DAY 1 Diggo 4th

Can You Explain It?

Explore Online

A river flows through the bottom of this canyon. Think about how the canyon may have formed. Imagine walking through the bottom of the canyon, near the river. What would you see and hear?

1. How do you think this canyon formed? What could have reshaped the rock ?

EVIDENCE NOTEBOOK Look for this icon to help you gather evidence to answer the questions above.

Making a Move

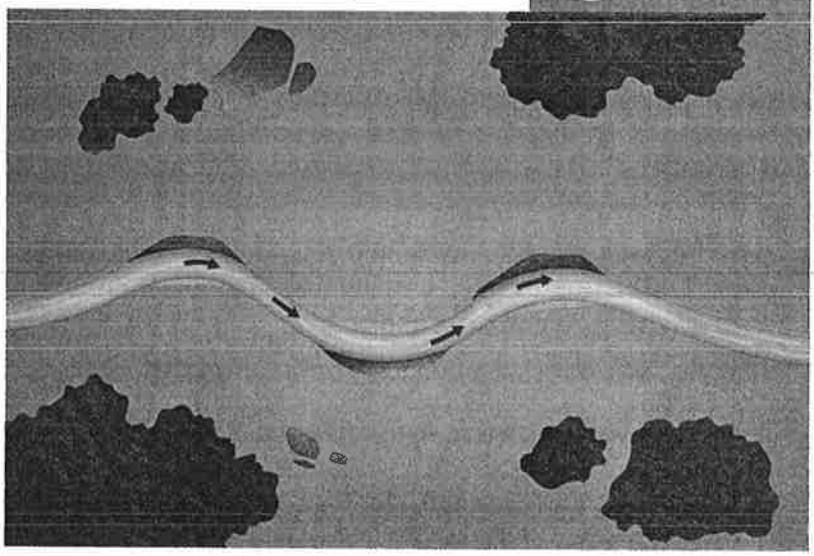
Watery Trails

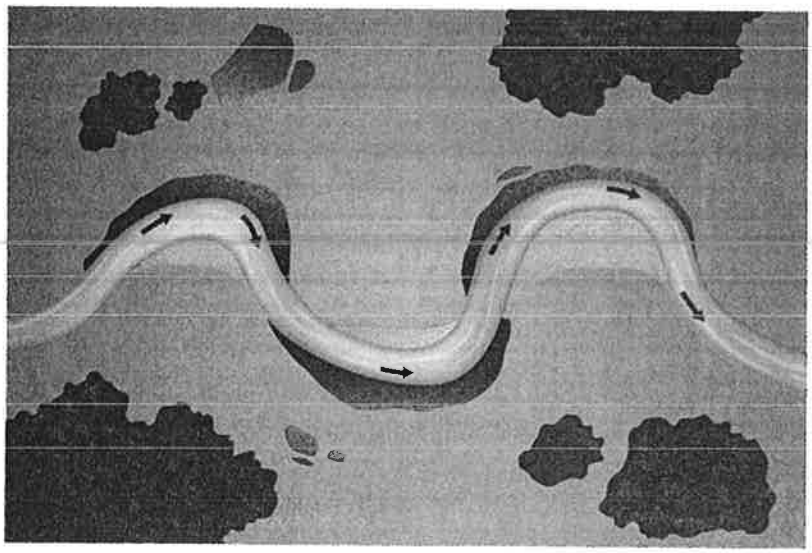
A river is a stream of water that flows within a channel. A river starts at its source and ends at its mouth. In between these points, the width, volume, and flow of the river changes. These changes happen over time.

Hills and mountains are the source for many rivers. The riverbed has a steep slope, and its valley is narrow. As a result, the river flows downhill fast. The flowing river picks up small rocks and soil known as *sediment*. Other rivers may join the original river, making it wider. As a river nears its mouth, it slows down and drops sediment. A large area of flat land known as a *delta* may form here.

Step 1: The images on these pages show one way that a river can change through various processes.

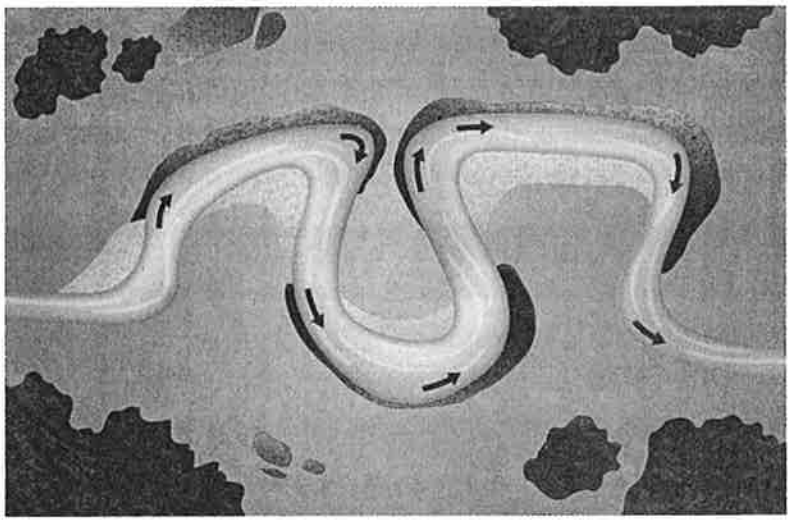
Explore Online

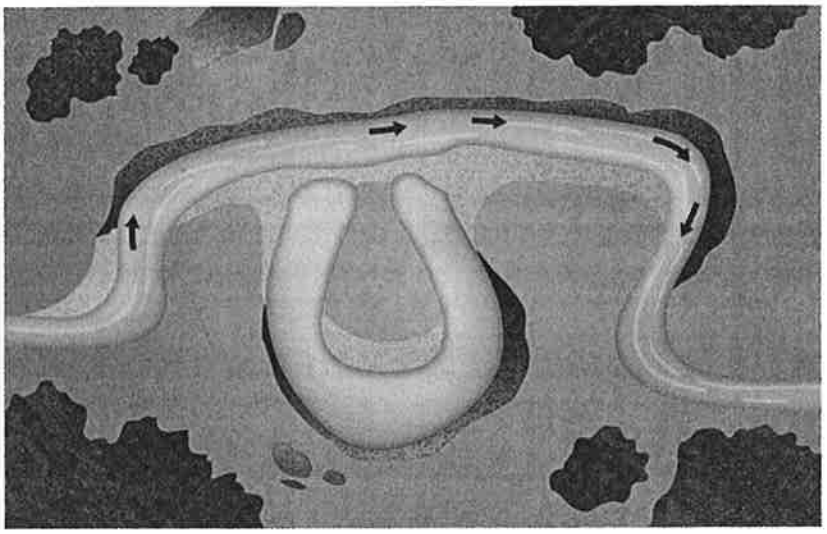




Step 2: As it flows downstream, the river is forming curves and bends as sediment is picked up in one place and dropped in another. The dark areas show where sediment is being picked up. The lighter areas are where it is being dropped. These processes are changing the course of the river.

Step 3: Moving water continues to shape the river. It has nearly formed a loop. Look back at how the river began. Notice how much these processes have changed the river!





Step 4: Over time, this river has changed its course. Part of the old course has been cut off. The water left in the old path forms a lake known as an oxbow lake. Over time, it may dry up.

2. Choose the best word or phrase to complete each sentence.

steep	**flat**	**wider**	**narrower**	**banks**
mouths	**curves**	**meander**	**floodplain**	**deltas**

The slope of a river is often _____ near its source. The river gets _____ as other rivers and streams enter it. Rivers sometimes form _____ as they flow through these flat areas. Rivers slow down near their mouths, dropping sediment to form _____.

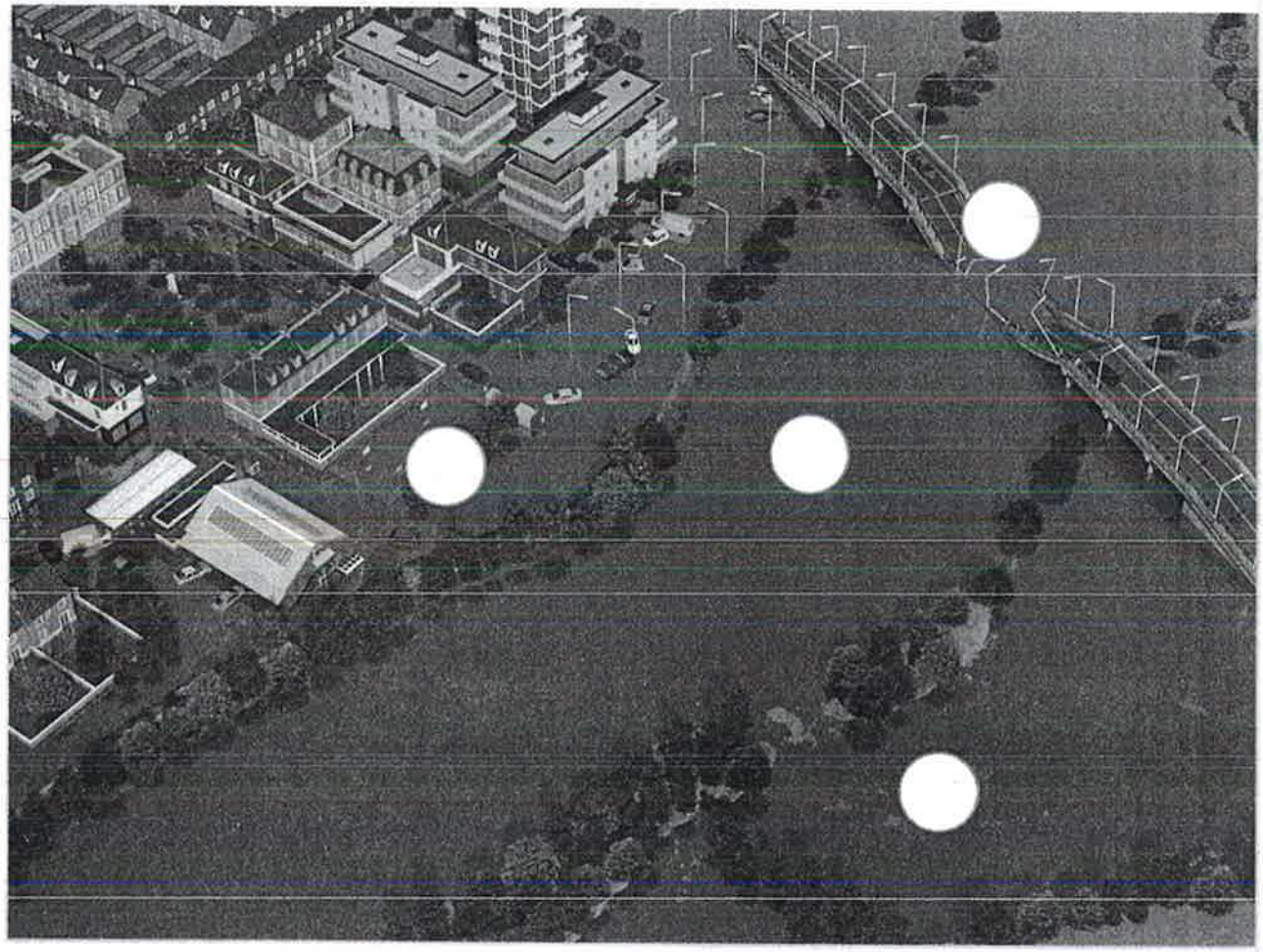
EVIDENCE NOTEBOOK You've learned about some changes caused by rivers. In your Evidence Notebook, explain how this information might relate to the canyon you saw at the beginning of the lesson.

Over Its Banks

What happens to rain once it hits the ground? Some sinks in. Some runs into rivers, lakes, and the ocean. If rain is heavy, a river can flow over its banks. This causes flooding. Flooding can cause many things to happen.

Effects of a Flood

3. Read the descriptions and look at the picture. Then label the part of the picture that matches each description.



a. The flood has killed crops in this field, but the floodwaters also drop sediment that contains nutrients. This makes rich soil that is good for future crops.

b. Most of the time, this river flows between its banks where the trees are. When water flows over the banks, flooding occurs.

c. Floodwaters can cover roads and damage houses, schools, and other buildings. Water may enter basements and the first floor of some buildings.

d. In a flash flood, more water than normal rushes down a river. The rushing water is strong enough to damage low bridges over the river.

DAY 2

HANDS-ON Apply What You Know

Water Effects

4. Research to find images of ways that floods can damage roads. What do you notice about the roads and what they are made of? Do you think that floodwaters could break other things into pieces? Use evidence from your research to support your response.

Water has damaged this road.

Putting it Together

Select all the answers that apply for each question.

5. Why does the flow of a river slow down near its mouth?

- **a.** It flows over flat land.
- **b.** It is full of stones and gravel.
- **c.** It is entering a larger body of water.
- **d.** It is flowing through a steep channel.

6. When do bends form in a river?

- **a.** when the river first forms
- **b.** when the river flows very fast
- **c.** when the river is getting older
- **d.** when the river flows over a broad, flat area

7. What effects can flooding have?

- **a.** Streets are covered with water.
- **b.** Floodwater enters houses.
- **c.** Rainfall is heavier than normal.
- **d.** Soil washes away.

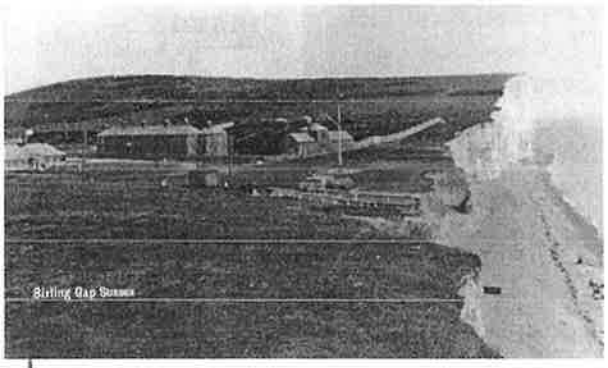
8. What are positive effects of flooding?

- **a.** Floodwaters drop sediment that is rich in nutrients.
- **b.** Curves form in a river.
- **c.** Water flows very slowly down a river.
- **d.** Good farmland forms on floodplains.

Away It Goes!

Vanishing Cottages

These pictures show a seaside town in England named Birling Gap. The town is near cliffs by the sea. The cliffs are made of a very soft rock called chalk. Strong waves pound the cliffs, especially during storms.



1905: This picture shows several houses at Birling Gap. They are a short distance from a cliff that drops into the sea.

1930s: Compare this photo to the photo from 1905. You can see that some of the cliff has fallen away.

1970s: In this photo from the 1970s, more of the cliff has disappeared.

2015: Look at how the distance of the houses from the edge of the cliff has changed.

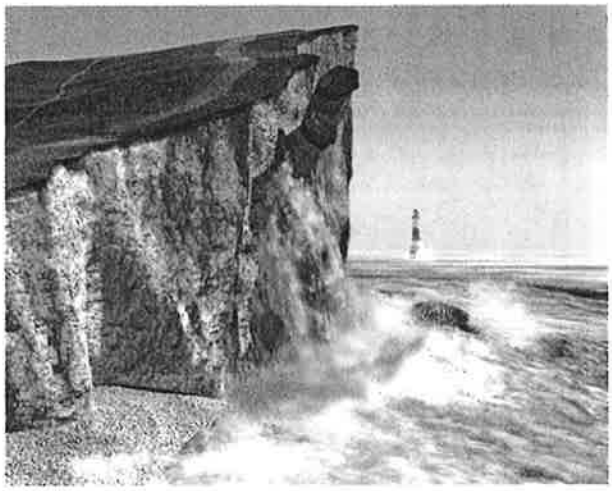
9. Language SmArts Use the images above to help you answer these questions. What happened to the distance between the houses and the cliff between 1905 and 2015? What do you think caused this change?

Watch It Go!

Several processes constantly change Earth's surface. Three of these processes are described below.

- **Weathering** is the breaking down of rocks on Earth's surface into smaller pieces. Weathering occurs in rivers when the current causes rocks to bump against each other and break apart. Weathering can also occur in other ways.
- **Erosion** is the process of moving weathered rock and soil from one place to another. This happens when rivers move rock and soil downstream. Factors such as wind and gravity can also cause erosion.
- **Deposition** occurs when water slows down and drops the rocks and sediment it carries. This occurs at the mouth of rivers and anywhere water stops moving.

10. In the images below, circle where the change is taking place.



11. Choose the word or phrase to complete each sentence.

erosion	weathering	deposition

When rock from a cliff cracks, _____ occurs. When the rock falls, _____ occurs. Finally, the rock settles on the land below. This is called _____.

Water Power

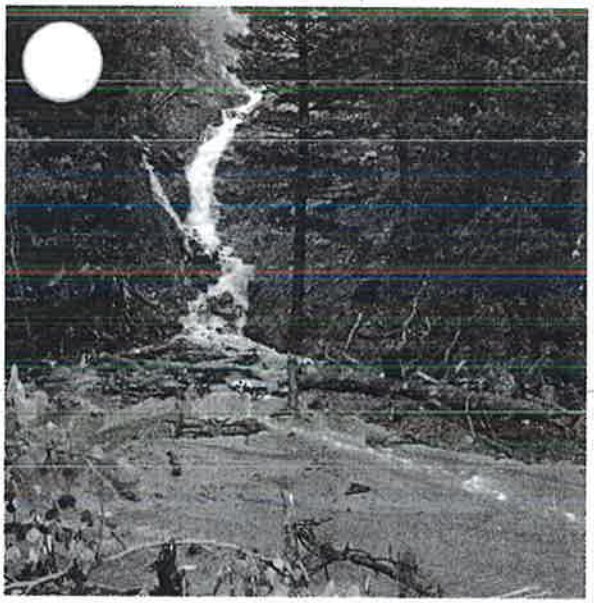
As you've seen, water helps shape the land through weathering, erosion, and deposition. Rivers change the areas they flow through. Flooding can move sediment. Waves can crumble cliffs.

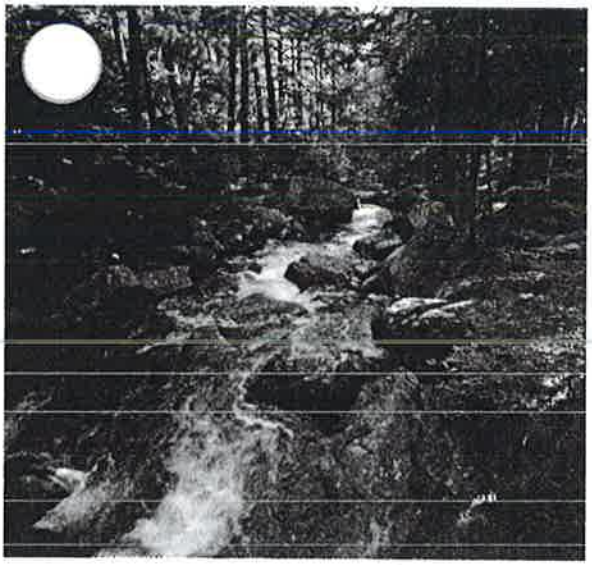
There are many factors that can affect the rates of weathering, erosion, and deposition. The amount of water, the angle of a slope, and rate of the deposition can all affect how quickly these processes occur.

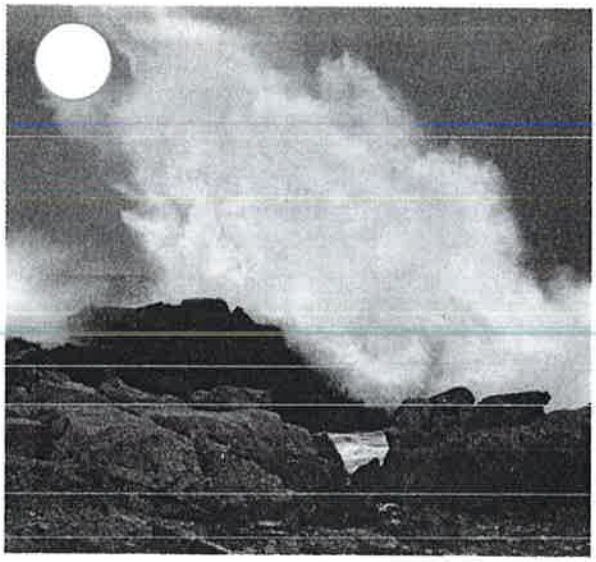
Changing the Shape of Land

12. Look at the images below, and label them with letters for the correct descriptions shown at the top of the next page.

Explore Online







DAY 3

a. Heavy rain can cause **mudslides,** or the quick movement of rain-soaked soil downhill. Mudslides are a type of erosion. When the ground is steep, water and mud can slide down faster. As a result, there is more erosion.

b. **Waves** cause both weathering and erosion on rocky beaches. The force of the pounding waves splits and chips rock. Then the water carries the pieces away.

c. A **swiftly flowing stream** causes erosion. The moving water carries sediment and rocks downstream.

d. **Falling water** weathers the stone under the falls. Erosion causes pieces of rock to drop away. Then deposition piles the rocks up under the falling water. When weathering happens quickly, erosion and deposition happen quickly, too.

EVIDENCE NOTEBOOK You've learned about ways that water can cause weathering and erosion. In your Evidence Notebook, make a list that summarizes this information. Then write a sentence or two for each entry on your list, explaining how it provides evidence for how a canyon is formed.

Language SmArts

Categorizing Information

13. Complete the table with these possible causes and effects: *waves, swift current, mudslide,* or *flooding.*

Cause	Effect
	Sediment is deposited on farmland.
Heavy rain pours down a steep slope of bare soil.	
	Weathering splits and breaks the rock of a cliff.
	Erosion occurs as rocks move downstream.

Tip

The English Language Arts Handbook can provide help with understanding how to categorize information.

Cold Stuff!

Water, Ice, and Water

Explore Online

Liquid water becomes ice when its temperature drops to 0 °C or below. When its temperature rises above 0 °C, the ice thaws and becomes liquid water again. In nature, this cycle of freezing and thawing happens constantly. Can this pattern of freezing and thawing cause weathering and erosion? Look at the images on this and the next page to find out!

1

There are small cracks in the surface of this rock.

2

Precipitation fills cracks in the rock with water. This usually happens after rain falls or snow melts.

3

If the temperature falls below 0 °C, water in the cracks freezes. The liquid water becomes solid ice. What happens when the ice presses against the sides of the crack?

4

When the temperature rises above 0 °C, the ice melts. Compare the crack now to the original crack.

5

The crack is now wider than before. After this pattern repeats many times, pieces may break off and be carried away.

HANDS-ON Apply What You Know

Watching Water Grow

14. Fill a clear plastic cup halfway with water. Use a permanent marker to make a line on the side of the cup where the top of the water is. Place the cup in the freezer overnight. The following day, take the cup out of the freezer. Observe the top of the water. Is it the same place where you drew the line? If not, can you explain why?

Language SmArts

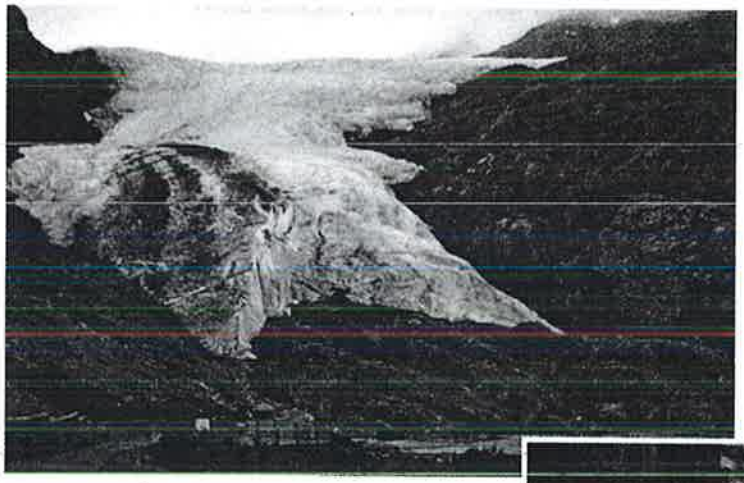
Recalling Information

15. Predict what will happen to the rock as the pattern of freezing and thawing continues. Use information from these pages or personal experience to support your prediction.

Pushing Through

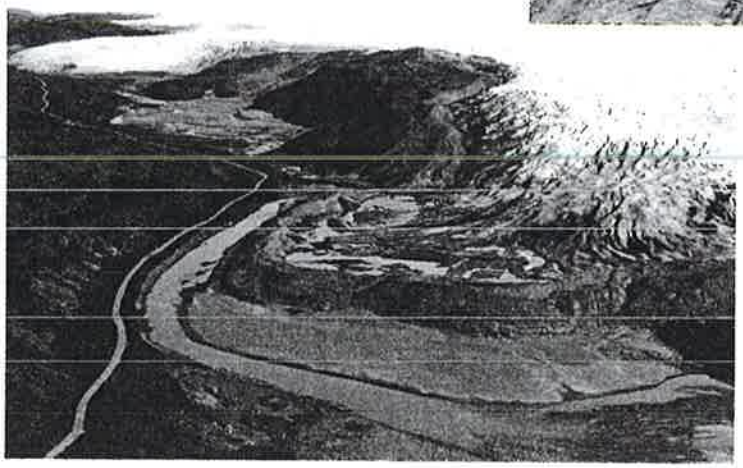
A glacier is a river of ice moving downhill very slowly. Glaciers are found in the coldest parts of Earth—the cold polar zones or cold, high mountain valleys.

Glaciers look like they are standing still. But they are slowly moving—so slowly that you can't see the movement with your eyes alone. But as glaciers move, they can change the land—just like running water. Glaciers weather rock beneath them. They scrape and cut rock they slide over. They cause erosion by pushing the broken pieces of rock under them and on top of them as they move. Deposition occurs when glaciers melt and leave the rock they carried behind.



As this glacier moves, it pushes rocks along with it.

Glaciers change the land they flow through.



As the ice melts, glaciers also leave sediment behind.

Day 4

What about Us?

At the Beach

Look at the photos below. They show waves hitting a beach. Recall what you have learned about weathering, erosion, and deposition. Do you see any of these processes in the photos?

Explore Online

Waves in the ocean roll onto the shore. The waves move sand over the beach. They also bring with them bits and pieces of rocks and shells and leave them on the shore. Then the tide pulls the water back. Some of the material it deposited is washed back into the ocean. Erosion and deposition change the shape and slope of beaches.

Beach Weathering

19. Choose the word that correctly completes each sentence in the paragraph.

erosion	deposition	weathering

Beach sand forms from the _____, or breaking down, of rock.

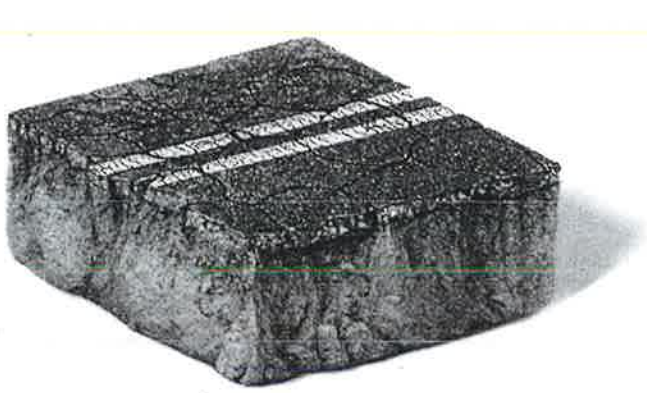
Waves move sand along the beach, causing _____.

In some places, sand washes from the beach into the ocean. In other places, _____ leaves new sand on the beach.

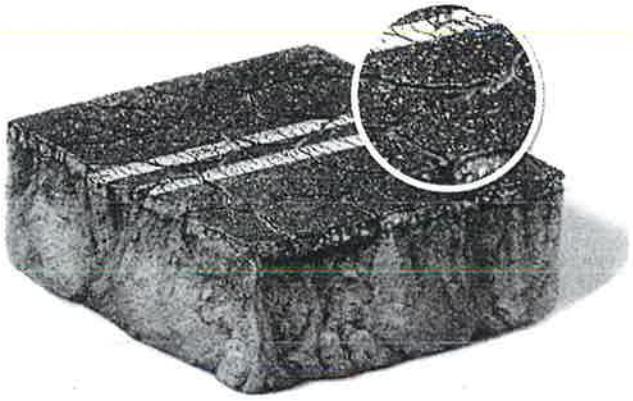
On the Road

20. Look at the parts of two roads below. One road is in a place with a cold winter climate. The other road is in a place where the winter climate is warmer. Label the region each pair of images comes from.

_____



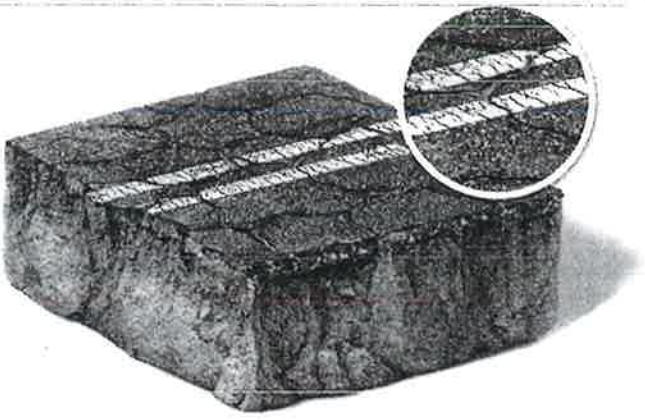
No matter how smooth pavement is, small cracks cover the surface of the road.



When precipitation falls, the small cracks fill with different forms of water: liquid or ice.

_____

Small cracks cover the surface of the road.

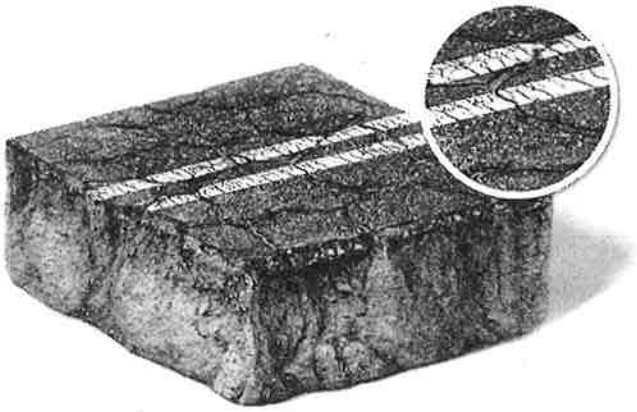


When it rains, cracks in the road fill with water.

EVIDENCE NOTEBOOK Study the surface of a sidewalk or road. Describe its surface in your Evidence Notebook. Explain how any cracks you observe may have occurred.

If the temperature drops below freezing, the water freezes and the cracks expand.

When temperatures rise and the ice melts, the cracks are wider than before.



The temperature stays above freezing, so the water remains liquid.

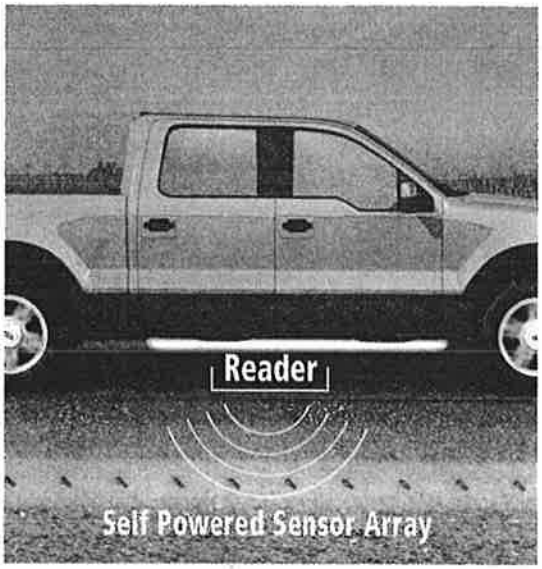
The road is dry, and the cracks are the same size as before the rain.

21. Explain the reasoning you used to label the roads.

Engineer It!

Fighting Potholes

Potholes are holes that form in roads due to weathering and erosion. One way that civil engineers might be able to stop potholes is by building smart roads. These roads are built with sensors in them. The sensors send information about traffic and road damage. When the information is received, needed repairs can take place before potholes get too big.



22. What other useful information could these sensors in the roads gather?

_____

_____

_____

Putting It Together

23. Choose the best word or phrase to complete the paragraph.

weathering	**erosion**	**deposition**

When waves move sand over beaches, _____ occurs. Beaches also show _____ when waves leave behind sand and bits of other material they carry. These processes change the shape and slope of beaches.

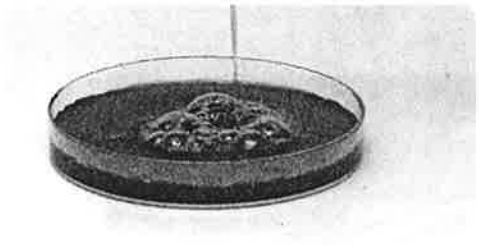
24. Choose the best word or phrase to complete the paragraph.

thaws	**flows**	**freezes**
closes	**expands**	**melts**
hot	**mild**	**cold**

Changing temperatures can affect the condition of roads. Water _____ and thaws inside cracks in roads. Ice _____ in the cracks, just as it does in rock. As a result, roads in _____ climates often show winter damage.

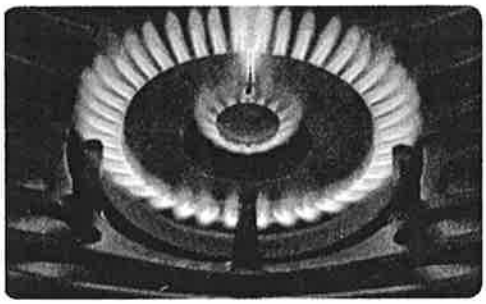
Limited Supply

A **nonrenewable resource** is a resource that, once used, cannot be replaced in a reasonable amount of time. Fossil fuels, such as crude oil, coal, and natural gas, are nonrenewable resources. These fossil fuels are burned to release energy and generate electricity. They are nonrenewable because they take hundreds of millions of years to form.



Crude oil is the remains of once-living organisms that were buried under mud. It is used for heat, to fuel vehicles, and is an ingredient of many products, like plastics and paints.

Coal is the buried remains of plants that died millions of years ago. In some places coal is used for heat and for cooking. Some early trains and ships ran on coal.



Natural gas is the remains of once-living organisms. It is used for heat and as a fuel source for buses and other vehicles.

Uranium is a natural element not from organisms but found in rocks formed billions of years ago. Uranium is used to produce nuclear energy. It is a nonrenewable resource, but it is not a fossil fuel.

4. How do these nonrenewable resources help people in their daily lives?

_____

_____

Language SmArts

Compare and Contrast

5. How are crude oil, coal, and natural gas different from uranium?

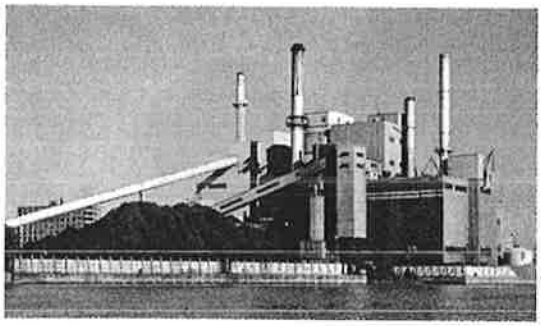
_____

_____

Collecting and Processing

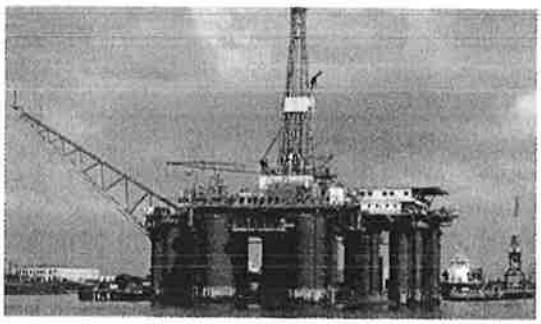
Each picture shows an example of how nonrenewable energy sources are collected or processed. Fossil fuels such as crude oil, coal, and natural gas are first removed from Earth's crust. Then they can be used by electricity generating plants to provide electricity to homes and businesses.

Nonrenewable resources cannot replenish themselves. To make sure people have enough energy for current and future needs, efforts have been made to conserve fossil fuels and use them wisely. The effects of carbon dioxide emissions are another reason why these efforts have been made.

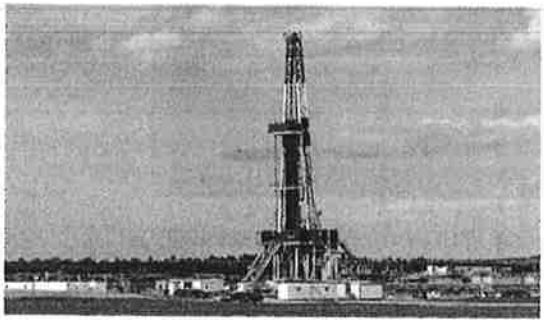


Coal, which is mined from deposits in layers of rocks, is taken to electricity-generating plants to be burned and converted to electrical energy.

Uranium is mined from rocks and is used to create large amounts of energy, which is then provided to homes and businesses for heat and electricity. It is a fuel source for nuclear energy plants.



Gasoline used as fuel in vehicles comes from crude oil, which is drilled from underground wells, including wells that are under water. It is also burned to generate electricity.



Natural gas is extracted from rock formations deep underground and then transported by pipeline and burned for use in electricity generation.

HANDS-ON Apply What You Know

The School's Energy

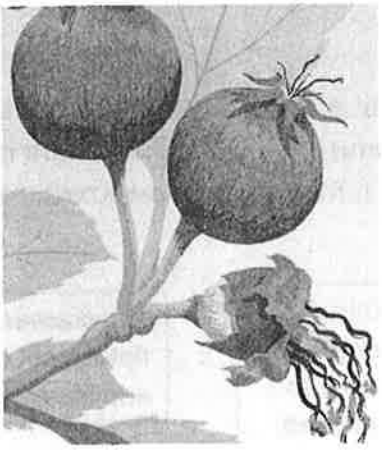
6. Do research to find out about the energy generating plant that supplies electricity to your school. How does it generate electricity? Make a poster about your findings. Compare your findings with your classmates.

DAY 5

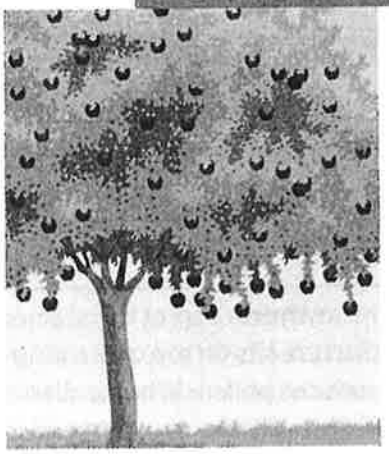
Can You Explain It?

Explore Online

Madison was excited about a fruit tree in the backyard of her new home. As spring began, she observed the tree every day, and noticed several bees near the tree.



A couple of months later, Madison noticed some of the flowers started to swell, while others began to wither and turn brown. She wondered what was happening.



Gradually the bulges left over from the flowers got bigger. Slowly but surely the fruit grew and grew. Eventually, the tree was covered in ripe apples.

1. How did the one flower turn into fruit? Why did some of the other flowers not turn into fruit?

Tip

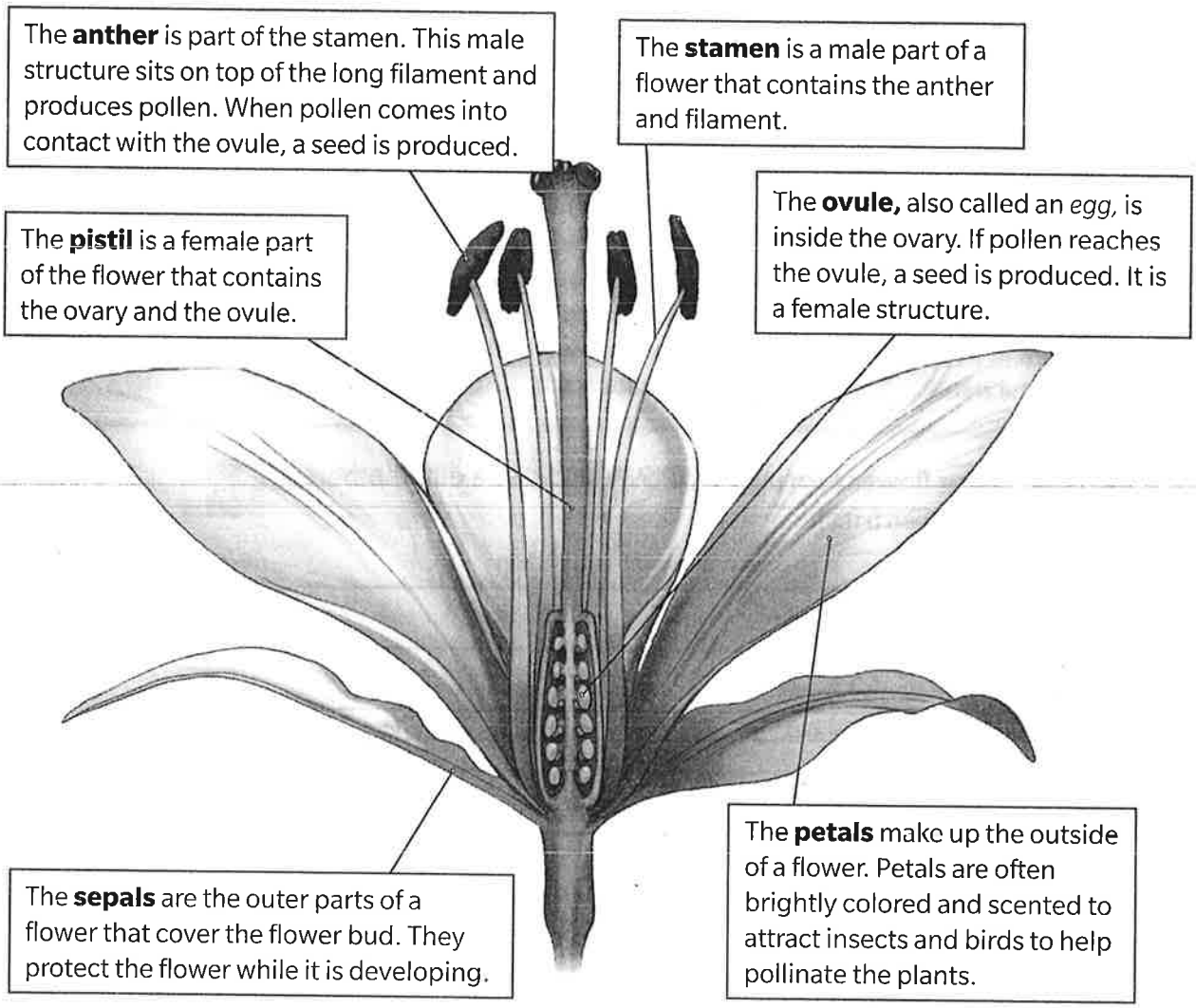
To recall the names of many parts of plants, read What Are Some Plant Parts and How Do They Function?

EVIDENCE NOTEBOOK Look for this icon to help you gather evidence to answer the questions above.

Why Do Plants Have Flowers?

Flower Power

Have you ever looked closely at a flower? There are structures inside a flower that help the plant reproduce. View the illustration below to learn more about the names and functions of these structures.



2. Choose the correct words from the diagram that complete the sentences.

The _____ cover and protect the flower bud. The _____ is where pollen is produced. If pollen comes into contact with the _____, a seed is produced.

Where Did the Pollen Go?

You know that flowers produce pollen. You have likely seen yellow dust floating in the air or coating the top of a car during the spring or summer. This is pollen. If you are allergic to pollen, you know exactly when flowers are producing it in high amounts! Pollen is necessary for the reproduction of flowering plants.

Pollination is the transfer of pollen from one flower to another. Animals, like hummingbirds, are attracted to the flowers to feed on their sweet, sugary nectar. As an animal, like this hummingbird, feeds on the nectar, some of the pollen sticks to its body.

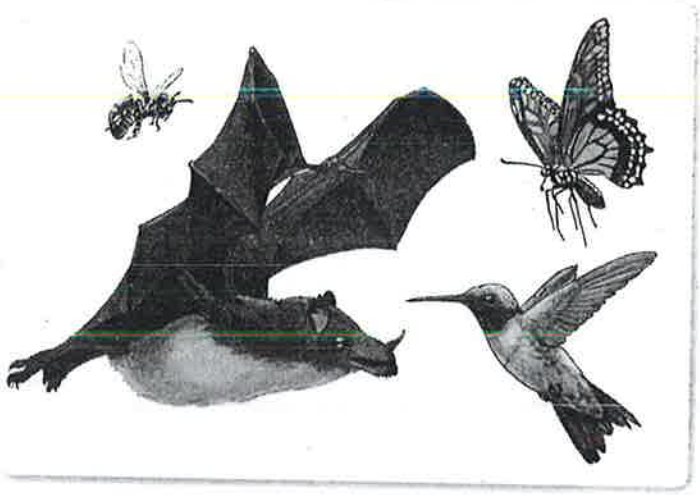
After the hummingbird moved to the next flower to feed, some of the pollen on its body fell off onto the new flower. The pollen grew a tube down to the ovule and fertilization occurred. **Fertilization** is the process when male and female reproductive parts join together.

3. Language SmArts Summarize the process a flowering plant goes through for fertilization using the words *pollination* and *fertilization*.

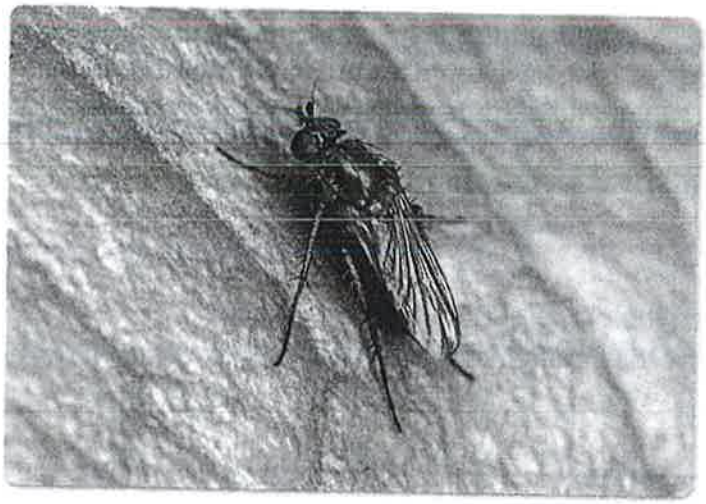
Reproduction is when a plant makes new plants. When pollen reaches an ovule, a seed begins to develop. Eventually, the seed will be moved from the flower to a new location. If the new location has the right conditions, the seed will grow into a new plant. This means that the original plant has reproduced.

In More Ways than One

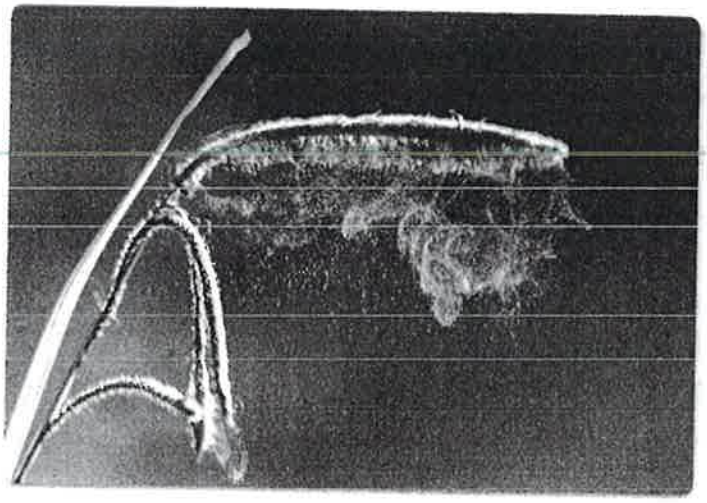
You've already read about one way that pollen can be moved from one plant to another with help from birds. View the images to learn other ways pollination can take place.



Some plants are pollinated by animals called pollinators. These animals are attracted to the nectar by the sweet smell of the flower. When they eat, pollen sticks to their faces or bodies. As they move from one flower to another, the pollen is also transferred.



Unlike most sweet-smelling flowers, the skunk cabbage in this photo smells like rotting meat. This stinky plant attracts flies. The flies land on the flowers, get pollen on their bodies, and move pollen from flower to flower as they fly around.

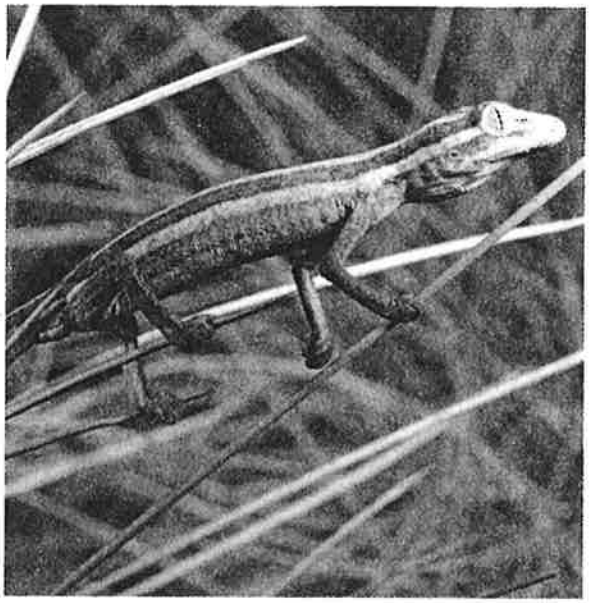


Some plants do not depend on animals for pollination. Instead, their pollen is moved by the wind. This plant releases pollen that drifts in the wind. If the pollen lands on the same type of plant, fertilization can occur.

DAY 6

Can You Explain It?

Explore Online



Lizards are excellent climbers, expertly moving around. Most lizards climb like the one on the left. The lizard on the red wall on the right is called a gecko. How are its feet different from the other lizard?

1. What did you observe about the two lizards in the photos? You can see how the lizard on the left is moving on the grass. But how is the surface the gecko is climbing different from the grass? How do you think the gecko's external structures are different?

EVIDENCE NOTEBOOK Look for this icon to help you gather evidence to answer the question above.

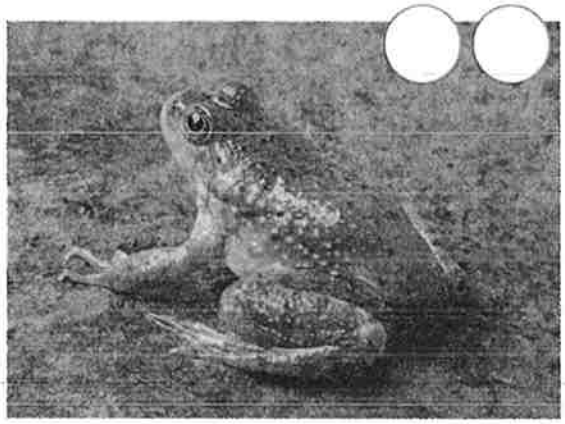
Body Building

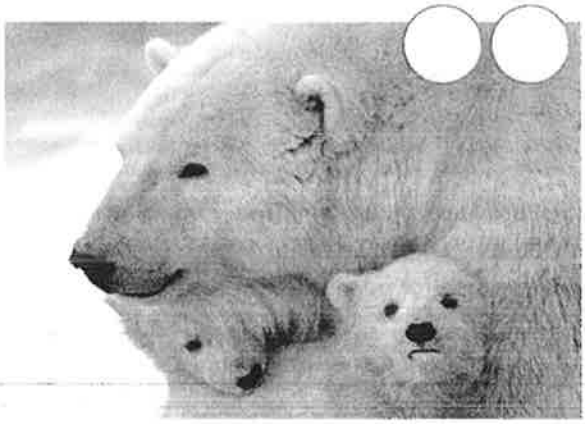
It's All in the Skin

Animals that live in different environments have to deal with different conditions. These conditions can limit or control what characteristics animals that live in those environments can have to survive.

Body Coverings

2. Match each description with the animal covering it describes.





a. Moisture and oxygen passes easily through the thin, moist skin. The animal needs to live in a wet and warm environment.

b. Thick hairs trap heat produced by the animal's body to keep the animal warm in cold environments.

c. A slimy substance produced by the skin keeps it from drying out in the warm environment.

d. Transparent, hollow hairs of the fur appear white so the animal can blend into its environment.

Animals have **external structures** that allow them to live, grow, reproduce, and survive. External structures are structures on the outside of an organism. The external structures of the frog wouldn't allow it to survive in the Arctic, but it can survive in a warmer, wetter environment.

A polar bear has external structures meant for an Arctic environment. Take a look at the polar bear picture again, and describe what you think an Arctic environment is like and how a polar bear would survive there.

EVIDENCE NOTEBOOK Animals have many external structures that function to support survival, growth, behavior, and reproduction. Make a list of some of the other structures you see in the photos above.

Moving Parts

3. Animals have structures that help them move. Look at the pictures below and record similarities and differences. Think about the way these animals move.

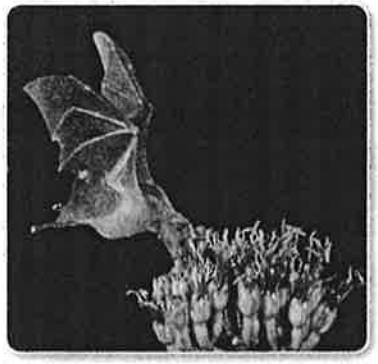
Explore Online

An ant crawls along with its six legs.

The two, larger hind legs of the frog are strong, allowing it to jump far.

Alike:

Different:



A bat's wings are thin, stretchy membranes made of skin that catch the air to fly.

A pigeon flaps its feathered wings to move it up in the air.

Alike:

Different:

The tail of the shark pushes from side to side against the water, moving it along.

A dolphin pushes its tail up and down to move forward in the water.

Alike:

Different:

Moving Through the Environment

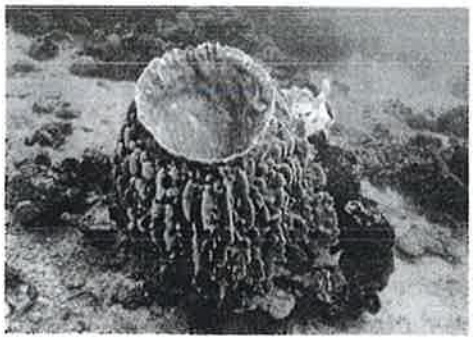
Animals are adapted, or fit well, to the environments in which they live. They have external body parts that help them move about on land, in the air, or through the water.

Land, Water, or Air?

4. Based on your observations of the external structures of these animals, label whether the animal best moves on land, in air, or in water.

_____ _____ _____

Although most animals have structures for moving in their environment, there are some animals that don't often move from place to place. Corals, sponges, and barnacles are animals that mostly stay in one place. These animals have structures that let them catch food even though they cannot move.



5. Language SmArts What do the animals moving about in each environment have in common? List similarities in structures you observe in the animals.

_____

_____

_____

_____

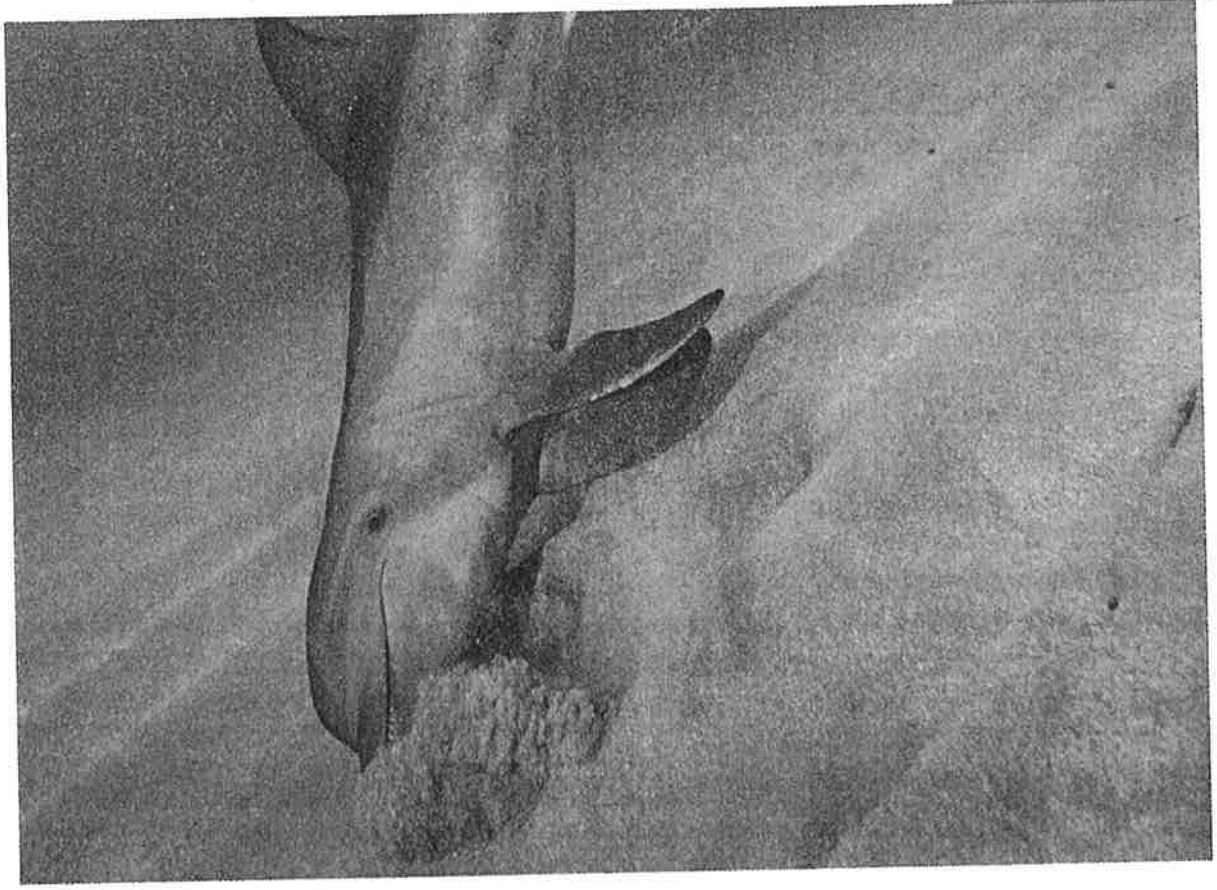
_____

_____

DAY 7

Can You Explain It?

Explore Online



Animals use their senses to obtain and process information about their environment. Dolphins often swim and search for food in dark or murky water where they cannot see using their eyesight.

1. How do you think dolphins find food in dark water, especially if what they are looking for does not make any noise? What other sense might they use to "see" without using their eyesight?

_____

_____

_____

_____

Tip

Learn more about parts animals use to move about in their environments in What Are Some External Structures of Animals?

EVIDENCE NOTEBOOK Look for this icon to help you gather evidence to answer the questions above.

Touchy, Feely

Body Senses

Have you ever touched something hot with your hand? How did you react? You probably responded by pulling your hand back very quickly!

The Skeletal and Nervous Systems

2. Look at the image showing systems in your body that work together, then match the description to the part it describes.

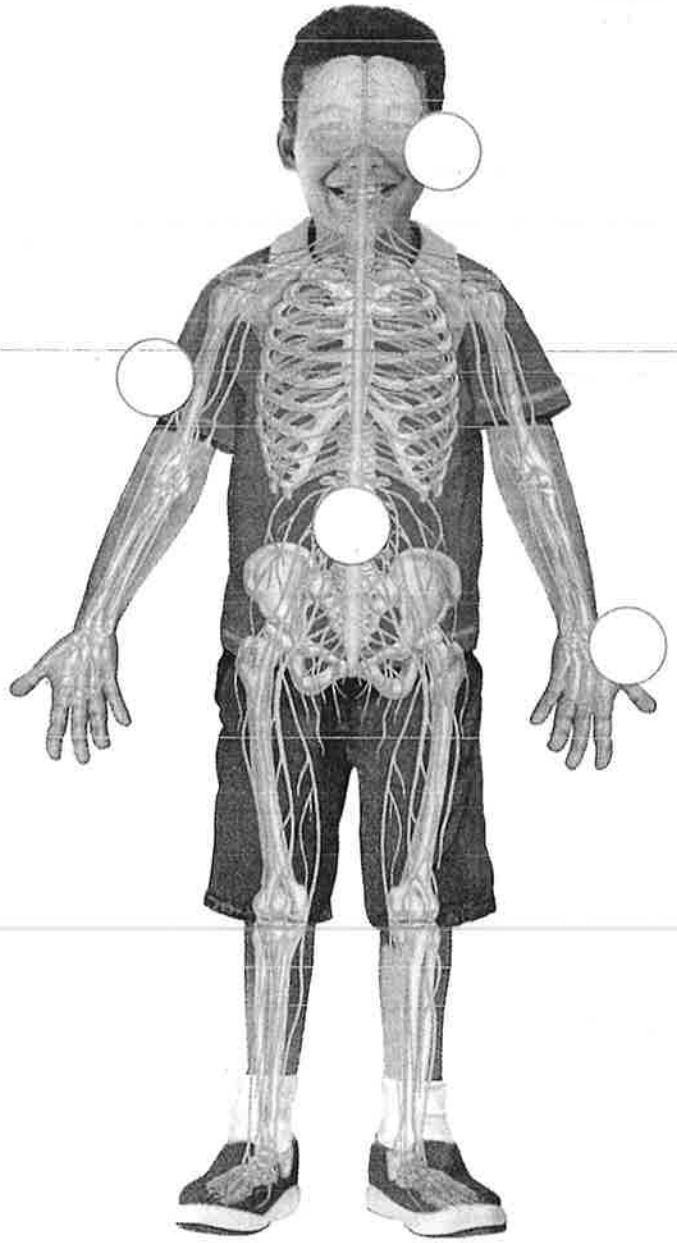
Explore Online

a. Humans and many other animals have a **skeletal system** mainly made of bones. The skeletal system gives structure, support, and protection to the softer parts of the body.

b. The nervous system contains some very important parts of the body—the **brain**, the spinal cord, and the nerves. The brain is the central processing organ and is protected by the skeletal system.

c. The nervous system contains two kinds of **nerves**: those that send information to the brain or spinal cord, and those that send information from the brain and spinal cord to the rest of the body.

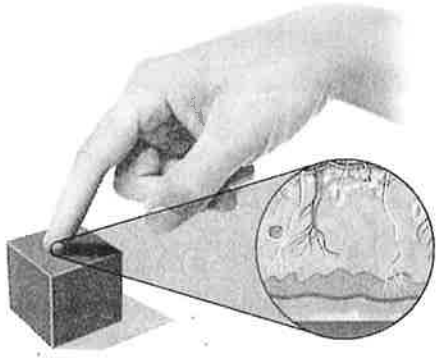
d. The **spinal cord** is a bundle of special nerve fibers and tissue that connects almost all the parts of the body to the brain. It is protected by the backbone. The brain and the spinal cord make up the central nervous system.



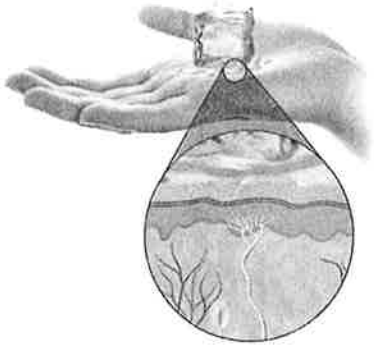
Skin Deep

The largest organ in your body is your skin. It provides protection by covering your entire body. Skin also contains special structures called **receptors**. Receptors respond to changes inside and outside the body and report them to your nervous system. These changes may form perceptions and memories that could guide your actions.

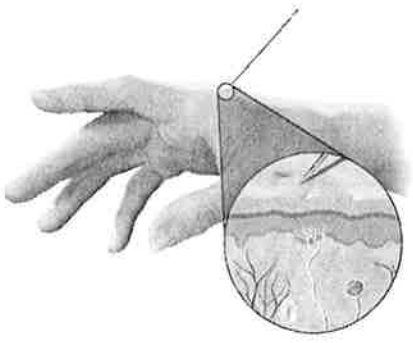
There are three main types of skin receptors: touch, temperature, and pain. All three nerve endings can receive different kinds of information that comes to the skin from the environment.



Touch and pressure receptors react to how hard, soft, rough, or smooth an object is. When you touch something like a wood block, receptors send nerve signals to your brain. The brain processes these signals so that you know what you are holding.



If you are holding an ice cube, you quickly realize that your hand is freezing! This is because temperature receptors in your skin react to the temperature of the ice cube and send nerve signals to the brain.



When the skin feels intense pressure or is injured, pain receptors send information about the pain to the central nervous system. The central nervous system processes the signals and causes the muscles to try to move away from the source of the pain. The body's reaction to pain is immediate.

Humans aren't the only organisms, which are living things, that have a central nervous system for controlling the body. All mammals, fish, insects, and birds rely on a central nervous system. Simpler animals have a more basic kind of nervous system.

Feel It

Test your understanding of how skin works by answering each of the questions below.

3. A friend places a warm rock in your hand. Which types of information about the rock will your skin receptors most likely receive? Circle all that apply.

a. color

b. taste

c. weight

d. temperature

4. In most cases, where does the information sent from skin receptors in your hand get processed?

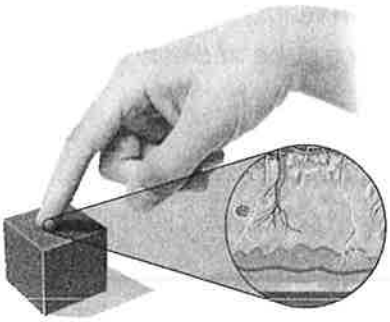
a. in the brain

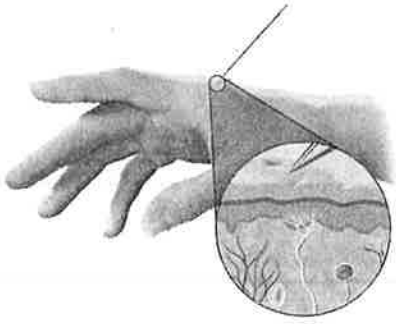
b. in the hand

c. in pain receptors

d. in the tips of the fingers

5. Which kind of receptor do you think would relay the message to your brain if you were cut? Circle your answer.





Language SmArts

Identifying Main Ideas and Details

6. How do your senses react to things in your environment?

Day 8

Is That Something I Want to Eat?

How the Nose Knows

You've learned about the receptors in your skin. But did you know that you also have receptors in your nose?

Every time you breathe air into your nose, receptors inside the nose sense different chemicals in the air. These smell receptors are attached to nerves that send signals to the brain about those chemicals. This is how you are able to smell odors and aromas in the air.

You probably think you have a strong sense of smell. But compared to other mammals, a human's sense of smell isn't very good. Mice have the second strongest sense of smell of all mammals.

8. Write the word that best completes each sentence.

You are able to smell odors and aromas because you have smell receptors in your _____. Elephants have the strongest sense of smell. The trunk of the elephant contains touch and _____ receptors.

HANDS-ON Apply What You Know

Name That Scent!

Try a simple activity to test your sense of smell. Blindfold your partner and see how many smells he or she can identify correctly. Hold a scented item in front of your partner's nose. Keep track of your results. Switch with your partner and repeat.

9. Did your results surprise you? Why or why not? Which scents did you guess correctly?

DAY 9

Need Salt?

Like your skin, your tongue has receptors to receive information from its environment: the mouth and whatever you may be drinking or chewing. The tongue has receptors that allow you to taste and feel what you eat and drink.

Which Receptor?

10. Explore how the sensory receptors of your tongue work. Then match the adjectives to the receptor they describe.

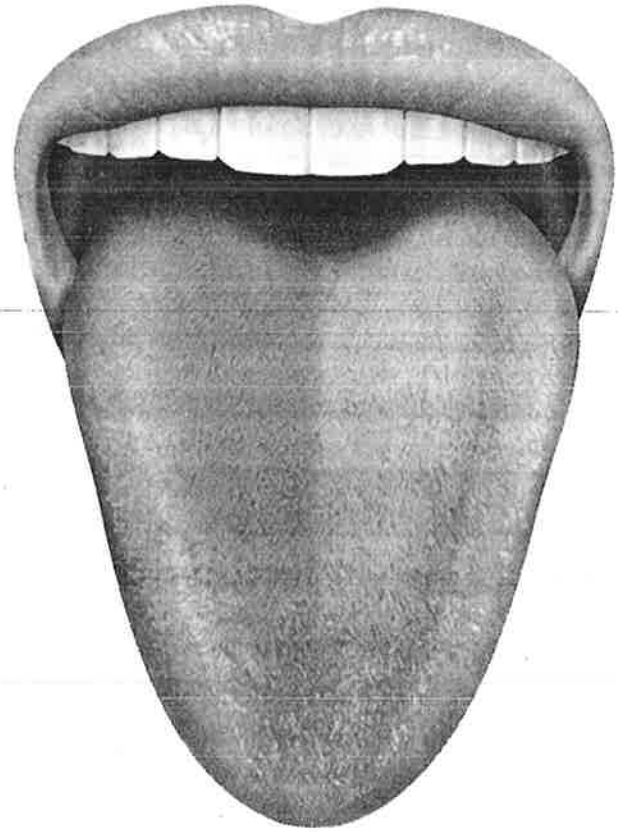
Explore Online

Taste isn't the only characteristic of food that's important. Touch receptors on your tongue let you know about the texture of what you eat and drink. Some things are smooth, some things are lumpy, and some things are rough.

It's also important to know the temperature of your food. When the temperature receptors of your tongue come into contact with what you are eating or drinking, they send signals to your brain letting you know how hot or cold it is.

The taste buds are the receptors on your tongue that sense salty, sweet, bitter, sour, and umami (savory) flavors. Every time you take a bite of something, taste buds send signals to the brain to let you know how your food tastes.

Occasionally, you might eat or drink something that's too hot, too spicy, too cold, or too sharp. The pain receptors on your tongue let your brain know when you're better off letting food cool off, warm up, or be avoided completely.



sour	**smooth**
sweet	**cold**
boiling	**spicy**
grainy	**warm**

Taste	Touch	Temperature	Pain

DAY 10

HANDS-ON Apply What You Know

No See, No Smell, No Taste?

Your nose is more important than you might think, especially when it comes to tasting foods.

Surprisingly, much of your ability to taste comes from your smell receptors. Even though your taste buds react to salty, sour, sweet, savory, and bitter flavors, it's your smell receptors that allow you to specifically identify a particular food.

Blindfold a partner, then give him or her four different foods to eat. Have your partner hold his or her nose. Ask him or her to identify the food. Switch with your partner and repeat using four different foods.

11. What are your results? How do you think your daily life would change if you could not smell?

_____

_____

_____

12. Discuss the results with your partner. Talk with your classmates about the ways we use smell in our daily lives.

EVIDENCE NOTEBOOK Dolphins are mammals, just like us. However, they don't have a sense of smell. Why do you think the sense of smell wouldn't be useful to dolphins? Record your ideas in your notebook.

Language SmArts

Cause and Effect

13. Is there a food you avoid because of the way it smells or tastes? How might an animal in the wild benefit from a strong smell or taste response?

_____

_____

_____

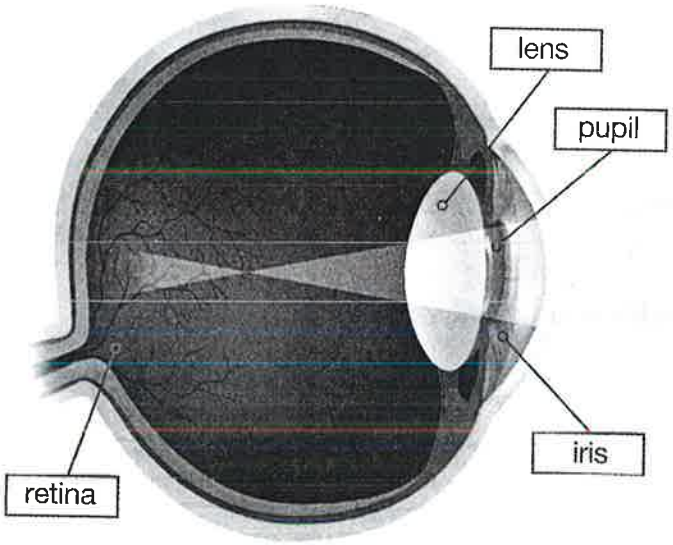
Tip

The English Language Arts Handbook can provide help with understanding how to make cause and effect connections.

Sights and Sounds

Eye See!

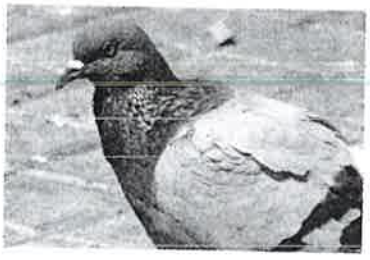
Along with the skin, tongue, and nose, there are also sensory receptors in the eyes. Many animals have specialized receptors that receive different types of information through the eyes.



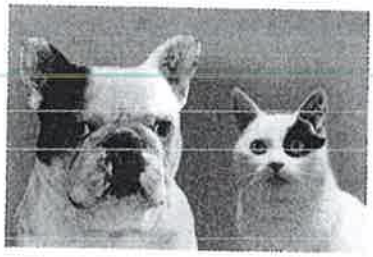
Light bounces off an object. It then enters the eye through an opening at the center of the iris called the *pupil*. The iris is the part of the eye that has color. After passing through the pupil, light strikes the back of the eye. At the back of the eye is an area called the *retina* where there are light receptors. These receptors react to the light and send nerve signals along a pathway to the brain, where the information is processed.

But How Does It See?

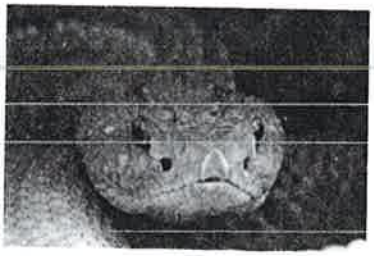
14. Circle the structures that allow each animal to "see."



Pigeons see color just like humans. But they can also see ultraviolet light, unlike humans.



Dogs and cats can see with their eyes, but they rely more on scent and sound for their survival than on vision.



Some snakes see in two ways. They see color and have vision pits in their faces that allow them to *see* heat.