Reading and Writing in Science
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Living Things Need Energy

Producers

Living things that create their own food

Example:

Primary Consumers

Example:

Secondary Consumers

Example:

Decomposers

Living things that feed on dead plants and animals

Example:
The Story Goes On

Read the Literature feature in your textbook.

Write About It

Response to Literature  The poet brings to life a sequence of events that happens every day in nature. What do you think happens when the enemy spots the bug? Write a fictional narrative in which you tell what happens next. Make sure you bring the conflict to a reasonable conclusion.

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Plants and Sunlight

Use your textbook to help you fill in the blanks.

What are plants?
1. During photosynthesis, plants give off a gas called ________________, which we breathe.
2. Plants come in all sizes, ________________, and colors.
3. Some plants are so small that ________________ or as tall as skyscrapers.
4. Tropical bamboo plants can grow about 4 meters a week, which is about ________________ an hour.
5. The world’s oldest tree is almost ________________ years old.
6. The ________________ is the deadliest plant of all.
7. There are about ________________ different kinds of plants.
8. The roots of a plant take in ________________ and ________________ from the soil.

How do plants get energy?
10. The process in which plants make their own food is called ________________.
11. During the daytime, plants take in sunlight, water, and ________________.
12. Plants use energy from the Sun to change carbon dioxide and water into ________________.
13. The green material in the leaves called ________________ captures sunlight for the plants.
14. Energy from the Sun is called ________________.

15. Many plants have a system of ________________ to carry water and nutrients from the bottom of the plant to the top.

Why are plants important?

16. Plants provide ________________ that travels from one organism to another.

17. When an animal eats a plant, ________________ passes from the plant to the animal.

Where do plants grow?

18. A(n) ________________ is everything that surrounds a living thing.

19. ________________ is a measure of the total mass of living things in an environment.

Summarize the Main Idea

20. Briefly describe the photosynthesis process and then explain why plants use photosynthesis.

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________
Plants and Sunlight

Match the correct letter with the description.

1. Plants make their own food in a process called _____.
2. Plants use energy from the Sun to change _____ and water into sugar.
3. A leaf is filled with _____, which gives it the green color and helps it capture the sunlight.
4. Plants give off _____ into the air.
5. _____ is the total mass of living things in an environment.
6. Energy from the Sun is called _____.
7. Plants do not eat _____ or other living things for food.
8. A(n) _____ is everything that surrounds a living thing.
Plants make their own food. This process is called ________________. A plant takes in ________________, ________________, and ________________ to produce its own food. The leaves of a plant capture sunlight through the green material called ________________. Energy from the Sun is called ________________. The ________________ anchor a plant to the ground and bring water to the stem of a plant. The plant gets the ________________ from the air around it. As a result of this process, the plant makes food and gives off ________________, which we breathe in! A(n) ________________ is everything that surrounds a living thing. Biomass is a measure of the ________________ of living things in an environment. A dense rain forest has ________________ living things than a dry desert. Plants make up most of the biomass in an environment.
Food Chains

Use your textbook to help you fill in the blanks.

What is a food chain?

1. The way energy passes from one organism to another is shown in a(n) ___________________.
2. Plants get their energy from the ___________________.
3. Plants are called ___________________ because they can make their own food.
4. Animals are called ___________________ because they cannot make their own food.
5. Most food chains begin with ___________________.
6. Plants, or ___________________, are next in the food chain.
7. Decomposers break down organisms and return ___________________ to the soil.
8. With each step of the food chain, matter and ___________________ pass from one organism to another.
9. A(n) ___________________ is an animal that eats only plants.
10. Deer, rabbits, and mice are examples of ___________________, which are the first consumers in a food chain.
11. Other animals can consume ___________________ for food.
12. An animal that is hunted by another animal is called ___________________.
13. An animal that hunts another animal for food is called a(n) ___________________.

What are carnivores and omnivores?

14. Animals that eat other animals are called ___________________.
15. Animals that eat both plants and animals are ___________________.

Name ___________________________ Date ____________
What are decomposers?
16. Decomposers break down plant or animal life that is no longer ________________.
17. Decomposers work ________________ to break down organisms completely.

What are some examples of food chains?
18. Food chains in a pond start with a(n) ________________, contain ________________, and end with decomposers.
19. In the California desert, one producer is the ________________ tree.

Summarize the Main Idea
20. Explain the order of a pond food chain beginning with algae.

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**Food Chains**

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<th>a. algae</th>
<th>d. decomposers</th>
<th>g. herbivore</th>
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<td>b. carnivores</td>
<td>e. food chain</td>
<td>h. omnivore</td>
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<tr>
<td>c. consumers</td>
<td>f. fungi</td>
<td>i. producer</td>
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**Match the correct vocabulary word with the description.**

1. A(n) _____ shows how energy passes from one organism to another as food.
2. A(n) _____ is also known as a primary consumer.
3. A pond food chain can begin with plant-like producers called _____.
4. Consumers eat food that is made by a(n) _____.
5. Animals are called _____ because they cannot make their own food.
6. The food chain continues until _____ break down the organisms and return nutrients to the soil.
7. Animals that eat other animals are _____.
8. Plant-like decomposers called _____ break down what is left of dead animals.
9. A bear is a(n) _____, an animal that will eat both plants and animals.
Food Chains

| decomposers | cannot | producer | consumers |
| food chain   | fungi   | omnivores |
| carnivores   | earthworm | herbivores |

Fill in the blanks.

Living things need energy in order to survive. A [blank] shows how energy passes from one organism to another as food. First, a plant, also called a [blank], uses the Sun's energy to make its own food. Animals [Blank] make their own food. They are called [Blank] because they must eat or consume other plants or animals for food. The chain continues until [blank] break down the organisms and return nutrients to the soil. A(n) [Blank] eats plant life that has already died. [Blank] break down rotting wood and other plant parts. [Blank] are prey for other animals in the food chain. Animals that eat other animals are called [Blank]. [Blank] eat both plants and animals. Plants and animals depend on one another for survival.
Food Webs

Use your textbook to help you fill in the blanks.

**What is a food web?**
1. A(n) ______________________ shows a group of food chains linked together.
2. The struggle of several organisms for the same resource is called ____________________.

**How can food webs change?**
3. Living things in a food web ______________________ on one another.
4. All the members of a single type of organism in an environment is a(n) ____________________.
5. In the 1800s, too many sea otters were hunted for their ____________________.
6. Without sea otters, fewer ____________________ were eaten.
7. Without the sea otter to help control the size of the sea urchin population, the ____________________ almost disappeared.

**How do new organisms change food webs?**
8. In 1935, Australia’s sugar cane fields were being destroyed by the ____________________ and ____________________.
9. The ____________________ was brought to the sugar cane fields to eat the beetles.
10. The toads changed the food web because they did not eat the beetles, but they did eat ____________________.
What is an energy pyramid?

11. A picture that shows the amount of energy passed through a food web is called a(n) ____________________.

12. There are more ____________________ than any other living thing in an energy pyramid.

13. The next level on the pyramid is the ____________________, which eat plants to stay alive.

14. Each level of the pyramid gets only ____________________ percent of the energy from the level below.

15. Animals at the top of the pyramid must eat a lot of food to get the ____________________ they need to stay alive.

Summarize the Main Idea

16. How does the ocean’s kelp forest in the 1800s show how producers and consumers are related?

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## Food Webs

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<td>c.</td>
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<td>g.</td>
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Match the correct letter with the description.

1. _____ A group of food chains linked together.
2. _____ The struggle of several organisms for the same resource.
3. _____ A type of seaweed.
4. _____ In 1935, Australia’s sugar cane fields were being destroyed by these insects.
5. _____ Each member of a food web can belong to more than one of these.
6. _____ A model of how energy passes through a food web.
7. _____ The bottom of the energy pyramid.
8. _____ They must eat plants to stay alive.
9. _____ People thought these would help the insect trouble in Australia in 1935.
Cloze Test

Name ___________________________ Date __________

**Food Webs**

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Fill in the blanks.

Energy is passed from one living thing to another.

A _______________ links together many food chains.

A(n) _______________ shows the energy as it moves through a food web. The bottom level of the pyramid is the _______________. They use about 90% of that _______________ to live and grow. The other 10% is stored. The next level of the pyramid is the _______________. Each level of the pyramid gets a _______________ percentage of energy from the level below. An animal at the _______________ of the pyramid must eat a lot of food to get the energy it needs.
Write About It
Write a persuasive letter to a community leader. Convince him or her that it is important to protect the environment in your area.

Getting Ideas
Do some print and online research. Make a list of plants and animals that would be lost if we don’t protect the environment.

Planning and Organizing
A persuasive letter has a special job. Its job is to persuade the reader to agree with your opinion. Here are two sentences Chris wrote. Does each sentence support his position? Write Yes or No.

Opinion: We must protect the environment.
1. The California condor is a beautiful creature. _______
2. Animals are hurt when the places they live are destroyed. _______

Now write three of your own sentences on a separate piece of paper. Include facts and details to support the opinion that we must protect the environment.

Drafting
Your assignment is to write a persuasive letter to a community leader. On the next page, write your letter. Use the guidelines below.
1. Write your complete address and the date.
2. Write the name and address of the person to whom you are writing.
3. Write the word “Dear,” the name of the person, followed by a colon.
4. Write an introductory paragraph. Explain your position.
5. Provide facts and reasons that back up your position.
6. Tell what you want to happen in your last paragraph.
7. For the closing, write “Sincerely yours,” then a comma. Sign your name on the next line. Print your name under your signature.
Revising and Proofreading

Now revise and proofread your letter. Ask yourself:

- Have I used convincing facts and reasons to support my opinion?
- Have I corrected all grammar errors?
- Have I corrected all spelling, punctuation, and capitalization errors?
Microorganisms

Use your textbook to help you fill in the blanks.

What is a microorganism?
1. A(n) ________________ is a living thing too small to be seen with just your eye.
2. Many microorganisms are made of only one ________________.
3. Scientists use a(n) ________________ to look at tiny cells.
4. Small microorganisms called ________________ can cause illness.
5. Some ________________ will eat harmful bacteria and keep them under control.
6. Many harmful protists live in ________________ and lakes.

Which microorganisms are producers and consumers?
7. Some microorganisms are producers because they carry out ________________.
8. A type of protist that lives in the water is called ________________.
9. Algae acts like a producer because it carries out ________________.
10. A(n) ________________ is a protist that acts like an animal and is a consumer.
11. A euglena acts like both a(n) ________________ and an animal.
12. In the sunlight, a euglena carries out ________________ like a plant.
Which microorganisms are decomposers?
13. In the forest, ___________________________ is one of the first decomposers to work on dead matter.
14. Mushrooms are ___________________________. They decompose fallen trees.
15. Different types of bacteria ___________________________ different nutrients in the soil.

How do microorganisms work in our bodies?
17. Tears in your eyes keep out ___________________________ microorganisms.

Summarize the main idea
18. Why are plant and animal decomposers considered natural recyclers?

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
Microorganisms

Complete the crossword puzzle using words from the lesson.

Across
2. A protist that acts like an animal in most ways
4. Break down dead matter so it can be recycled
5. Living things too small to be seen with just our eyes
6. A microorganism that can be helpful or harmful to humans
7. A group of microorganisms.

Down
1. First decomposer to attack a tree
3. A tool used to see tiny cells
5. One of the first decomposers to work on dead matter
Microorganisms

Fill in the blanks.

Living things are everywhere even if the naked eye cannot see them. A(n) ________________ is a living thing that cannot be seen with just your eye. One of the smallest microorganisms is called _________________. It can be helpful or _________________. Bacteria can cause _________________, or they can help humans swallow and digest food. Organisms called ________________ are larger than bacteria and can be found in lakes and ponds. They have structures or parts that do special _________________. A(n) _________________ is a protist that acts like an animal. Its ________________ changes shape to catch food. A(n) _________________ is a protist that carries out photosynthesis in the sunlight. It also has a _________________, which helps it move to get food in the dark. In the forest, _________________ clings to dead wood and starts to break it down. Organisms called _________________ are decomposers that attach to a tree when it falls. There are many kinds of microorganisms.
Susan Perkins knows that the smallest things can be the most important. She is a scientist at the American Museum of Natural History who studies microorganisms. Microorganisms are found all over Earth—in soil, air, and water. They are found from the poles to the desert. There are millions of them in just one drop of ocean water. Some microorganisms live inside the animals they attach to and cause disease. Susan studies the microorganisms that live in the blood of lizards and cause a disease called malaria.

These red blood cells are being attacked by microorganisms that cause malaria, a blood disease that causes severe fever in humans.

Susan studies Anolis lizards from the eastern Caribbean islands.

Sequence
• Look for words that show order, such as first, then, and next.
• Try to retell the sequence in your own words.

How does Susan investigate these tiny creatures? She starts by taking blood from a lizard. Then she takes the blood to a lab and studies the microorganisms. This helps her understand the relationship between the microorganisms and the lizard it lived inside.

Next, Susan tries to understand how different kinds of malaria are related to each other. She studies why these microorganisms are found in different parts of the world and how they react to different medicines. Susan’s research is then applied to humans and helps scientists to fight the disease.
Write About It

Sequence  Reread the article with a partner. Make a sequence-of-events chart to describe what Susan does first, next, and last in her research. Then use your chart to write a summary about her work.

Using the comic strip as a model, create simple drawings in the blank strip below to quickly illustrate the four steps that Susan takes to study the microorganisms that cause malaria.

1  2  3  4

Next, in a lengthy paragraph, explain why Susan’s first three steps help her work on the fourth and most important step in her studies. Directly answer the prompt in your topic sentence. Use details from the reading in addition to your own ideas to clearly explain why Susan could not go on to the fourth step without accomplishing the first three steps. Discuss the steps in sequential order. Smoothly move from one idea to the next with transitional words. Wrap up your paragraph with a closing sentence that restates the main idea of your paragraph. Write your paragraph on a separate piece of paper.
Living Things Need Energy

Choose the letter of the best answer.

1. Algae and euglena are examples of
   a. bacteria.  
   b. carnivores.  
   c. herbivores.  
   d. protists.

2. The first consumers in a food chain are
   a. carnivores.  
   b. herbivores.  
   c. omnivores.  
   d. producers.

3. What do plants make through photosynthesis?
   a. meat  
   b. carbon dioxide  
   c. oxygen  
   d. water

4. Many microorganisms are made of
   a. yeast.  
   b. millions of cells.  
   c. one cell.  
   d. two cells.

5. Organisms at the bottom of an energy pyramid are
   a. consumers.  
   b. herbivores.  
   c. producers.  
   d. decomposers.

6. Carnivores eat
   a. other animals.  
   b. plants.  
   c. plants and animals.  
   d. rotting plants and animals.

7. Organisms that cannot make their own food are
   a. producers.  
   b. decomposers.  
   c. herbivores.  
   d. consumers.
Choose the letter of the best answer.

8. Which item is part of the biomass of a desert?
   a. cactus  
   b. rock  
   c. sand  
   d. sunlight

9. What does an omnivore eat?
   a. other animals  
   b. plants  
   c. plants and animals  
   d. decomposing plants and animals

10. The struggle of several animals for the same resources is called
    a. adaptation.  
    b. competition.  
    c. photosynthesis.  
    d. population.

11. A group of food chains linked together form a(n)
    a. energy pyramid.  
    b. food chain.  
    c. food pyramid.  
    d. food web.

12. An organism that makes its own food is a(n)
    a. animal.  
    b. consumer.  
    c. decomposer.  
    d. producer.

13. Solar energy comes from
    a. oxygen.  
    b. soil.  
    c. sugar.  
    d. sunlight.

14. Organisms that eat rotting plants and animals are called
    a. decomposers.  
    b. herbivores.  
    c. primary consumers.  
    d. producers.

15. What does a food chain represent?
    a. all of the animals in an environment  
    b. all of the plants in an environment  
    c. all of the abiotic factors in an environment  
    d. energy passing from one organism to the next
Living Things and Their Environment

Nonliving things are ________________________.

Living things are ________________________.

need protection because they are ________________________.

include ________________________, deserts, and ________________________.

Animals have developed ________________________ to help them ________________________ in their environment.

have different ________________________, ________________________, and ________________________.
Welcome to the Sea of Sand

Read the Literature feature in your textbook.

Write About It

Response to Literature  The poet uses figurative language and vivid details to describe the desert environment. Write a composition describing your own environment. Tell the impression it creates. Use figurative language and descriptive words to paint a vivid picture.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Ecosystems
Use your textbook to help you fill in the blanks.

1. _______________ and their nonliving environment make up an ecosystem.

2. Plants, animals, and microorganisms are _______________ in an ecosystem.

3. Rainfall and temperature are _______________ in an ecosystem.

Life in a Pond

4. _______________ are needed for plants to live in a pond.

5. A special _______________ helps plants grow well in the ecosystem.

6. Abiotic factors that make up a pond include _______________.

Life in a Desert

7. The food that desert animals eat provides _______________.

8. Desert animals survive very hot and very cold weather by living _______________.

What is a rain forest ecosystem like?

9. More life is found in the _______________ than any place on Earth.

10. The _______________ are called the emergent layer of the rain forest.
11. Snakes and treefrogs can be found in the __________________________ layer of the rain forest.

12. Below the rain forest canopy is the __________________________ layer of the rain forest.

13. Very few plants grow on the __________________________ because there is little sunlight.

**What is a coral reef ecosystem?**

14. Organisms that are no longer living form __________________________ .

15. Coral is an __________________________ of the reef ecosystem.

**Summarize the Main Idea**

16. What two things are included in an ecosystem?

______________________________

______________________________
Ecosystems

Match the correct letter with the description.

1. _____ A layer of the rain forest just below the emergent layer
2. _____ A group of living things and their nonliving environment
3. _____ The typical weather patterns of an area
4. _____ The place where few plants grow because there is very little sunlight
5. _____ All of the living things in an ecosystem
6. _____ The area beneath the rain forest canopy
7. _____ Nonliving things in an ecosystem
8. _____ The tops of the tallest trees
Cloze Test

Ecosystems

<table>
<thead>
<tr>
<th>biotic factors</th>
<th>emergent</th>
<th>rain forest</th>
<th>understory</th>
</tr>
</thead>
<tbody>
<tr>
<td>canopy layer</td>
<td>living things</td>
<td>sunlight</td>
<td>water</td>
</tr>
<tr>
<td>coral reefs</td>
<td>rainfall</td>
<td>underground</td>
<td></td>
</tr>
</tbody>
</table>

Fill in the blanks.

An ecosystem includes all ______________ and their nonliving environment. You can find plants and animals that are called ______________ in an ecosystem. Abiotic factors such as ______________ and temperature are also found in an ecosystem. Animals living in a desert ecosystem get their ______________ from the food they eat. Desert animals survive extreme temperatures in the desert by living ______________.

Most of life on Earth is found in the ______________. The top layer of the rain forest is the ______________ layer. Underneath the emergent layer are the ______________ and the ______________ layer. The forest floor gets very little ______________. ______________ are formed from dead organisms. Coral is an abiotic factor found in a reef ecosystem.
Living Things Need Each Other

Use your textbook to help you fill in the blanks.

How do animals depend on plants?
1. Plants produce _______________________ for animals to breathe.
2. _______________________ are eaten by caterpillars and rabbits.
3. Other animals, such as beetles, eat plant _______________________.
4. Earthworms and some snails eat plants that are _____________________.
5. Plants are the main source of _______________________ entering food chains.

Plants as Shelter
6. Some animals such as birds use plants to build _______________________ that they use as their homes.
7. Plants help keep animals _______________________ from harm.

How do plants depend on animals to reproduce?
8. _______________________ is the process when male cells are transported to female cells in a flower.
9. The male cells are stored in the _______________________ of a flower.
10. The _______________________ holds the female egg cells.
11. After pollination, the _______________________ , at the base of the pistil, turns into a fruit.
Moving Pollen Around

12. _______________ is a sweet drink found inside the flower.

13. As animals travel from flower to flower, _______________ rubs off the flower to the next flower.

14. Animals help flowers _______________ by rubbing pollen on different flowers.

How do plants depend on animals to carry seeds?

15. The process of spreading seeds is called _______________.

16. Animals eat fruit and seeds and leave fruit seeds on the ground in their _______________.

17. Some seeds stick to _______________ and fall to the ground and grow into new plants.

Summarize the Main Idea

18. What are two ways that animals depend on plants and two ways that plants depend on animals?

_________________________________________________________________

_________________________________________________________________
## Vocabulary

**Living Things Need Each Other**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>a.</td>
<td>nectar</td>
<td>d.</td>
</tr>
<tr>
<td>b.</td>
<td>ovary</td>
<td>e.</td>
</tr>
<tr>
<td>c.</td>
<td>pistil</td>
<td>f.</td>
</tr>
<tr>
<td>g.</td>
<td>stamen</td>
<td></td>
</tr>
</tbody>
</table>

Match the correct letter with the description.

1. _____ Part of the flower that holds the pollen and contains the male cells
2. _____ A sweet drink inside the flower
3. _____ The female part of a plant that turns into a fruit after pollination
4. _____ Part of the flower that holds the female egg cells
5. _____ Male and female cells from flowers join together
6. _____ A flower’s powdery material
7. _____ The process of spreading seeds
Fill in the blanks.

Plants produce the oxygen in the air we breathe. Every day we eat plants such as __________________ and vegetables. Other animals such as rabbits and beetles eat plant leaves, roots, and __________________. Birds use plants to build __________________ for protection against danger in the environment. Plants depend on animals for __________________ to make new plants. The male part of the plant is called the __________________, and the __________________ holds the female cells. Both parts must join to make new plants. Animals such as bees and birds drink __________________ from flowers. __________________ is transferred by animals as they travel from flower to flower. Animals also help plants by spreading seeds through __________________. Sometimes animals spread seeds when the seeds stick to their skin, fall to the ground, and then grow into new plants.
Write About It

Write a report that shows how plants are useful to us. Include facts and details that you have learned in this chapter and from your own online research. Use words such as because and since that show cause and effect.

Getting Ideas
Start with the question: How are plants useful to us? Then do some print and online research to answer this question. Make a chart to record information.

Planning and Organization
Kevin came up with four categories of ways that plants are useful to people. They are

- food
- clothing
- shelter
- transportation

He wants to organize information into these categories. When he writes his report, he will use a new paragraph for each category.

Here are some sentences he wrote. Write the category each sentence fits in.

1. Plants provide fruits and vegetables. ______________
2. Native Americans hollowed out tree trunks to make canoes. ______________
3. Cotton comes from cotton plants. ______________
4. The lumber industry replants trees in the Northwest. ______________

For each category, write sentences that you could use in your report. Write five sentences on a separate sheet of paper.
Drafting

Write a sentence to begin your report. Focus on your most important idea about the topic.

Now write your report. Begin with a paragraph that tells your most important idea about how plants are useful to us. Write paragraphs including facts and details from more than one source. At the end summarize the ways plants are useful to us.

Revising and Proofreading

Help Kevin connect these sentences with words like because or since to show cause and effect.

1. Wood can be used to make boats. Wood floats on water.

2. The white, fibrous substance around cotton seeds can be made into a soft material. We use cotton for clothing.

Now revise and proofread your report. Ask yourself:

- Have I clearly stated my main idea about plants?
- Have I included facts and details showing plants’ usefulness?
- Have I used transition words to show cause and effect?
- Have I ended with a logical conclusion about the value of plants?
- Have I corrected all grammar errors?
- Have I corrected all problems in spelling, punctuation, and capitalization?
Changes in Ecosystems

Use your textbook to help you fill in the blanks.

How can ecosystems change?
1. When biotic or abiotic factors change, the ________________ changes, too.
2. Over time, ecosystems are always ________________.
3. Changes in the ecosystems can make it difficult for plants and animals to ________________.

Natural Events Change Ecosystems
4. ________________ and ________________ changes affect ecosystems.
5. ________________ and tropical storms are examples of a weather change that affects ecosystems.
6. Long periods of no rain are called ________________.

Humans Change Ecosystems
7. Cutting down forests and digging for resources in Earth’s surface can change ________________.
8. Many human activities cause ________________ and make living things sick.

What happens when ecosystems change?
9. A ________________ can change a forest ecosystem quickly.
10. Animals change their behaviors and habits to ________________ changes in the ecosystem.
11. Some fires help a forest ecosystem from becoming too _________________.

12. If there are only a few of a specific plant or animal in an ecosystem, that plant or animal is _________________.

13. When all of a specific plant or animal are destroyed or die, that plant or animal becomes _________________.

How can humans protect ecosystems?
14. ________________ are made to limit pollution and make hunting certain animals or picking certain plants illegal.

15. An example of an endangered animal is the _________________.

Summarize the Main Idea
16. What causes ecosystems to change?

___________________________________________________________________________

___________________________________________________________________________
Changes in Ecosystems

Match the correct letter with the description.

1. _____ Makes living things sick and can even raise the temperatures on Earth
2. _____ An individual organism’s response to change
3. _____ An animal or plant that has very few left of its kind
4. _____ An animal or plant that has none left of its kind
5. _____ The ability to stay alive
Fill in the blanks.

An ecosystem changes when biotic or abiotic factors change.

Ecosystems are always _________________. Plants and animals have a difficult time ________________ because of changes in the ecosystem. A hurricane is an example of a ________________ change that affects ecosystems. Rising temperatures on Earth are caused by ________________. To survive changes in the ecosystem, animals must change their behaviors and ________________. ________________ can help with overcrowding in forests. When very few of an animal or plant type are left, it becomes ________________. The ________________ is an endangered animal. When there are no longer any animals of a certain kind left, it is ________________. One way to limit pollution and make hunting certain animals or picking certain plants illegal is to make ________________.
Mail Call

Scientists at the American Museum of Natural History collect stories from people around the world to learn about local environments.

TO: American Museum of Natural History  
FROM: Clara  
SUBJECT: The Chaparral After a Wildfire

Dear Museum Scientists,

My name is Clara. I live in a small town in Southern California. The hills around our town are covered with evergreen shrubs. The land is very dry and there are not a lot of trees. This environment is called chaparral.

We didn’t get a lot of rain here last summer. In August, a lightning storm started a wildfire in the chaparral. When I walked through the area after the fire, all I saw were gray ashes and dead shrubs.

It’s April now, and I hiked through the burnt chaparral last week. I brought my field guide with me so I could look up the plants and animals I saw. The chaparral has changed so much! There are fields of wildflowers blooming everywhere. I found a hillside monkey flower and scarlet larkspur. My guidebook told me that these flowers have seeds that can stay dormant for several years. They need fire, heat, or smoke to sprout. The wildflowers have attracted insects like honeybees. The birds and animals are back, too! I saw a cactus wren and jackrabbits. My guidebook explained that the low bushes provide shelter for jackrabbits and nesting for cactus wrens.

I can’t wait to go back to see how the chaparral will change even more!

Your friend,
Clara
Make Predictions

• Use what you know to tell what might happen.
• Use what you read to tell what might happen.

Write About It

Read the letter again. Predict what the chaparral will be like next year.

What might happen if a drought were to affect the chaparral environment? Write your prediction in the form of a paragraph.
Adaptations

Use your textbook to help you fill in the blanks.

What is an adaptation?

1. _________________ are special features that help living things survive in their environment.
2. A fish’s gills, a dragonfly’s wings, and an eagle’s sharp _________________ are adaptations.
3. Adaptations help animals move, _________________ , and live in certain climates.

How do animals adapt?

4. Some insects look like leaves. Blending into an environment is called _________________.
5. _________________ is an adaptation in which animals hide by looking like other organisms.
6. The study of how organisms pass traits from one generation to the next is called _________________.

What are some adaptations of desert plants and animals?

7. Desert plants have many adaptations that help them survive with little _________________.
8. Desert animals have adaptations that keep them _________________.
9. Creosote bushes have mainly shallow roots that help them take in _________________ that falls.
10. The jackrabbit has extra large ears to help it keep _________________ .
11. Animals that sleep during the day and are active at night are called _________________.

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What are some adaptations of arctic plants and animals?
12. In the arctic tundra, living things have special adaptations to help them ____________________.
13. The arctic willow has ____________________ on its leaves to keep heat in.
14. The smaller an animal is the more quickly it ____________________. That’s why many arctic animals have very large bodies.
15. The polar bear’s waterproof outer fur ____________________, and its thick inner fur ____________________.

What are some adaptations of living things in the ocean?
16. A thick layer of fat called ____________________ keeps a whale’s body warm in cold ocean water.
17. The leafy sea dragon confuses its predators because it ____________________.

Summarize the Main Idea

_____________________________________________________

_____________________________________________________

_____________________________________________________

_____________________________________________________

_____________________________________________________

_____________________________________________________

_____________________________________________________

_____________________________________________________
Adaptations

Fill in the puzzle with the clues below.

Across

2. an environment that is very cold ____________
3. blending into an environment ____________
5. a thick layer of fat that keeps a whale’s body warm ____________
6. a very hot, dry environment ____________
7. occurs when one organism imitates another ____________

8. special features that help living things survive in their environment ____________

Down

1. animals that sleep during the day and are active at night ____________
4. the study of how organisms pass traits from one generation to the next ____________
Fill in the blanks.

Organisms are wonderfully adapted to the environments in which they live. Whether a plant or animal lives in a hot, dry ________________ or the cold ________________ tundra, they have special features called ________________ to help them survive. Examples of adaptations include ________________ animals that survive the desert heat by sleeping during the day and being active at night. On the other hand, ________________ have two coats of fur to help keep them warm and dry in their very cold environment. Other methods of adaptation include ways animals confuse their predators. Some animals use ________________ and imitate other animals. Still other animals adapt by ________________ and blend into the environment. Parents pass these useful traits from one generation to the next. The science of ________________ studies how these traits are passed from parents to their children.
Living Things and Their Environment

Choose the letter of the best answer.

1. A hummingbird's narrow beak is an example of
   a. adaptation.     c. mimicry.
   b. camouflage.    d. pollination.

2. A living thing that has very few left of its kind is said to be
   a. abiotic.       b. adapted.     c. endangered.     d. extinct.

3. Which is an example of an abiotic factor in an environment?
   a. bacteria       b. fish        c. snow        d. trees

4. Mimicry occurs when
   a. an animal sleeps during the day and is active at night.
   b. an organism cannot adapt to its environment.
   c. an organism is one of a few remaining of its kind.
   d. one organism imitates another organism.

5. Genetics is the study of how organisms
   a. change their environments.
   b. compete for food within their environment.
   c. pass traits from one generation to the next.
   d. use sunlight to make food.

6. An ecosystem is
   a. the climate and other abiotic factors of an area.
   b. a group of living things.
   c. a group of living things and their nonliving environment.
   d. the nonliving environment.
Choose the letter of the best answer.

7. Male and female cells from flowers join together in a process called
   a. accommodation.  
   b. adaptation.  
   c. pollination.  
   d. seed dispersal.

8. Animals move fruit seeds from place to place in a process called
   a. accommodation.  
   b. mimicry.  
   c. pollination.  
   d. seed dispersal.

9. Which is an example of camouflage?
   a. an insect that looks like a leaf  
   b. an eagle’s sharp claws  
   c. a rabbit’s long ears  
   d. the thick skin on a cactus

10. The typical weather pattern of an area is its
    a. biotic factor.  
    b. climate.  
    c. ecosystem.  
    d. environment.

11. An animal may survive changes to its food supply by
    a. becoming endangered.  
    b. blending into its environment.  
    c. making an accommodation.  
    d. passing traits.

12. An animal that is extinct
    a. can no longer be found.  
    b. has only a few left of its kind.  
    c. has adapted to its environment.  
    d. will reappear over time.
Rocks and Minerals

- Sedimentary
  - How am I formed?
  - Names of Rock

- Igneous
  - How am I formed?
  - Names of Rock

- Metamorphic
  - How am I formed?
  - Names of Rock
Rock Secrets

Read the Literature feature in your textbook

Write About It

Response to Literature  Every rock has a story to tell about Earth’s past. Write a fictional story. A rock collector picks up a rock and it starts to talk, telling its secret story. Make sure your narrative has a beginning, a middle, and an end.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________

________________________________________________________________________
Minerals: The Building Blocks of Rocks

Use your textbook to help you fill in the blanks.

What is a mineral?
1. Many common substances found on Earth are made up of ________________.
2. Minerals are natural, nonliving substances that make up ________________.
3. Each mineral has its own chemical makeup. They are made of the same ________________.
4. Different minerals have different types of ________________ shapes, which are often shaped like cubes and hexagons.
5. Only about 30 minerals are common in rocks. They are called ________________.

How are minerals identified?

Luster
6. Some minerals are shiny while other minerals may be dull. Luster describes ________________.

Cleavage
7. The way a mineral ________________ is called cleavage.

Streak
8. Quartz can be white, pink, or purple, and the powder left when it is scratched is called ________________.
How can hardness be used to identify minerals?

9. The _______________ shows the hardness of some common minerals. Hardness is a property of minerals.

10. _______________ is the hardest mineral, and talc is the softest.

What are minerals used for?

11. Minerals are used to make ___________________.

12. Rocks that are mined because they contain useful substances are called _______________.

13. Diamonds, rubies, and emeralds are some _______________ that are removed from Earth’s crust.

Summarize the Main Idea

14. What properties do scientists use to identify minerals?

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________
Minerals: The Building Blocks of Rocks

| a. minerals | d. luster | g. elements |
| b. cleavage | e. crystals | h. gems |
| c. ores | f. streak | i. rock-forming minerals |

Match the correct letter with the description.

1. _____ The natural nonliving substances that makes up rocks
2. _____ What minerals are made up of
3. _____ Shapes of minerals made by the way their atoms are arranged
4. _____ Found in common rocks
5. _____ Describes the way light reflects off the surface of a mineral
6. _____ The property that describes the way minerals split
7. _____ Identifies the mineral by the color of the powder left behind when it is scratched across a plate
8. _____ Rocks that are mined because they contain useful substances
9. _____ Minerals prized for their beauty
Fill in the blanks.

No matter where you go in the world, minerals are everywhere. Table __________ is a mineral as is the graphite in your pencil. Scientists have identified about 3,000 different kinds of minerals.

Rocks are made of ___________. About 30 of them make up most __________ rocks. Rocks come in many shapes, colors, and ___________.

Minerals can be ___________ or gems. Minerals have a certain ___________ shape. Some are shaped like cubes or ___________. The shape of the mineral comes from the way its ___________ are arranged.

Scientists identify minerals by their ___________. Luster is one property. It identifies the way light ___________ off a mineral. Some minerals are hard while others are ___________. The Mohs hardness scale can be used to identify the ___________ of minerals.
Igneous Rocks

Use your textbook to help you fill in the blanks.

How are igneous rocks formed?

1. The layer of melted rock below Earth's crust is called ________________.
2. Magma that reaches Earth's surface is called ________________.
3. When melted rock cools and hardens, it forms ________________.
4. Igneous rocks are classified according to the way they are ________________.
5. When melted rock cools and hardens ________________, an intrusive igneous rock is formed.
6. Because magma cools very slowly below Earth's surface, ________________ mineral crystals are formed.
7. When melted rock cools and hardens ________________, an extrusive igneous rock is formed.
8. Because lava cools rather ________________ above Earth's surface, the crystals in extrusive igneous rock are usually small.

What are the properties of some igneous rocks?

9. The properties of an igneous rock depend upon the way it is formed and the ________________ that make it up.
10. The ________________ of the mineral crystals within a rock gives a rock its texture.
11. Large mineral crystals give granite its ________________ texture.
12. Granite's many colors come from the variety of ________________ that make it up.
13. The tiny holes in pumice are caused by ____________________________ that escape as lava cools.

14. Because of the way it forms, pumice is very light and often ____________________________.

15. The lava that forms obsidian can cool in just a few ____________________________.

16. Obsidian looks like shiny black ____________________________.

What are some uses of igneous rocks?

17. Because of its hardness, ____________________________ makes a strong and long-lasting building material.

18. The rough texture of ____________________________ makes it a good substance to scrub off dirt.

Summarize the Main Idea

19. The properties of igneous rocks depend on what two factors?
Igneous Rocks

Complete the crossword puzzle using words from the lesson.

Across
3. Igneous rocks formed below Earth’s surface
4. A hard igneous rock used in buildings
6. A shiny black rock
7. A lightweight igneous rock that is full of tiny holes

Down
1. Melted rock
2. Igneous rocks formed above Earth’s surface
3. The rocks formed when melted rock cools and hardens.
5. Melted rock below Earth’s surface
Igneous Rocks

Use your textbook to help you fill in the blanks.

A layer of melted rock lies beneath Earth’s crust. When this melted rock, called _________________, cools and hardens, it becomes _________________ rock. Sometimes it remains _________________ Earth’s surface and hardens slowly over hundreds or thousands of years.

As it slowly cools, large mineral _________________ form within it. The rock that results is called _________________ igneous rock. An example of this kind of rock is _________________, which has a coarse texture from the large crystals it contains.

When melted rock reaches Earth’s surface, it is called _________________ . Once above the surface of Earth, it cools rapidly. Only small mineral crystals have time to form before it _________________ .

The rocks that form from the cooled lava are called _________________ igneous rocks. One example of extrusive igneous rock is _________________ , which is full of tiny holes from the gas bubbles that were in the lava when it hardened. Another is _________________ , which has a shiny, glass-like texture.
Every year, for about a month, Sisir Mondal travels across the globe to places like India and South Africa. Sisir travels to those places to study rocks.

In the field, Sisir studies large layers of igneous rock. Sisir collects rock samples. He studies them closely to figure out their textures and what kinds of minerals the rocks contain. Based on his observations, he makes a geologic map of the area.

Back in the museum, Sisir takes a much closer look at the rock samples he collected. He uses microscopes and other tools to see what stories the rocks tell. Sisir wants to know why certain minerals are found in the rocks. He’s particularly interested in finding rocks that contain metallic elements like chromium and platinum. Why are those metals important? People use them every day. Chromium is used to make many things including steel. Platinum is a precious metal, used in everything from jewelry to catalytic converters in cars.

Compare and Contrast

• Look for similarities and differences.
• Use your own experiences to apply to the situation.

Compare and Contrast

1. What is the same about the work Sisir does in the field and the work he does in the lab?

________________________________________________________________________

2. What is different about the work Sisir does in the field and the work he does in the lab?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Write About It

To explore the differences and similarities between Sisir’s work in the field and in the museum, write two short journal entries on a separate piece of paper. Treat these entries like games of make-believe, and pretend that you actually are Sisir. Use words such as “I,” “me,” “my,” and “mine” to make it seem as if Sisir were speaking. One entry will be written on the last day of your studies in the field in South Africa. The other entry will be written on your first day back to the museum to study the rocks you found. Each entry should be at least six sentences long and should have a natural flow.

Guidelines—What to write in the entry for South Africa:

• Start with a clear beginning, and discuss the type of day you have had in the field.

• Describe the texture and minerals of the igneous rocks you’ve found.

• Briefly describe the weather, sights, and sounds in the field.

• Summarize how different your work will be in the museum.

What to write in the entry for Sisir’s return to the museum:

• Start with a clear beginning, and discuss whether or not you’re glad to be back at the museum.

• Explain whether or not you enjoy working in the field or the museum. Do you enjoy both?

• Describe the atmosphere in the museum.

• Discuss what you accomplished in the museum today and why you couldn’t accomplish those same things in the field.

• Sign off. Example: “I am tired from my trip, so I must get to bed. Good night.”
Sedimentary Rocks

Use your textbook to help you fill in the blanks.

How are sedimentary rocks formed?
1. Rocks can be formed from tiny particles called ________________.
2. ________________ are rocks formed of layers of sediment pressed together.
3. Over a long period of time, the layers of sediment turn into ________________.

How do layers of rock form?
4. Sediments can be picked up by ________________.
5. Over time, new layers of sediment are dropped on top of ________________.
6. The ________________ of the top layers squeezes out the water and air from the lower layers.
7. ________________ cement the sediments together forming the sedimentary rock.

What are the properties of some sedimentary rocks?
8. Limestone is usually white and forms ________________.
9. Limestone contains ________________.
10. The remains of plants and animals from millions of years ago are called ________________.
11. Another type of sedimentary rock called ________________ is made from sand and quartz cemented together.
12. ________________ often cements red sandstone together.
13. A conglomerate rock is formed from ________________.
14. Conglomerate rocks ________________ show distinct layers like other types of sedimentary rocks do.

What are some uses of sedimentary rocks?
15. Limestone is useful in the classroom as ________________.
16. ________________ coal is sedimentary rock.
17. Sedimentary rock often contains ________________ that can show us what living things in the past looked like.

Summarize the Main Idea
18. What are the three different types of sedimentary rocks, and what are the differences among them?
   ________________.
   ________________.
   ________________.
Sedimentary Rocks

| a. conglomerate | d. limestone | g. sediments |
| b. fossils      | e. sandstone | f. sedimentary rock |
| c. iron oxide   |             |               |

Match the correct letter with the description.

1. _____ Tiny particles of rocks or minerals
2. _____ Remains of animals or plants from millions of years ago
3. _____ Rock made up of rounded pebbles, stones, or even boulders once carried by fast-flowing waters
4. _____ Bits of sand that had become cemented together
5. _____ The type of rock formed from sediments that become pressed together
6. _____ Rocks formed from the remains of once-living things on the bottom of the ocean
7. _____ Often the cementing material, stains the rock red
Fill in the blanks.

Most sedimentary rocks are formed over a long period of time. ________________ , or tiny particles, is pressed together in layers to form a rock. Most often, these particles are carried by ________________ and dropped off in a new place. The ________________ of the top layer presses out the water and air from the lower layers to form the sedimentary rock. ________________ is formed on the bottom of the ocean. Plant and animal remains, called ________________, help create the layers of limestone. ________________ is another type of sedimentary rock made up of bits of sand cemented together. Sometimes ________________ stains the rocks red. Another type of sedimentary rock is a ________________, which is formed from larger rocks lumped together.
Metamorphic Rocks

How are metamorphic rocks formed?
1. Heat and pressure can cause the physical and mineral contents of rocks to change.
2. Extreme heat and pressure cause to form deep inside Earth.
3. Examples of metamorphic rocks are and slate.

What are properties of some metamorphic rocks?
4. The amount of heat and pressure a metamorphic rock undergoes determines its .
5. Gneiss has mineral layers called bands and its texture is .
6. A metamorphic rock with a medium texture is .
7. The texture of marble depends on the size of the inside it.
8. Slate feels because it contains small crystals.

What are some uses of metamorphic rocks?
9. Statues and buildings can be made from .
10. can be created from the rock lapis lazuli.
11. Small chunks of metamorphic rocks can be found in
   __________________________.

12. __________________________ is a metamorphic rock found deep
    inside Earth. It is used as a fuel.

How can you be a rock detective?
13. To identify a rock, geologists examine physical properties, crystal
    size, layers, and __________________________.

14. A(n) __________________________ might contain a fossil.

15. An igneous rock looks smooth and might
    __________________________ when held in the light.

16. A metamorphic rock will have certain minerals and
    __________________________.

What is the rock cycle?
17. The __________________________ occurs when a rock changes from
    one form to another.

Summarize the Main Idea
18. How is a metamorphic rock created?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
Fill in the blanks with the correct vocabulary word. Then use the clues to solve the message.

1. I am a rock used in statues. [ ] [ ] [ ] [ ] [ ] [ ]

2. I am a rock found deep in Earth and used as fuel. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

3. I am a type of rock that may contain fossils. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

4. I am a smooth and shiny rock. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

5. I am the process by which rocks change from one form to another. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

6. I am a rock with a medium texture, and I am used in swimming pools and ceramics. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

7. I am a rock used in jewelry. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Use the numbered letters from your vocabulary words to solve the message below.

Extreme heat and pressure can cause rocks to become [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
Fill in the blanks.

The extreme heat and pressure within Earth squeezes rocks together. This causes the ____________ properties of rocks to change. ____________ are formed deep inside Earth. Metamorphic rocks can be made from ____________, sedimentary, or other metamorphic rocks. For example, traces of the igneous rock granite can be found in the metamorphic rock _____________. The physical ____________ of metamorphic rocks are different. The minerals and ____________ in metamorphic rocks determine their ____________ and appearance. A geologist can classify a rock by looking for _____________. One clue to help identify metamorphic rocks are _____________. Because of their useful properties, metamorphic rocks are used to make items such as tile, jewelry, statues, and even gravel.
Write About It

Compare two things made from rocks. Use words that tell about likenesses, such as “both,” “like,” and “too.” Use words that tell about differences, such as “but” and “unlike.”

Getting Ideas

Select two different things made of rocks. Write the name of each thing above each circle below. In the outer part of each circle, tell how it is different. In the part that overlaps, tell how they are the same.

Planning and Organizing

On her trip to the Children’s Museum, Kirsten learned that the little balls in the game “marbles” are made from marble, obsidian, and other rocks. She wants to compare and contrast the two types. Here are two sentences that she wrote. Write Compare by each sentence that tells how they are alike. Write Contrast by each sentence that tells how they are different.

1. The ones made from marble were pink or red or yellow, but the ones from obsidian were dark green or black. _______________
2. Both marble and obsidian are igneous rocks. _______________
Write three sentences comparing and contrasting your two objects made from rocks.

1. 

2. 

3. 

Drafting

Write your own sentence to begin your comparison. It should tell your topic and your main idea.

Now write to compare and contrast two things made of rock. Use a separate piece of paper. Arrange your sentences in a way that makes sense. Remember to use words that tell about likenesses and differences.

Revising and Proofreading

Here are some sentences Kirsten wrote. Proofread them. Find five grammar errors she made and correct them.

Both sets of marble was beautiful, but I likes the obsidian ones more. They was so bright and shiny. They has such a rich, dark color. I couldn’t wait to shot them.

Now revise and proofread your writing. Ask yourself:

- Have I used words that show likeness and words that show difference?
- Have I corrected all grammar errors?
- Have I corrected all spelling, punctuation, and capitalization errors?
Rocks and Minerals

Choose the letter of the best answer.

1. The way a mineral splits is called
   a. cleavage.    b. hardness.    c. luster.    d. streak.

2. The rock cycle is the process by which rocks
   a. are identified.    c. change into their final form.
   b. change into gems.    d. change from one form to another.

3. Melted rock beneath Earth’s surface is called
   a. lava.    b. magma.    c. ore.    d. sedimentary.

4. How is a streak formed?
   a. A light is shined on a mineral.
   b. A mineral is rubbed across a plate.
   c. A mineral is scratched by a diamond.
   d. A mineral is split.

5. Once melted rock reaches Earth’s surface, it is called
   a. lava.    c. a mineral.
   b. magma.    d. ore.

6. The way light reflects off the surface of a mineral is called
   a. cleavage.    c. luster.
   b. hardness.    d. streak.

7. Which type of rock is formed when melted rock cools near Earth’s crust?
   a. igneous    c. metamorphic
   b. magma    d. sedimentary
Choose the letter of the best answer.

8. Intense heat and pressure deep beneath Earth’s surface can cause some rocks to change into
   a. igneous rock.               c. metamorphic rock.
   b. sedimentary rock.          d. obsidian.

9. Layers of tiny particles are compressed over time to form
   a. igneous rock.               c. metamorphic rock.
   b. magma.                      d. sedimentary rock.

10. The building blocks of rocks are
    a. gems.                      c. minerals.
    b. ores.                     d. sedimentary rocks.

11. A mineral that can scratch another mineral has a greater
    a. cleavage.           b. hardness.              c. luster.              d. streak.

12. Tiny particles of rocks, minerals, plants, or other animal materials are called
    a. fossils.              b. gems.                  c. ores.                 d. sediments.

13. Bauxite is considered an ore because
    a. it is rare.             c. it is a useful mineral that is mined.
    b. it is a gem.           d. it is the hardest mineral.

14. Mohs hardness scale is used to
    a. compare the luster of different minerals.
    b. determine the hardness of a mineral.
    c. measure the cleavage of a mineral.
    d. weigh minerals.
Erosion is a process that changes Earth _________.

Flowing water, waves, and wind can cause _________.

__________ is made up of rock minerals, humus, water, and bacteria.

When weathered rock is dropped off, ________ has taken place.

Ice sheets called ________ shape the land as they move over it.
Sierra

Read the Literature feature in your textbook.

Write About It

Response to Literature  The poet uses personification to describe how rock is slowly worn away. Write a letter to the poet. Tell if you liked the poem. Discuss how making the mountain seem human made you feel. What did it help you understand?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________
Weathering

Use your textbook to help you fill in the blanks.

What is weathering?

1. Rocks are constantly ________________ .
2. Freezing and thawing, plants, wind, and pressure can break rocks into ________________ .
3. This breaking down of rocks is called ________________ .
4. ________________ involves ways that rock breaks down without changes to ________________ .
5. Over time, repeated ________________ of water breaks rocks apart.
6. As plant roots grow larger, they cause cracks in rocks to ________________ .
7. Outer layers of rock peel off like the layers of ________________ in a kind of weathering called ________________ .
8. The wearing away of rock by ________________ is called ________________ .

What are some other causes of weathering?

9. A rock can break down when ________________ in the rock are ________________ .
10. When ________________ in air dissolves in water, it can react with iron in rocks to form ________________ and cause the rocks to break down.
11. Decaying plants leave _________________ in soil that are dissolved by _________________.

12. Dissolved acids _________________ when they come into contact with a rock’s minerals and cause it to _________________.

13. Carbonic acid that can react with the minerals in some rocks forms when ________________ combines with _________________.

**How is soil formed?**

14. Soil is mostly bits of _________________.

15. Soil also contains _________________.

16. It can take ________________ of years for weathering to break rocks down to form soil.

17. Soil layers are called _________________, and each has its own _________________.

18. Soil horizons are different from place to place because the ________________ that make up soil are different from place to place.

**Summarize the Main Idea**

19. How do physical weathering and chemical weathering affect rocks in the same way?

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
Weathering

Match the correct letter with the description.

1. _____ A layer of soil
2. _____ Breaks rock down without changing the rock material
3. _____ Weathering that causes layers of rock to peel like an onion
4. _____ The breaking down of rocks
5. _____ Breaks rock down by changing its minerals
6. _____ Decayed plant or animal material
7. _____ Sharp edges of blowing sand wearing rocks away
8. _____ A substance that forms when carbon dioxide combines with rainwater
Weathering

Rocks are under constant attack by many forces and eventually break down. The breaking down of rocks is called _____________. Physical weathering breaks rock into smaller pieces without causing _____________ changes. Physical weathering can be caused by freezing, thawing, plants, _____________, and abrasion. Chemical weathering causes _____________ in the minerals in rocks. Oxygen and _____________ can combine with _____________ to form a weak _____________ that can react with rock to break it down. Soil is mostly made from bits of weathered rock, minerals, and _____________, which is decayed plant or animal material. Soil forms into layers or _____________ over many years. Soil is different from place to place because the rocks and living things that make up soil are different from place to place.
Erosion and Deposition

Use your textbook to help you fill in the blanks.

What causes erosion?
1. The transport of weathered rock is called ________________.
2. The shape of the land is changed as ________________ work together.
3. The biggest cause of erosion is ________________.
4. Eventually, ________________ are ________________ in a new place.
5. Waves also cause ________________ as they break rocks apart and then ________________ the rocks and sand.
6. Wind ________________ small pieces of rock, sand, and soil and carries them to ________________.
7. Wind ________________ by ________________ at the same time.
8. ________________ takes place when weathered rock, sand, and soil are ________________ by wind or water.

What affects erosion?
9. A ________________ soil is eroded more easily than ________________ clay.
10. Erosion is also affected by the ________________ of ________________.
11. The strength of ______________________ and the growth of ______________________ also affect the rate of erosion.

12. In 1930, a ______________________ began that allowed bare, dry soil to ______________________ in an event known as the ______________________.

13. Many animals died because there were no ______________________ for them to eat, and thousands of ______________________ had to ______________________.

How can soil erosion be slowed?
14. From the Dust Bowl, people learned that it was important to ______________________ soil by using methods to save it and ______________________.

15. Farmers ______________________ between fields to slow ______________________.

16. Farmers use a method called ______________________ when they plant ______________________ of food crops and other plants to ______________________.

17. Farmers prevent soil from eroding when they ______________________ their fields ______________________ a slope in a method called ______________________.

Summarize the Main Idea
18. How do erosion and deposition affect the land?
   ______________________
   ______________________
   ______________________
   ______________________
   ______________________
Erosion and Deposition

<table>
<thead>
<tr>
<th>a. conservation</th>
<th>c. deposition</th>
<th>e. erosion</th>
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<tbody>
<tr>
<td>b. contour plowing</td>
<td>d. Dust Bowl</td>
<td>f. strip farming</td>
</tr>
</tbody>
</table>

Match the correct letter with the description.

1. _____ Plowing across slopes rather than up and down
2. _____ Carrying away weathered rock
3. _____ Methods used to save soil and slow erosion
4. _____ Planting rows of food crops next to rows of plants that hold soil
5. _____ Dropping off weathered rock
6. _____ Event during which a great deal of soil eroded, affecting plants, animals, and people
Fill in the blanks.

Sediments and small rocks are often carried along in flowing water.

The carrying away of weathered rock is called ________________

The biggest cause of erosion is _________________. Blowing ________________ picks up small pieces of rock, sand, and soil as it ________________ and ________________ rock. Bits of eroded rock, sand, and soil are dropped off when ________________ takes place. The rate of erosion can be affected by the ________________ of sediments, the ________________ of wind or water, and the presence of ________________. Farmers can ________________ soil by planting rows of crops and soil-holding plants in a method called ________________. They can also prevent the soil on slopes from eroding by using ________________.

There are many methods that farmers can use to conserve soil.
Landforms: Changing Over Time

Use your textbook to help you fill in the blanks.

What is a landform?
1. Huge, vast stretches of land without any hills or mountains are called ________________.
2. Natural features on Earth’s surface are called ________________.
3. Most landforms take shape over ________________ periods of time.
4. A ________________ is a deep, narrow ________________ with ________________.

How can running water change land?
5. Water flows from the ________________ to the ________________.
6. As rivers journey downhill, they cut away land along their sides and ________________.
7. When land becomes flatter, a river runs ________________ and becomes ________________.
8. A slowly running river that drops sediments at its ________________ forms an area of land called a ________________.

How can waves change land?
9. Waves pounding at a cliff can break ________________ off its bottom and ________________ the base of the cliff.
10. ________________ are long, narrow strips of land that protect coastlines from ________________.
How does wind change land?
11. Wind can blow sand into hills called ________________ .
12. Sand dunes can be shaped like ________________ or ________________ that are shaped like long, wavy ridges.

How can ice change land?
13. Thick sheets of ice that slowly creep over the land in colder parts of Earth are called ________________ .
14. Glaciers form when ________________ falls than can melt.
15. Thick snow changes into ________________ , which begins to ________________ downhill and freeze onto ________________ .
16. Glaciers widen, deepen, and straighten valleys into a ________________ .

Summarize the Main Idea
17. How do natural processes create landforms?
   
   __________________________
   __________________________
   __________________________
   __________________________
   __________________________
   __________________________
   __________________________
# Landforms: Changing Over Time

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<table>
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<tbody>
<tr>
<td>a.</td>
<td>barrier island</td>
<td>c.</td>
</tr>
<tr>
<td>b.</td>
<td>canyon</td>
<td>d.</td>
</tr>
<tr>
<td>e.</td>
<td>landform</td>
<td>f.</td>
</tr>
</tbody>
</table>

Match the correct letter with the description.

1. _____ An area of land that forms at the mouth of a river
2. _____ A hill formed by blown sand
3. _____ A long, narrow strip of land that runs parallel to a coast
4. _____ A natural feature on Earth’s surface
5. _____ A deep, narrow valley with steep sides
6. _____ A large, thick sheet of ice
Fill in the blanks.

Earth’s surface is always changing. Natural features on Earth’s surface are called _________________. Running water can carve a _________________, a deep narrow valley with _________________. Rivers curve when one bank is eroded and the sediments are _________________. Sediments deposited at the ________________ of a river form an area of land called a(n) _________________. The constant action of waves can move sand and cause _________________. Long, narrow strips of land that run parallel to a coast are called _________________. Wind carrying sand and bits of rock _________________ rocks over a period of many years. Wind blows sand into hills called _________________. Large, thick sheets of ice called _________________ creep slowly over land and form _________________ valleys. Forces change the surface of Earth in many ways over time.
Write About It

Write a paragraph in which you summarize “Land Over Time,” on a separate piece of paper. In your own words, tell the main idea. Write only the most important details.

Getting Ideas

Make sure you understand the purpose of a summary before you start to write. Write True or False by each statement below.

1. A summary is the same length as the article. __________
2. A summary is shorter than the article. __________
3. A summary contains only important information. __________
4. A summary contains all the information. __________
5. When you write a summary, you put information in your own words. __________
6. When you write a summary, you use the exact words from the article. __________

Planning and Organizing

Reread the article “Land Over Time.” Underline important information that belongs in a summary. Cross out unimportant information.

Land Over Time

Mountains seem like mighty giants. But are they? Weathering can break down even the mightiest mountain. Let’s see how.

Wind carries seeds. Some seeds may land on patches of soil on rock and sprout. The roots find small cracks in the rock. The roots grow larger. At the same time, rain fills the cracks. When it gets cold, the water freezes. As a result, the ice expands and widens the cracks more. Eventually the roots get thicker. The cracks widen more until some pieces of the rock break off. In time, these smaller pieces of rock will become smaller yet. Over millions of years, weathering will break the mountain down.
Drafting

Write the main idea of “Land Over Time” on the lines below. Remember that the main idea is the most important idea.

________________________________________________________________________________________

Write a topic sentence for your summary. Put the main idea of the article in your own words. Tell the title of the article.

________________________________________________________________________________________

Now write the first draft of your summary on a separate sheet of paper. Start with your topic sentence. Then tell the important facts and details in your own words. Draw a conclusion at the end.

Revising and Proofreading

Proofread these sentences from one student’s summary. Correct the five spelling, punctuation, and capitalization errors.

“Land Over time shows that nothing lasts forever. It may take millions of years, but even great mountains can be destroyed? The process of wethering begins with the wind.

Now revise and proofread your summary. Ask yourself:

• Have I begun with a topic sentence that tells the main idea of “Land Over Time”?
• Have I left out minor details?
• Have I used my own words?
• Have I corrected all spelling, punctuation, and capitalization errors?
History of Science

Looking Back at Yosemite National Park

Yosemite Valley once looked very different than it does now. How can geologists find out how it has changed? They can read the rocks to investigate how Yosemite Valley got to look the way it does today.

• **500 million years ago**
  A sea covers the area that is now Yosemite. Sediments slowly build up on the ocean floor, growing thousands of feet high. The lower layers become rock.

• **90 million years ago**
  Underground, magma rises and cools into a huge block of granite.

• **10–5 million years ago**
  The Sierra Nevada is formed as the block of granite is pushed upward. The Merced River carves Yosemite Valley into a canyon.

• **3–1 million years ago**
  An ice age brings glaciers that fill the V-shaped valley. They widen it, deepen it, and carve it into a U-shaped valley.

• **10,000 years ago**
  The last glacier finally melts. Lake Yosemite is formed when rocks dam the valley. Creeks plunge off cliffs creating Yosemite’s waterfalls.
In 1906, President Theodore Roosevelt made Yosemite Valley and its surrounding forests a national park. Now each year millions of people visit Yosemite National Park to explore and learn about its geological clues for themselves.

**Write About It**

**Summarize** Write a few sentences that tell about the history of Yosemite National Park from long ago to the present. Use a summary chart to help organize your writing.

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
Slow Changes on Earth

Choose the letter of the best answer.

1. Which is an example of chemical weathering?
   a. Carbonic acid reacts with limestone.
   b. Sand wears away the edges of rocks.
   c. Sediment is deposited at the mouth of a river.
   d. Waves crash on a shore.

2. Deposition occurs when
   a. bits of sand, soil, and rock are carried away by wind or water.
   b. bits of sand, soil, and rock are deposited by wind or water.
   c. sand blasts away the sharp edges of a rock.
   d. water reacts with the minerals in a rock.

3. Sediment that collects near the mouth of a river forms an area of land called a
   a. canyon.
   b. delta.
   c. sand dune.
   d. plain.

4. Sand dunes are formed by
   a. chemical weathering.
   b. exfoliation.
   c. waves.
   d. wind.

5. A deep, narrow valley with steep sides is known as a
   a. canyon.
   b. glacier.
   c. sand dune.
   d. U-shaped valley.
Choose the letter of the best answer.

6. The breaking down of rocks is called
   a. deposition.          c. thawing.
   b. formation.          d. weathering.

7. A large, thick sheet of ice that slowly creeps across land is a
   a. canyon.            c. glacier.
   b. delta.             d. horizon.

8. Exfoliation is an example of
   a. chemical weathering.  c. physical weathering.
   b. deposition.         d. thawing.

9. The carrying away of weathered rock is called
   a. contour plowing.    c. erosion.
   b. deposition.         d. weathering.

10. Natural features on Earth’s surface are called
    a. humus.            c. minerals.
    b. landforms.       d. sediments.
Fast Changes on Earth

Landslides occur when a large amount of loose rock and ______ moves rapidly.

A __________ is a giant wave usually caused by an earthquake.

Floods and ______ change the land quickly and may cause ________ to property.

Earthquakes occur when plates suddenly move along a ____________.

__________ form along Earth’s moving plates and at hot spots in Earth’s crust.

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California’s Weather Woes

Read the Literature feature in your textbook.

Write About It
This article tells how during one week in February, California got very heavy rains. Write a summary of the article. Start by telling the main idea. Then include the effects of the heavy rains. Leave out unimportant details. Reach a conclusion at the end.

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________
Landslides

Use your textbook to help you fill in the blanks.

How do landslides change the land quickly?
1. _________________ is a _________________ that acts on all objects.
2. _________________ pulls materials such as weathered rocks and soil from a _________________ to a _________________.
3. A _________________ occurs when a large amount of loose rock and soil _________________.
4. A landslide is sometimes caused by things that quickly shift the land such as an _________________ or rocks that _________________.
5. A landslide can carry _________________ with it and also cause _________________.

How do floods change the land quickly?
6. _________________ can also cause the land to _________________.
7. When the ground is not able to hold any more water, it runs on top of _________________ and may flow into streams and rivers.
8. A _________________ occurs when the banks of a _________________ or _________________ overflow.
10. Some floodwaters are so strong that they may
   ________________ soil that supports bridges and roads,
   causing them to ____________________.

11. When land becomes full of water, it may change into a river of
   ________________ called a ____________________.

12. Materials left behind by a mudslide may keep
   ________________ from going down as quickly.

What are some safety tips for landslides and floods?
13. During heavy rains, listen to ________________ for warnings.
14. Watch and listen for ________________, new
   cracks in the ________________, and tilting
   ________________.
15. If you are near a landslide, ________________.
16. A ________________ means that flooding is possible.
17. A ________________ means that a flood is occurring or will
   occur soon.
18. If there is a warning for your area, ________________.
19. If caught in a flood, do not ________________.

Summarize the Main Idea
20. What do landslides and floods have in common?

   __________________________________________

   __________________________________________
Landslides

Match the correct letter with the description.
1. _____ Flooding is possible.
2. _____ A river of mud and rock.
3. _____ The banks of a river or stream overflow.
4. _____ A large amount of loose rock or soil moves rapidly.
5. _____ A flood is occurring or will occur soon.

Answer the questions.
6. What is the difference between a flood watch and a flood warning?

7. If you are caught in a flood, you should avoid

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Landslides

Fill in the blanks.

Some forces can change the land quickly. When ____________ pulls materials rapidly downhill, a ____________ occurs. These can occur when land shifts rapidly during an ____________, or by the ____________ and thawing of rocks. When the ground is not able to hold any more water, it runs on top of the land and may flow into streams and ____________. When streams or riverbanks ____________, a flood occurs. Flood waters ____________ soil quickly and can wash away anything in their path. When the land becomes full of water, it may change into a river of mud and rock called a ____________. During heavy rains, you should listen to ____________ and watch for signs of a possible landslide. A ____________ means that flooding is possible, and a ____________ means that a flood is occurring or will occur soon. If caught in a flood, do not walk in moving water.
Earthquakes

Use your textbook to help you fill in the blanks.

What are earthquakes?
1. Fast changes take place on Earth’s _________________ or the crust.
2. The crust is made up of giant slabs of rock called _______________ that fit together like the pieces of a puzzle.
3. A place where the plates come together and rocks move along one or both sides of a crack is called a _________________.
4. Earthquakes in Earth’s crust are caused by a sudden shift of Earth’s _________________.
5. Many earthquakes happen in an area around the _________________ where some of Earth’s plates meet.

What causes an earthquake?
6. Most earthquakes happen where Earth’s _________________ meet.
7. Large earthquakes do not usually occur where Earth’s slow movement called _________________ takes place along faults.
8. Different kinds of faults form because Earth’s plates move in _________________.
9. Plates pull apart in a _________________, and rocks above the fault surface _________________.
10. Plates push together in a _________________, and rocks above the fault _________________.
11. The _________________ Fault is an example of a _________________ where rocks slide past each other in different directions.
12. The vibrations of an earthquake are strongest where the earthquake ____________________.
13. Earthquakes’ vibrations move through Earth’s crust in ____________________ like the ripples from a pebble dropped in a pond.

What is a tsunami?
14. A giant ocean wave called a ____________________ is usually caused by an earthquake on the ____________________.
15. As a tsunami moves closer to shore, it slows and gets ____________________.
16. A tsunami may be one ____________________ of water or a series of ____________________.

What are some safety tips for earthquakes and tsunamis?
17. Your family should hold ____________________ and arrange a ____________________ outside your home for when the earthquake is over.
18. If outside during an earthquake, you should move quickly to an ____________________, and if in a car, you should not stop under a ____________________.
19. If you live near the coast, you should listen for tsunami advisories, watches, and warnings after an ____________________.
20. If there is a tsunami warning for your area, you should ____________________ right away.

Summarize the Main Idea
21. Why do earthquakes occur?
___________________________________________________
# Earthquakes

<table>
<thead>
<tr>
<th>a. creep</th>
<th>d. normal fault</th>
<th>g. strike-slip fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. earthquake</td>
<td>e. plates</td>
<td>h. tsunami</td>
</tr>
<tr>
<td>c. fault</td>
<td>f. reverse fault</td>
<td>i. vibrate</td>
</tr>
</tbody>
</table>

**Match the correct letter with the description.**

1. _____ Gigantic slabs of rock that make up Earth’s crust
2. _____ Movement in Earth’s crust caused by a sudden shift in Earth’s plates
3. _____ Crack where plates come together and rocks move along one or both sides
4. _____ Rocks slide past one another in different directions.
5. _____ Giant ocean wave
6. _____ Slow movement along faults
7. _____ Plates push together and rocks above the fault move upward.
8. _____ To shake
9. _____ Plates pull apart, and rocks above the fault surface move down.
Earthquakes begins normal fault reverse fault
earthquakes Pacific Ocean strike-slip fault plates tsunamis

Fill in the blanks.

Earth’s surface is always changing. Earth’s crust is made up of gigantic slabs of rock called ________________ that fit together like the pieces of a puzzle. A place where plates come together and move along one or both sides is called a _________________. ________________ occur when Earth’s plates undergo a sudden shift. Many earthquakes happen in an area around the _________________. A ________________ occurs when plates pull apart and rocks above the fault surface move down. When plates push together and rocks above the fault move upward, a ________________ occurs. Rocks that slide past one another in different directions form a ________________ fault. The vibrations from an earthquake are strongest where the earthquake first _________________. Earthquakes on the ocean floor can cause giant waves called _________________.

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Writing in Science

Write About It

Narrative Writing Write a personal narrative about a natural event that you experienced. What happened? What did you do? How did you feel? Why do you still remember the experience? Use the “I” point of view. Include time-order words to show the order of events.

Getting Ideas

Use a separate piece of paper to write down ideas for your narrative. Write the natural event at the top of the page. Then brainstorm. Then make four lists on your page:
• What happened
• What I did
• Why I remember it
• How I felt

Planning and Organizing

Antonio decided to write about an earthquake he experienced. Here are some sentences that he wrote. Put them in time order. Write 1 by the sentence that should come first. Write 2 by the sentence that should come second. Number the last sentence 5.

1. I ran to the doorway and put one arm on each side to hold myself steady. _____
2. A low rumbling sound filled my room. _____
3. Something woke me up, but I wasn’t sure what. _____
4. The quake lasted only a minute, but it felt like a year. _____
5. Then my bed began to shake. _____

Now write five sentences about your natural event on a separate piece of paper. Put the sentences in time order.
Drafting

Try to grab your reader’s interest in the first sentence of your personal narrative. Here are two sentences that Antonio wrote. Circle the one he should use to begin his narrative.

October 15, 2003 is a date I shall never forget.

I had an interesting experience in October.

Now write the first draft of your personal narrative on a separate piece of paper. Begin with an attention-grabbing sentence. Tell the events in time order. Use details and end by telling what the event meant to you.

Revising and Proofreading

Here are some sentences that Antonio wrote. Rewrite each sentence using the “I” point of view.

1. He screamed when the bed started to shake.

2. He didn’t know what was happening, and this made him scared.

3. He looked around for a place where he could take cover.

Now revise and proofread your personal narrative. Ask yourself:

- Have I used the I point of view?
- Have I organized the events in time order?
- Have I corrected all grammar errors?
- Have I corrected all spelling, punctuation, and capitalization errors?
Volcanoes
Use your textbook to help you fill in the blanks.

What is a volcano?
1. A _________________ is a mountain that builds up around an opening in _________________ .
2. An _________________ occurs when melted rock, gases, and pieces of rock are _________________ of a volcano.
3. Gases that build up pressure in magma can cause an _________________ .
4. Magma can rise through a _________________ called a _________________ .
5. Magma is called _________________ once it reaches the _________________ where it cools and hardens to form a _________________ .

Where do volcanoes form?
6. When one Earth plate is pushed beneath another, the plate moving down melts and is changed to _________________ .
7. Heated magma _________________ up through Earth’s crust to form _________________ .
8. Volcanoes that form in the middle of a plate may occur when magma partially melts through Earth’s crust in an area called a _________________ .
What are some kinds of volcanoes?

9. A ________________ has steep sides and is formed when gases in thick magma explode and cause lava to burst into the air.

10. When lava falls in pieces around the volcano, it forms a cuplike shape around the vent called a ________________.

11. A ________________ has wide, flat sides and is formed by layers of lava that flow ________________.

12. A ________________ is made up of layers of ________________ and ________________.

13. Eruptions seem to ________________, with an ________________ eruption followed by a quiet period when lava ________________.

14. The layers of a composite volcano build up to form a ________________ shape that is usually ________________, with the shape of one side matching the shape on the other side.

How can you be safe around volcanoes?

15. If you live near a volcano, you should have a ________________ available for each member of your family.

16. If told to do so, you should ________________.

17. If you are indoors near an erupting volcano, close all ________________ and make sure your ________________ are inside.

Summarize the Main Idea

18. How does a volcano cause sudden changes to Earth’s surface?

________________________________________________________________________________________

________________________________________________________________________________________
What is a volcano?

- a. cinder-cone volcano
- b. composite volcano
- c. crater
- d. eruption
- e. hot spot
- f. lava
- g. magma
- h. rift volcano
- i. shield volcano
- j. vent
- k. volcano

Match the correct letter with the description.

1. _____ Melted rock beneath Earth’s surface
2. _____ A mountain that builds up around an opening in Earth’s crust
3. _____ A volcano that forms along the edges of spreading plates
4. _____ A volcano with steep sides that forms when pieces of lava fall around the vent
5. _____ A cuplike shape that forms around the vent of a volcano
6. _____ Happens when melted rock, gases, and pieces of rock are forced out of a volcano
7. _____ A wide, flat volcano formed by layers of lava that build up over time
8. _____ A cone-shaped volcano that has explosive eruptions and quiet periods when lava flows gently
9. _____ Central opening in a volcano
10. _____ Place where magma partially melts through Earth’s crust
11. _____ Melted rock that reaches Earth’s surface
What is a volcano?

A volcano is a mountain that builds up around an opening in Earth’s crust called a(n) _________________. Gases trapped in melted rock beneath Earth’s surface can be forced out of a volcano during a(n) _________________. Once magma reaches Earth’s surface, it is called _________________. Volcanoes that form along the edges of spreading plates are called _________________. A volcano that is still erupting is a(n) _________________, and a volcano that is no longer erupting is a(n) _________________.

A(n) _________________ volcano has steep sides and forms from explosive eruptions. The cuplike shape that forms around the vent of a volcano is called a(n) _________________. _________________.

Volcanoes that are made up of layers of lava and ash are _________________ . There are many things people can do to stay safe in areas where volcanoes are active.
Ro Kinzler is fascinated by volcanoes and volcanic rocks, and she’d go just about anywhere to find out more about them. She is a scientist at the American Museum of Natural History.

Ro travels to the Cascades in Northern California to collect lava samples from active volcanoes like Mount Shasta and Medicine Lake. She wants to study how magma moves through Earth. Back in the lab, Ro does experiments to heat and squeeze the lava samples she collected to find out how they were formed in Earth.

You don’t just find volcanoes on land. There are lots of them on the ocean floor. Ro and other scientists have gone to the bottom of the ocean to study them in special underwater vehicles called submersibles. The scientists visited the Mid-Atlantic Ridge, part of the longest volcano chain in the world. Ro is one of the few people to have ever seen it. She peered out the portholes of the submersible Alvin with other scientists to make careful observations of the rock formations. They used these to create geologic maps of the ocean floor.

**Cause and Effect**

- The cause answers the question “Why did something happen?”
- The effect answers the question “What happened as a result?”

**Research**

Find out more about the Mid-Atlantic Ridge. Use library books and the Internet to research the Mid-Atlantic Ridge. You will use your research to make a chart and to write a lengthy paragraph covering the causes and effects of activity along the Mid-Atlantic Ridge.
Write About It

Focus Questions

- What happens along the Mid-Atlantic Ridge?
- What is the cause?
- What are the long-term effects of this activity?

Make a chart that summarizes the main ideas about the causes and effects of the activity along the Mid-Atlantic Ridge.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
</table>

Next, describe the activity along the Mid-Atlantic Ridge and then discuss what causes this activity and what the effects of it are. Directly answer the prompt in your topic sentence. Use details from your research to clearly explain the causes and effects. Discuss each cause and effect carefully. Wrap up your paragraph with a closing sentence that restates the main idea of your paragraph.
Fast Changes on Earth

Choose the letter of the best answer.

1. A river that overflows its sides may cause a(n)
   a. earthquake.  
   b. flood.  
   c. landslide.  
   d. tsunami.

2. Earth’s crust is made up of gigantic slabs of rock called
   a. craters.  
   b. faults.  
   c. hot spots.  
   d. plates.

3. A large amount of rock and soil that rapidly moves downhill is a(n)
   a. earthquake.  
   b. fault.  
   c. landslide.  
   d. tsunami.

4. An earthquake on an ocean floor can cause a
   a. river of mud.  
   b. tsunami.  
   c. volcano.  
   d. wall of sand and mud.

5. Earthquakes are caused by
   a. a mudslide.  
   b. gravity  
   c. a sudden shift in Earth’s plates.  
   d. a tsunami.
Choose the letter of the best answer.

6. Where are hot spots located?
   a. at the top of a volcano
   b. where magma partially melts through Earth’s crust
   c. where two plates meet
   d. a ring around the Pacific Ocean where most earthquakes happen

7. A mountain built up around an opening in Earth’s crust is a(n)
   a. crater.
   c. tsunami.
   b. eruption.
   d. volcano.

8. A cuplike shape formed at the vent of a volcano is a
   a. composite.
   c. hot spot.
   b. crater.
   d. shield.

9. Heavy rains can soak the soil on a slope of land and cause a(n)
   a. crater.
   c. mudslide.
   b. earthquake.
   d. tsunami.

10. A break in Earth’s crust is known as a(n)
    a. crater
    c. fault
    b. earthquake
    d. plate
Electricity

INPUT

Electrical charges cause _______________________.
They can be ______________________ or _______________________.
Opposites attract and like charges _______________________.

When electrical charges build up they are discharged as ______________________ electricity. An example of this is ______________________ during a thunderstorm.

In a ______________________ circuit, electricity travels through _____________ path.

In a ______________________ circuit, electricity flows through more than one path.

OUTPUT Light
Heat
Motion
Benjamin Franklin

Read the Literature feature in your textbook

Write About It
Response to Literature  This poem shows how Ben Franklin made an incredible discovery. Do some research to find out more about Ben Franklin and electricity. Then write a report. Include facts and details from more than one source.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
Static Electricity

Use your textbook to help you fill in the blanks.

What is an electrical charge?
1. Electrical charge is a _________________.
2. Scientists call the two types of electrical charges ________________ and _________________.
3. When positive and negative charges ________________, the matter is said to be neutral.
4. A positive charge and a negative charge ________________ one another.
5. The word “electricity” comes from the ancient Greek word for _________________.

What is static electricity?
6. When two objects touch, ________________ between the objects.
7. The buildup of electrical charges on an object is called _________________.
8. When you hold a negatively charged balloon near a wall, it ________________ the negative charges in the wall.
What is an electrical discharge?

9. Lightning is the discharge of ________________ inside a storm cloud.

10. A ________________ is the movement of static electricity from one object to another.

11. ________________ in a cloud push down on the negative charges in the ground.

12. The safest place in a lightning storm is ________________

What are conductors and insulators?

13. Copper and silver are examples of ________________ because charges flow through them easily.

14. Electricians often wear rubber gloves to ________________ themselves from getting an electrical shock.

15. The outside of an electrical wire is covered by an ________________ such as rubber or plastic.

16. The insulator keeps the electricity inside the wire and ________________.

Summarize the Main Idea

17. What causes static electricity?

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
Static Electricity

Match the vocabulary word with the correct description.

1. _____ electrical charge
   a. Rubber, plastic, and glass are good examples of these materials.

2. _____ discharge
   b. Positive and negative are the two types of this property of matter.

3. _____ conductors
   c. When clothes stick together after coming out of the dryer, they might have this buildup.

4. _____ insulators
   d. Walking across carpet and touching something metal can cause this movement of electricity.

5. _____ static electricity
   e. Copper and other metals are good examples of these materials.
Static Electricity

charged particles  electrical charges  negative
conductors  insulators  positive
discharge  movement  static electricity

Fill in the blanks.

Electricity powers traffic lights, appliances, and computers. There are different kinds of electricity, but all electricity is the result of _________________.

There are two types of electrical charges. Scientists call these charges ________________ and ________________. When two objects touch, ________________ can move from one object to the other. Negative charges move more easily than positive charges.

The buildup of electrical charges is called _________________. It is what makes clothes stick together. A small shock can be received from a ________________ of static electricity. A discharge is the ________________ of static electricity from one object to another.

Metals like copper and silver are good ________________ because they let charges flow through them easily. Rubber, plastic, and glass are examples of good ________________. These materials do not let charges flow through them easily.
Electric Currents

Use your textbook to help you fill in the blanks.

What is electric current?

1. ________________ can be made to flow continuously through materials.

2. A flow of electrical charges is known as an ________________.

3. The path along which electrical charges flow is called a ________________.

4. A complete, unbroken path is called a ________________.

5. Electric current cannot flow in an ________________.

6. A ________________ is a part of a circuit that opens and closes the circuit.

7. Electric current travels from a ________________ through one wire and prong.
What is a series circuit?
8. In a series circuit, all of the electrical charges flow
   ________________ and along ________________.
9. If any part of a series circuit is removed or broken, the circuit is
   ________________.

What is a parallel circuit?
10. A parallel circuit is a circuit in which the electric current flows
    through ________________.
11. The ________________ of a parallel circuit divide the
    electric current between them.

What affects electric current?
12. The amount of electric current that can flow through
    a circuit depends on ________________ and
    ________________.
13. Voltage is measured in units called ________________.
14. Increasing the ________________ of a circuit decreases
    the flow of electrical charges through it.
15. A ________________ can stop the rest of the circuit from
    operating properly and can be dangerous.
Electric Circuits

Unscramble each of the clue words. Take the letters that appear in the boxes marked with circles and unscramble the letters for the final message.

QUESTIONS

1. A property of matter

2. A flow of electrical charges

3. Can build up as static electricity and can be discharged

4. The unbroken path along which an electric current flows

5. Status of a circuit that is complete and unbroken with flowing electric current

6. Status of a circuit that has breaks or openings in which electric current cannot flow

7. Opens and closes the circuit

8. A circuit in which all electrical charges flow in the same direction and along the same path

9. The strength of a power source that is measured in volts

10. The ability of a substance to slow down electric current

11. Circuit in which the electric current follows two or more paths that are called branches

Letters to unscramble:

- REIGELTCRACALCACHE
- RUTCENR
- GESAHCR
- TIRCIUC
- SECDOL
- NEPO
- CHTISW
- SISREE
- EVLOGTA
- CANSETSERI
- LLLAPREA

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Chapter 6 • Electricity
Reading and Writing in Science

Use with Lesson 2
Electric Current
Electric Currents

<table>
<thead>
<tr>
<th>series circuit</th>
<th>parallel circuit</th>
<th>electric current</th>
</tr>
</thead>
<tbody>
<tr>
<td>voltage</td>
<td>current</td>
<td>open</td>
</tr>
<tr>
<td>charges</td>
<td>branches</td>
<td></td>
</tr>
</tbody>
</table>

Fill in the blanks.

People depend on electricity to light up rooms and to power televisions and computers. The electricity that people use relies on a ______________ of electrical charges. A flow of electrical charges is known as an ______________. Electric currents keep _______________ moving.

All electrical charges flow in the same direction and along the same path in a ______________. If any part of a series circuit is removed or broken, the circuit is ______________.

A _______________ is a circuit in which the electric current follows more than one path. These different paths are often called ______________.

The strength of a power source is its ______________.
Using Electrical Energy

Use your textbook to help you fill in the blanks.

How is electrical energy used?

1. An incandescent bulb produces ________________ and light.
2. Inside incandescent bulbs is a thin wire called a ____________________.
3. A fluorescent bulb uses a ____________________ to produce light.
4. Electrical energy can be converted into ____________________.
5. Electric motors change electrical energy into ____________________.

How does electrical energy get to your home?

6. ________________ are used to change the voltage of electric current.
7. Electric current from a power plant enters a transformer. Electric current leaves the transformer with a strength of about ________________ volts.
8. Appliances in a home usually run on ________________ volt circuits.
How can homes use electrical energy safely?

9. _________________ can cause electrical fires.

10. A _________________ stops the flow of charges by switching off the current if it gets too high.

11. A short circuit might happen when the _________________ of a wire frays.

12. A _________________ melts and breaks the circuit if the electric current in the circuit gets too high.

13. Plugging too many devices into one circuit can also cause too much current to go through a _________________.

14. _________________ stop the flow if there is too much electric current.
**Electrical Energy**

Across

2. A thin wire found in incandescent bulbs
   ________________

4. Can melt to break the flow of electric current in a circuit
   ________________

5. Can stop the flow of charges by switching off the current
   ________________

6. A bulb that produces light and much heat ________________

Down

1. A bulb that uses gas to produce light ________________

3. Changes the voltage of electric current ________________
Fill in the blanks.

_______ change the energy in the electric current into other kinds of energy such as light, heat, and motion.

A(n) __________ bulb uses high temperatures to produce light. Inside incandescent bulbs is a thin wire called a __________. A __________ bulb uses a gas to produce light. When an electric current passes through this gas, it glows.

Electrical energy can be converted into __________. Electric motors change electrical energy into __________.

Electrical energy travels from a power station through wires and transformers to a home. __________ are used to change the voltage of an electric current. Safety devices such as fuses and circuit breakers are used to protect homes and stores from an electric overload.
Write About It

What do you use that works by electricity that you would have trouble doing without? Write an essay that explains how you use an electrical device. Use time-order words or spatial words to make your directions easy to follow.

Getting Ideas

Make a list of things you use that run on electricity. Choose one item to write about.

Planning and Organizing

Jenna uses a hair dryer after every swim practice. Here are some steps that she wrote. Put 1 by the step that comes first. Put 2 by the step that comes second and so on. Number the last step 5.

1. _____ This makes electric current flow through the dryer and heat up the heating element.

2. _____ Lift your hair with a hairbrush and blow the hot air on it.

3. _____ Plug the hair dryer into an electrical outlet.

4. _____ Then the current makes the electric motor spin, turning the fan.

5. _____ Find the “on” switch and move it to the “hot” or “warm” position.
Drafting

Write steps you could use in your explanation. Use the chart below to help you. Write the name of the device on the line.

<table>
<thead>
<tr>
<th>Topic: ______________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>First, ______________________________________</td>
</tr>
<tr>
<td>Then, ______________________________________</td>
</tr>
<tr>
<td>Next, ______________________________________</td>
</tr>
<tr>
<td>Finally, ___________________________________</td>
</tr>
</tbody>
</table>

Now write the first draft of your explanation on a separate piece of paper. Write the steps in time order. Use transition words to connect the steps.

Revising and Proofreading

Here are some sentences that Jenna wrote. Combine each pair of sentences. Turn the second sentence into a prepositional phrase.

1. Make sure nothing blocks the airflow. It comes from the nozzle.
2. Remove the plug. Take it from the electrical outlet.

Now revise and proofread your explanation.
Hybrid Power

In cities like Los Angeles and Sacramento, millions of people drive cars. Most of the cars run on gasoline. There is a limited supply of gasoline in the world, and our cars make us very dependent on it. Also, the more gasoline the cars burn, the more they pollute the air. Pollution from cars contributes to a cloud of smog that sometimes covers a city like a blanket.

How can we become less dependent on gasoline and cut down on air pollution?

One way is to build better cars. Car companies have been working to develop hybrid cars. “Hybrid” is a word that describes something that is a mix of two different things. Hybrid cars use two different power sources—gasoline fuel and electrical energy.

In a traditional car, the gasoline engine runs all the time. But when the car is stopped at a light, sitting in traffic, or slowing down, power from the gasoline engine is not needed at all. At these times, the fuel that is used to keep the engine running is just being wasted.

A hybrid car is designed so that it uses much less fuel than a traditional car. It combines a gas-powered engine with an electrical motor powered by batteries. When the car is stopped or slowing down, the gas-powered engine shuts off. The battery-powered motor takes over to keep the lights, air conditioning, and radio working. The batteries get recharged when the car slows to a stop. The car changes its energy of motion into electrical energy.

The gasoline engines in hybrid cars can be smaller and more energy efficient and still provide enough power to keep the car cruising on the freeway. This makes us less dependent on gasoline — and makes for a cleaner environment!
Main Idea
• The main idea is the focus of the entire article.
• Details support and explain the main idea.

Write About It
How do hybrid cars help people and the environment?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
How does a hybrid car produce electrical energy?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Electricity

Choose the letter of the best answer.

1. The strength of a power source is its
   a. charge.  
   b. discharge. 
   c. resistance.  
   d. voltage.

2. A safety device that switches off dangerous currents is a
   a. circuit breaker.  
   b. insulator. 
   c. resistor. 
   d. transformer.

3. Charges do not flow easily through
   a. conductors.  
   b. copper wire. 
   c. insulators. 
   d. silver.

4. The continuous flow of electrical charges is
   a. discharge.  
   b. electric current. 
   c. static electricity. 
   d. voltage.

5. Rubbing wool on a balloon causes a buildup of electrical charges called
   a. discharge.  
   b. resistance. 
   c. static electricity. 
   d. voltage.

6. Electric current flows through one path in a
   a. transformer.  
   b. open circuit. 
   c. parallel circuit. 
   d. series circuit.

7. A device that protects against dangerous amounts of current is a
   a. filament.  
   b. fuse. 
   c. volt. 
   d. transformer.
Choose the letter of the best answer.

8. The voltage of an electric current can be increased by a(n)
   a. fuse.       c. resistor.
   b. insulator.  d. transformer.

9. Charges flow easily through
   a. conductors. c. plastic.
   b. insulators. d. rubber.

10. Resistance is the ability of a substance to
    a. change the charge of an object.
    b. provide power to a circuit.
    c. slow down electric current.
    d. speed up electric current.

11. Electric current flows through different paths in a
    a. fuse.       c. parallel circuit.
    b. open circuit. d. series circuit.

12. The path of electric current is called a
    a. circuit.     c. switch.
    b. fuse.       d. transformer.

13. A property of matter that can be positive or negative is
    a. electrical charge. c. resistance.
    b. electric current. d. voltage.

14. Static electricity that moves from one object to another is a(n)
    a. circuit.       c. electric current.
    b. discharge.     d. transformer.
Magnetism

What causes a magnetic field to be produced around a wire?

How can an electromagnet be made?

How many poles do all magnets have?

When is a magnetic field stronger? When is it weaker?

What items in your house use electromagnetics?
Cruising on Air

Read the Literature feature in your textbook.

Write About It

In this article, you learned that Maglev trains use magnets to travel at very fast speeds. What are some ways you use magnets? Write a report about uses of magnets. Include facts and details from this article and your experience to support your writing.
Magnets

Use your textbook to help you fill in the blanks.

What is a magnet?
1. When you bring two magnets together, they will either ________________ or attract each other.
2. A magnet is an object with ____________________.

Magnetic Poles
3. The strongest parts of the magnet are called the ________________.
4. When two magnets are brought together, a north pole and a ________________ attract each other.
5. The magnetic force between two magnets is ________________ when the magnets are far apart.

How do magnets attract?
6. Most magnets are made of ________________.
7. Inside a magnet, the tiny particles are lined up with ________________ facing one direction and south poles facing another.
What is a magnetic field?
8. Magnets point north because they line up with ___________ magnetic field.
9. A ___________ is the area of magnetic force around a magnet.
10. The magnetic field allows a magnet to ___________ without even touching it.
11. Much of the inside of Earth is made of ___________.
12. The iron creates a magnetic field which ___________ our planet.
13. Earth spins on its ___________, an imaginary line through the center of Earth.
14. The ___________ is a display of lights near the South Pole.
15. A ___________ is an instrument that uses Earth’s magnetic field to help people find directions.

Summarize the Main Idea
16. How does a compass work?

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
Magnets

a. attract  
b. axis  
c. compass  
d. iron  
e. magnet  
f. magnetic field  
g. magnetite  
h. poles

Use your textbook to help you fill in the blanks.

1. The inside of the Earth is made up of melted _____.
2. Earth spins around on a(n) _____, which is an imaginary line through the center of Earth.
3. A(n) _____ is any object with magnetic force.
4. A(n) _____ is the area of magnetic force around a magnet.
5. When two magnets are brought together, the north pole and the south pole _____ each other.
6. A(n) _____ is an instrument that uses Earth’s magnetic field to find direction.
7. The parts of a magnet where the magnetic force is strongest are called the magnetic _____.
8. _____ is a natural magnet containing iron.
Magnets come in many shapes and sizes. ________________ magnets always have magnetic force. The strongest part of a magnet is the _________________. Like poles attract each other and unlike poles ________________ each other. The mineral ________________ is a natural magnet containing iron. When you bring a magnet near certain ________________ objects like paper clips, tiny particles in the metal will line up. The tiny particles ________________ and ________________ in all different directions until they come in contact with a magnet. Then, the tiny particles line up facing the ________________ pole and the south pole. The paper clip becomes a ________________ magnet. It can attract other metal objects as well!
Electromagnets

Use your textbook to help you fill in the blanks.

What is an electromagnet?

1. When an electric current flows through a wire, it creates a ___________ around the wire.

2. An ___________ is a coil of wire wrapped around a core, usually an iron bar.

3. The magnetic field in the coil of wire causes ___________ inside the metal core to become magnetic.

4. When a current in an electromagnet stops, the metal core is no longer ___________.

How does a loudspeaker work?

5. A ___________ is a device that changes electrical energy into sound.

6. The ___________ is the part of the loudspeaker that vibrates to create sound.

7. When electric current flows through the electromagnet, it is pushed and pulled by the ___________.

8. The movement of the air is what we hear as ___________.
Telephones
9. A telephone receiver is actually a ________________.
10. The telephone mouthpiece is like a loudspeaker in ________________.
11. A ________________ is a magnet used to convert sound into electric signals.

How else are electromagnets used?
12. Electromagnets are often more useful than ordinary magnets because they can be ________________.
13. Electromagnets are used in ________________ that increase or decrease the voltage of electric currents.
14. They are also found in many household ________________ such as doorbells, vacuum cleaners, and dishwashers.

Summarize the Main Idea
15. Why are electromagnets more useful than permanent magnets?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
Vocabulary

Electromagnets

a. current  d. electromagnet  g. microphone
b. diaphragm  e. generate
f. loudspeaker

c. electric signals

Match the correct letter with the description.

1. _____ When a friend calls you on the phone, his or her voice is changed into this.

2. _____ This device uses a magnet to convert sound into electrical signals.

3. _____ The part of the loudspeaker that vibrates to create sound

4. _____ A device that changes electrical energy into sound

5. _____ To make an electric current

6. _____ When this is turned off, the electromagnet is no longer magnetic.

7. _____ A coil of wire wrapped around a core of iron
Electromagnets are very useful in our daily lives. In the 1820s, Michael Faraday and Joseph Henry made discoveries about electric current and magnets. They discovered that magnets could generate an _________________. When the current is flowing, it creates a ________________ around the wire. When the current is turned off, the _________________ is no longer magnetic.

A loudspeaker is a device that changes electrical energy into _________________. The _________________ is the part of the loudspeaker that vibrates to create sound. A telephone also has a tiny _________________. A friend’s voice on the phone is changed into _________________. The mouthpiece of the phone contains a ________________ that uses a magnet to convert sound into electrical signals. Electromagnets are used in many household appliances and toys.
Motors and Generators

Use your textbook to help you fill in the blanks.

What is an electric motor?
1. A motor is a device that changes energy into ___________ or motion.
2. A simple electric motor has a power source, a permanent magnet, a rotating loop of wire, and a ___________.
3. The ___________ is a rod that can spin and move.
4. The electric current runs through the wire loop, making a ___________.
5. In larger motors, the ___________ is made into a coil that is wound hundreds of times around an iron cylinder.

What is a generator?
6. An electric generator is a device that turns motion into ___________.
7. A generator changes ___________ into electrical energy.
8. Generators produce nearly all of our ___________.
9. Fossil fuels, like ____________________, coal, and ____________________, can be burned to heat water, producing steam.

10. ____________________ power splits atoms that contain large amounts of energy.

11. ____________________ heat is used from inside Earth to produce steam.

12. Hydropower uses ____________________ to turn turbines and create energy.

**What kinds of electric current are there?**

13. AC or ____________________ flows in one direction and then flows in the opposite direction.

14. When the flow of current is always in one direction, it is called ____________________, or DC.

15. A ____________________ is an example of a DC power source.

**Summarize the Main Idea**

16. How is an electrical generator the opposite of a motor?
Magnets in Motion

Use words from the lesson to solve the crossword puzzle.

Across
1. A rod that can spin and move

3. An example of a DC power source

6. When the flow of a current is always in one direction

7. A device that changes energy into motion

8. A device that changes motion into electrical energy

9. Heat used from inside Earth to produce steam

Down
2. Flowing water used to create energy

4. A simple electric fan

5. Power source that splits atoms that contain large amounts of energy
Magnets in motion

An electric ________________ is a device that changes electrical energy into _________________. It has a ________________, a permanent magnet, a rotating loop of wire, and a motor _________________. The opposite of an electric motor is an electric ________________, which changes motion into electrical energy. Different power plants use different sources of energy. Flowing water can turn ________________ and create electrical energy. ________________ power plants split atoms that contain large amounts of energy. Most generators produce ________________, which flows in one direction and then flows in the opposite direction. ________________ always flows in one direction. A ________________ is an example of a DC power source.
Write About It

Write a story about a special way that a character uses a magnet.

Getting Ideas

A good story contains a problem that must be solved. On a separate piece of paper, make a list of problems you could solve using a magnet.

Planning and Organizing

Sam decided that his main character would be Jared. Here are some notes he made.

knows a lot about magnets  loves science  wants to make friends

new kid in school  hobby is performing optical illusions

Jared

Now help Sam plan his story. Answer these questions:

1. What problem does Jared have?

2. What does Jared know a lot about?

3. What is his hobby?

4. Put together everything you know about Jared. How do you think he can solve his problem?
Crafting

Write a sentence to begin your story. Introduce your main character and the problem.

Now write the first draft of your story on a separate piece of paper. Introduce your main character and the problem. Tell how the character uses magnets to solve the problem. Put the events in order. At the end, show how the problem is solved.

Revising and Proofreading

Sam used dialogue in his story, but he didn’t use punctuation correctly. Here is part of his story. Proofread it. Add quotation marks where needed.

I’ll show you how the trick works, said Jared to his new friend. It’s really a simple trick.

First, let me guess, Jorge cut in. I bet it has something to do with magnets.

Jared laughed. The chess pieces have magnets in their base. You can make them move by moving a magnet under the table.

Now revise and proofread your story. Ask yourself:

• Have I provided details that create a vivid setting?
• Have I included a plot with a problem?
• Have I developed my characters, or made them seem like real people?
• Have I put the events in sequence?
• Have I included a believable solution to the problem?
• Have I corrected all grammar errors?
• Have I corrected all spelling, punctuation, and capitalization errors?
Motors at Work

Refrigerators, vacuum cleaners, hair dryers, and fans have one thing in common. They all have a motor. You can use those motors today because of people such as Joseph Henry and Michael Faraday. In 1831 these two scientists discovered how to use electromagnets to turn electrical energy into motion.

A few years later, Thomas Davenport, a blacksmith in Vermont, learned about electromagnets and built the first simple motor. He used the device to separate iron from iron ore.

It wasn’t long before people started inventing new devices that used motors. Washing machines, invented in the 1930s, use a motor to turn and wash your clothes. Another motor in a washing machine turns the water faucet on and off. Some of the first automobiles ran on electrical energy. Today many new cars use electric motors in addition to gasoline engines. Motors are useful for a lot of things! Can you think of any other machines that use electrical motors?

Problem and Solution

• A problem is something that needs to be solved.
• A solution is a plan that helps you solve a problem.
Write About It

Problem and Solution  How did Thomas Davenport first use his motor?

• 1831 Michael Faraday and Joseph Henry each produce motion using electromagnets.

• 1834 Thomas Davenport builds motors for his tools, as well as an electric model train.

• 1888 The electric car, or “horseless carriage,” is invented.

• 1891 Electric fans are sold by Westinghouse Electric & Manufacturing Company.

• 1901 H. Cecil Booth patents the vacuum cleaner.

• 1908 Washing machines use motors to spin and clean clothes.

Write about a problem you have had such as a messy room or a really hot summer day. How did an electric motor help you solve it? Brainstorm and write your ideas on a separate piece of paper.

Write a lengthy paragraph on a separate piece of paper. Discuss how an electrical motor helped you solve the problem you were facing. Directly answer the prompt in your topic sentence. Use details and your personal observations to clearly explain why this electrical motor helped you. Smoothly move from one idea to the next with transitional words. Wrap up your paragraph with a closing sentence that restates the main idea of your paragraph—how an electrical motor helped you solve a problem.
Magnetism

Choose the letter of the best answer.

1. Magnetic force is strongest at the
   a. axis.  
   b. center. 
   c. magnetic field. 
   d. poles.

2. A device that changes sound into electrical signals is a
   a. generator.  
   b. loudspeaker. 
   c. microphone. 
   d. motor.

3. The device that changes electrical energy into mechanical energy is a
   a. generator.  
   b. loudspeaker. 
   c. motor. 
   d. turbine.

4. Objects with magnetic force are called
   a. alternating.  
   b. fields. 
   c. generators. 
   d. magnets.

5. Electric current that flows back and forth is called
   a. alternating current. 
   b. direct current. 
   c. magnet. 
   d. open current.
Choose the letter of the best answer.

6. Which device changes mechanical energy into electrical energy?
   a. generator  
   b. loudspeaker  
   c. motor  
   d. turbine

7. Electric current that flows in one direction is called
   a. alternating current.  
   b. direct current.  
   c. turbine.  
   d. common wall outlet.

8. A magnet can attract or repel another object that enters its
   a. alternating current.  
   b. direct current.  
   c. pole.  
   d. magnetic field.

9. A device that changes electrical energy into sound is a
   a. turbine.  
   b. loudspeaker.  
   c. microphone.  
   d. motor.

10. An electromagnet is a magnet that
    a. attracts any object.  
    b. can be switched on and off.  
    c. is permanent.  
    d. is weak.

11. A compass needle points
    a. east.  
    b. north.  
    c. down.  
    d. west.