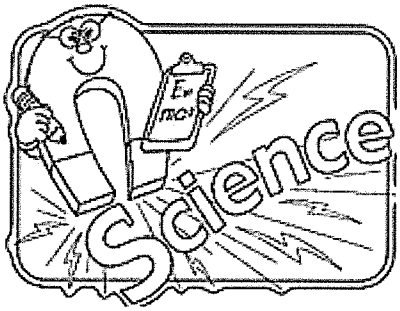
Name:_____

College:_____

4th Grade SCIENCE



Week of 5/24 - 5/27/2021

Spelman College®

1867 HOWARD UNIVERSITY

Monday

Date: May 24

Learning Target: I can identify different stages of the water cycle.

Learn by Reading

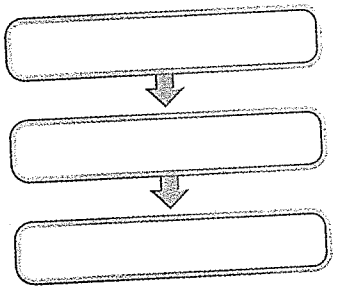
Water Moves

VOCABULARY

condensation	p. D7
evaporation	p. D7
precipitation	p. D8
water cycle	p. D8
water vapor	p. D6

READING SKILL

Sequence Use the chart to show events in the water cycle.



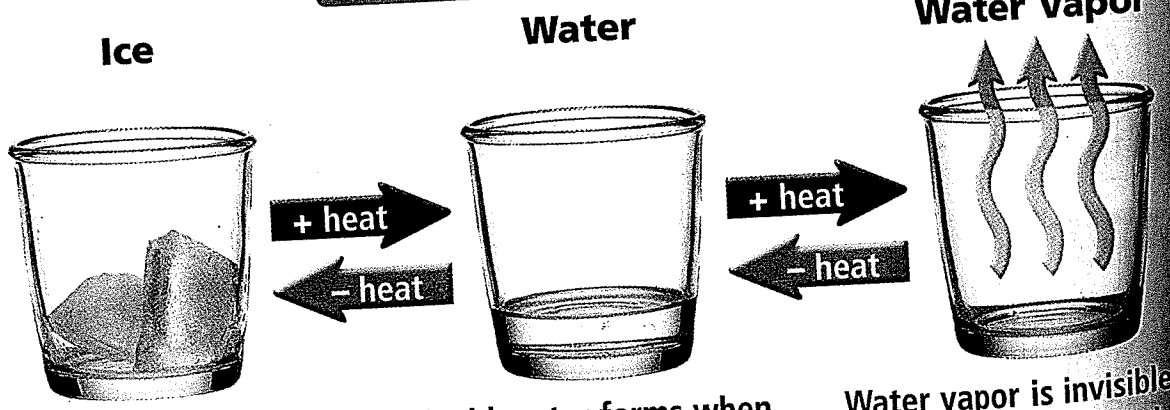
MAIN IDEA In the water cycle, water changes form and moves between the air and Earth's surface.

Changing Water

What do ice, liquid water, and water as a gas have in common? They all are different forms of water. You already know that ice is the solid form and water is the liquid form. **Water vapor** is water in the form of an invisible gas.

Water is one of the few materials on Earth that can be found in all three forms, or states, under normal conditions. You have probably seen or felt water as a solid, a liquid, and a gas in your daily life.

Water Changes State

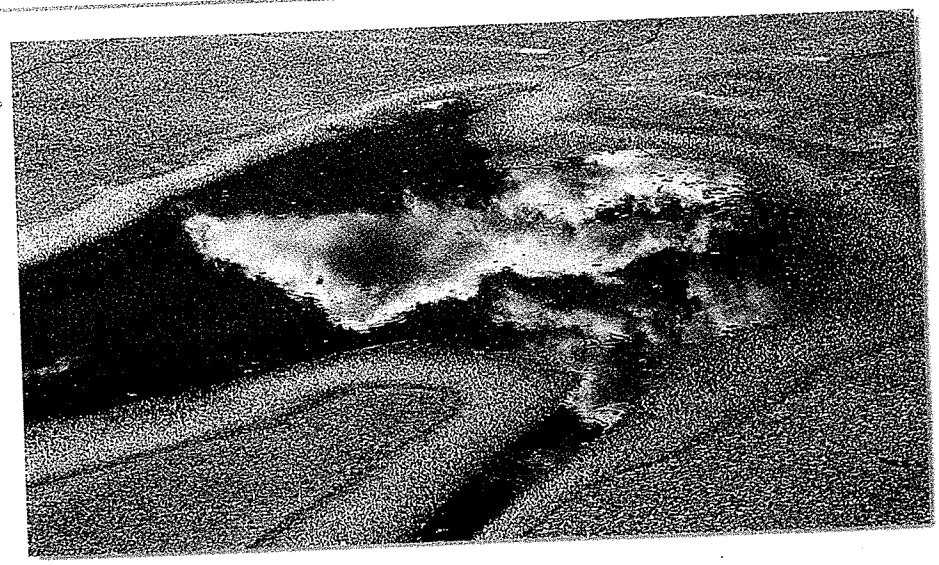


Ice is the solid form of water. When enough heat is removed from liquid water, ice forms.

Liquid water forms when heat is added to ice and when heat is taken away from water vapor.

Water vapor is invisible. One way it forms is when heat is added to liquid water.

y might a puddle
aporate more quickly
a warm day? ▶



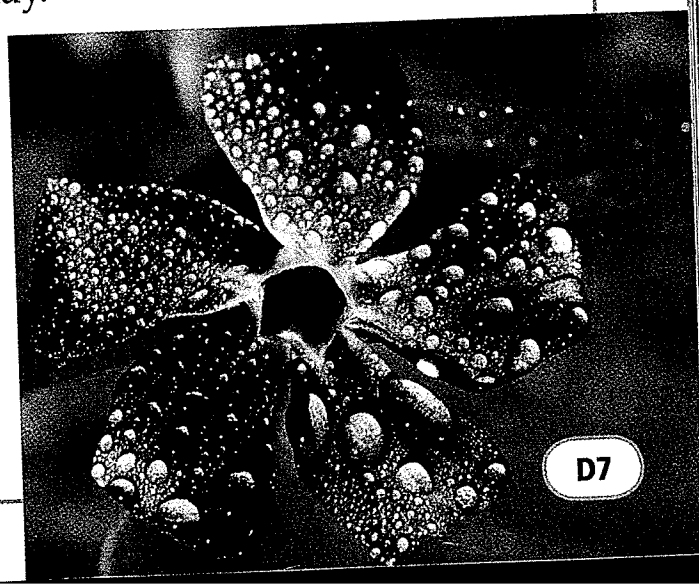
Have you ever noticed puddles of water in the street after a rainstorm? Sometimes, in a few hours, the puddles disappear. The liquid water in the puddles changes to the gas water vapor. The change of state from a liquid to a gas is called **evaporation** (ih vap uh RAY shuhn).

On a cool morning, you may have noticed drops of water on leaves or on car windshields. This water is dew. Dew does not fall like rain. It forms on cool surfaces from the condensation (kahn dehn SAY shuhn) of water vapor in air. **Condensation** is the change of state from a gas to a liquid.

Heating or cooling water can change it from one state to another. When heat is added to ice, the ice melts and changes to liquid water. When heat is added to liquid water, the water evaporates. That is why wet clothes on a line dry quickly in sunlight on a warm day.

When heat is taken away from water vapor, it condenses to form liquid water. If enough heat is taken away, the liquid water freezes and becomes ice.

SEQUENCE **What happens when heat is added to ice?**



In some dry areas, animals and plants use dew as a water source. ▶

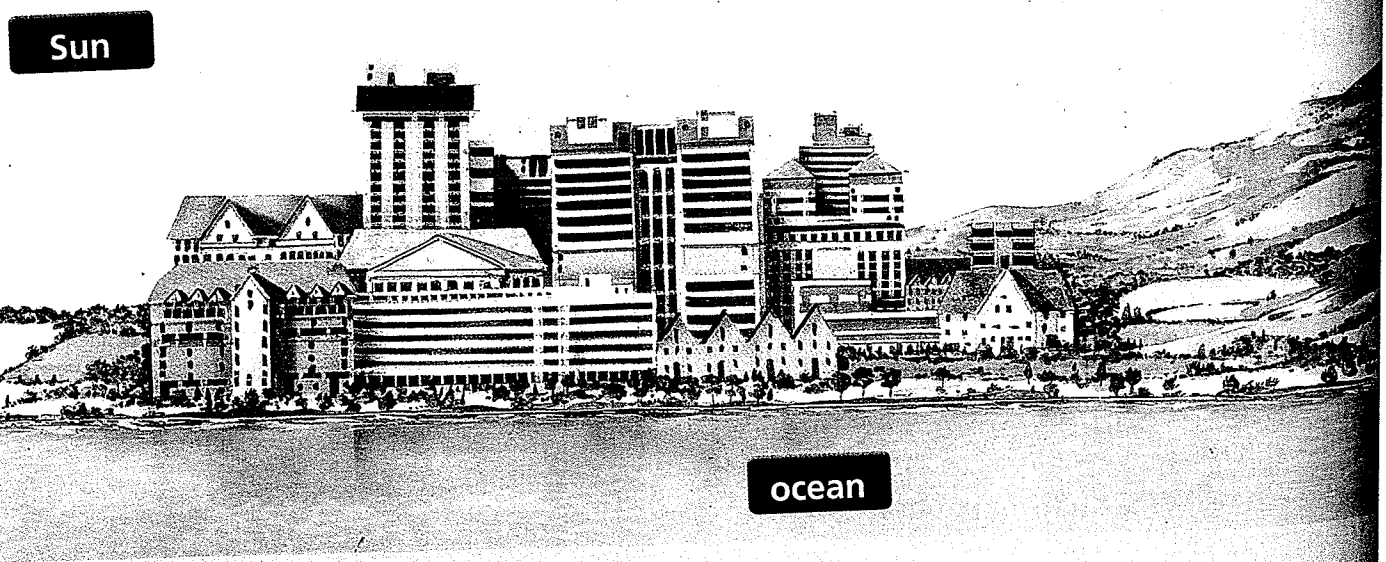
The Water Cycle

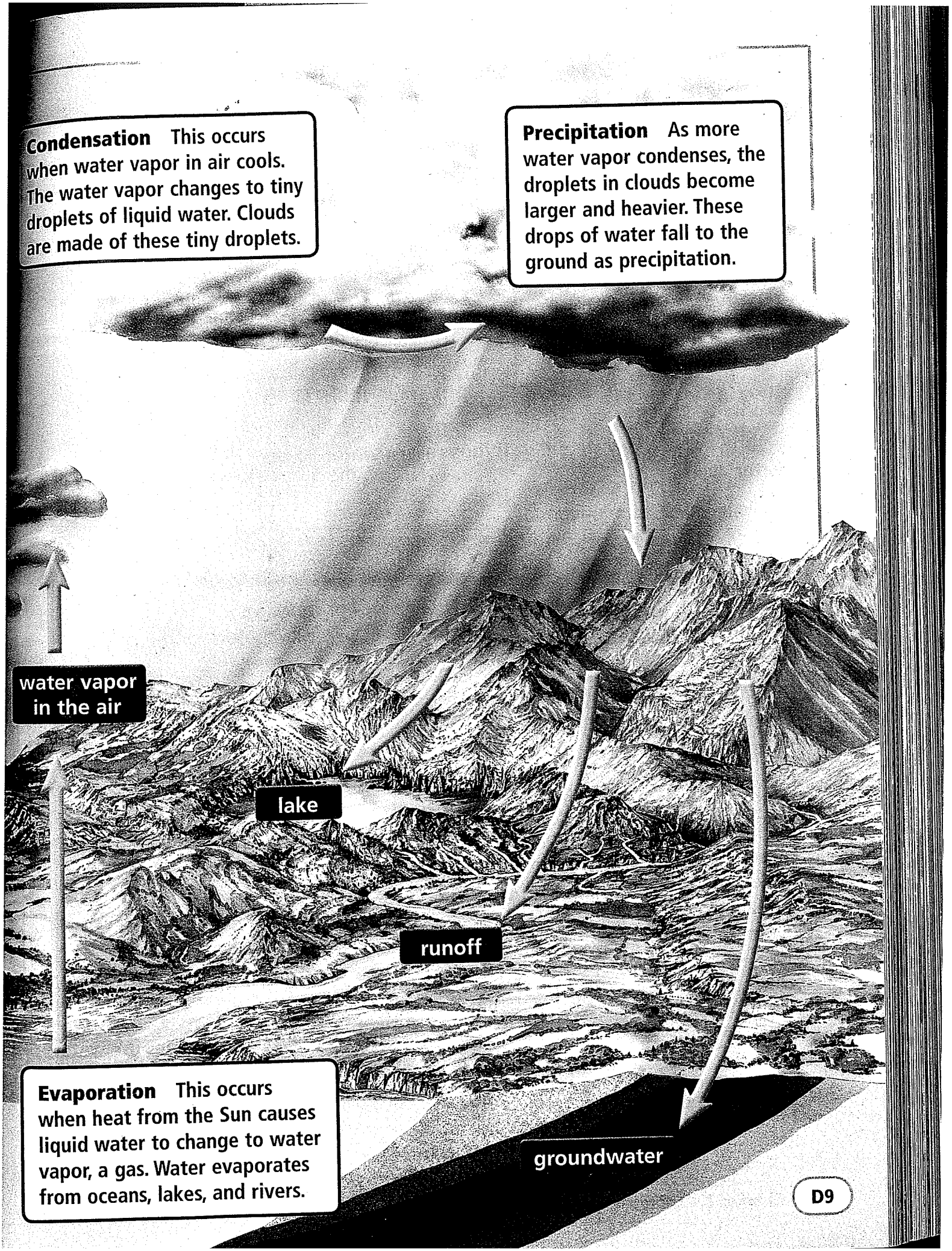
As water changes state, it moves between the air and Earth in a process called the **water cycle**. Water is always moving through the water cycle. This process renews Earth's water supply.

As liquid water on Earth evaporates, it forms water vapor in the air. When the water vapor in air cools, it condenses into tiny droplets. These tiny droplets form clouds. Larger water droplets fall back to Earth as precipitation (prih sihp ih TAY shuhn). **Precipitation** is any form of water that falls from clouds to Earth's surface. Precipitation includes rain, snow, sleet, and hail.

Some of the precipitation soaks into the ground, becoming groundwater. Water that does not soak into the ground flows downhill as runoff. Runoff collects in streams and rivers. Streams and rivers empty into ponds, lakes, and oceans.

SEQUENCE **What happens after water falls to the ground as precipitation?**




Condensation This occurs when water vapor in air cools. The water vapor changes to tiny droplets of liquid water. Clouds are made of these tiny droplets.
Precipitation As more water vapor condenses, the droplets in clouds become larger and heavier. These drops of water fall to the ground as precipitation.
water vapor in the air
lake
runoff
groundwater
Evaporation This occurs when heat from the Sun causes liquid water to change to water vapor, a gas. Water evaporates from oceans, lakes, and rivers.

EXIT TICKET

Name:_____	**Date:**_____
BCCSG	**Howard / Spelman**

1. Which process causes a wet towel to become dry?
   - A condensation
   - B evaporation
   - C precipitation
   - D deposition

2. What provides the source of energy for the water cycle?
   - A rain
   - B soil
   - C the Sun
   - D the Moon

3. Which list includes three weather conditions?
   - A windy, cloudy, and winter
   - B cold, morning, and rainy
   - C cloudy, cold, and windy
   - D rainy, summer, and evening

Grade:

Tuesday

Date: May 25

Learning Target: I can describe how the solar system is arranged. I can describe the rotation and revolution of the moon.

Learn by Reading

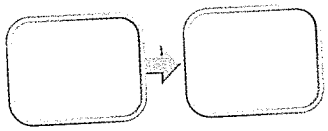
Day and Night

VOCABULARY

axis	p. D68
revolve	p. D68
rotate	p. D68

READING SKILL

Cause and Effect
Use the chart below to explain what causes day and night.



MAIN IDEA **The pattern of day and night is caused by Earth's rotation.**

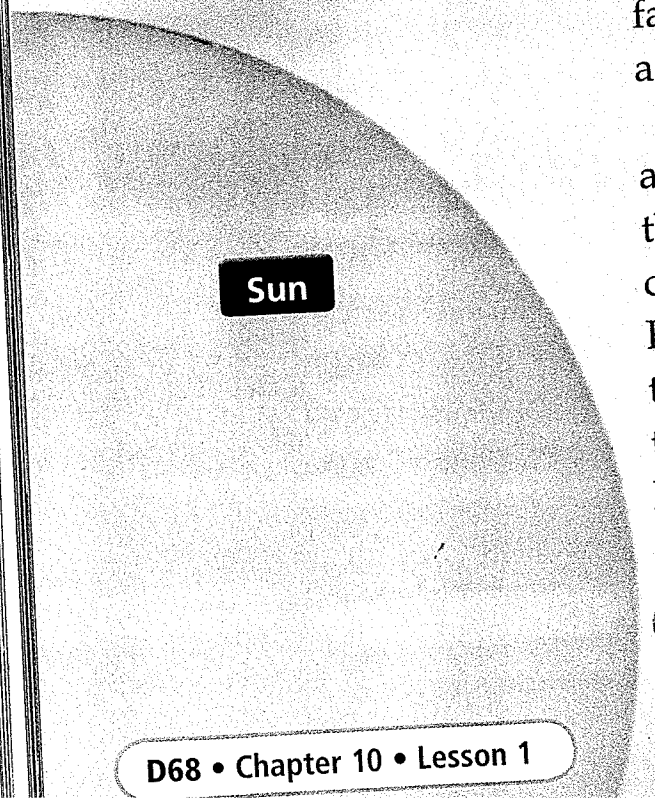
Rotating Earth

While you are enjoying after-school activities, it is the middle of the night in China. How can this be?

You have learned about one of the ways Earth and the other planets move. They **revolve** (rih VAHLV), or move in a path, around the Sun. While the planets revolve, they also rotate (ROH tayt). To **rotate** is to spin around an axis (AK sihs). An **axis** is an imaginary line through the center of an object. Earth's axis goes through the North and South Poles.

Imagine it is sunrise where you live. As Earth rotates, the side of Earth where you live turns to face the Sun. Only the side of Earth facing the Sun has daylight. Your day begins as the Sun appears to rise in the east.

As the day goes on, the Sun seems to move across the sky. But it is actually not the Sun that is moving. It is the turning of Earth that causes the Sun to look like it is moving. As Earth continues to rotate, your side of Earth turns away from the Sun. The Sun appears to set in the west. Night begins where you live. And now it's daytime on the other side of Earth.



CAUSE AND EFFECT **What causes the Sun to appear to move across the sky?**

Day and Night Around the Globe

North America

This part of Earth is facing the Sun, so it is daytime.

Asia

This part of Earth is facing away from the Sun, so it is nighttime.

Africa

This part of Earth has turned away from the Sun, so it is evening.

Length of Day and Night Changes

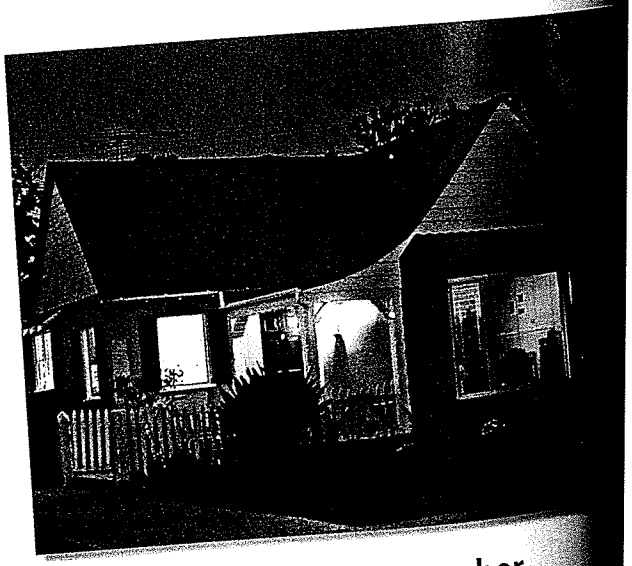
The length of day and night changes throughout the year. This happens because some parts of Earth face the Sun for more hours than other parts do. The tilt of Earth's axis causes these differences.

As Earth revolves around the Sun, different parts of Earth are tilted toward the Sun. In June, the North Pole is tilted toward the Sun. So places north of the Equator face the Sun for more hours than they face away from it. They have more hours of daylight and fewer hours of darkness.

In December, the North Pole faces away from the Sun. This means that places north of the Equator face away from the Sun for more hours than they face toward it. So, in these places, there are more hours of darkness than daylight.

CAUSE AND EFFECT **Why does the length of day and night change throughout the year?**

8:00 P.M. in June



8:00 P.M. in December

Learn by Reading

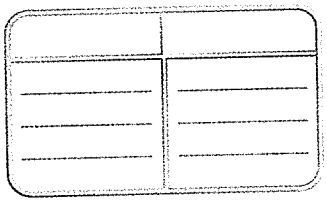
Moon Phases

MAIN IDEA **The Moon goes through a cycle of phases every month.**

VOCABULARY

READING SKILL

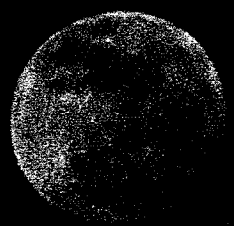
Compare and Contrast Use the chart to compare a full moon and a new moon.



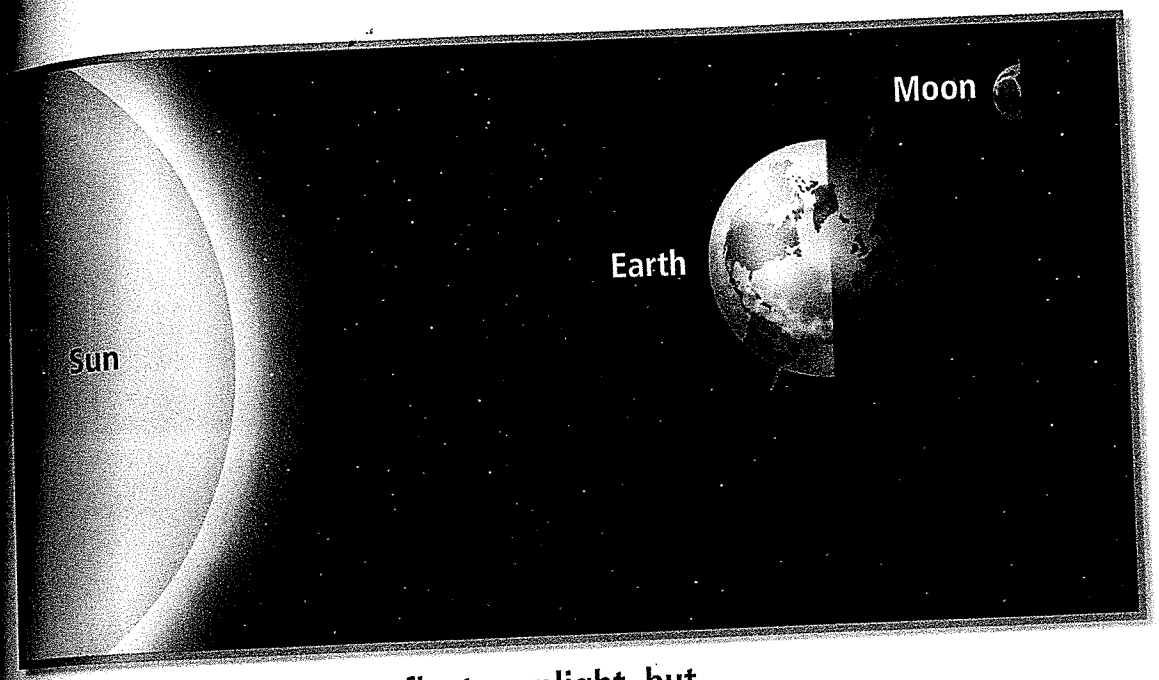
Earth's Moon

You can often see the Moon shining in the night sky. But the Moon does not make its own light. The "moonlight" you see comes from sunlight reflecting, or bouncing, off the Moon's surface. This reflected light makes the side of the Moon that faces the Sun look bright. The side of the Moon that faces away from the Sun is dark.

The Moon is a satellite (SAT 1 yt) of Earth. A **satellite** is any object that revolves around a planet. As it revolves around Earth, the Moon also rotates on its axis. It takes the Moon $27\frac{1}{3}$ Earth days to revolve once around Earth. It takes the same amount of time for the Moon to rotate once on its axis. As a result, the same side of the Moon always faces Earth.



Only one side of the Moon ever faces Earth. Astronauts are the only people who have ever seen the far side of the Moon.



▲ **The Moon's surface reflects sunlight, but the Moon does not make its own light.**

On some nights, the Moon looks big and round. On other nights, the Moon looks like a thin sliver. The Moon doesn't really change shape. It is always shaped like a ball.

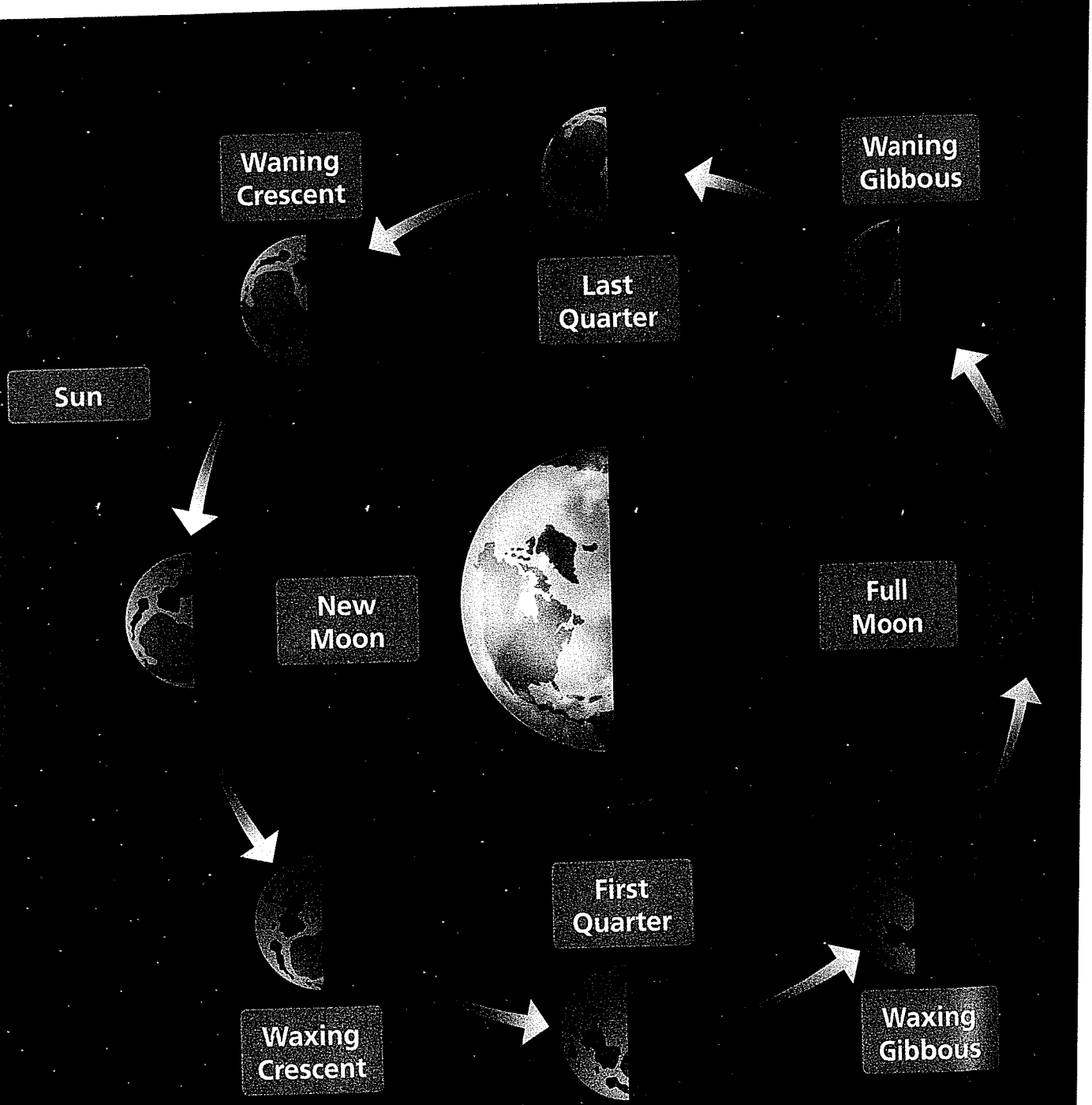
Why does the Moon appear to change shape? As the Moon revolves around Earth, you see different amounts of the Moon's sunlit side. Sometimes you can see a **full moon**, which is all of the Moon's sunlit side. A full moon looks bright and round.

Sometimes you can only see a small part of the Moon's sunlit side. This is when the Moon looks like a thin sliver. Sometimes you can't see any part of the Moon's sunlit side. This is called a **new moon**.

COMPARE AND CONTRAST **What are two different ways the Moon moves?**

The Moon in Motion

The different ways the Moon looks throughout the month are called the **phases of the Moon** (FAYZ ihz). The diagram below shows where the Moon is at each phase. The photos on the next page show how each Moon phase looks as seen from Earth.

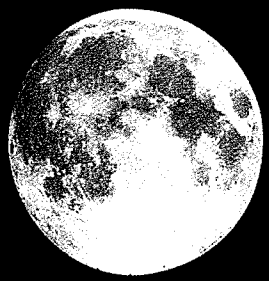


Last Quarter
You can still see about half of the Moon's sunlit side.

Waning Crescent
The Moon looks like a thin sliver.

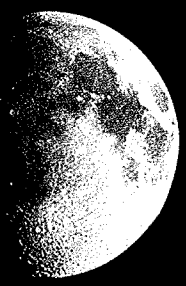
Waning Gibbous
The Moon looks almost full.

New Moon
You can't see any of the Moon's sunlit side.



Full Moon
All of the Moon's sunlit side is facing Earth.

Waxing Crescent
The Moon looks like a thin sliver.



Waxing Gibbous
The Moon still looks almost full.

First Quarter
About one half of the Moon's sunlit side can be seen.

A Closer Look at the Moon

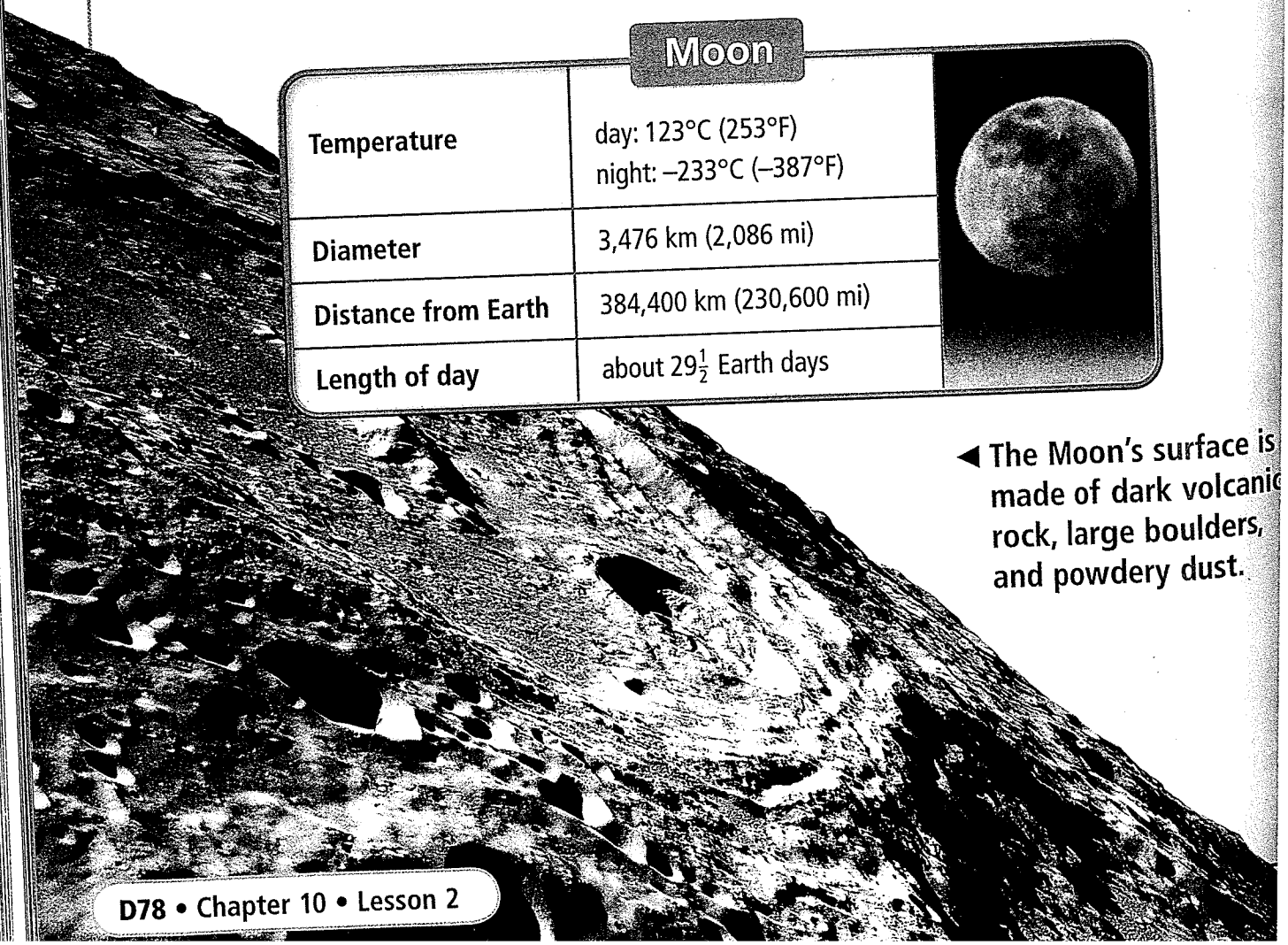
The rocky surface of the Moon is covered with mountains, flat plains, and craters (KRAY turz). A **crater** is a bowl-shaped dent. It is caused by an object from space striking the surface of a planet or moon. There is no air or liquid water on the Moon, and there are no living things. Daytime temperatures on the moon are much hotter than on Earth. Nighttime temperatures are much colder.

The Moon's diameter is only about one-fourth Earth's diameter. Because the Moon is smaller, its gravity is weaker than Earth's gravity. So things weigh less on the Moon than they do on Earth.

COMPARE AND CONTRAST **Compare the daytime temperatures on the Moon to those on Earth.**

Moon

Temperature	day: 123°C (253°F) night: –233°C (–387°F)
Diameter	3,476 km (2,086 mi)
Distance from Earth	384,400 km (230,600 mi)
Length of day	about $29\frac{1}{2}$ Earth days

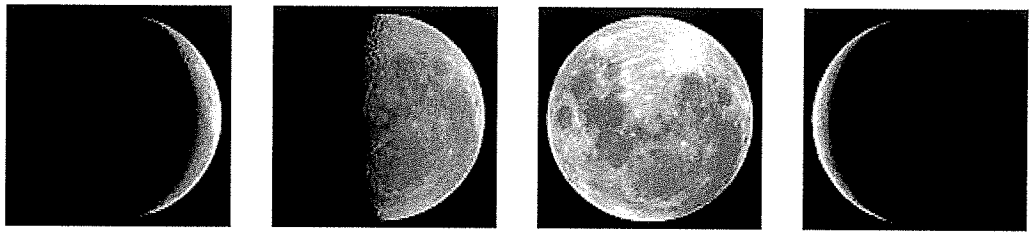


◀ The Moon's surface is made of dark volcanic rock, large boulders, and powdery dust.

EXIT TICKET

Name:_____	**Date:**_____
BCCSG	**Howard / Spelman**

1. The diagram below shows the appearance of an object in the sky that was observed from Earth during the month of September.

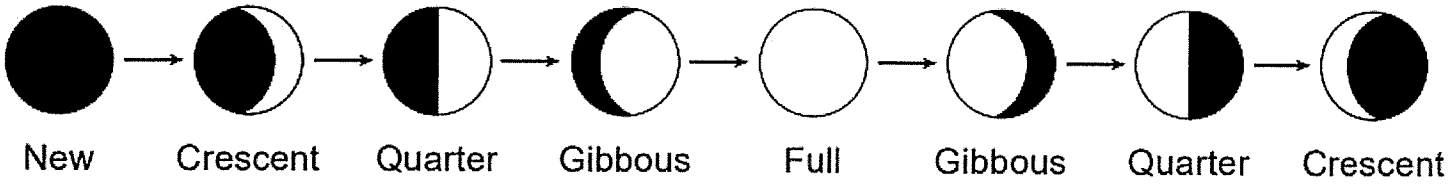


September 1 | September 6 | September 10 | September 23

The object being observed was most likely
A the Sun
B the Moon
C a star
D a planet

2. How long does it take for Earth to revolve around the Sun one time?
A a day
B a week
C a month
D a year

3. The diagram below shows the changing appearance of an object in space as viewed by an observer in New York State.



New | Crescent | Quarter | Gibbous | Full | Gibbous | Quarter | Crescent

The diagram shows the changing appearance of
A the Moon as it revolves around Earth
B Earth as it revolves around the Moon
C the Sun as it revolves around Earth
D Earth as it revolves around the Sun

Grade:

Wednesday

Date: May 26

Learning Target: I can describe the different properties and states of matter and their characteristics.

REVIEW

Learn by Reading

Physical Properties

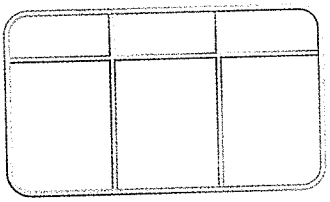
MAIN IDEA Matter has properties that can be observed and measured.

VOCABULARY

gas	p. E7
liquid	p. E7
mass	p. E9
matter	p. E6
physical property	p. E7
solid	p. E7
volume	p. E9

READING SKILL

Classify As you read, list examples of solids, liquids, and gases.

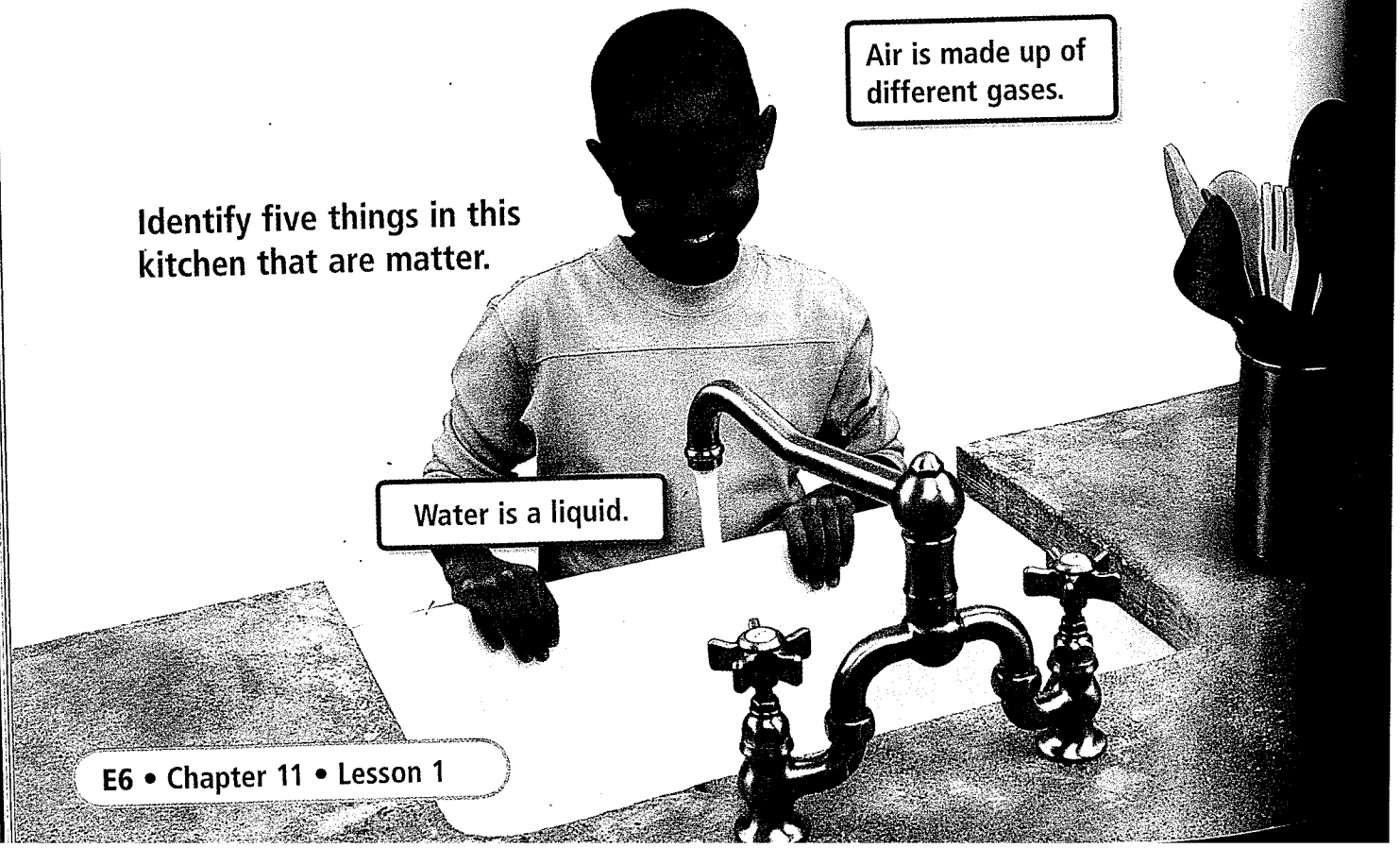


Three States of Matter

What do you like to do in the kitchen? You might like to help with the cooking, or maybe you just like to eat. Whether you're cooking or eating, you're using matter. **Matter** is anything that has mass and takes up space. Everything in this kitchen is matter. And even though you can't see it, the air in the kitchen is matter, too.

Matter is found in different states, or forms. Three states of matter are solid, liquid, and gas. Heating or cooling can cause matter to change from one state to another. Look in this kitchen for matter in different states.

Identify five things in this kitchen that are matter.

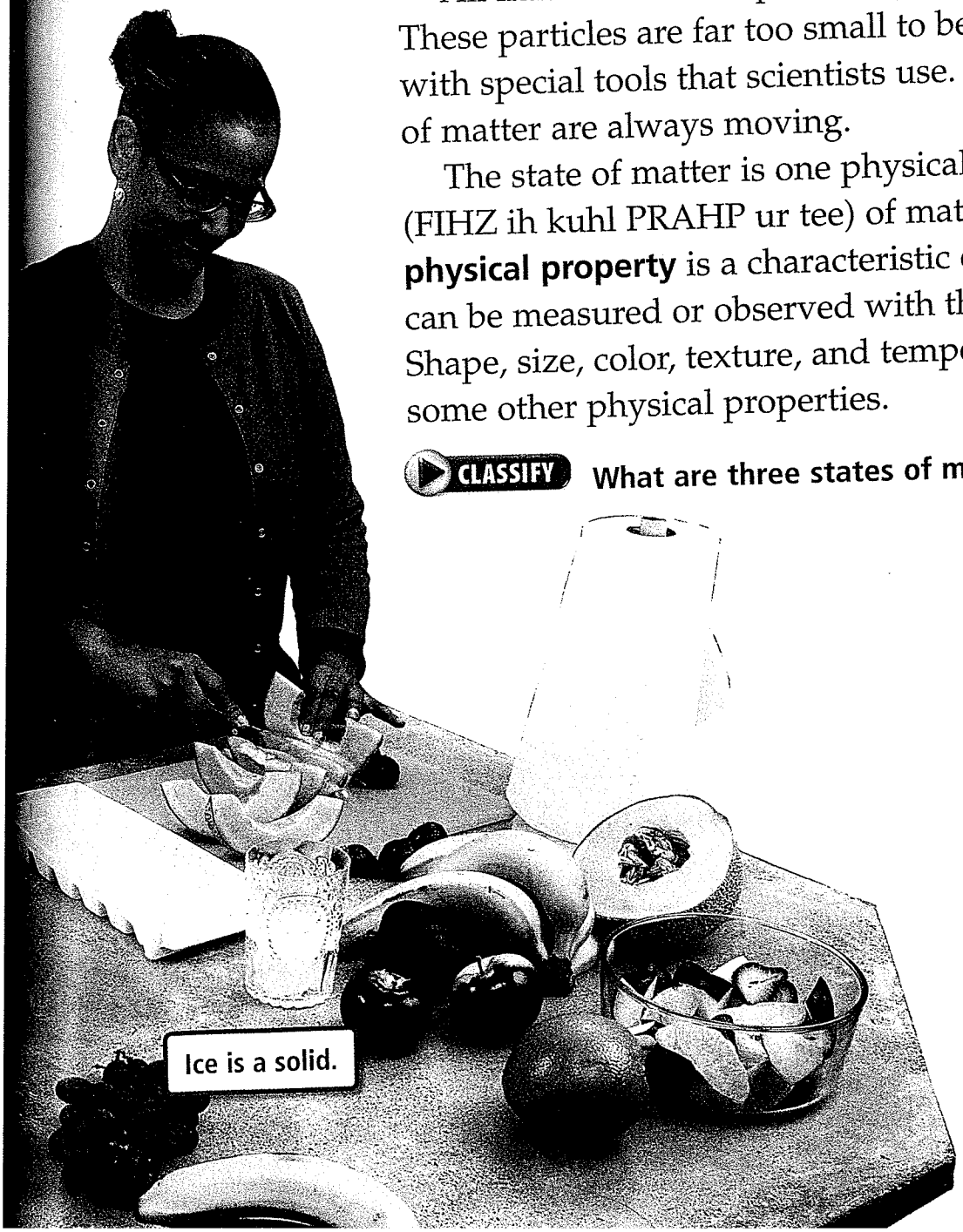


A **solid** (SAHL ihd) is matter that has a definite shape and takes up a definite amount of space. Ice is a solid. If you heat ice, it becomes liquid (LIHK - wihd) water. A **liquid** takes the shape of its container and takes up a definite amount of space. If you heat water, it becomes water vapor, a gas. A **gas** has no definite shape and does not take up a definite amount of space. A gas will spread out to fill a large space, or it can be squeezed into a small space.

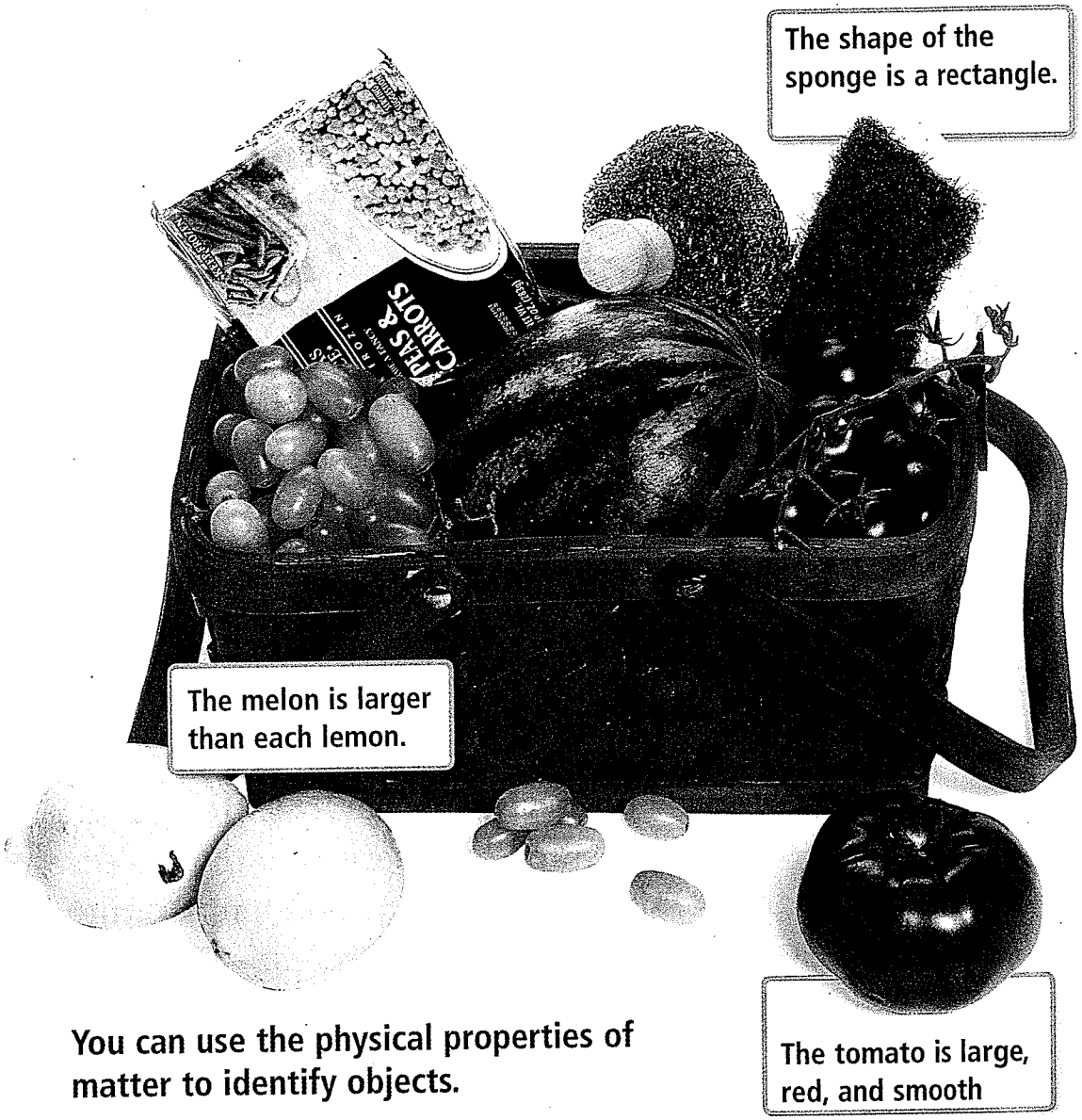
All matter is made up of many tiny particles. These particles are far too small to be seen except with special tools that scientists use. The particles of matter are always moving.

The state of matter is one physical property (FIHZ ih kuhl PRAHP ur tee) of matter. A **physical property** is a characteristic of matter that can be measured or observed with the senses. Shape, size, color, texture, and temperature are some other physical properties.

CLASSIFY **What are three states of matter?**



Ice is a solid.



You can use the physical properties of matter to identify objects.

Observing Matter

Look for the melon in the grocery basket. What physical properties of the melon did you use to find it? You might have looked for its color and shape.

Other physical properties you can observe are texture, temperature, hardness, sound, flavor, and size. You observe the physical properties of matter using your five senses—sight, touch, taste, smell, and hearing. If you could pick up the melon and eat it, you might observe that it is smooth, crisp, sweet, and juicy.

easuring Matter

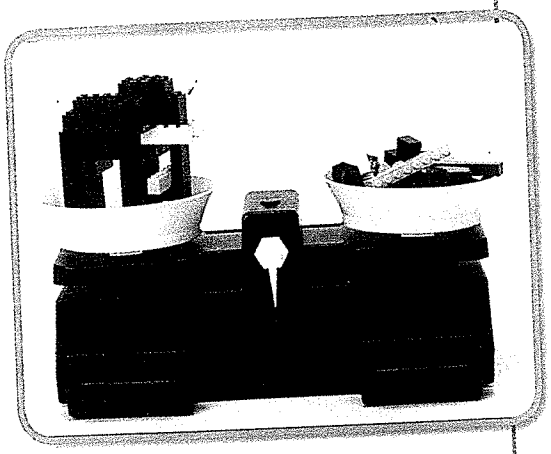
How would you describe how heavy a arble or a bowling ball is? You can use a easuring device such as a balance or a scale o find an exact measurement.

How heavy the marble or the bowling ball s depends on its mass. **Mass** is the amount of matter in an object. A balance measures mass. Mass is given in units called grams (g).

Mass is different from weight (wayt). Weight measures the pull of Earth's gravity (GRAV ih tee) on an object. Mass and weight are both physical properties of matter.

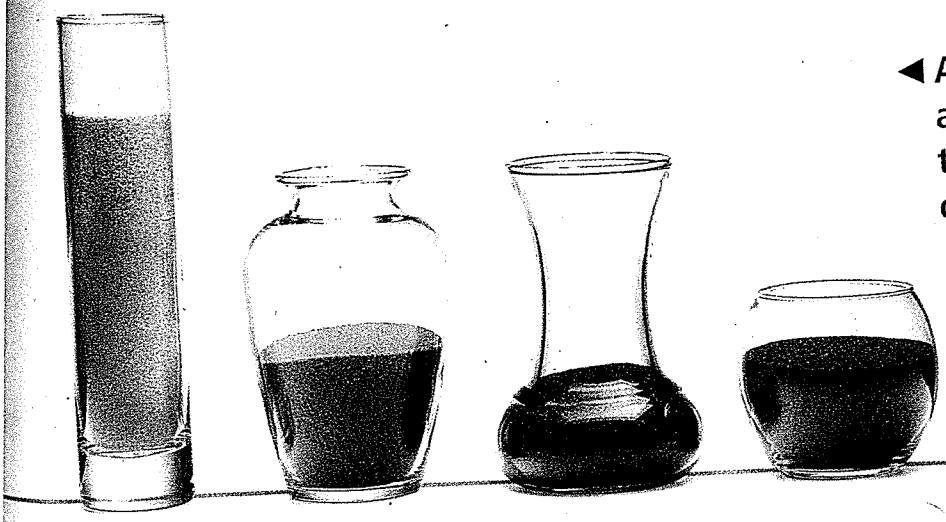
The bowling ball and marble have different masses. They also have different volumes (VAHL-yoomz). **Volume** is the amount of space that matter takes up. Look at the containers. The same volume of sand has been put into each container. No matter what the container's shape, the sand takes up the same amount of space in each one.

Volume is also a physical property. The volume of a solid is often measured in cubic centimeters (cm^3). Liquid volume is often measured in liters (L).



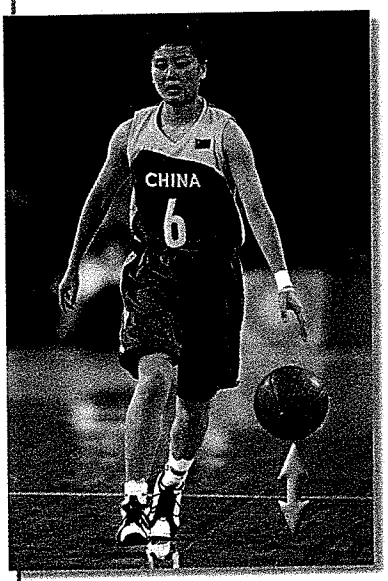
▲ **The mass of an object equals the sum of the masses of its parts.**

CLASSIFY **What units describe volume?**



◀ **Although each container is a different shape and size, the volume of sand in each container is the same.**

Useful Properties of Matter



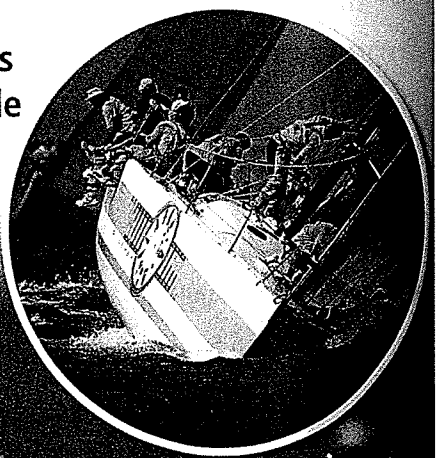
▲ A basketball is made from matter that is unbreakable and springy.

Which would you choose to wear in the rain: a raincoat or a wool sweater? You would probably choose a raincoat because you know raincoats are waterproof. You choose one material over another because of its properties.

The properties of different kinds of matter make them useful for different purposes. You wouldn't cook food on a stove in a plastic pan. A metal pan heats food without melting.

Being magnetic is a useful property of some metals. Some kinds of matter allow electricity to pass through them easily. Glass is a kind of matter that allows light to pass through it.

CLASSIFY **What are two useful properties of matter?**



The boaters' raincoats, as well as many parts of the boat, are made from waterproof materials. ▶

The swimmer's goggles are made from matter that is clear, unbreakable, and waterproof.

Learn by Reading

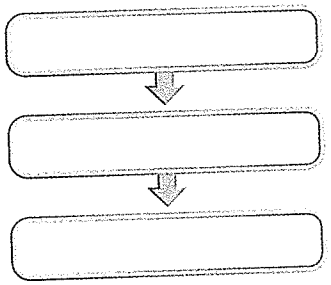
Physical Changes

VOCABULARY

condense	p. E15
evaporate	p. E15
freeze	p. E15
melt	p. E15
physical change	p. E14

READING SKILL

Cause and Effect Use a chart to show how heating causes matter to change state.



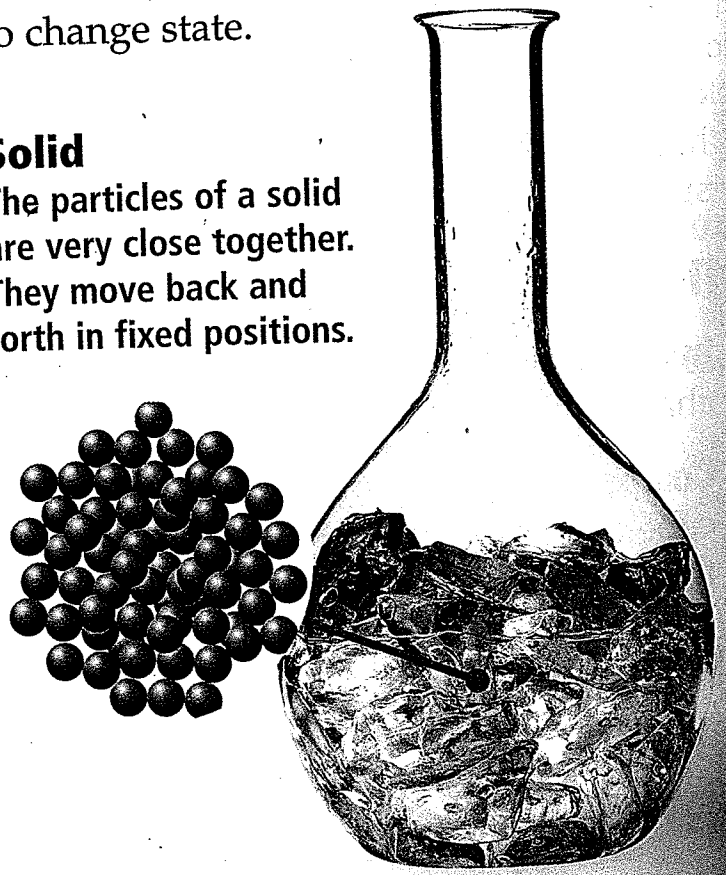
MAIN IDEA **A physical change is a change in the way matter looks.**

Energy and Changing States

What happens to ice cubes left in a glass in a warm room? They become liquid water. Water has changed state from a solid to a liquid. In either state, water is still water. A change in state is a physical change. A **physical change** is a change in the size, shape, or state of matter. A physical change does not change the makeup of the matter.

Why do you have to eat a frozen juice bar quickly on a hot day? The juice bar melts because energy, in the form of heat, causes it to change state.

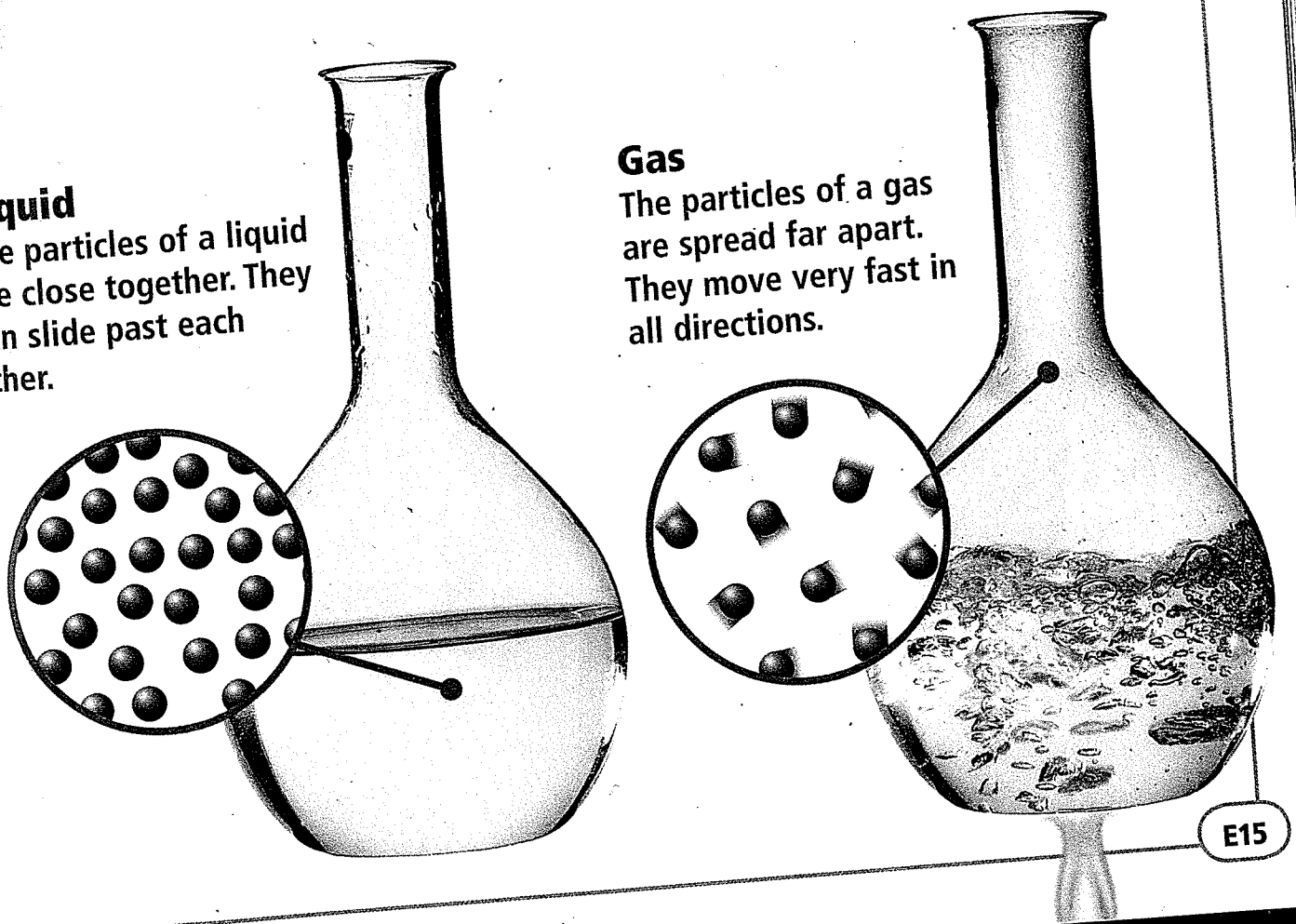
Solid
The particles of a solid are very close together. They move back and forth in fixed positions.



Matter heats up when energy is added to it. Adding ergy causes the particles of matter to move faster. dding enough heat to a solid causes it to **melt**, or ange state from a solid to a liquid. When a liquid is eated enough, it will boil, or change state from a liquid a gas. When liquids **evaporate** (ih VAP uh rayt), they hange state slowly from a liquid to a gas. You can think f boiling as a liquid evaporating rapidly.

Matter cools when energy is taken away. Taking away nergy causes the particles of matter to move more lowly. When a gas is cooled, it will **condense** (kuhn-DEHNS), or change state from a gas to a liquid. When a liquid is cooled enough it will **freeze**, or change state from a liquid to a solid.

CAUSE AND EFFECT **What causes matter to change state?**



Useful Physical Changes

How do you make a paper airplane? You fold a sheet of paper in a certain way. You can also use scissors to cut notches in the wings of the plane. In both cases, you are changing the shape of the paper. These physical changes are useful because they allow the paper to glide through the air.

Every day you make physical changes to matter so that the matter is useful to you. Sharpening pencils and tying shoelaces are physical changes. Mixing chopped celery into tuna fish is a physical change. You can taste both the celery and the tuna. That's because mixing does not change the celery or the tuna into new kinds of matter.

CAUSE AND EFFECT **What are two ways that you can make a useful physical change?**

Molding clay and folding paper are useful physical changes.

EXIT TICKET

Name:_____	**Date:**_____
BCCSG	**Howard / Spelman**

1. Hard, light-colored, and smooth are observations that describe a
   A glass marble
   B rain cloud
   C cat's fur
   D cotton ball

2. Which type of energy needs to be removed from liquid water to change the liquid water to solid water?
   A light
   B heat
   C sound
   D chemical

3. A student crumpled up a flat sheet of paper into a round ball. Which property of the paper changed?
   A hardness
   B color
   C mass
   D shape

Grade:

Thursday

Date: May 27

Learning Target: I can explain how electricity can be turned into other forms of energy such as light, heat, and sound.

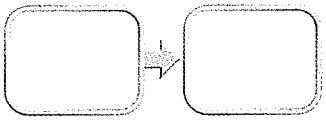
Learn by Reading

VOCABULARY

electric circuit p. F29
electric current p. F28

READING SKILL

Cause and Effect
Use a graphic organizer to list some possible effects of electrical energy.



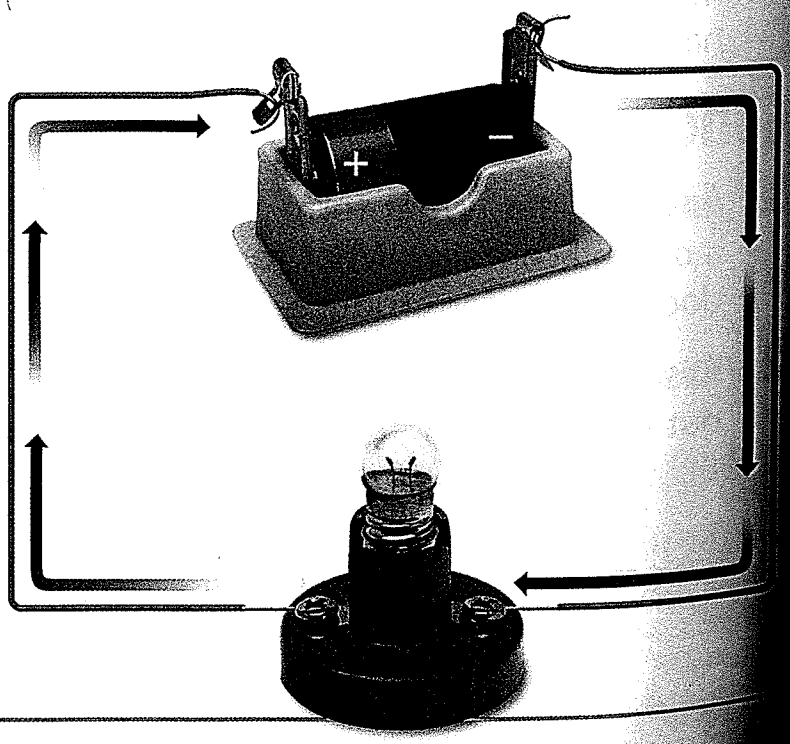
Electrical Energy

MAIN IDEA **Electrical energy is the energy of charged particles.**

Flow of Electric Charges

Most people take electricity for granted until there is a power blackout. That's when they realize that electrical energy is an important part of everyday life. Electrical energy is the energy of charged particles of matter. For electricity to run lamps and TVs, some of these charged particles must move.

Charged particles of matter carry either a positive or a negative electric charge. Positively charged particles and negatively charged particles attract each other. Negatively charged particles tend to flow, or move, toward positively charged particles. This flow of charged particles is an **electric current** (KUR uhnt).

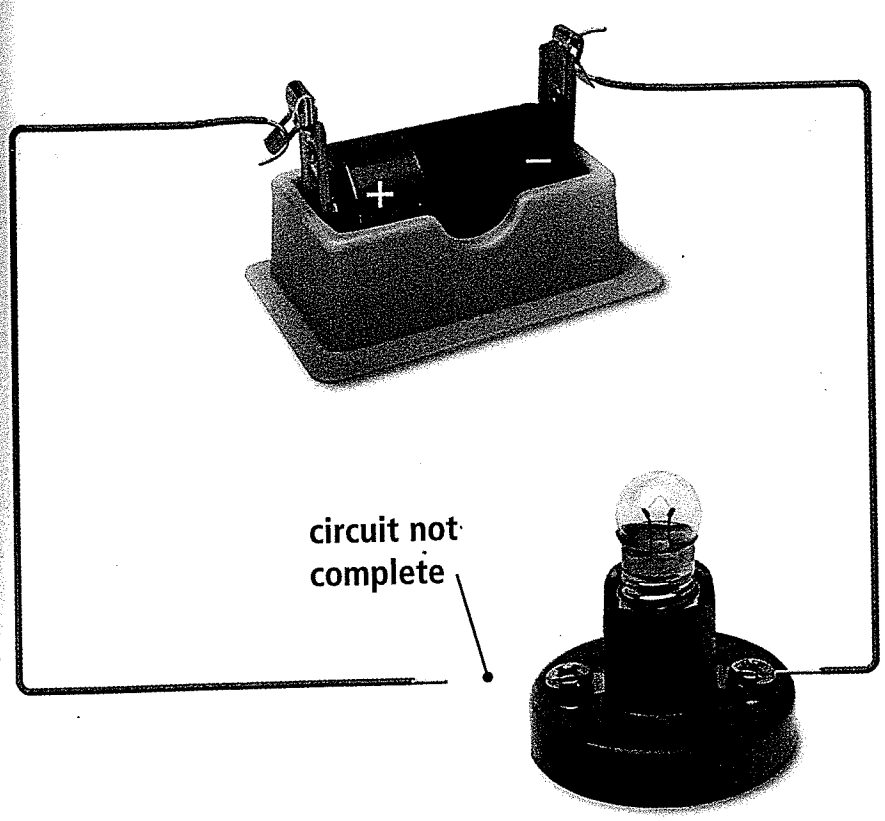


Electric current moves through a complete circuit, causing the bulb to light. ▶

Electric current flows through a path called an **electric circuit** (SUR kiht). A circuit is made up of wires and electrical devices. It has a source of electricity, such as a battery. Electric current can flow through a circuit only if the circuit is complete. There cannot be any gap in the circuit.

CAUSE AND EFFECT **What causes negative charges to flow?**

When a lamp is unplugged, there is a gap in the circuit. The lamp can be turned on only when it is plugged in and the circuit is complete. ▶

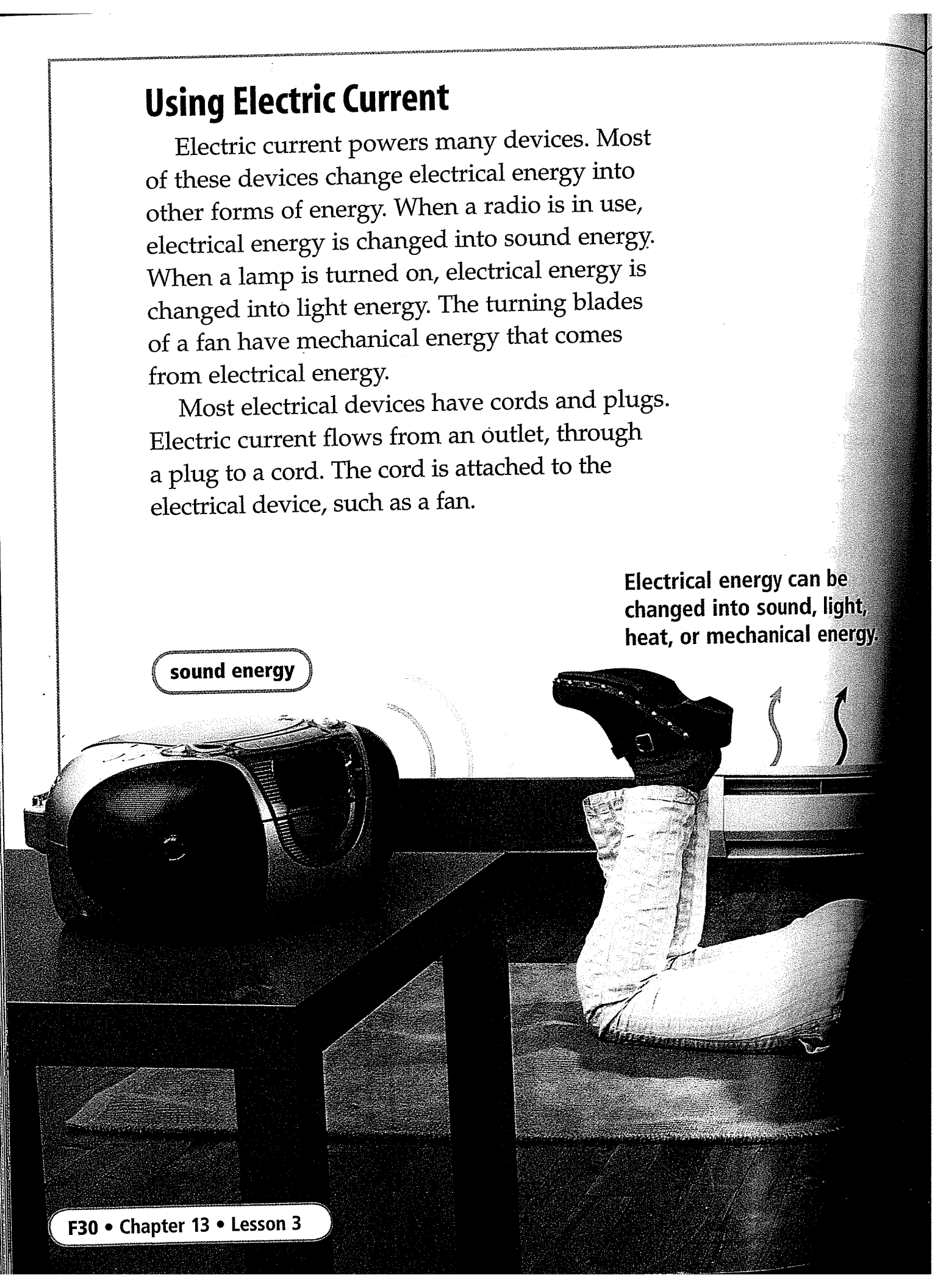


◀ Any gap in a circuit stops electric current, so the bulb does not light.

Using Electric Current

Electric current powers many devices. Most of these devices change electrical energy into other forms of energy. When a radio is in use, electrical energy is changed into sound energy. When a lamp is turned on, electrical energy is changed into light energy. The turning blades of a fan have mechanical energy that comes from electrical energy.

Most electrical devices have cords and plugs. Electric current flows from an outlet, through a plug to a cord. The cord is attached to the electrical device, such as a fan.

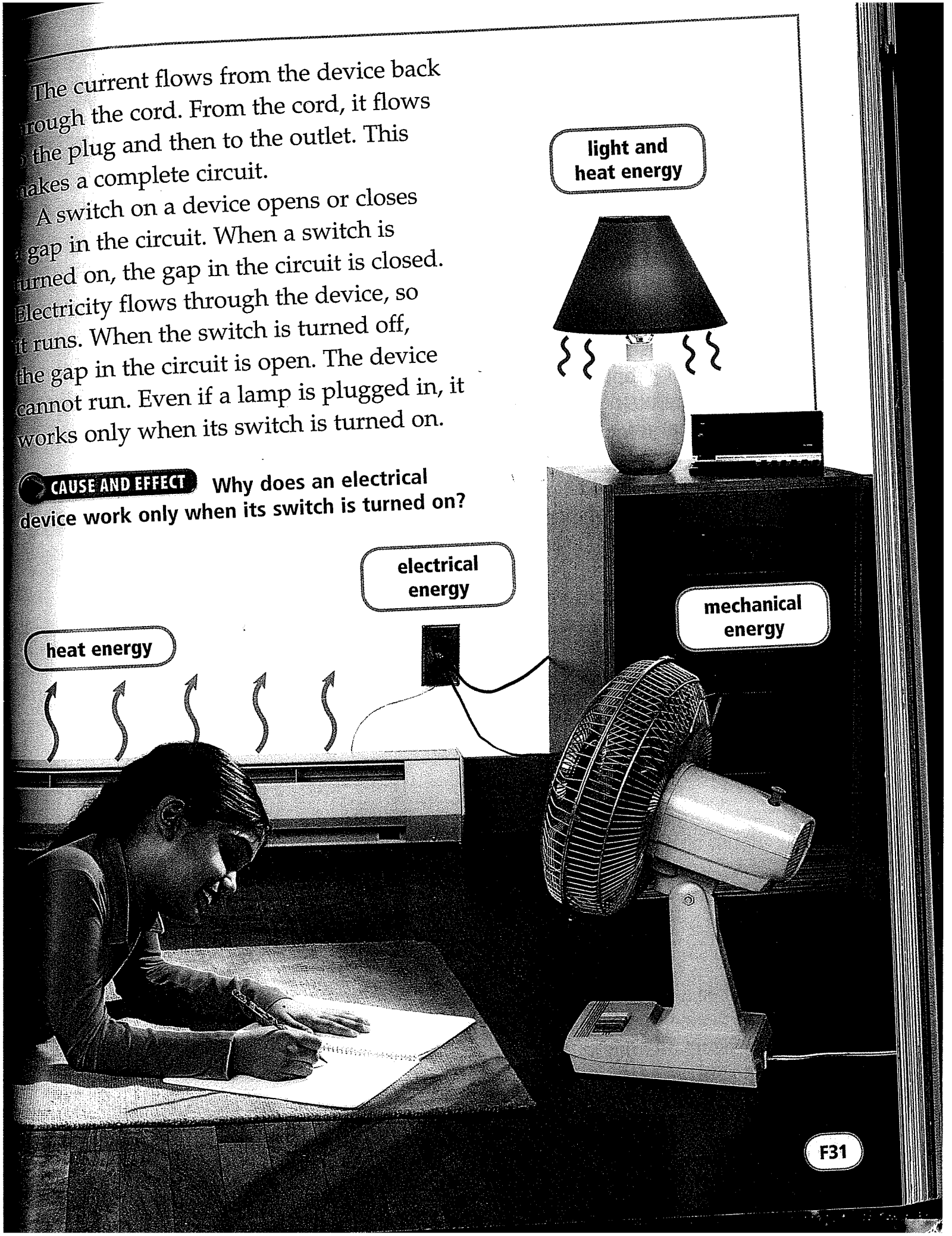


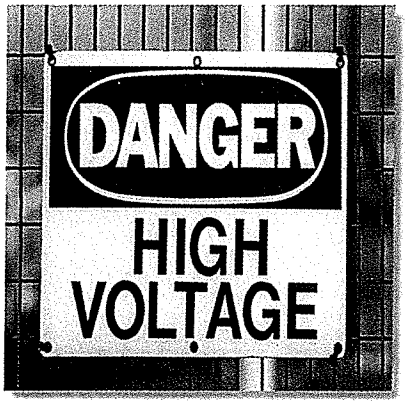
Electrical energy can be changed into sound, light, heat, or mechanical energy.

The current flows from the device back through the cord. From the cord, it flows to the plug and then to the outlet. This makes a complete circuit.

A switch on a device opens or closes a gap in the circuit. When a switch is turned on, the gap in the circuit is closed. Electricity flows through the device, so it runs. When the switch is turned off, the gap in the circuit is open. The device cannot run. Even if a lamp is plugged in, it works only when its switch is turned on.

CAUSE AND EFFECT **Why does an electrical device work only when its switch is turned on?**





▲ Warning signs like this can protect people from dangerous electric charges.

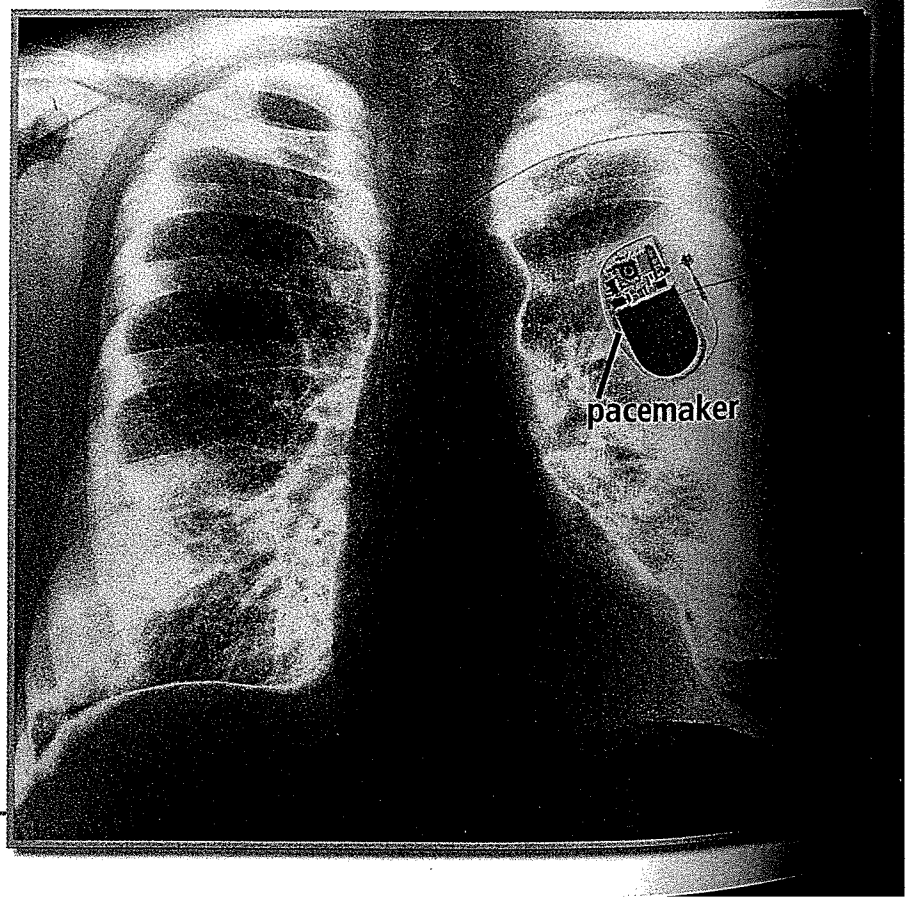
Electrical Energy and Your Body

Look around you. Each person in your class is using electrical energy right now. The human body uses electrical energy to function. Electrical signals in the heart keep it beating at the right pace. Electrical signals also carry messages from the brain to other parts of the body.

Where do the heart and brain get electrical energy? It comes from the chemical energy in food. The body changes some of the chemical energy in food into electrical energy.

Electric current from a source outside the body can be very dangerous. If a large amount of electricity passes through the body, it can stop the heart from beating. It can also change to heat energy and cause burns.

CAUSE AND EFFECT **How does the brain use electrical energy?**



A pacemaker is an electrical device that helps keep the heart beating at the right rate. ▶

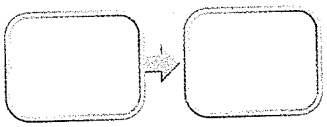
Learn by Reading

VOCABULARY

friction	p. F45
heat	p. F42
thermal energy	p. F42

READING SKILL

Cause and Effect Use the chart to show how thermal energy moves from a warmer object to a cooler object.



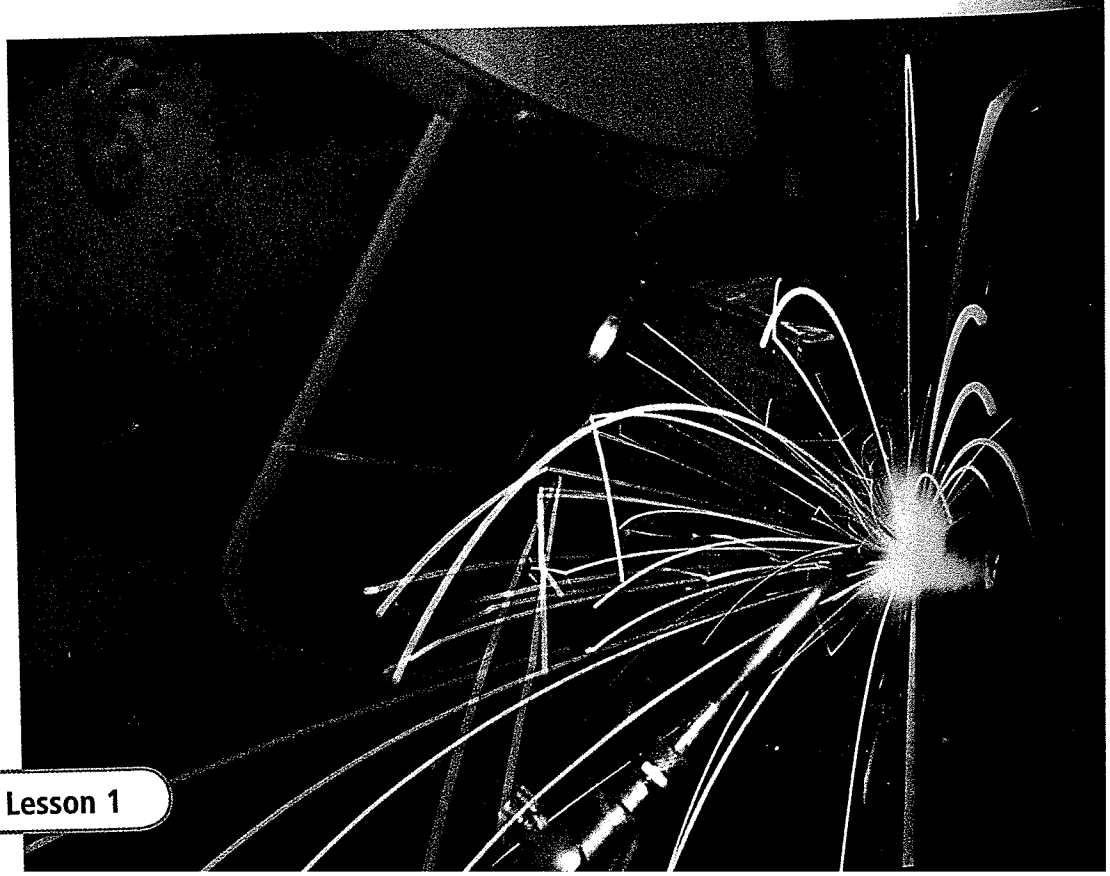
Heat

MAIN IDEA **Thermal energy moves from warmer objects to cooler objects. You feel the movement of thermal energy as heat.**

Thermal Energy

You have learned that matter is made up of tiny particles that are always in motion. The energy of moving particles in matter is called **thermal energy** (THUR muhl). The more thermal energy an object has, the faster its particles move. You feel thermal energy as heat. **Heat** is the flow of thermal energy from warmer objects to cooler objects. Thermal energy is sometimes called heat energy.

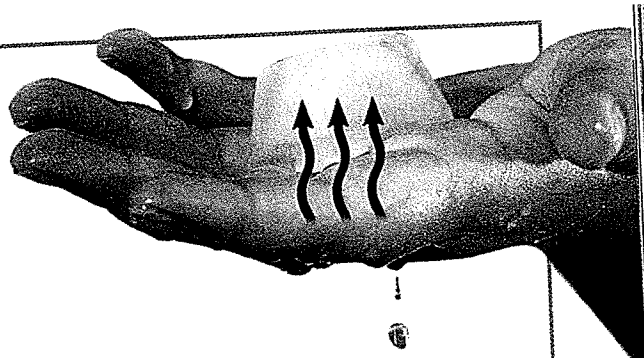
A welder uses heat to melt metal. The thermal energy from the hot flames moves to the cooler metal object.



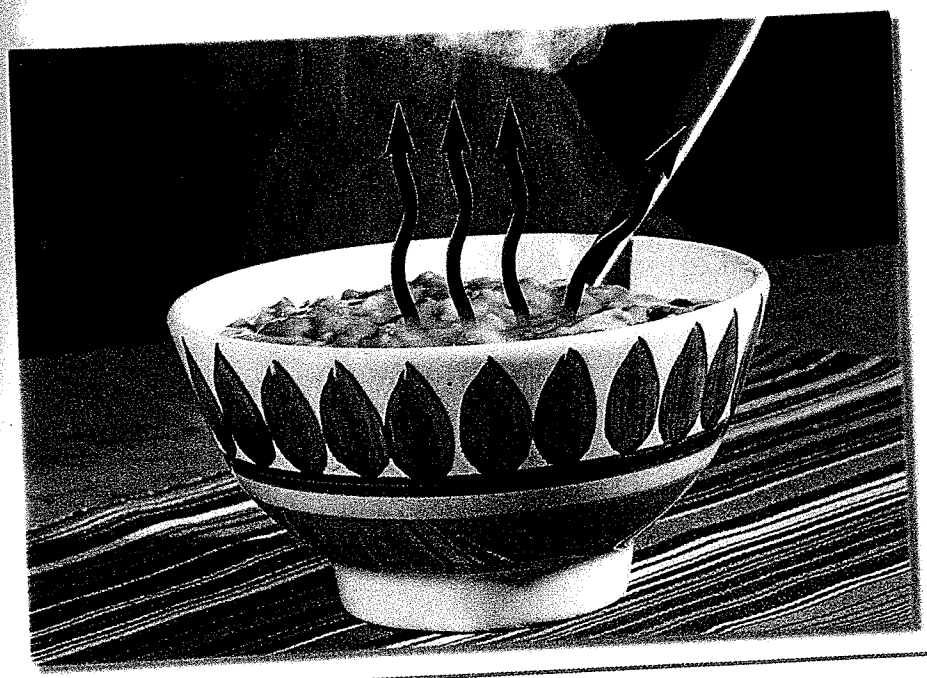
Why does your hand feel cold when you hold an ice cube? Thermal energy from your hand moves to the ice cube. The ice melts because its particles have gained thermal energy. A warm mug of hot chocolate heats your hands because thermal energy from the mug moves to your cooler hands.

Look below to see how thermal energy moves from the hot cereal. After a few minutes, the cereal is cooler and the spoon is warmer. If you held your hand over the cereal, you would feel the heat. The spoon and air have gained thermal energy, so they have become warmer. The cereal has lost thermal energy, so it has become cooler. This flow of thermal energy will continue until the cereal, the air, and the spoon are all equally warm.

CAUSE AND EFFECT **What causes an object to feel warm when you touch it?**



▲ **When you hold an ice cube, thermal energy from your warm hand moves to the cold ice. Your hand feels cold because it has lost thermal energy.**



◀ **Thermal energy moves from the hot cereal to the cooler spoon and cooler surrounding air.**

▲ **The heat lamp changes electrical energy into thermal energy that keeps these chicks warm. The lamp also gives off light energy.**

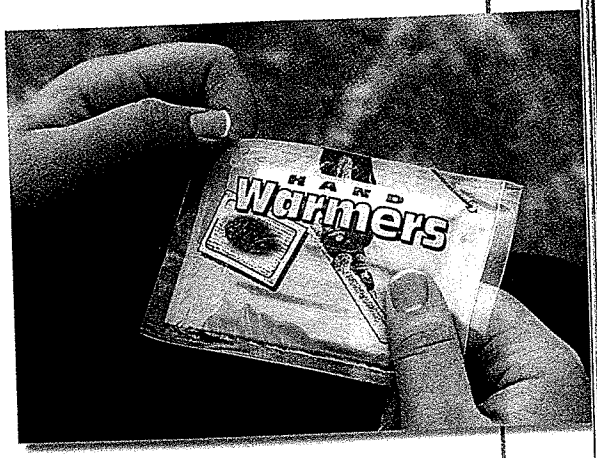
Producing Thermal Energy

There are many forms of energy. You have learned about light energy, electrical energy, mechanical energy, sound energy, and chemical energy. Each of these forms of energy can change into thermal energy. This is how thermal energy is produced. Electrical appliances such as toasters, electric stoves, and hair dryers all use electrical energy to produce thermal energy.

You have probably noticed that you feel warm when you stand in the sunlight. That is because the Sun gives off energy that becomes thermal energy and light energy.

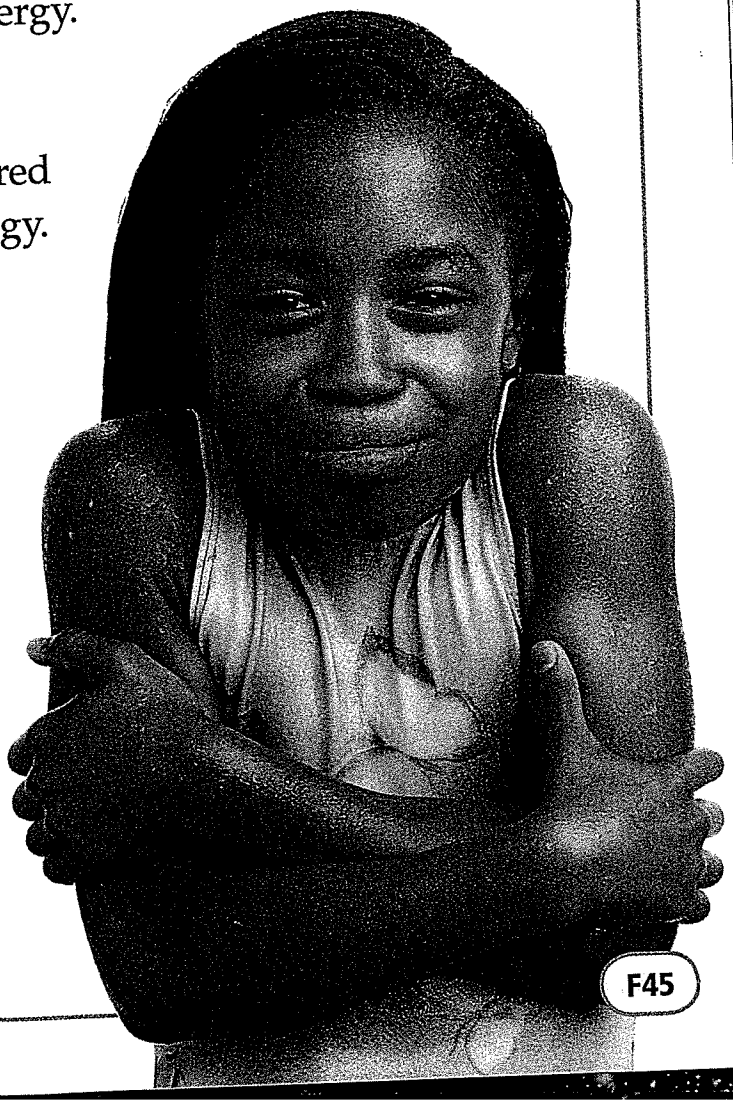
Did you know that you can also produce thermal energy? You have probably noticed that when you rub your hands together, they get warm. This happens because friction (FRIHK shuhn) produces thermal energy. **Friction** is a force that occurs when one object rubs against another object. Friction slows down and stops motion between two surfaces that touch.

Another way to produce thermal energy is by changing chemical energy to thermal energy. Why do you feel heat from a campfire? When wood is burned, the chemical energy stored in the wood changes to thermal energy. Your body is warm because it changes the chemical energy stored in the food you eat to thermal energy. When you squeeze a thermal pack, chemicals inside it combine to produce thermal energy. The chemical energy stored inside the pack changes to thermal energy.

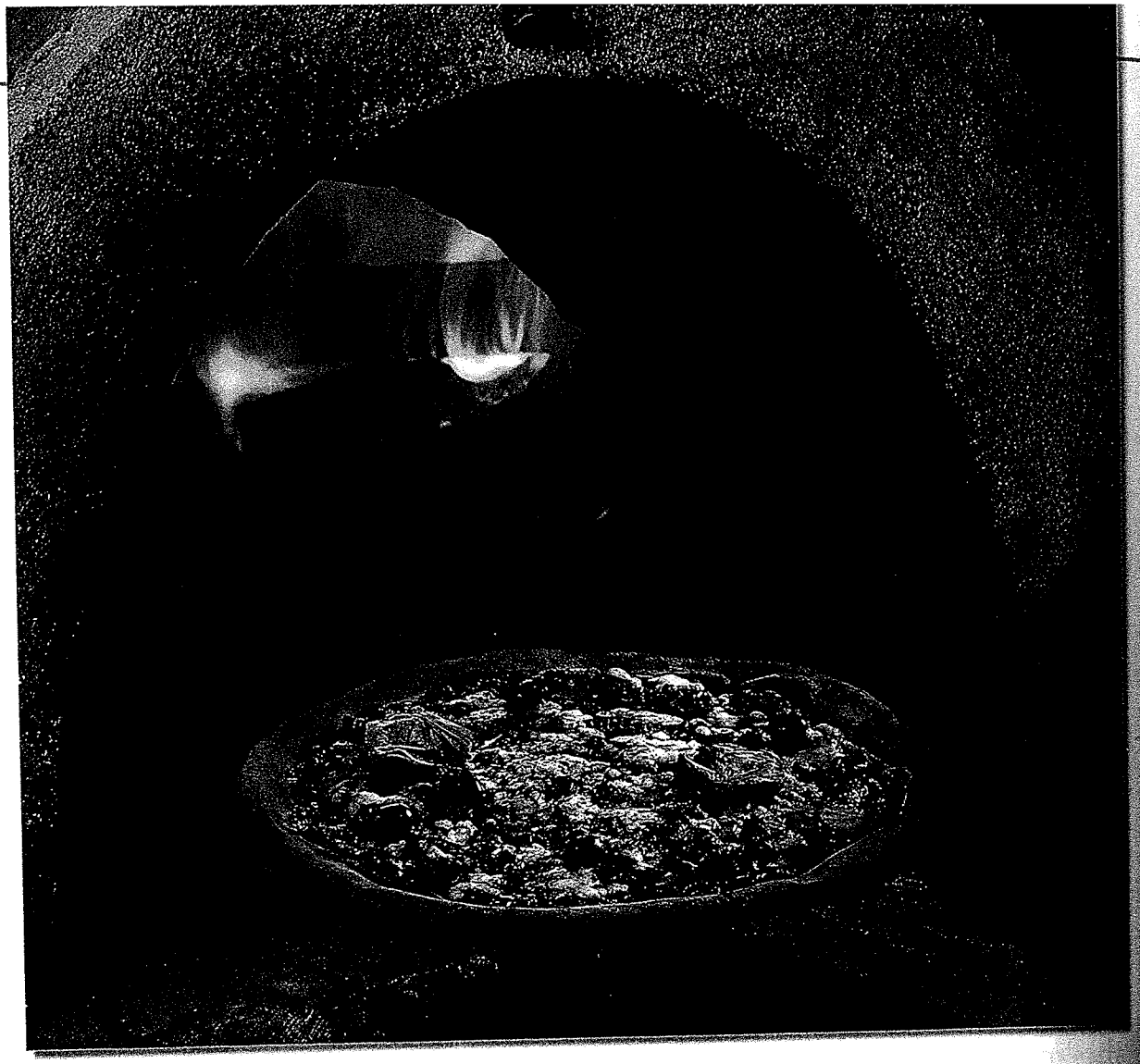


▲ How does this thermal pack get warm?

CAUSE AND EFFECT **What causes your hands to get warm when you rub them together?**



Quickly rubbing your arms can make you feel warmer when you are cold. Friction between your moving hands and your arms produces thermal energy. ▶



Thermal energy can be used to cook a pizza.

Using Thermal Energy

People use thermal energy for many things. People who live in cold climates use thermal energy to heat their homes. In factories, thermal energy is used to melt steel so that it can be shaped to build cars, refrigerators, and other useful things. People use thermal energy to cook food. What are some ways you use thermal energy?

CAUSE AND EFFECT **What is the effect of thermal energy on steel?**

EXIT TICKET

Name:_____	**Date:**_____
BCCSG	**Howard / Spelman**

1. A student drops a button and a nickel, and they both fall to the floor. What causes both of these items to fall to the floor?
   A magnetism
   B electricity
   C sound
   D gravity

2. Which form of energy is produced when a person claps his hands?
   A chemical
   B electrical
   C light
   D sound

3. Which force pulls objects toward the center of Earth?
   A gravity
   B friction
   C magnetism
   D electricity

Grade: