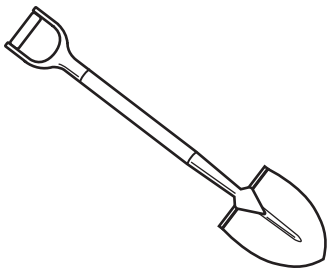
drill

1. _____
2. _____



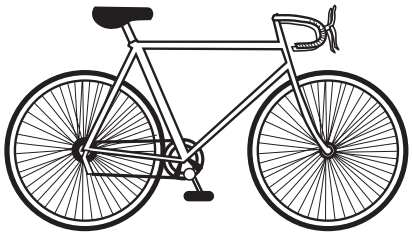
scissors

1. _____
2. _____



shovel

1. _____
2. _____



bicycle

1. _____
2. _____

Name _____

Daily Science
Big Idea 6
WEEK 5

Unit Review

Hands-on Activity

Learn About Levers

Try this simple experiment to see how the position of a fulcrum changes the amount of force you need to lift a book.

What You Need

- ruler
- block or other stable object to act as the fulcrum
- paperback book
- lightweight container such as a small plastic tub
- marbles
- masking tape

1. Assemble your lever by taping the container to the end of the ruler at the 12-inch mark.
2. Set the ruler on the fulcrum at the 6-inch mark.
3. Place the book on the end of the ruler at the 1-inch mark.
4. Add marbles to the container until the book is raised into the air.
5. Repeat step 4 with the fulcrum under the ruler at the 3-inch mark and the 9-inch mark.

What Did You Discover?

1. How many marbles did it take to lift the book when the fulcrum was at the following marks?

   3 inches: _____ 6 inches: _____ 9 inches: _____

2. Describe the change in force needed to lift the book when you moved the fulcrum each time.

   _____

3. Use math to figure out how many marbles it would take to lift the book if the fulcrum were at the following marks:

   4½ inches: _____ 7½ inches: _____

Answer Key

***Big Idea 1:* Week 1 • Day 1**

A. 1. true 3. false
2. false 4. true
B. 1. dams 3. safety/shelter/a hiding place
2. deep
TALK: Answers will vary.

***Big Idea 1:* Week 1 • Day 2**

A.

Answers will vary—e.g., The lodge walls are thick and are made from mud, sticks, and logs.
B. 1. lodge 3. entrance; underwater
2. pond
C. Answers will vary—e.g., Those animals can't or won't hunt in the water.

***Big Idea 1:* Week 1 • Day 3**

A. Beavers use logs they gather in the summer as food during the winter.
B. Beavers eat trees and use them to build their lodges and dams.

***Big Idea 1:* Week 1 • Day 4**

A. Answers will vary.

Positive Effects	Negative Effects
create new wetland habitats	destroy trees
slow soil erosion	cause silt to build up and flood the land behind them

B. 1. silt 3. wetland
2. Erosion

***Big Idea 1:* Week 1 • Day 5**

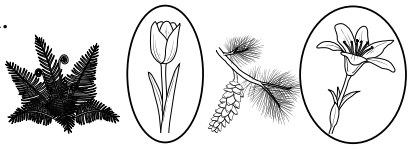
A. 1. silt 4. wetland
2. habitat 5. erosion
3. lodge
B. Dams create ponds that are deep enough not to freeze solid in winter.
Dams create ponds that beavers can hide in.
C. 1. false 3. true 5. false
2. false 4. true

***Big Idea 1:* Week 2 • Day 1**

A. 3, 1, 4, 2
B. It would hurt the plant's ability to spread because the plant could not make seeds.

***Big Idea 1:* Week 2 • Day 2**

A.



These plants are angiosperms because they have flowers.
B. 1. angiosperms
2. pollinate
3. pollinators/bees/insects
C. Flowers attract pollinators. When flowers are pollinated, they produce fruit and seeds to make new angiosperms.

***Big Idea 1:* Week 2 • Day 3**

A. 1. seeds 3. scatter
2. digestive 4. fruit
B. 1. true 2. false 3. false
C. Answers will vary—e.g., People plant seeds. People feed seeds to animals. People throw seeds on the ground when they finish eating.

***Big Idea 1:* Week 2 • Day 4**

A. 1. sterile 2. mutation
B. Answers will vary.

Seedless fruit that you like to eat	Fruit that you wish didn't have seeds
Answers will vary—grapes, blueberries, watermelons, oranges, pineapple	Answers will vary—cherries, raspberries, apples, mangoes, strawberries

***Big Idea 1:* Week 2 • Day 5**

A. 1. mutation 4. sterile
2. pollination 5. Pollen, ovary
3. angiosperms
B. 4, 1, 5, 2, 3
C. Answers will vary—e.g., Angiosperms have flowers and make seeds.

***Big Idea 1:* Week 3 • Day 1**

A. proboscis, nectar
B. 1. allows the bee to get nectar that is hard to reach
2. allows the bee to collect pollen easily

***Big Idea 1:* Week 3 • Day 2**

A. Answers will vary—e.g., Worker bees build the honeycomb with wax from their glands. Worker bees mold the honeycomb with their mouths and feet.
B. 3, 1, 4, 2

***Big Idea 1:* Week 3 • Day 3**

A. Answers will vary—e.g., The honeybee is smaller. The bumblebee is larger. Both have wings and six legs. The bumblebee has a fatter back end. The bumblebee has more hair.
B.

	Honeybee	Bumblebee
Pollinates flowers	✓	✓
Drinks nectar from flowers	✓	✓
Produces large amounts of honey	✓	
Creates honeycomb filled with honey	✓	
Often dies in the winter		✓
Depends on flowers for survival	✓	✓

***Big Idea 1:* Week 3 • Day 4**

A. b, a, c
TALK: Answers will vary.

***Big Idea 1:* Week 3 • Day 5**

A. a, c, b
B. 4, 1, 5, 2, 6, 3
C. 1. Bees pollinate flowers.
2. Bees pollinate crops.
3. Bees make honey.
D. Answers will vary—e.g., Only some bees make honey. Honeybees make a lot of honey.

***Big Idea 1:* Week 4 • Day 1**

A. 4, 1, 3, 2
B. Birds would hoard sunflower seeds because seeds last longer than worms do.
C. Animals in tropical places wouldn't need to hoard food because the plants grow all year-round.

***Big Idea 1:* Week 4 • Day 2**

A. Fat provides energy.
Body fat can be stored for later use.
B. winter, food, fat, more, energy

***Big Idea 1:* Week 4 • Day 3**

1. dormant 3. dormant
2. hibernating 4. hibernating

***Big Idea 1:* Week 4 • Day 4**

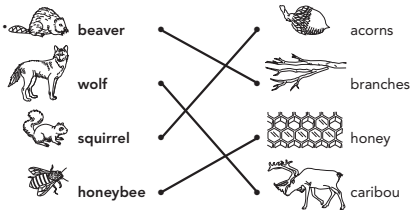
A. Plants are still growing and producing food in warmer places. Animals are not hibernating and so are easier to find and eat. Water is available to drink because lakes and ponds are not frozen.
B. The wolves migrate, too.

Big Idea 1: Week 4 • Day 5

A. 1. migrate 3. hoard
2. dormant 4. hibernate

B. 1. true 3. true
2. false 4. true

C.



Big Idea 1: Week 5 • Unit Review 1

A. 1. A 2. B 3. D 4. A 5. D

B. Answers will vary—e.g.,
1. Bees pollinate flowers.
2. Plants provide food and shelter for animals.
3. Animals eat fruit and distribute seeds.

Big Idea 1: Week 5 • Unit Review 2

A. 1. b 5. a 9. h
2. i 6. j 10. d
3. g 7. c
4. e 8. f

B. habitat, nectar, pollen, pollinate, ovary

Big Idea 1: Week 5 • Unit Review 3

1. A 2. D 3. B

Big Idea 1: Week 5 • Unit Review 4

Answers will vary.

Big Idea 2: Week 1 • Day 1

A. 1. recycle nutrients
2. enrich the soil
3. get rid of the waste

B. 1. true 2. true 3. false

C. Answers will vary—e.g., landfills, forests, in your home, in lakes

Big Idea 2: Week 1 • Day 2

A.

Size of bacteria	smallest decomposers
Where bacteria live	every ecosystem
How bacteria eat	absorb food

B. Answers will vary—e.g., Bacteria live and grow better in warm places than they do in cold places.

Big Idea 2: Week 1 • Day 3

A. 1. fungus 2. Mold 3. absorb

B. Mushrooms are fungi. Fungi cannot make their own food like plants do.

C. C

Big Idea 2: Week 1 • Day 4

A. 1. true 2. false 3. false

B. 1. better 2. better 3. worse

TALK: Answers will vary—e.g., Gardeners can make sure the compost is damp and warm and keep chemicals out of the compost.

Big Idea 2: Week 1 • Day 5

A. bacteria, mold, fungus, decomposers, absorb

B. 1. false 2. true 3. false

C. Answers will vary—e.g., When decomposers break down garbage, they produce substances that we smell as unpleasant odors.

Big Idea 2: Week 2 • Day 1

A. 1. true 4. true
2. false 5. false
3. false

B. Answers will vary—e.g., Bacteria are decomposers. They probably break down your teeth and cause them to decay.

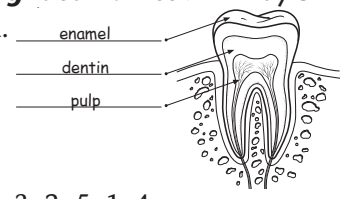
Big Idea 2: Week 2 • Day 2

A. bacteria, acid, dissolve

B.

Big Idea 2: Week 2 • Day 3

A.



B. 3, 2, 5, 1, 4

Big Idea 2: Week 2 • Day 4

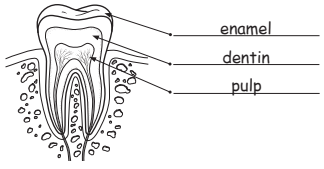
c, a, d, b

TALK: Answers will vary—e.g., Flossing removes food stuck between your teeth that bacteria could use to produce acid and dissolve the enamel.

Big Idea 2: Week 2 • Day 5

A. plaque, acid, dissolve, cavity

B.



The *pulp* is the part of the tooth that can become infected.

C. 1. false 3. true
2. true 4. true

Big Idea 2: Week 3 • Day 1

A. 1. b 2. c 3. a

B. 3, 2, 1

C. 1. Both are microscopic.
2. Both can be infectious.

Big Idea 2: Week 3 • Day 2

A. b, a, c

B. antibodies, immune system, viruses, reproduce

Big Idea 2: Week 3 • Day 3

1. They break down food we eat, which helps us absorb nutrients.
2. Antibiotics could kill the good bacteria we need to stay healthy.
3. They will get new bacteria to replace the bacteria that may be destroyed in their digestive system.

Big Idea 2: Week 3 • Day 4

A. 1. Some bacteria break down oil or toxic substances.
2. Bacteria could be used to convert garbage into energy.

B. Answers will vary—e.g., The scientist could put the bacteria on several different things, such as oil or trash, and study the bacteria for a certain amount of time to see if it breaks down any of those things.

Big Idea 2: Week 3 • Day 5

A. 1. d 2. c 3. b 4. a 5. e

B. 1. true 3. false 5. false
2. true 4. true 6. true

C. Answers will vary—e.g., If a person coughs or sneezes, he or she can spread viruses or bacteria through the air. If another person breathes in the virus or bacteria, that person might become ill.

Big Idea 2: Week 4 • Day 1

A. 1. microorganisms
2. nutrients

B. leaking water pipe, locker room, garbage can

Big Idea 2: Week 4 • Day 2

A. 1. true 2. true 3. false

B. 1. It is safe when the mold has been added to the food on purpose.
2. Mold and bacteria that you cannot see may still be in the food.

***Big Idea 2:** Week 4 • Day 3*

A. 3, 1, 4, 2
B. 1. the yeast is not warm enough to reproduce.
2. it is full of gas.
3. the yeast is killed.

***Big Idea 2:** Week 4 • Day 4*

A. 1. antibiotic 3. antibiotic
2. penicillin 4. penicillin
B. 1. D 2. B

***Big Idea 2:** Week 4 • Day 5*

A. yeast, fungus, microorganisms, nutritious, antibiotic, penicillin
B. 1. true 4. false
2. false 5. true
3. true

***Big Idea 2:** Week 5 • Unit Review 1*

A. 1. D 2. A 3. C 4. D 5. B
B. Answers will vary—e.g.,
1. They break down garbage to get rid of it.
2. They enrich the soil with nutrients.

***Big Idea 2:** Week 5 • Unit Review 2*

1. j	7. s	13. f	19. l
2. v	8. h	14. b	20. a
3. q	9. r	15. u	21. i
4. d	10. g	16. c	22. k
5. n	11. p	17. e	
6. o	12. t	18. m	

***Big Idea 2:** Week 5 • Unit Review 3*

1. 20–29 years old
2. more than 60 years old
3. 20–29 years old
4. Tooth decay is a smaller problem because the total percentage of people with cavities is decreasing.

***Big Idea 2:** Week 5 • Unit Review 4*

Answers will vary.

***Big Idea 3:** Week 1 • Day 1*

A. 1. C 2. A
B. 1. erosion 3. weathering
2. weathering 4. erosion

***Big Idea 3:** Week 1 • Day 2*

A. 1, 3, 4, 2
B. 1. Rocky Mountains
2. channels in the ground
C. 1. uplifted 2. channels

***Big Idea 3:** Week 1 • Day 3*

A. Water seeped into cracks in the rocks and froze in the winter. When the water froze, it expanded and pushed the rocks apart.
Then the pull of gravity caused sections of the canyon wall to collapse, making the canyon wider.
B. 1. water 3. wind
2. ice 4. gravity
TALK: Answers will vary.

***Big Idea 3:** Week 1 • Day 4*

1. Flooding might prevent the saltcedar from growing too thick. The floodwater will also wash away some of the built-up salt.
2. Flooding will create sandbars for the fish to lay eggs. Flooding will also help the fish find food.

***Big Idea 3:** Week 1 • Day 5*

A. 1. channels 4. weathering
2. uplifted 5. ecosystems
3. erosion 6. expanded
B. 1. B 2. C
C. Glen Canyon Dam blocked the Colorado River. This harmed the ecosystem.
Now the dam occasionally releases lots of water to help the ecosystem.

***Big Idea 3:** Week 2 • Day 1*

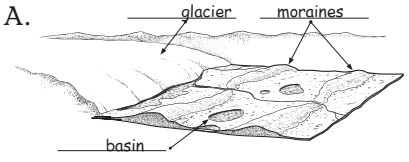
A. 1. must be cold year-round
2. more snow must fall than melt
B. 1. true 3. false
2. false 4. true

***Big Idea 3:** Week 2 • Day 2*

1. Meltwater causes some glaciers to slide.
2. Gravity causes some glaciers to spread out.

***Big Idea 3:** Week 2 • Day 3*

A.



B. 1. basins 3. moraine
2. moraines 4. basin

***Big Idea 3:** Week 2 • Day 4*

1. 150 years 3. 1950–2000
2. 1900–1950

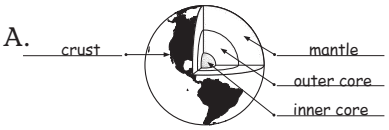
TALK: Answers will vary—e.g., sea levels would rise, the land would change, the climate would change, animal habitats would change, etc.

***Big Idea 3:** Week 2 • Day 5*

A. 1. moraines 4. meltwater
2. glaciers 5. retreat
3. basins
B. 1. false 3. true
2. true 4. false
C. As layers of snow build up, the top layers add pressure to the bottom layers, turning them into dense ice.

***Big Idea 3:** Week 3 • Day 1*

A.



B. 1. mantle, crust
2. crust, mantle
C. Answers will vary—e.g., The core would be densest because it is underneath the mantle and crust. The heaviest materials would sink to the core.

***Big Idea 3:** Week 3 • Day 2*

A. 1. true 2. false 3. true
B. 1. They are both hot.
2. Lava is liquid, but rock in the mantle is solid.
C. Answers will vary—e.g., Magma is below Earth's crust, and lava is above it.

***Big Idea 3:** Week 3 • Day 3*

A. Answers will vary—e.g., Lava pours through vents in Earth's surface as lava flows. As the lava stacks up and cools, it creates rock that forms islands.
B. 1. false 2. false 3. false

***Big Idea 3:** Week 3 • Day 4*

A. 1. debris 2. chamber
B. Answers will vary—e.g., The gases and magma are building up under the layers of rock, which makes the volcano bulge.

Big Idea 3: Week 3 • Day 5

A. 1. Magma, lava 3. vents
2. core, mantle, crust 4. debris
5. chamber
B. 1. false 3. true
2. true 4. true

Big Idea 3: Week 4 • Day 1

A. Answers will vary.
B. A
C. 1. true 2. false 3. true

Big Idea 3: Week 4 • Day 2

A. 1. north or northwest
2. San Francisco, Los Angeles, San Diego
B. 1. plates 2. fault

Big Idea 3: Week 4 • Day 3

A. 1. moving apart
2. sliding past
3. colliding
B. 1. false 3. false
2. false 4. true

Big Idea 3: Week 4 • Day 4

1. 1, 20 3. 4.0
2. 7.0 4. 144,434

Big Idea 3: Week 4 • Day 5

A. 1. boundaries 4. seismometer
2. plates 5. magnitude
3. fault
B. 1. sliding past each other
2. moving apart
3. coming together
C. Answers will vary—e.g.,
1. Earth's plates float on the mantle.
2. Earth's plates can cause earthquakes when they move.
3. Earth's plates can create faults.

Big Idea 3: Week 5 • Unit Review 1

A. 1. B 2. C 3. B 4. A 5. B
B. Answers will vary—e.g., Glaciers create moraines and basins; Erosion created the Grand Canyon; Plate movement causes earthquakes; Mountains form when plates collide.

Big Idea 3: Week 5 • Unit Review 2

DOWN	ACROSS
1. plates	4. mantle
2. erosion	6. uplifted
3. meltwater	7. fault
5. crust	10. weathering
8. magma	12. lava
9. moraines	13. basin
11. expanded	14. glacier

Big Idea 3: Week 5 • Unit Review 3

1. composite 4. composite
2. cinder 5. cinder
3. shield 6. composite

Big Idea 3: Week 5 • Unit Review 4

1. It scratched or tore the foil.
2. Water and sand were left behind. It would be called a moraine.
3. Glaciers can move rock, and these rocks can scratch other rocks.

Big Idea 4: Week 1 • Day 1

A. 1. when magma cools
2. when water evaporates
B. 1. false 2. true 3. true

Big Idea 4: Week 1 • Day 2

A. 1. luster 2. streak 3. color
B. Geologists use many properties to identify minerals because some minerals show the same properties.

Big Idea 4: Week 1 • Day 3

A. 1. fracture 3. fracture
2. cleavage 4. cleavage
B. They chose rocks with fracture, because they needed sharp edges.

Big Idea 4: Week 1 • Day 4

A. 1. 3 2. quartz 3. 4 and 5
B. Drills with diamonds in the tips can drill through any rock, because diamonds are the hardest minerals.

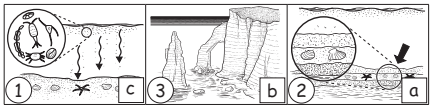
Big Idea 4: Week 1 • Day 5

A. 1. minerals 5. hardness
2. fracture 6. luster
3. cleavage 7. crystalline
4. color, streak
B. 1. cleavage, fracture
2. streak
3. color, luster

Big Idea 4: Week 2 • Day 1

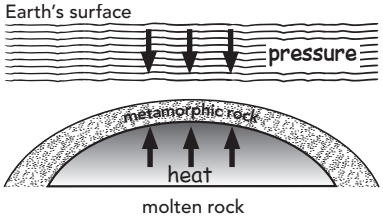
1. igneous 4. granite
2. crystals 5. microscope
3. pumice

Big Idea 4: Week 2 • Day 2



TALK: Answers will vary—e.g., As the landscape changes, rock moves.

Big Idea 4: Week 2 • Day 3

A.


B. 1. Heat, pressure 3. melt
2. metamorphic

Big Idea 4: Week 2 • Day 4

1. metamorphic 4. sedimentary
2. rock 5. magma
3. sediment

Big Idea 4: Week 2 • Day 5

A. 1. igneous 4. cement
2. rock cycle 5. metamorphic
3. Sedimentary, sediment
B. Answers will vary—e.g.,
Igneous: contains crystals, formed from lava
Metamorphic: can have swirls, formed from heat and pressure
Sedimentary: made of sediment, formed from pressure
C. 1. erosion or weathering, cementing
2. heat, pressure
3. cooling

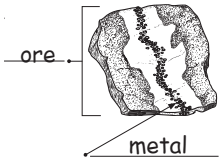
Big Idea 4: Week 3 • Day 1

Natural resources found above ground	Natural resources dug out of the ground
air	iron
water	limestone
plants, animals	oil, coal, and natural gas

Big Idea 4: Week 3 • Day 2

A. 4, 2, 3, 1
B. 1. true 2. false

Big Idea 4: Week 3 • Day 3

A.


People often use machines to *extract* natural resources from the ground.
B. *mineral* is to *rock*
TALK: Answers will vary—e.g., They mined close to the surface, because they didn't have the tools to dig very deeply at first. They used water, shovels, picks, and—later—explosions to mine for gold.

Big Idea 4: Week 3 • Day 4

A. 1. false 4. true
2. true 5. false
3. false

B. Answers will vary—e.g., By reducing, you use less resources. By reusing, you use a resource, such as a cup or bag, over and over again so that you don't need a new one. By recycling, you reduce the amount of new resources that are needed.

Big Idea 4: Week 3 • Day 5

A. 1. natural resource, renewable
2. fossil fuel, carbon
3. Ore, metals
4. conserve
5. extract

B. Answers will vary—e.g.,

Fossil fuels I use:	How I use them:
1. oil	1. plastic bags and cups
2. natural gas	2. when I turn on the heater

Metals I use:	How I use them:
1. aluminum	1. my baseball bat
2. silver	2. my necklace

Big Idea 4: Week 4 • Day 1

A. 1. It can be very heavy.
2. It can have an unusual shape.
3. It can show signs of melting.
4. It is very different from other rocks in the area.

B. A meteor is a streak of light caused by an object burning in Earth's atmosphere, but a meteorite is an object from space that hits Earth's surface.

Big Idea 4: Week 4 • Day 2

A. Scientists have difficulty studying asteroids because they are small and far away.

B. 1. true 2. false 3. true

Big Idea 4: Week 4 • Day 3

A. The Moon is made up of igneous rock, because it is cooled lava.

B. Similar: 1. contain similar minerals and elements;
2. some rocks are made from cooling lava
Different: 1. no weathering from water or wind on the Moon;
2. fewer minerals in lunar rocks

Big Idea 4: Week 4 • Day 4

A. Mars has volcanoes, canyons, and rocks very similar to those on Earth.

B. Sedimentary rocks would contain fossil remains, because they would probably be destroyed during the processes that create igneous and metamorphic rocks.

Big Idea 4: Week 4 • Day 5

A. meteor, meteorite, lunar, maria, extraterrestrial, asteroid

B.

	Like Earth rocks	Different from Earth rocks
Lunar rocks	1. contain many of the same elements 2. some rocks made from lava	1. fewer minerals than Earth rocks 2. not changed by weathering
Mars rocks	1. contain hematite 2. weathering like Earth rock	1. unusual minerals not found on Earth

Big Idea 4: Week 5 • Unit Review 1

A. 1. C 2. B 3. C 4. D 5. A

B. Answers will vary—e.g., Streak—the mark a mineral leaves behind; Color—the color or colors a mineral appears to be; Luster—the shininess of a mineral; Cleavage/fracture—how a mineral breaks when it is struck; Hardness—how hard a mineral is

Big Idea 4: Week 5 • Unit Review 2

1. t	5. k	9. e	13. c	17. g
2. m	6. q	10. o	14. b	18. s
3. a	7. d	11. l	15. i	19. n
4. j	8. f	12. h	16. p	20. r

Big Idea 4: Week 5 • Unit Review 3

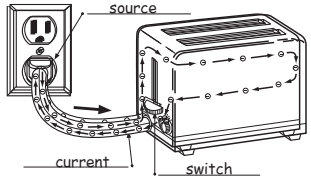
1. calcite 4. quartz
2. quartz 5. apatite
3. graphite 6. hematite

Big Idea 4: Week 5 • Unit Review 4

1. The chalk in vinegar changed more, because it started to fizzle and dissolve.
2. It allows the vinegar to cover more parts of the chalk and work faster.
3. Because vinegar breaks down limestone.

Big Idea 5: Week 1 • Day 1

A.



B. Answers will vary—e.g., The lever pops up to keep the toast from burning. It breaks the circuit.

Big Idea 5: Week 1 • Day 2

A. 1. true 3. false
2. true 4. false

B. A resistor is not as good at conducting electricity as a conductor.

C. Answers will vary—e.g., Resistors helped toasters heat up enough to toast bread.

Big Idea 5: Week 1 • Day 3

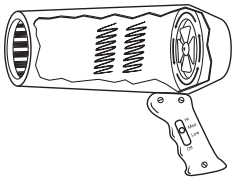
A. 3, 1, 2, 4

B. The length of time that the filaments radiate heat will change.

C. Answers will vary—e.g.,
1. sun 3. iron
2. electric stove

Big Idea 5: Week 1 • Day 4

A.

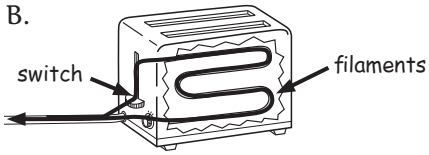


B. Answers will vary.

Big Idea 5: Week 1 • Day 5

A. 1. switch, circuit, electric current
2. conductor, resistor
3. filaments, radiate

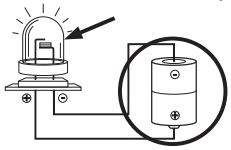
B.



C. Answers will vary—e.g., They need to move the iron to iron out the wrinkles and not burn the cloth.

Big Idea 5: Week 2 • Day 1

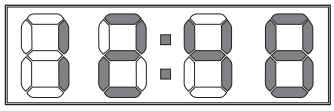
A.



B. 1. true 2. true 3. false

TALK: Answers will vary—e.g., The lights last longer and are brighter. This makes them easier to see.

Big Idea 5: Week 2 • Day 2

A. 

B. 17

C. Answers will vary—e.g., a computer screen

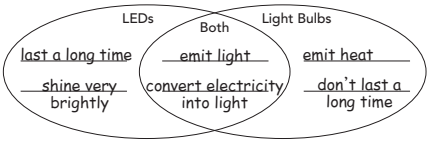
Big Idea 5: Week 2 • Day 3

A. Answers will vary—e.g., When the electrons flow through the LED, they get excited and release photons.

B. 2, 4, 1, 3, 5

Big Idea 5: Week 2 • Day 4

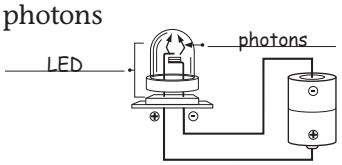
A. Answers will vary—e.g.,



B. 1. LEDs convert more electricity into light than incandescent bulbs.
2. LEDs are brighter than incandescent because they shine light in one direction.
3. LEDs last much longer than incandescent bulbs.

Big Idea 5: Week 2 • Day 5

A. LEDs, display, electrons, photons

B. 

C. 1. heat: light
2. circuits: photons
3. less: more

Big Idea 5: Week 3 • Day 1

A. hearing aid, sound waves

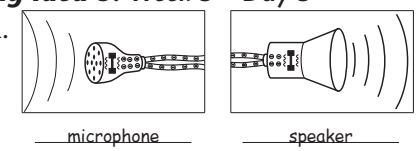
B. 1. false 2. true 3. true

Big Idea 5: Week 3 • Day 2

A. 5, 3, 2, 1, 4

B. Answers will vary—e.g., Some sounds are louder than others, so it is necessary to be able to turn the volume on a hearing aid up or down.

Big Idea 5: Week 3 • Day 3

A. 

B. 1. microphone 3. microphone
2. speaker 4. amplifier

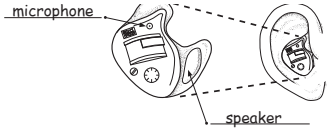
Big Idea 5: Week 3 • Day 4

A. 1. true 3. false
2. true 4. false

B. Answers will vary—e.g.,
1. stereo 3. loudspeaker
2. headphones

Big Idea 5: Week 3 • Day 5

A. hearing aid, sound waves, microphone, amplifier, electromagnet, speaker

B. 

Answers will vary—e.g., Sound waves enter the microphone where they are turned into electric current. The current is sent to the amplifier, where it becomes stronger. It travels to the speaker, which turns the current back into sound waves and sends them into the middle ear.

Big Idea 5: Week 4 • Day 1

A. *electric car*

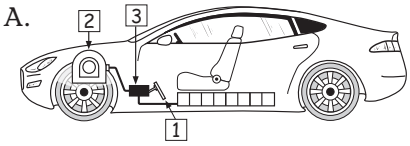
B. 1. electric motor, mechanical energy
2. batteries
3. the energy of motion or motion

Big Idea 5: Week 4 • Day 2

A. magnetic forces, electromagnet

B. 2, 5, 4, 1, 3

Big Idea 5: Week 4 • Day 3

A. 

B. The coil receives the current. More current makes the rod spin faster, which makes the wheels spin faster.

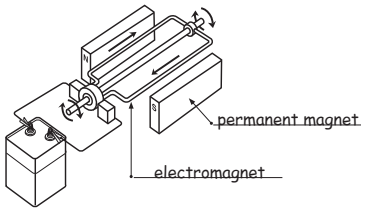
Big Idea 5: Week 4 • Day 4

A.

Machine	Source of electricity (*outlet* or *battery*)	Which parts move?
Blender	outlet	blades
Clothes washer	outlet	inside basket
Electric toothbrush	battery	brush
Electric mixer	outlet	mixer blades
Remote-control car	battery	motor/wheel
Electric fan	outlet	fan blades

Big Idea 5: Week 4 • Day 5

A. 1. mechanical energy, electric motor
2. controller
3. electromagnet, magnetic force

B. 

Big Idea 5: Week 5 • Unit Review 1

1. A 2. D 3. A 4. C 5. B 6. C

Big Idea 5: Week 5 • Unit Review 2

1. i	6. b	11. l	16. m
2. d	7. f	12. j	17. c
3. a	8. h	13. g	
4. o	9. q	14. e	
5. n	10. p	15. k	

Big Idea 5: Week 5 • Unit Review 3

1. motion and light
2. light and sound
3. light and heat
4. light, motion, and sound
5. light and sound
6. sound
7. heat

Big Idea 5: Week 5 • Unit Review 4

1. The screw and magnet lifted up with it.
2. The screw and magnet spun around.
3. The wire is the electromagnet because it has a magnetic force created by electricity.

Big Idea 6: Week 1 • Day 1

A. *triangle* is to *shape*

B. 1. ramp 4. escalator
2. slide 5. trail up a hill
3. ladder

Big Idea 6: Week 1 • Day 2

A. Both people are doing the same amount of work.

B. 1. force 2. distance 3. work

Big Idea 6: Week 1 • Day 3

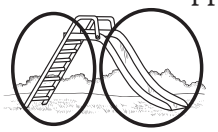
A. 1. Marco 2. Maria

B. 

Answers will vary—e.g., You use more force because the ramp is shorter and steeper.

Big Idea 6: Week 1 • Day 4

A. Answers will vary—e.g.,
1. restaurant 3. library
2. post office 4. shopping mall



B. 1. ladder 2. slide

Big Idea 6: Week 1 • Day 5

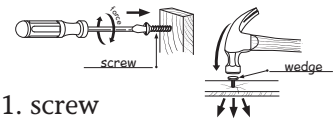
A. work, inclined plane, simple machine, distance, force

B.

C. Answers will vary—e.g., Inclined planes make work easier by allowing a person to use less force over a greater distance.

Big Idea 6: Week 2 • Day 1

A.



B. 1. screw
2. wedge
3. simple machines
4. changes direction

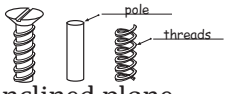
Big Idea 6: Week 2 • Day 2

A. 1. dirt 2. cloth 3. food 4. wood

B. Answers will vary—e.g., A nail is a wedge that changes the direction of some of the force applied to it in order to push the wood out of its way.

Big Idea 6: Week 2 • Day 3

A.



B. inclined plane

C. The screw will come out.

Big Idea 6: Week 2 • Day 4

A. Long, thick nails create more friction.

B. Answers will vary—e.g.,
1. Both are simple machines.
2. Both change the direction of the force applied to them.

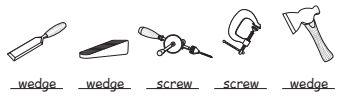
C. Answers will vary—e.g.,
1. A nail is a wedge, but a screw is a screw.
2. A screw requires a circular force, but a nail does not.

Big Idea 6: Week 2 • Day 5

A. 1. wedge 3. screw
2. threads 4. friction

B. 1. true 2. false 3. false 4. true

C.



Big Idea 6: Week 3 • Day 1

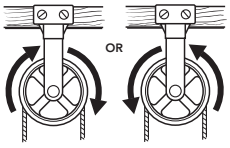
A. 1. pulley 3. elevators
2. wheel, groove

B. 1. true 2. true 3. false

TALK: Answers will vary—e.g., A pulley is like an inclined plane because it changes the amount of force needed to do work. It is like a screw because it changes the direction of the force applied to it.

Big Idea 6: Week 3 • Day 2

A.



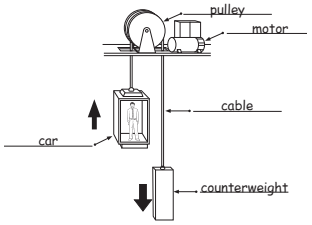
B. 1. true 2. false 3. false

C. 1. makes it easier to lift the flag high
2. makes it easier to lower the bucket to a place people can safely go

Big Idea 6: Week 3 • Day 3

Answers will vary—e.g.,
1. It allows you to do work with less force.
2. Add more movable pulleys.
3. to reduce the amount of force needed to move something

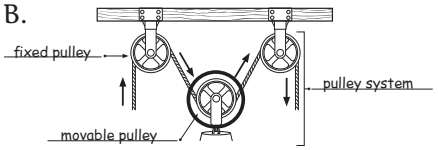
Big Idea 6: Week 3 • Day 4



Big Idea 6: Week 3 • Day 5

A. 1. counterweight
2. movable
3. fixed
4. mechanical advantage

B.



Big Idea 6: Week 4 • Day 1

1. the lever, the container, and the wheel and axle
2. the lever and the wheel and axle

TALK: Answers will vary—e.g., People who need to move heavy loads use wheelbarrows. They are not used as much today because we have other machines to help us move heavy loads.

Big Idea 6: Week 4 • Day 2

A. Answers will vary—e.g., When you push down or pull up the lever, it raises or lowers the load.

B. Answers will vary—e.g.,
1. door handle 3. pole vault
2. pliers 4. chopsticks

Big Idea 6: Week 4 • Day 3

A.

B. 1. true 2. false

C. 1. wheel 2. axle 3. wheel 4. axle

Big Idea 6: Week 4 • Day 4

A. 1. wedge 2. lever 3. lever
lever wedge wheel and axle
or wheel and axle

B. *lever* is to *scissors*

Big Idea 6: Week 4 • Day 5

A. 1. fulcrum 2. lever
3. compound machine
4. wheel and axle

B. 1. false 2. true 3. true 4. false

C. Answers will vary.

Big Idea 6: Week 5 • Unit Review 1

1. B 2. C 3. B 4. A 5. B 6. C

Big Idea 6: Week 5 • Unit Review 2

ACROSS	DOWN
1. wedge	1. wheel and axle
4. screw	2. fixed pulley
7. compound machine	3. friction
	4. simple machine
9. pulley	5. work
10. distance	6. lever
11. force	8. fulcrum

Big Idea 6: Week 5 • Unit Review 3

can opener: wedge, lever, wheel and axle
fishing pole: lever, wheel and axle
drill: screw, wheel and axle
scissors: wedge, lever
shovel: wedge, lever
bicycle: wheel and axle, lever

Big Idea 6: Week 5 • Unit Review 4

Answers will vary.

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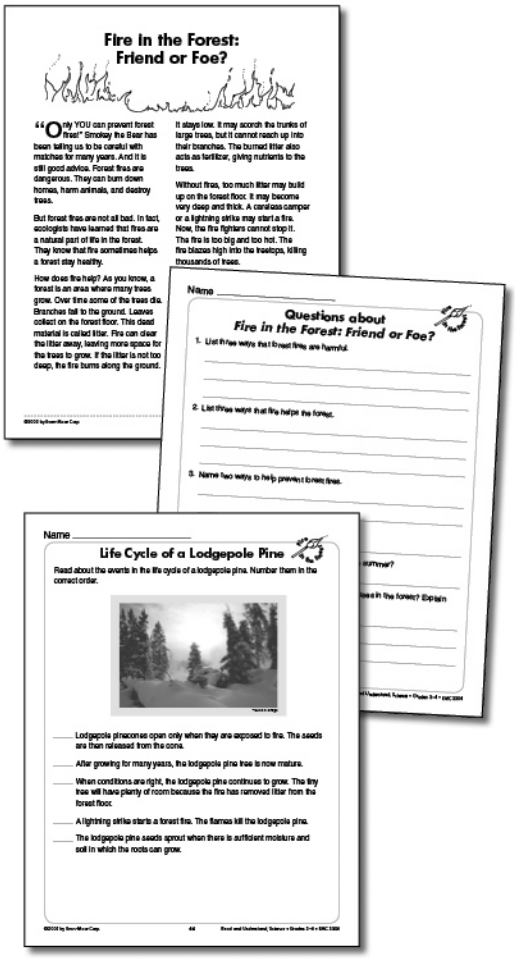

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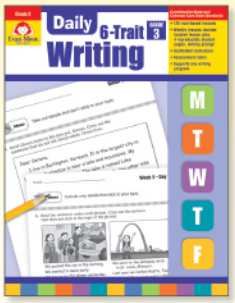

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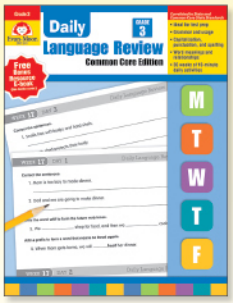

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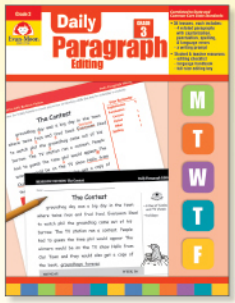

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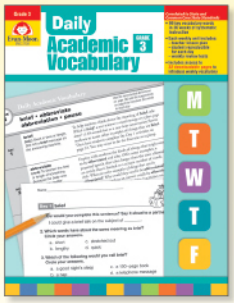

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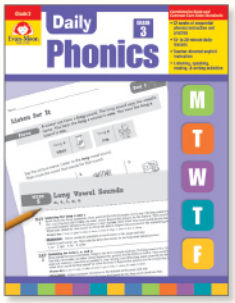

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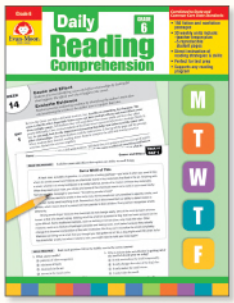

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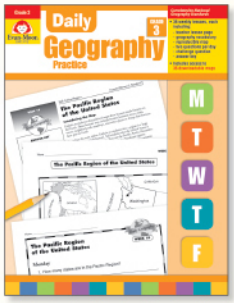

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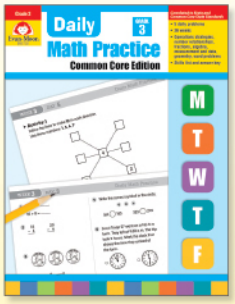

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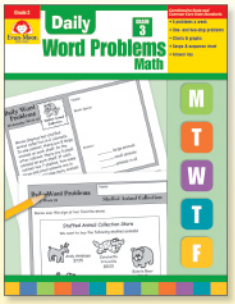

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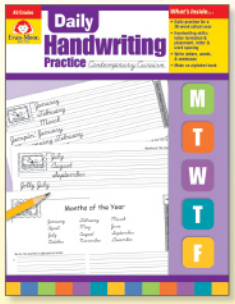

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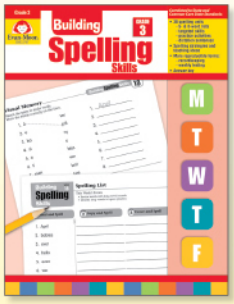

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