Instructions for Copying

Answers are printed in non-reproducible blue. Copy pages on a light setting in order to make multiple copies for classroom use.
LIFE SCIENCE

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Monarch
by Marilyn Singer

Read the Unit Literature feature in your textbook.

Write About It
Response to Literature This poem describes a caterpillar changing into a butterfly. All living things change as they grow. Write a poem about how you have changed as you have grown. Write about some exciting things you are waiting for.

Students’ poems should demonstrate vivid word choice and include grammar and mechanics. Their poems should include students’ own observations about the changes in their lives and hopes for the future.
# A Look at Living Things

Complete the concept map about structures of plants and animals. Some examples have been done for you.

<table>
<thead>
<tr>
<th>What Living Things Need</th>
<th>Plant Structures</th>
<th>Animal Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Sugars are made inside leaves during photosynthesis.</td>
<td>Food is taken in by tongues, beaks, trunks, and teeth.</td>
</tr>
<tr>
<td></td>
<td>Nutrients are taken in by roots.</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>Water is taken in by roots.</td>
<td>Water is taken in by tongues, beaks, trunks, and roots.</td>
</tr>
<tr>
<td></td>
<td>Water flows through stems.</td>
<td></td>
</tr>
<tr>
<td>Gases</td>
<td>Carbon dioxide is taken in by leaves.</td>
<td>Oxygen is taken in by lungs, gills, and skin.</td>
</tr>
</tbody>
</table>
Living Things and Their Needs

Use your textbook to help you fill in the blanks.

What are living things?

1. A sunflower plant changes with age, or grows.

2. A plant responds to shade when it bends toward sunlight.

3. Trees reproduce by making seeds.

4. Alligators lay eggs to make more of their own kind.

5. Water and sunlight are nonliving things in nature.

6. Rocks are nonliving because they do not grow, respond, or reproduce.

What do living things need?

7. All living things need food, water, space, and gases in order to survive.

8. Animals eat other organisms because they need food for energy.

9. Living things need water to break down food.

10. Air and water contain a(n) gas called oxygen.
11. Plants need the gases oxygen and **carbon dioxide** to survive.

12. Living things need room, or **space**, to grow, move, and find food.

13. Living and nonliving things are part of an organism's **environment**.

**What are living things made of?**

14. Living things are made of small parts called **cells**.

15. A tool called a(n) **microscope** helps us to see cells.

16. Organisms that have one cell and live in many places are called **bacteria**.

**Critical Thinking**

17. What characteristics can not be used to tell the difference between living and nonliving things?

   Possible answers: size, shape, color, movement, sound, the environment in which something is located, temperature, complex structure
Living Things and Their Needs

Match the correct letter with the description.

a. carbon dioxide  
b. cell  
c. environment  
d. microscope  
e. organism  
f. oxygen  
g. reproduce  
h. respond

1. _____ to make more of one's own kind
2. _____ a small part that makes up all living things
3. _____ all of the living and nonliving things that surround an organism
4. _____ a gas that plants and animals need
5. _____ a special tool that helps make tiny things look larger
6. _____ a gas that plants use to make food
7. _____ another name for a living thing
8. _____ to react to the world around you
Living Things and Their Needs

Fill in the blanks. Use the words from the box.

<table>
<thead>
<tr>
<th>carbon dioxide</th>
<th>food</th>
<th>oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>cells</td>
<td></td>
<td></td>
</tr>
<tr>
<td>energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>organisms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>respond</td>
<td></td>
<td></td>
</tr>
<tr>
<td>grow</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Living things are made of small parts called cells. Some organisms are made of many ________ cells _________. Others are made of only one cell.

Living things have needs. They need food for ________ energy ________ to help them move and ________ grow _________. They need water to break down and move ________ food ________ through their bodies. They need gases. Animals get the gas ________ oxygen ________ from air or water. Plants also need the gas ________ carbon dioxide ________.

Living things, or ________ organisms ________, have many characteristics in common. They ________ respond ________ when they are in danger or when they get too hot. Living things ________ reproduce ________ to make new plants and animals. A thing without these characteristics is nonliving.
Eating Away at Pollution

Read the Reading in Science feature in your textbook.

Write About It

Classify The article explains that some microorganisms are harmful and others are helpful. This is a way to classify them. Read the article again with a partner. Look for another way to classify microorganisms. Then write about it.

Classify

Fill in the blanks in the graphic organizer below. When you have finished, you will be able to see how the two groups are alike and different.

<table>
<thead>
<tr>
<th>Harmful Microorganisms</th>
<th>Helpful Microorganisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Where they are</strong></td>
<td><strong>all around</strong> us.</td>
</tr>
<tr>
<td><strong>What they do</strong></td>
<td>make plants and</td>
</tr>
<tr>
<td></td>
<td><em>animals</em> sick.</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>tiny</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Planning and Organizing

Answer the following questions.

What do helpful microorganisms eat?

Some eat things that are harmful to animals and plants, such as oil and dangerous chemicals found in smoke.

What do helpful microorganisms help clean?

Some clean water and land. Others help clean the air.

Drafting

Explain how helpful microorganisms are alike.

They eat pollution and keep Earth clean. They are small living things.

Explain how helpful microorganisms are different.

Some eat oil, and others eat chemicals. Some clean the water and soil. Others clean the air.

Now, write how you would classify helpful microorganisms.

I would classify them by whether or not they eat oil or chemicals.
Plants and Their Parts

Use your textbook to help you fill in the blanks.

What are plants?

1. One way in which plants are alike is that they make their own _______ food _______.

2. Roots, stems, and leaves help a plant get what it needs in order to _______ survive _______.

How do roots and stems help plants?

3. Roots collect water from the _______ soil _______.

4. Carrots have a thick root, or _______ taproot _______, that stores food.

5. Roots take in _______ nutrients _______ that help plants grow and stay healthy.

6. The plant part that holds up leaves to sunlight is the _______ stem _______.

7. Stems have _______ tubes _______ that carry food and water through a plant.

8. A tree has a hard, woody stem called a(n) _______ trunk _______.

Name __________________ Date __________

Chapter 1 • A Look at Living Things
Reading and Writing
Why are leaves important?

9. Leaves are important because ____________ is made in the leaves.

10. Plants get energy from the ____________ to make food.

11. Plants change carbon dioxide and water into ____________ that they use for food.

12. Leaves have tiny holes that take in ____________.

13. When you breathe, you take in ____________ that plants release.

How can you classify plants?

14. Scientists study plants by putting them into ____________.

15. Scientists group plants by their ____________, such as roots, stems, or leaves.

Critical Thinking

16. What are the jobs of roots, stems, and leaves?

- Roots collect water, take in nutrients, and hold a plant in place.
- Stems support leaves and have hollow tubes through which water, nutrients, and food move. Leaves take in carbon dioxide and sunlight and are the places where food is made.
Plants and Their Parts

Use the words in the box to fill in the blank.

leaf  photosynthesis  stem  sugar
nutrient  root  structure  tubes

1. A ________ is a structure that holds up a plant.
2. A plant’s ________ helps it survive.
3. The structure in which food is made is the ________.
4. The process of making food is called ________.
5. A ________ is a structure that takes in water.
6. A substance that helps living things grow and stay healthy is a ________.
7. The substance that is made in the leaves and used as food for the plant is ________.
8. Stems use ________ to carry water and food throughout the plant.
Plants and Their Parts

Fill in the blanks. Use the words from the box.

<table>
<thead>
<tr>
<th>carbon dioxide</th>
<th>oxygen</th>
<th>structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>classify</td>
<td>photosynthesis</td>
<td>reproduce</td>
</tr>
<tr>
<td>nutrients</td>
<td></td>
<td>water</td>
</tr>
</tbody>
</table>

All plants have one thing in common. They can make their own food through the process of **photosynthesis**. In this process, plants make sugars from **carbon dioxide** and water. Plants give off **oxygen**, which animals need in order to live.

Most plants also have parts, or **structures**, in common. Scientists use these to group, or **classify**, plants. Flowers and cones help some plants **reproduce**. Roots hold plants in place and take in **water** and nutrients. Water, food, and **nutrients** flow through the tubes in stems. Stems help leaves to get **sunlight**. Inside a leaf, a plant makes food.
Animals and Their Parts

What are animals?

1. One characteristic that most animals have in common is that they can ________ move.

2. Unlike plants, animals cannot make their own ________ food.

3. Animals are able to ________ respond to their environments much more noticeably than plants.

4. Wings and tails are ________ structures that help animals get what they need.

5. Animals move toward food and away from ________ danger.

6. Wolves can run and jump because of their ________ strong legs.

7. Fins and tails help ________ fish move through the water.

8. Ducks and geese have ________ webbed feet that help them swim.

How do animals get what they need?

9. Birds use structures called ________ beaks to get food and water.
10. Lions use their sharp **teeth** for biting.

11. Animals that have flat back teeth use them for **chewing**.

12. Lungs and gills help animals take in **oxygen**.

**How do animals stay safe?**

13. A **shelter** helps protect animals from bad weather.

14. Rocks and **trees** are examples of safe places, or shelters, for animals.

15. A snail has a(n) **hard shell** to keep it safe in its environment.

**Critical Thinking**

16. A sponge is an animal. Adult sponges do not move. Why do you think a sponge is classified as an animal?

_A sponge cannot make its own food. It can take in oxygen from its environment._
Animals and Their Parts

Match the correct letter with the description.

a. gills  c. muscles  e. quills  g. trunk
b. lung  d. nest  f. shelter  h. wings

d. ______ a kind of shelter for young birds

b. ______ a structure that takes in oxygen from air

a. ______ structures that take in oxygen from water

h. ______ a structure that helps elephants pull food to their mouths

f. ______ structures that help birds fly and glide through the air

e. ______ structures that help protect a porcupine from other animals

c. ______ structures that help a snake move
Animals and Their Parts

Fill in the blanks.

<table>
<thead>
<tr>
<th>air</th>
<th>move</th>
<th>respond</th>
<th>teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>fins</td>
<td>organisms</td>
<td>swim</td>
<td></td>
</tr>
</tbody>
</table>

Animals share certain characteristics that make them different from plants. Animals can fly, run, jump, or swim. They eat other organisms instead of making their own food. Animals respond to their environments more noticeably than plants.

Animals have a variety of structures. They have different kinds of teeth for biting and chewing. Lungs and gills help animals get oxygen from air and water. Feet, legs, and wings help different animals move. Fish have tails and fins that help them move through water. Tongues, beaks, and trunks help animals get water and food.
Classifying Animals

Use your textbook to help you fill in the blanks.

**How can you classify animals?**

1. Scientists group, or **classify**, animals so that they can study them.

2. One way to classify animals is by the presence or absence of a **backbone**.

**What are some invertebrates?**

3. The covering around an insect is thin and **hard**.

4. A spider is an invertebrate because it is covered by a(n) **exoskeleton**.

5. Crabs have an exoskeleton called a **shell**.

**What are some vertebrates?**

6. Birds have lightweight bones and wings to help them **fly**.

7. Birds and **reptiles** have lungs and they lay eggs.

8. Reptiles live in wet or dry places because their skin is **waterproof**.

9. Frogs and toads breathe through **gills** when they are young.
10. Amphibians can live on land because they grow lungs and \underline{legs}.

11. Fish have scales and a \underline{flat} shape to move easily through water.

**What are mammals?**

12. People are a kind of vertebrate called a \underline{mammal}.

13. Mammals feed \underline{milk} to their young.

14. Some mammals are covered with \underline{fur}.

15. Mammals use their \underline{lungs} to breathe.

**Critical Thinking**

16. Why are vertebrates classified into different groups? Give examples of structures for each group.

Vertebrates are classified into different groups because they have different structures. A bird has a beak, feathers, and wings.

Reptiles have scaly skin and lungs. Amphibians have gills when they are young, but they grow lungs and legs as they get older.

Fish have scales and gills. Mammals have hair or fur.
Classifying Animals

What am I?

Choose a word from the word box below to answer each question.

<table>
<thead>
<tr>
<th>amphiphian</th>
<th>fish</th>
<th>mammal</th>
</tr>
</thead>
<tbody>
<tr>
<td>exoskeleton</td>
<td>invertebrate</td>
<td>vertebrate</td>
</tr>
</tbody>
</table>

1. I am a hard, outer covering around animals with no backbone. What am I? ____________
   
   exoskeleton

2. I am a vertebrate that spends part of my life in water and part of my life on land. What am I? ____________
   
   amphibian

3. I have a soft body and no backbone. What am I? ____________
   
   invertebrate

4. I am an animal with a backbone. What am I? ____________
   
   vertebrate

5. I am a vertebrate with gills and I live in water my whole life. What am I? ____________
   
   fish

6. I am a vertebrate with hair. I feed milk to my young and care for them. What am I? ____________
   
   mammal
Scientists classify animals into groups to make studying them easier. Two main groups of animals are vertebrates and invertebrates. Invertebrates have an exoskeleton to protect their bodies. There are many more invertebrates than vertebrates.

There are five kinds of vertebrates. All of them have a backbone to support their bodies. The kind of vertebrate that lays eggs and can fly is a bird. A reptile has scaly skin and breathes with lungs. An amphibian looks like a fish when it hatches. Its gills change to lungs as the animal gets older. Vertebrates that swim and have scales are called fish. Mammals, another kind of vertebrate, do not hatch from eggs but are born.
**Desert Birds**

Read the Writing in Science feature in your textbook.

**Write About It**

**Descriptive Writing** Choose two animals. Learn more about them. Then write a paragraph on a separate piece of paper that describes how the animals are alike and different.

**Getting Ideas**

Select two different animals. Write the name of each animal above each oval below. In the outer part of each oval, write how each animal is different. In the part that overlaps, tell how they are the same.

**Possible answer:**

```
<table>
<thead>
<tr>
<th>Different</th>
<th>Alike</th>
<th>Different</th>
</tr>
</thead>
<tbody>
<tr>
<td>seals</td>
<td>layer of blubber; fat; up to 880 pounds</td>
<td>mammals; spend time in water</td>
</tr>
<tr>
<td></td>
<td>thick coats; sleek; 45-80 pounds</td>
<td></td>
</tr>
</tbody>
</table>
```

**Planning and Organizing**

Olivia wanted to show how a sea otter and a seal are alike and different. Here are two sentences that she wrote. Write “compare” if the sentence tells how they are alike, and “contrast” if it tells how they are different.

1. **compare** Both seals and sea otters are mammals that spend time in the water.
2. **contrast** Unlike seals, sea otters do not have a layer of blubber.

**Drafting**

Begin your description by writing your own sentence. Name your two animals. Write a main idea that includes them.

Possible answer: Both sea otters and seals spend a lot of time in the water, but they are otherwise very different.

Now write a paragraph describing your two animals. Use a separate piece of paper. Write how they are alike and different. Include vivid details to describe the animals.

**Revising and Proofreading**

Here are some sentences that Olivia wrote. She made five mistakes. Proofread the sentences. Find the errors and correct them.

Both sea otters and seals *spends* a lot of time in the water. Often, the water is cold. How do they stay warm? Sea otters have very thick coats that keep them warm. Seals have blubber to *protect* them from the cold. Usually, sea otters look sleek, while seals look fat.

Now revise and proofread your writing. Ask yourself:

- Did I show how my two animals are alike and different?
- Did I include descriptive words?
- Did I correct all mistakes?
A Look at Living Things

Circle the letter of the best answer.

1. A living thing that makes more of its own kind is said to
   a. grow.
   b. respond.
   c. reproduce.
   d. react.

2. The living and nonliving things that surround an organism make up its
   a. shelter.
   b. environment.
   c. exoskeleton.
   d. structure.

3. The structure in which a plant makes food is a
   a. stem.
   b. leaf.
   c. root.
   d. flower.

4. The plant structures that collect water and nutrients are
   a. roots.
   b. stems.
   c. leaves.
   d. flowers.

5. Every living thing can be called a(n)
   a. cell.
   b. invertebrate.
   c. vertebrate.
   d. organism.
Circle the letter of the best answer.

6. A structure that land animals use to breathe air is a(n)
   a. lung.
   b. gill.
   c. exoskeleton.
   d. cell.

7. An animal without a backbone is a(n)
   a. fish.
   b. amphibian.
   c. vertebrate.
   d. invertebrate.

8. An animal that has feathers and breathes with lungs is a(n)
   a. amphibian.
   b. reptile.
   c. bird.
   d. mammal.

9. An animal that has gills and lungs during its life is a(n)
   a. fish.
   b. reptile.
   c. amphibian.
   d. invertebrate.

10. A vertebrate that has hair and gives birth to its young is a(n)
    a. amphibian.
    b. reptile.
    c. bird.
    d. mammal.
Living Things Grow and Change

Complete the chart below to show the stages in the life cycles of plants and animals. Some answers have been completed for you.

**Flowering Plants**
- Seeds made in flowers → seedling → adult → plant dies

**Conifers**
- Seeds made in cones → seedling → adult → plant dies

**Amphibians and Most Insects**
- Egg → Larva looks different from parents → pupa → adult → animal dies
  - Egg
  - Larva looks different from parents.
  - Pupa
  - Adult
  - Animal dies

**Reptiles and Fish**
- Egg → Young animal looks like parents → adult → animal dies
  - Egg
  - Young animal looks like parents.
  - Adult
  - Animal dies

**Birds**
- Egg → Young animal looks like parents → adult → animal dies
  - Egg
  - Young animal looks like parents.
  - Adult
  - Animal dies

**Mammals**
- Born live → Young animal looks like parents → adult → animal dies
  - Born live
  - Young animal looks like parents.
  - Adult
  - Animal dies
Plant Life Cycles

Use your textbook to help you fill in the blanks.

How do plants grow?

1. The structure inside an apple that grows into a new plant is a(n) ________ seed. 
2. A seed has stored food and nutrients to help the ________ embryo survive. 
3. When conditions are right, a seed will begin to grow, or ________ germinate. 
4. An adult plant grows from a small plant called a(n) ________ seedling. 

How do plants make seeds?

5. The part of a flowering plant that makes seeds is a(n) ________ flower. 
6. Seeds form when an egg joins with ________ pollen. 
7. Flowers have colors and smells that attract animals to drink their ________ nectar. 
8. You can find a fruit around the seeds of ________ flowering plants. 
9. In order to grow, seeds must get to the ________ soil.
What is the life cycle of some plants?

10. A seed germinates in the first stage of a flowering plant’s life cycle.

11. When plants die, they add nutrients to the soil.

12. Two kinds of plants that reproduce by making seeds are flowering plants and conifers.

13. Pollen moves from small male cones to large female cones when the wind blows.

How do plants grow without seeds?

14. An onion can grow a new plant from its underground stem, or bulb.

Critical Thinking

15. What are the steps in the life cycle of a flowering plant? Use the terms seed, germinate, seedling, flower, and pollination in your answer.

Flowering plants start as seeds, which germinate and grow into seedlings. The seedlings grow into adult plants, which produce flowers that make seeds through the process of pollination. Then a seed develops, and the cycle starts again. When adult plants die, they break down, adding nutrients to the soil that new plants use to grow.
Plant Life Cycles

Choose a word from the box that matches each clue below and write its letter in the space provided.

a. cone  c. flower  e. life cycle  g. pollination  h. seed
b. embryo  d. fruit  f. pollen

1. ______ a structure that can grow into a new plant
2. ______ a structure in flowering plants that makes seeds
3. ______ all of the stages in an organism's life
4. ______ the process that takes place when pollen moves from the male part of a flower to the female part of a flower
5. ______ a structure that holds seeds
6. ______ a young plant inside a seed
7. ______ a structure in conifers that makes seeds
8. ______ a powder made by the male part of a flower or cone
Plant Life Cycles

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>adult</th>
<th>fruit</th>
<th>reproduce</th>
</tr>
</thead>
<tbody>
<tr>
<td>cones</td>
<td>germinate</td>
<td>wind</td>
</tr>
<tr>
<td>eggs</td>
<td>pollination</td>
<td></td>
</tr>
</tbody>
</table>

Plants ________ from seeds and grow into ________ plants. Then the plants reproduce.
When plants die, they return nutrients to the soil that new plants use.

Flowers help flowering plants ________ .
Flowers produce pollen and ________ .
Animals and ________ move pollen to eggs.
This movement is called ________ . After a flower is pollinated, a seed forms and is protected by a ________ that grows around it. Conifers make seeds in ________ instead of flowers. Wind blows pollen from small male cones to large female cones. The large cones grow seeds.

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Animal Life Cycles

Use your textbook to help you fill in the blanks.

What are some animal life cycles?

1. A _______ changes into a frog as it grows.

2. Animals change in different ways, but all change as part of their _________.

3. After an animal is born, it grows, changes, _________, and dies.

4. During their life cycles, some animals change form through the process of _________.

5. Metamorphosis happens in the life cycles of amphibians and some _________.

6. The life cycle of amphibians and insects begins with a(n) _________.

7. A young amphibian that ________ from an egg does not look like an adult.

8. Another name for an insect that has just hatched is _________.

How do reptiles, fish, and birds change as they grow?

9. Fish lay their eggs in _________.

Chapter 2 • Living Things Grow and Change
Reading and Writing

Use with Lesson 2
Animal Life Cycles
10. When reptiles and fish are young, they look like ________, similar to their parents.

11. Unlike most reptiles and fish, ________ protect their eggs and raise their young.

What is the life cycle of a mammal?

12. Most mammals do not hatch from eggs, but are ________.

13. Like birds, young mammals ________ look like adults.

14. Mammals look after their young until the young can ________ survive on their own.

Critical Thinking

15. How are the life cycles of animals alike and different?

The life cycles of animals are alike because they are born or hatched. They all grow and change, reproduce, and die. They are different because most animals hatch from eggs, but mammals are born live. Only amphibians and some insects go through metamorphosis. Unlike most animals, birds and mammals take care of their young until the young can live on their own.
Animal Life Cycles

Match the correct letter with its description.

1. _____ a structure containing food and nutrients that young animals need in order to grow
2. _____ the stages through which animals grow, change, reproduce, and die
3. _____ the process by which an animal breaks out of an egg
4. _____ a young insect that has just hatched
5. _____ the stage of an animal’s life cycle when it reproduces
6. _____ a process by which an organism’s body changes form
7. _____ a young frog that breathes with gills
Animal Life Cycles

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>adults</th>
<th>larva</th>
<th>live</th>
<th>parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>die</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hatch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lay eggs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mammals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>life cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>metamorphosis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Animals grow, change, and reproduce in different ways. All animals change during their life cycles. Animals are hatched from eggs or born live. At the end of their life cycles, all animals die.

Reptiles, fish, and birds all lay eggs and mammals are born live. Young birds and mammals look similar to their parents. When they hatch, young reptiles and fish look just like their parents. Amphibians and insects in the larva stage look very different from their parents. Larvae hatch from eggs, and then change into adults through a process called metamorphosis. They will then look like their parents.
The Little Lambs

Read the Writing in Science feature in your textbook.

Write About It

**Personal Narrative** Have you ever seen a plant or animal grow and change? Write about your experience. Describe the changes. Write what you observed, what you did, and how it made you feel.

Getting Ideas

Select a plant or animal to write about. Think about how it changed as it grew. Write three stages of its growth down in the sequence chart below.

**Plant or animal:** horse

- My foal had long legs and no teeth.
- My horse got its first set of teeth when it was a year old.
- My horse is still growing and gaining weight at three years old.

Planning and Organizing

Jake wrote about his horse Wind Star. Here are three sentences that he wrote. Put them in time order. Write 1 next to the sentence that should come first. Write 2 next to the sentence that should come next. Write 3 next to the sentence that should come last.

1. _____ 2 Wind Star got his first set of teeth when he was one.
2. _____ 3 Now he is three years old and still growing.
3. _____ 1 When Wind Star was a foal, he had no teeth.
Drafting

Write the first sentence of your narrative. Use “I” to refer to yourself. Describe something interesting about a plant or animal that you helped to care for.

Possible sentence: I fell in love with Wind Star the first time I saw him.

Now complete your personal narrative. Use a separate piece of paper. Begin with the sentence you wrote above. Include details about how your plant or animal grew and changed. Put them in time order. Explain how watching these changes made you feel.

Revising and Proofreading

Here is part of the personal narrative that Jake wrote. He had a lot of trouble with homophones. Homophones are words that sound alike but have different spellings and different meanings. Proofread it. Find the five mistakes he made. Correct them.

My little foul looked so handsome. He had a white star write in the middle of his forehead. His coat was chestnut brown. His legs wobbled whenever he stood up. He was the cutest creature I had ever scene. I couldn’t weight for him to grow up sew that I could ride on him.

Now revise and proofread your own writing. Ask yourself:

- Did I use the pronoun “I” to describe my own experience?
- Did I detail how the plant or animal grew and changed?
- Did I correct all mistakes?
From Parents to Young

Use your textbook to help you fill in the blanks.

What are inherited traits?

1. Features that make an organism unique are called _________.

2. Examples of human traits are eye and hair _________.

3. People use traits to _________ an organism.

4. The passing on of a trait from parents to young is called _________.

5. The features that your parents passed on to you are called _________.

6. You look like your ________ because of inherited traits.

7. Most organisms have a(n) _________ of traits from both parents.

8. An organism will look _________ like the parent that passes on visible traits.

9. If a gray dog and a yellow dog have yellow puppies, yellow is a more _________ trait than gray.

10. Both parents pass on traits to their young, otherwise known as _________.

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Which traits are not inherited?

11. Traits that people and animals learn over time are called __________.

12. Learned traits and traits caused by the environment are not __________.

13. A scar is a trait caused by the __________.

14. An example of a trait caused by the environment is a tree losing its __________.

Critical Thinking

15. What is the difference between traits that are inherited and traits that are not inherited? Give examples in your answer.

Traits that are inherited come from parents. Examples are hair and eye color. Traits that are learned or are caused by the environment are not inherited. An example of a learned trait is riding a bicycle. An example of a trait that is caused by the environment is a rabbit that gets fat when it eats plenty of food.
From Parents to Young

Fill in the blanks.

environment  inherited traits  offspring  visible
heredity  learned traits  trait

1. Traits that come from parents are called ____inherited traits____.

2. You may look more like one of your parents than the other one because that parent passed on ____visible____ traits.

3. New skills you gain that were not passed on from your parents are called ____learned traits____.

4. The passing on of traits from parents to young is called ____heredity____.

5. A unique feature of a living thing is a(n) ____trait____.

6. Hair that gets lighter from the Sun is an example of a trait caused by the ____environment____.

7. Another word for an organism’s young is ____offspring____.
**From Parents to Young**

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>environment</th>
<th>learned traits</th>
<th>offspring</th>
</tr>
</thead>
<tbody>
<tr>
<td>inherited traits</td>
<td>mixture</td>
<td>skills</td>
</tr>
</tbody>
</table>

The features that make an organism unique are called traits. Some traits are passed from parents to their **offspring**. These traits are called **inherited traits**. Organisms look like both parents because they get a(n) **mixture** of traits from both parents. However, an organism may look more like the parent that has passed on the more visible traits.

Other traits are new **skills**, such as learning to read. They are not inherited. Skills that an animal learns are called **learned traits**. Learned traits can change or appear because of the **environment**. For example, green leaves may turn yellow if a plant needs water.
Meet Darrel Frost

Read the text below.

A fence lizard is soaking up warmth from the Sun when a hawk soars overhead. The hawk spots the lizard, then swoops down to grab a meal. The lizard has no time to scurry away. How can it escape the hawk’s claws?

If the hawk catches the lizard’s long tail, the tail will break off. The bird will be left holding a wriggling tail while the lizard runs away. In time, the lizard will grow a new tail. Growing new body parts is a trait called regeneration.

Regeneration is one of the many amazing traits that Darrel Frost studies. Darrel is a scientist at the American Museum of Natural History. He travels all over the world to learn about different kinds of lizards. Then he observes their traits. Finally, he uses his observations to find out how different kinds of lizards are related.

Rewrite the first two sentences using the words first, second, third, and fourth.

First, a fence lizard is soaking up warmth from the Sun. Second, a hawk soars overhead. Third, the hawk spots the lizard. Fourth, the hawk swoops down to grab a meal.
**Write About It**

**Sequence** Read the article with a partner. Fill in a sequence-of-events chart to show how Darrel learns about lizards. Then use your chart to write a summary about Darrel and his work.

<table>
<thead>
<tr>
<th>First</th>
<th>Darrel travels all over the world to learn about lizards.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next</td>
<td>He observes them and studies their traits.</td>
</tr>
<tr>
<td>Last</td>
<td>He uses his observations to try to find out how different kinds of lizards are related.</td>
</tr>
</tbody>
</table>

**Summarize**

Write your summary on the lines below. Use your own words. Include the ideas in the boxes above. Be sure your summary tells what happens first, next, and last.

Darrel is a scientist who studies amphibians and reptiles. He studies regeneration, which means growing a new body part. Darrel is interested in learning about types of lizards. First, Darrel travels around the world. Next, he observes and studies the lizards. Last, he tries to find out how different lizards are related.
Living Things Grow and Change

Circle the letter of the best answer.

1. Which structure of a flowering plant holds seeds?
   a. cone
   b. fruit
   c. egg
   d. embryo

2. Which structure contains food and nutrients for developing animals?
   a. embryo
   b. egg
   c. seed
   d. pupa

3. When pollen joins an egg in the ovary of a flower, what is formed?
   a. a seed
   b. a cone
   c. a flower
   d. a fruit

4. Which is an example of a learned trait?
   a. flower shape
   b. eye color
   c. speaking a language
   d. a scar

5. Which young animal looks very different from its parents?
   a. kitten
   b. alligator
   c. chick
   d. beetle larva

6. Which plant structure makes seeds?
   a. cone
   b. fruit
   c. flower
   d. embryo
Circle the letter of the best answer.

7. Any feature of a living thing is called a(n)
   a. instinct.
   b. trait.
   c. inherited trait.
   d. learned trait.

8. Inherited traits come from
   a. parents.
   b. skills.
   c. environment.
   d. offspring.

9. The inside of a seed contains a(n)
   a. egg.
   b. fruit.
   c. larva.
   d. embryo.

10. In which stage does an insect change into an adult?
    a. life cycle
    b. metamorphosis
    c. larva
    d. pupa

11. What must happen before a seed forms in a flower or a cone?
    a. pollination
    b. metamorphosis
    c. heredity
    d. germination

12. Which structure in conifers makes seeds?
    a. flower
    b. fruit
    c. cone
    d. embryo

13. Which stage happens before the pupa stage?
    a. adult
    b. egg
    c. larva
    d. seed
Once Upon a Woodpecker

Read the Unit Literature feature in your textbook.

Write About It

Response to Literature This article tells about special features of woodpeckers that help them survive. What are some special features you have that help you survive? Write about them.

Paragraphs should have a clear topic sentence that directly addresses special features that help students survive. The sentences that follow should provide details for the topic sentence, such as which special features help humans survive. Examples would be hands that help people prepare food needed to survive, or ears that help detect danger. Students should use a closing sentence that wraps up the main idea of the paragraph or restates the topic sentence. Good paragraphs will include correct grammar and mechanics and demonstrate proper transition from one idea to the next.
Living Things in Ecosystems

Complete the concept map with the information you learned about the climates and adaptations in Earth’s ecosystems. Some answers have been completed for you.

<table>
<thead>
<tr>
<th>Ecosystem</th>
<th>Climate and Other Characteristics</th>
<th>Adaptations</th>
</tr>
</thead>
<tbody>
<tr>
<td>desert</td>
<td>dry, warm ___________ during the day, cool at night</td>
<td>cactus leaves and stems hold water nocturnal to survive warm days</td>
</tr>
<tr>
<td>tropical rain forest</td>
<td>hot and damp ___________ all year round</td>
<td>leaves have grooves and “drip tips” climb or fly into trees</td>
</tr>
<tr>
<td>temperate forest</td>
<td>cold, dry winters and warm, wet summers</td>
<td>trees lose leaves in winter hibernate during the winter</td>
</tr>
<tr>
<td>wetland</td>
<td>land under water ___________ most of the year</td>
<td>roots spread out above the water catfish breathe oxygen</td>
</tr>
<tr>
<td>ocean</td>
<td>warmer in shallow areas, colder in deeper areas</td>
<td>plants (algae): air bladders animals: gills and fins</td>
</tr>
</tbody>
</table>
Food Chains and Food Webs

Use your textbook to help you fill in the blanks below.

**What is an ecosystem?**

1. Plants, animals, water, soil, and sunlight in an area all interact to form a(n) _________.

2. In an ecosystem, organisms have different homes, or ________ where they live.

3. Plants and animals get food, water, and _________ from their habitats.

**What is a food chain?**

4. To live and grow, every living thing needs _________.

5. The system by which organisms get and give energy is a(n) _________.

6. Green plants and algae are ________ that use the Sun's energy to make food.

7. Organisms that get their energy from eating other organisms are called _________.

8. Decomposers, such as worms and ________, break down dead plants and animals.

9. Decomposers put ________ into the soil that are used by new plants.
Lesson Outline

What is a food web?
10. A grasshopper is a(n) ________ herbivore because it gets its energy from eating plants.

11. A heron is a(n) ________ carnivore because it gets its energy from eating animals.

12. A bear is an omnivore, which means that it eats plants and ________ animals.

Why are decomposers important?
13. If ecosystems did not have ________ decomposers, piles of dead plants and animals would build up.

14. The nutrients that decomposers put back into water or soil help other organisms ________ grow.

Critical Thinking
15. How do living and nonliving things interact in an ecosystem? Use the terms sunlight, plants, animals, decomposers, and soil in your answer.

Plants use sunlight to make their own food. Animals eat the plants for energy. Other animals might eat these animals. When plants and animals die, decomposers break them down into nutrients. The nutrients go into the soil and help new plants grow.
Food Chains and Food Webs

Match the correct letter to its description.

<table>
<thead>
<tr>
<th>a. predator</th>
<th>b. consumer</th>
<th>c. decomposer</th>
<th>d. ecosystem</th>
<th>e. food chain</th>
<th>f. food web</th>
<th>g. habitat</th>
<th>h. producer</th>
</tr>
</thead>
</table>

1. ______ the living and nonliving things that interact in an environment
2. ______ an organism that makes its own food
3. ______ shows how energy passes from one organism to another in an ecosystem
4. ______ an organism that eats other organisms
5. ______ hunts other organisms for food
6. ______ an organism that breaks down dead plant and animal material
7. ______ shows how food chains are linked together
8. ______ the place where an organism lives
Food Chains and Food Webs

Use the words in the box to fill in the blanks.

| animals   | ecosystem | omnivores |
| consumers | energy    | producers |
| decomposers | herbivores | Sun |

Living things depend on other living things and nonliving things around them. All of these things form a(n) \[\text{ecosystem}\]. In an ecosystem, \[\text{energy}\] passes from one organism to another. Food chains begin with \[\text{producers}\] that make their own food. They use energy from the \[\text{Sun}\].

Organisms that cannot make their own food are called \[\text{consumers}\]. Consumers that eat plants are called \[\text{herbivores}\]. Carnivores eat other \[\text{animals}\]. Plants and animals are eaten by \[\text{omnivores}\]. Nutrients from dead organisms are recycled by \[\text{decomposers}\].
Types of Ecosystems

Use your textbook to help you fill in the blanks below.

How do ecosystems differ?

1. An ecosystem’s long-term weather conditions are called its _______ climate.

2. Plants grow well in ecosystems that have _______ soil rich in humus.

3. Grasslands, forests, oceans, and ponds have _______ different types of plants and animals.

What is a desert?

4. A desert is an ecosystem that gets very little _______ rain.

5. Deserts have few plants because the soil is mostly _______ sand, which does not provide them with enough water to survive.

6. Animals in the desert search for food at _______ night when temperatures are cooler.

What is a forest?

7. A(n) _______ tropical rain forest is an ecosystem that is warm and rainy all year long.

8. The temperatures and rainfall change each season in a(n) _______ temperate forest.
LESSON Outline

What is an ocean?

9. The largest environment on Earth is a body of water called a(n) \textit{ocean}.

10. In the ocean, a ridge made of tiny animals called \textit{coral} attracts many fish.

What is a wetland?

11. An ecosystem in which the land is often \underline{wet} and sometimes dry is a wetland.

12. Plants grow well in wetlands because the soil is \underline{full of} \textit{nutrients}.

13. Wetlands help prevent \underline{flooding} because they absorb water.

Critical Thinking

14. What are three characteristics that make Earth’s ecosystems different from one another? Give an example of each characteristic.

\textit{Earth's ecosystems have different climates, types of soil, and kinds of animals. The desert gets very little rain. The temperate forest has soil rich in humus. The ocean has fish, sea sponges, and other animals that do not live anywhere else.}
### Types of Ecosystems

Match the words in the box to their definitions below. Write the correct letter in the space provided.

<table>
<thead>
<tr>
<th>a. climate</th>
<th>d. ocean</th>
<th>g. tropical forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. desert</td>
<td>e. soil</td>
<td>h. wetland</td>
</tr>
<tr>
<td>c. forest</td>
<td>f. temperate</td>
<td></td>
</tr>
</tbody>
</table>

1. ______ an ecosystem in which water covers the soil for most of the year
2. ______ the long-term weather conditions of an area
3. ______ an ecosystem that has many trees
4. ______ the type of forest ecosystem found in North America, Europe, and Asia
5. ______ a mixture of broken-down rocks and humus
6. ______ an ecosystem that has a dry climate
7. ______ the largest environment on Earth
8. ______ the type of forest that is hot and damp
Types of Ecosystems

Use the words in the box to fill in the blanks below.

climates  fresh  ocean  soil
desert  hot  seasons  Sun
dry  humus  shallow  tropical rain

Earth's ecosystems differ in many ways. They have different types of climates, soil, plants, and animals. The largest ecosystem is the ocean.

Most ocean organisms live in shallow water. Few animals live deep in the ocean because they would not get any light from the Sun. Wetlands can have fresh water. In a desert, the land is dry and has few plants.

The ecosystem that gets the most rain is the tropical rain forest. It is hot there all year long. The soil has few nutrients. A temperate forest has four seasons and soil that is rich in humus. Many animals can be found in temperate forests.
Meet Ana Luz Porzecanski

Read the Reading in Science feature in your textbook. Work with a partner to answer the following questions.

Characteristics of the Tinamou

1. What kind of animal is the tinamou? How do you know?
   
   It is a bird because it has feathers and lays eggs.

2. What colors is the tinamou?
   
   brown and grey

3. In which type of ecosystem does the tinamou live?
   
   grasslands known as pampas

Characteristics of the Other Animal

Think of an animal that has some things in common with the tinamou. Answer the questions below.

1. What is the other animal? Describe it.
   
   Possible answer: It is a turtle. It has a shell and scales, and lays eggs.

2. What color is the animal?
   
   Possible answers: green or brown

3. In which type of ecosystem does it live?
   
   Possible answer: a wetland
Write About It

Compare and Contrast  Work with a partner to compare the tinamou with another animal you know about. List ways the animals are alike and different in a Venn diagram. Then use your diagram to write about the animals.

Use your answers to the questions on the previous page to fill in the Venn diagram.

Different
Tinamou

bird

feathers

grey

lives in the pampas

Alike

both lay eggs

both might be brown

Different

Sample answer: turtle

reptile

scales

green

lives in the wetlands

1. On a separate piece of paper, explain how the two animals are alike and different.

Possible answers: Both lay eggs. A tinamou has feathers.
Adaptations

Use your textbook to help you fill in the blanks below.

**How are living things built to survive?**

1. A frog's sticky tongue is a(n) ________ adaptation that helps it find food.

2. Some animals escape from danger by using ________ camouflage to blend in with their environment.

3. In cold climates, some animals have ________ blubber to keep their bodies warm.

**What adaptations help desert plants and animals survive?**

4. Desert plants have ________ spines to keep animals from eating them.

5. Coyotes are ________ nocturnal, meaning that they sleep during the day and hunt at night.

6. Jackrabbits have ________ large ears to help them stay cool.

**What adaptations help forest plants and animals survive?**

7. Trees in temperate forests save water during the winter by losing their ________ leaves.

8. An organism that imitates another is using ________ mimicry.
9. Some animals **hibernate** during the winter.

**What adaptations help ocean plants and animals survive?**

10. Plant-like organisms that live in the ocean and make their own food are called **algae**.

11. Algae without roots have **air bladders** to help them float on the water’s surface.

**What are adaptations to a wetland?**

12. Wetland plants have adaptations to help them survive when **water levels** change.

13. During dry seasons, wetland catfish breathe **oxygen** from the air.

**Critical Thinking**

14. What are three ways in which adaptations help organisms survive? Give an example of each.

Adaptations help organisms find food, escape danger, and live in different climates. Frogs have sticky tongues to catch insects. Some snakes use camouflage so that they will not be seen. Some animals in cold climates keep warm through a layer of blubber.
Adaptations

Use the words in the box to fill in the blanks below.

- adaptation
- blubber
- camouflage
- hibernate
- migrate
- mimicry
- nocturnal
- air bladders

1. A special characteristic that helps an organism survive in its environment is a(n) adaptation.
2. Animals that are active at night are nocturnal.
3. A layer of fat under the skin of some animals who live in cold climates is blubber.
4. When animals move from one place to another, they migrate.
5. Blending into one's environment is called camouflage.
6. When one living thing imitates another in color or shape, it is using mimicry.
7. Animals go into a deep sleep when they hibernate.
8. Balloon-like structures that help algae float are called air bladders.
Adaptations

Use the words in the box to fill in the blanks below.

- air bladders
- gills
- nocturnal
- roots
- camouflage
- migrate
- sunlight

Living things have adaptations that help them find food and water. Desert plants have long ______ roots to find water. Algae use _______ to float on the ocean's surface to get _______. Deep in the ocean, the _______ has a light that attracts its food.

Some animals use _______ to blend into their environment. Animals in the desert are _______, or active at night. Some forest animals _______ during the winter when food is hard to find. Fish have _______ so that they can breathe underwater. Some animals _______ when the seasons change.

Plant and animal adaptations can be found in every environment.
Living Things in Ecosystems

Circle the letter of the best answer.

1. All the living and non-living things in an environment form a(n)
   a. habitat.
   b. food web.
   c. ecosystem.
   d. food chain.

2. Which ecosystem has the highest density of living things?
   a. temperate forest
   b. tropical rain forest
   c. wetland
   d. desert

3. To avoid very cold temperatures when the seasons change, some animals
   a. use mimicry.
   b. use camouflage.
   c. become nocturnal.
   d. migrate.

4. Which type of organism makes its own food?
   a. consumer
   b. producer
   c. herbivore
   d. omnivore

5. Which of these ecosystems receives the least rain?
   a. forest
   b. ocean
   c. desert
   d. wetland

6. An animal that is active at night is said to be
   a. hibernating.
   b. migrating.
   c. using camouflage.
   d. nocturnal.
Circle the letter of the best answer.

7. Which of the following is an example of a consumer?
   a. plant
   b. insect
   c. algae
   d. bacteria

8. Which of the following shows that organisms usually eat more than one type of food?
   a. habitat
   b. ecosystem
   c. food chain
   d. food web

9. Which ecosystem has soil that is under water most of the year?
   a. desert
   b. wetland
   c. temperate forest
   d. tropical rain forest

10. Which type of organism breaks down dead plants and animals?
    a. decomposer
    b. carnivore
    c. producer
    d. omnivore

11. What do some animals do so that they can survive with less energy in winter?
    a. use camouflage
    b. use mimicry
    c. migrate
    d. hibernate

12. Climate describes an ecosystem’s
    a. weather.
    b. plants.
    c. soil.
    d. nonliving things.
Changes in Ecosystems

Complete the concept map with the information that you learned about changes in ecosystems.

- The changes can be small or large.
- Living things can cause changes when they compete for resources.

Changes in ecosystems affect living things.

- Changes that affect living things include floods, droughts, and disease.
- Living things that cannot adjust to changes may become endangered, which means that only a few of their population remain.

Living things change ecosystems.

- When people pollute land, air, or water, they cause changes in ecosystems.
- People also cause changes by clearing land for towns and cities.

Fossils tell about past changes.

- People study fossils to learn about ancient organisms and changes on Earth over time.
- Dinosaurs are extinct, possibly because of a meteor, and saber-toothed cats are extinct, possibly because of climate changes.
Living Things Change Their Environments

Use your textbook to help you fill in the blanks.

**How do living things change their environments?**

1. Living things change their environments in small and large ways.

2. One way that plants change the environment is by absorbing water from the soil.

3. Worms change the environment by adding nutrients to the soil.

4. When water is limited, a struggle, or competition, among plants may occur.

5. Food and water are resources that living things need to survive.

**How do people change their environments?**

6. The organisms that cause the most changes to the environment are people.

7. Plants and animals can lose their homes when people clear forests.

8. Cars, factories, and trash can harm the environment by causing pollution.

9. Pollution increases when wetlands are drained.
10. An organism that is new to an environment can harm it by competing for **limited resources** that other plants and animals need.

**How can people protect their environments?**

11. You protect the environment when you ________reduce________ the amount of paper you use.

12. You protect the environment when you ________reuse________ newspapers to line pet cages.

13. Businesses protect the environment when they ________recycle________ old newspapers into new paper products.

14. When you plant a tree, you help keep ________soil________ from washing away.

**Critical Thinking**

15. How do you help plants and animals when you reduce, reuse, and recycle paper products?

Possible answer: Paper is made from trees. When you practice the 3 Rs, less paper has to be made. Fewer trees have to be cut down for new paper products. This saves forests from being cleared, and plants and animals will not lose their homes.
Living Things Change Their Environments

Match the word with its correct description below. Write its letter in the space provided.

- a. competition
- b. pollution
- c. predators
- d. recycle
- e. reduce
- f. resource
- g. reuse

1. _____ to turn old things into new things
2. _____ when harmful materials get into the air, land, or water
3. _____ animals that hunt other animals
4. _____ something that helps an organism survive
5. _____ to use something again
6. _____ the struggle for survival among living things
7. _____ to use less of something
Living Things Change Their Environments

Use the words in the box to fill in the blanks below.

competition  healthy  reuse  soil  homes  recycle  wetlands  forests

To meet their needs, living things, including people, change the environment. To build towns and cities, people sometimes drain ________ and clear _________. This takes _________ away from many plants and animals. Another cause of change is ________ for resources, such as water and space, among living things. As a result, the environment is changed.

People can improve the _________. We can produce less trash if we _________ and _________. We can keep the environment _________ by planting trees. Trees help keep _________ in its place. They can also help clean the air.
Changes Affect Living Things

Use your textbook to help you fill in the blanks.

What are some ways environments change?

1. An environment can change when a(n) ______ flood covers dry land with water.

2. Living things are harmed when they do not get enough water during a(n) ______ drought.

3. Floods and droughts are types of ______ natural disasters.

4. Animals can lose their homes when lightning starts a(n) ______ wildfire.

5. Some bacteria and mold can cause ______ diseases that harm many living things.

How do organisms respond to changes?

6. Burrowing in the mud is a(n) ______ adaptation that helps frogs survive in a dry environment.

7. Some animals that cannot survive in a changed environment may move to a new ______ habitat.

8. If organisms cannot move and the environment has changed too much, the organisms will ______ die.
How do environmental changes affect an entire community?

9. In the grasslands of the central United States, prairie dogs build ______ and eat _______.

10. Prairie dogs are food for ________ and _______.

How does a living thing become endangered?

11. The population of a(n) ________ organism is very small.

12. Because it cannot adjust to dry conditions, the ________ may disappear.

13. People can cause organisms to become endangered when they ________ them.

Critical Thinking

14. Would animals in a forest be harmed if a disease spread that only affected plants? Explain why or why not.

Possible answer: Yes, animals would be harmed. Some animals eat plants for food, and other animals eat them. Therefore, many animals may not have enough food. The animals would also lose their places to live and hide.
Changes Affect Living Things

Match the word with its correct description below. Write the letter of the word in the space provided.

- a. community
- b. disease
- c. drought
- d. endangered
- e. flood
- f. population
- g. natural disaster
- h. wildfire

1. _____ a long period of time with no rain
2. _____ something that covers dry land with water
3. _____ can be caused by bacteria or mold
4. _____ can start when lightning strikes a dry area
5. _____ all of the organisms in an ecosystem
6. _____ a flood is an example of this
7. _____ when an organism has only a few living members of its population left
8. _____ all of the members of a single type of organism in an ecosystem
Changes Affect Living Things

Use the words in the box to fill in the blanks below.

- disease
- migrate
- plants
- prairie dogs
- tunnels
- floods
- organism
- water

Changes in an environment affect its living things. A change that affects only one type of organism can eventually affect other populations. For example, coyotes eat prairie dogs. Mice and snakes live in the tunnels that prairie dogs build. If a(n) disease destroyed the prairie dogs, all of these other animals would be affected.

Besides diseases, natural disasters such as floods and droughts can change an environment. When dry land is covered by water, soil and plants can be washed away. Some organisms die from too little water during a drought. Organisms must migrate or adjust to a changing environment. If they do not, they may become endangered.
Save the Koala Bears

Read the Writing in Science feature in your textbook.

**Write About It**

**Persuasive Writing** Choose an endangered animal you care about. Research to find out why this animal is in trouble. Write a paragraph to convince readers that this animal should be saved. Be sure to end with a strong argument.

**Getting Ideas**

Fill out the chart below. Write your opinion about your endangered animal in the top oval. Write down the reasons that support your opinion in the bottom ovals.

**Opinion**

Possible answer: We need to protect the giant panda bear before it dies out.

**Reason**

Only 1,600 panda bears are left in the wild.

**Reason**

If these creatures die out, it would affect the balance of nature.
Planning and Organizing

Isabella wrote about the giant panda bear. Does her sentence tell why we should protect the panda? If so, write “yes.” Write “no” if it does not.

1. If pandas die out, it will affect the balance of nature. yes

2. I saw a beautiful panda bear in the zoo. no

Drafting

Pick an animal. Write a sentence that states your opinion about saving it.

Possible sentence: We need to protect the giant panda bear.

Now write your paragraph on a separate piece of paper. Begin with the sentence that you wrote above.

Revising and Proofreading

Here are some sentences that Isabella wrote. Proofread them. Find the five spelling errors. Cross out each misspelled word. Write the correct spelling above it.

Panda bears have lived in bamboo forests for millions of years. If the giant panda bear dies out, the Earth will lose one of the most beautiful creatures in the world. I believe that people must take action now.

Now revise and proofread your writing.

Ask yourself:

- Did I state my opinion about an endangered animal?
- Did I include convincing reasons?
- Did I correct all mistakes?
Living Things of the Past

Use your textbook to help you fill in the blanks.

What can happen if the environment suddenly changes?

1. People know about organisms that lived long ago because of remains called _______ fossils _______.

2. A type of organism that has no living population is said to be _______ extinct _______.

3. Large animals called _______ saber-toothed cats _______ became extinct about 10,000 years ago when the climate changed.

4. Ice covered much of Earth during the _______ Ice Age _______.

5. Disease and dry weather caused the _______ St. Helena Olive tree _______ to become extinct in 2004.

How can we learn about things that lived long ago?

6. Scientists can tell what animals ate by studying their _______ teeth _______.

7. Scientists learn how animals moved by studying their _______ bones _______.

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LESSON 8

Fish fossils found on _________ teach us that the area was once covered by _________.

9. The _______ fossils are usually deep below the surface of the ground.

10. The _______ fossils are usually below ground but close to the surface.

How are living things of today similar to those that lived long ago?

11. Fossils do not show how organisms used their _________.

12. Elephants today are similar to _______ that lived long ago.

13. The pterodactyl was a flying reptile that used its beak and claws to catch fish, just as the _______ does today.

Critical Thinking

14. Tropical plants can be found where it is hot and rainy. Fossils of tropical plants have been found in a place where it is cold today. What can you infer from this finding?

Possible answer: The place where it is cold today probably used to have a hot and rainy climate.
Living Things of the Past

Who am I? What am I?

Choose a word from the box below that answers each question and write its letter in the space provided.

a. extinct  
b. fossil  
c. ice Age  
d. saber-toothed cat  
e. St. Helena Olive tree  
f. woolly mammoth

1. _____ b I am the remains of an organism that lived long ago. What am I?

2. _____ f I am an ancient animal that used a trunk as elephants do today. Who am I?

3. _____ a I was a living organism, but there are no more of my kind alive. What am I?

4. _____ d I am a big animal that became extinct when the climate changed thousands of years ago. Who am I?

5. _____ e I am a type of tree that is extinct because of disease and dry weather. What am I?

6. _____ c During my time, large ice sheets covered much of the land. What am I?
Scientists learn about ancient organisms by studying fossils. They learn how animals looked, how they moved, and what they ate. Some living things today look similar to organisms of long ago. Scientists can infer from them how ancient organisms used their body parts. For example, elephants look like woolly mammoths.

From fossils, scientists also learn how Earth has changed over time. They find fossils in its rock layers. Scientists think that some animals are extinct because of natural events. For example, dinosaurs may have died when a(n) meteor hit Earth. Other animals became extinct because of humans’ activities, competition, and disease.
Looking at Dinosaurs

Read the Reading in Science feature in your textbook.

Write About It

Fact and Opinion  What animal do you think dinosaurs are like? What animal do scientists think dinosaurs are like? Why do scientists think this?

Planning and Organizing

Answer the following questions.

What animal do you think dinosaurs are like?

Possible answer: Dinosaurs are like tortoises because they are both reptiles and have scaly skin.

What animal do scientists think dinosaurs are like? Why do scientists think this?

Possible answer: Most scientists agree that dinosaurs are like birds because they laid eggs and some were covered in feathers. They think this based upon evidence that was discovered.
Drafting

Write a paragraph explaining how one of the previous answers is an opinion and the other is a fact. Use examples of dinosaur discoveries to support your writing.

Possible answer: The first answer is my opinion because it is what I thought about dinosaurs without any evidence. The second answer is fact because it is supported by scientific evidence, such as the discovery of dinosaur nests containing eggs in the Gobi Desert in China and dinosaur fossils with feathers.
Changes in Ecosystems

Circle the letter of the best answer.

1. To use something again is to
   a. reuse.
   b. reduce.
   c. recycle.
   d. compete.

2. Which is an example of a resource?
   a. fossil
   b. air
   c. disease
   d. adaptation

3. Soil and plants may be washed away during a
   a. drought.
   b. wildlife.
   c. flood.
   d. disease.

4. When you use less of something, you
   a. adapt.
   b. recycle.
   c. reuse.
   d. reduce.

5. Which organism is extinct?
   a. lizard
   b. eagle
   c. elephant
   d. woolly mammoth

6. In the grasslands of the central United States, which organism is prey for a coyote?
   a. grass
   b. prairie dog
   c. hawk
   d. eagle

Name ___________________________ Date ____________

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Circle the letter of the best answer.

7. For which of these resources do plants compete?
   a. prey  
   b. food  
   c. sunlight  
   d. air  

8. Scientists learn the most about ancient organisms by studying
   a. fossils.  
   b. resources.  
   c. natural disasters.  
   d. adaptations.  

9. Which does a business do when it makes new cans from old cans?
   a. adapt  
   b. reuse  
   c. reduce  
   d. recycle  

10. Which is a natural disaster caused by too little rain?
    a. pollution  
    b. disease  
    c. drought  
    d. flood  

11. What is produced when harmful things are put in the air, water or on land?
    a. pollution  
    b. competition  
    c. extinction  
    d. adaptation  

12. Which is a predator?
    a. tree  
    b. fungus  
    c. wild horse  
    d. hawk
One Cool Adventure

Read the Unit Literature feature in your textbook.

Write About It

Response to Literature  This article tells about the first women to cross Antarctica on skis. What do you know about Antarctica or other places on Earth? Write about an imaginary trip around the world. What kinds of things might you see? Write about it.

Each paragraph should have a clear topic sentence that directly addresses the kinds of things students might experience on a trip around the world. The sentences that follow the topic sentence should include details about the trip, such as the humidity they would encounter while trekking in the jungles of Brazil. Students should use a closing sentence that restates the main idea of the paragraph. Good paragraphs will contain vivid words and imagery, include correct grammar and mechanics, and demonstrate proper transition from one idea to the next.
Earth Changes

Complete the concept map about Earth’s features and how they can change. Some parts have been done for you.

Some of Earth’s Features

1. mountains
2. oceans
3. valleys
4. plateaus
5. islands
6. any others students might choose

Some things cause landforms on Earth’s crust to change suddenly.

1. volcanoes
2. earthquakes
3. floods
4. landsides

Some things cause landforms on Earth’s crust to change very slowly.

1. Weathering by:
   a. moving water
   b. wind
   c. ice
   d. plant roots
2. Erosion by:
   a. wind
   b. water
   c. glaciers
Earth’s Features

Use your textbook to help you fill in the blanks.

What covers Earth's surface?

1. More than half of Earth is covered by _________ water.

2. Most of Earth is covered by ___________ oceans, which are made up of salt water.

3. Rivers and glaciers are made up of _________ fresh water.

4. Water that is not _________ salty is fresh water.

5. Earth’s _________ continents make up seven great land areas.

What are some of Earth’s land and water features?

6. A deep, narrow valley with steep sides is a(n) _________ canyon.

7. A landform with water all around it is a(n) _________ island.

8. Rivers are bodies of _________ moving water.

9. Land that is flat on top and higher than the land around it is called a(n) _________ plateau.
What land features are in the oceans?

10. The land under an ocean at the edge of a continent is called a **continental shelf**.

11. Land that stretches for thousands of miles across the ocean is called the **abyssal plain**.

12. Canyons called **trenches** form the deepest parts of the ocean floor.

What are the layers of Earth?

13. Earth’s **crust** makes up the continents and the ocean floor.

14. Earth’s crust is a(n) **thin**, cool layer.

15. Under the crust is a layer called the **mantle**.

16. The deepest and hottest layer of Earth is the **core**.

17. The outer core is made up of **melted** rock.

18. Earth’s inner core is made up of **solid** rock.

Critical Thinking

19. What can a map show you about Earth’s features?

   A map can show that Earth has land and water features. It can show that most of Earth is covered by water.
Earth’s Features

Match each word with its definition.

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. abyssal plain</td>
<td>i. ocean</td>
</tr>
<tr>
<td>b. coast</td>
<td>f. crust</td>
</tr>
<tr>
<td>c. continent</td>
<td>g. island</td>
</tr>
<tr>
<td>d. continental shelf</td>
<td>h. mantle</td>
</tr>
<tr>
<td>e. core</td>
<td></td>
</tr>
<tr>
<td>j. trench</td>
<td></td>
</tr>
</tbody>
</table>

1. _______ a large body of salt water
2. _______ Earth’s thin outer layer
3. _______ a great area of land
4. _______ the layer immediately below Earth’s crust
5. _______ land that borders the ocean
6. _______ a canyon that is the deepest part of the ocean floor
7. _______ the deepest and hottest layer of Earth
8. _______ land with water all around it
9. _______ a plateau under the ocean at the edge of a continent
10. _______ a deep, flat part of the ocean floor, thousands of kilometers wide
Earth’s Features

Fill in the blanks.

<table>
<thead>
<tr>
<th>abyssal plain</th>
<th>landforms</th>
<th>plain</th>
</tr>
</thead>
<tbody>
<tr>
<td>continental shelf</td>
<td>mantle</td>
<td>plateau</td>
</tr>
<tr>
<td>crust</td>
<td>ocean</td>
<td></td>
</tr>
</tbody>
</table>

The seven large land areas of Earth are the continents. Continents have ___________ such as mountains and valleys. A high, flat landform with steep sides is a(n) ___________. Another landform is a(n) ___________, which is flat and wide.

The outer layer of Earth is the ___________. It is thin and cool. The layer just below the crust is the ___________. It is made up of rock that is hot and flowing.

Most of Earth is covered by salty ___________ water. Land under the ocean along a coast forms the ___________. Farther out, the wide, flat ___________ makes up the ocean floor. A deep canyon in the ocean floor is called a trench.
Sudden Changes to Earth

Use your textbook to help you fill in the blanks.

What are earthquakes?

1. The huge rocks that make up Earth's crust can _______ move.

2. Rocks below ground can bend when they _______ slide past each other.

3. Rocks below ground can press against other rocks and _______ pull apart.

4. Rocks that bend can _______ snap back and cause sudden movement.

5. A sudden movement of rocks in Earth's crust is an _______ earthquake.

6. An earthquake can be _______ weak or very strong.

7. The land _______ vibrates, or shakes, during an earthquake.

8. During an earthquake, vibrations travel as _______ waves in all directions.

What are volcanoes?

9. A mountain around an opening in Earth’s crust is a _______ volcano.
10. Melted rock is called _____magma_____ when it is in Earth’s crust and mantle.

11. Melted rock that flows through an opening in the crust is called _____lava_____.

12. A volcanic _____mountain_____ forms when lava, rocks, and ash pile up in layers.

13. Lava can _____ooze_____ from a volcano, or it can explode out of it.

What are landslides and floods?

14. The force that pulls on all objects, including rocks, is called _____gravity_____.

15. When rocks and soil move downhill very fast, a _____landslide_____ occurs.

16. A river that overflows can cause a _____flood_____ on land that is usually dry.

Critical Thinking

17. How can earthquakes, volcanoes, landslides, and floods change the shape of coastlines?

Possible answer: Earthquakes, floods, and landslides can make land fall into the ocean and change the shape of the coast.

Volcanic mountains under the ocean can rise above the surface of the sea and create islands.
Sudden Changes to Earth

Match the correct word to its definition by writing its letter in the space provided.

1. ______ shaking felt during an earthquake
2. ______ melted rock in the crust and mantle
3. ______ the force that pulls objects downward
4. ______ sudden movement of rocks in Earth’s crust
5. ______ water that flows over land that is normally dry
6. ______ melted rock that flows through an opening and out onto land
7. ______ rock and soil pulled down a hill by gravity
8. ______ a mountain that builds up in Earth’s crust around an opening
Sudden Changes to Earth

Use the words in the box to fill in the blanks.

- crust
- earthquake
- flood
- lava
- magma
- volcano

The land that makes up Earth's surface can change very quickly. Large, flat rocks in Earth's ________ can slide or press against each other. If they break or snap back, they cause an _________. Water can also change land. Sometimes heavy rain fills a river, and water flows over the banks. A ________ forms as water flows onto land that is usually dry.

Hot, melted rock in Earth's crust is called _________. Magma that flows out through an opening in the crust is called _________. A mountain that forms around an opening in Earth's crust is a _________. Lava can ooze or explode from a volcano and change the land.
**Slide on the Shore**

Read the Reading in Science feature in your textbook.

**Cause and Effect**

Use the graphic organizer to list the causes and effects of erosion and ways to prevent it.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>heavy rains, melting snow, construction</td>
<td>weakens cliffs, and may cause landslides</td>
</tr>
<tr>
<td>carving terraces into cliffs</td>
<td>prevents landslides</td>
</tr>
<tr>
<td>using drains and covers</td>
<td>keeps land dry</td>
</tr>
<tr>
<td>planting a variety of plants</td>
<td>keeps soil in place</td>
</tr>
<tr>
<td>building walls of rock and concrete</td>
<td>supports a cliff from below</td>
</tr>
<tr>
<td>digging ditches</td>
<td>directs water around buildings</td>
</tr>
</tbody>
</table>
Write About It

Cause and Effect  Read the article again with a partner. Write a few sentences that tell what causes landslides to happen. Include also what people can do to prevent them from happening.

Planning and Organizing

Why do landslides take place?

Heavy rains, melting snow, and construction weaken cliffs.

What are three things that people can do to prevent landslides?

People can carve terraces into cliffs so that rocks and water do not flow to the bottoms of cliffs. They can use drains and covers to keep land dry. They can also plant a variety of plants to keep soil in place.

What structures can keep cliffs safe for people to live on or near?

Walls of concrete or rock can be built to support a cliff from below and ditches can be dug to direct water around buildings.

Drafting

► Write a clear statement about the causes of landslides.

► Write a clear statement about what can happen as a result of a landslide and what people can do to prevent them.
Weathering and Erosion

Use your textbook to help you fill in the blanks.

What is weathering?

1. The process of **weathering** breaks down rocks into smaller and smaller pieces.

2. Weathering can break down rocks into **sand** and soil.

3. Weathering can be caused by **running water**, wind, rain, and ice.

4. Rocks can weather when they **scrape** against each other.

5. Water that freezes in a crack **expands** and makes the crack larger.

6. Over time, freezing and **thawing** water breaks down a rock into smaller pieces.

7. Plant **roots** grow into cracks in a rock and split the rock.

What is erosion?

8. Pieces of weathered rock get moved to other places by **erosion**.

9. Erosion can happen when **gravity** pulls weathered rock and soil downhill.
LESSON 10.
One cause of erosion is the __________ in rivers and the ocean.

11. Rock can be dropped or _______ by wind when the wind slows down.

12. Rocks are carried along inside a(n) _______ and drop off as it melts.

How can people change the land?

13. Digging a(n) _______ is a small example of how people can change land.

14. Land is changed when trees are cut to build _______ , _______ , and _______.

15. Soil can wash away if trees are not _______.

16. Land can change when it is _______ for valuable minerals and metals.

Critical Thinking

17. Why would planting trees help stop erosion caused by wind and water?

Planting trees would help stop wind erosion because it would keep the wind from blowing soil away. Trees also help keep water from washing soil away.
Weathering and Erosion

What am I?

Choose a word from the word box below that answers each question and write the correct letter in the space provided.

- a. erosion
- b. glacier
- c. gravity
- d. roots
- e. soil
- f. weathering
- g. wind

1. I am a force that pulls materials downhill.
   What am I?  c

2. I drop or deposit small bits of rock when I slow down.
   What am I?  g

3. I can grow in small cracks and split rocks apart.
   What am I?  d

4. Rocks freeze under me. Then I drop them in new places when I begin to melt. What am I?  b

5. I am the movement of weathered rock.
   What am I?  a

6. I cause rocks to break down with the help of running water, rain, and ice. What am I?  f

7. I am the result of rocks, being broken down into smaller pieces. What am I?  e
Weathering and Erosion

Fill in the blanks.

blow away  erosion  deposited  expands  plant roots  scrape  wind

The weathering of rocks is the way that rocks get broken into small pieces. Weathered rock moving from one place to another is _______. Sand and rocks are picked up and _______ in a new place. Moving water, glaciers, and _______ help erosion take place. People can cause erosion by cutting down trees, which can cause the soil to _______.

Some weathering happens because water _______ when it freezes in a crack in a rock. Repeated _______ and thawing helps break the rock. Some rocks weather when they _______ against other rocks. Rocks also break apart when _______ grow into their cracks. They also break when gravity pulls rocks downhill.
Missing Noses

Read the Writing in Science feature in your textbook.

Write About It
Expository Writing Write a paragraph to describe other causes of weathering. Remember to start with a topic sentence and to end with a conclusion.

Getting Ideas

Water is one cause of weathering and erosion. What are some other causes? Write them in the chart below.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocks scrape against each other.</td>
<td>They get worn away.</td>
</tr>
<tr>
<td>Fierce winds blow.</td>
<td>Soil gets blown away.</td>
</tr>
<tr>
<td>Machines dig up ground.</td>
<td>Weathering occurs.</td>
</tr>
<tr>
<td>Gravity pulls soil downhill.</td>
<td>Erosion occurs.</td>
</tr>
</tbody>
</table>

Planning and Organizing

Here are three sentences that Suki wrote. Write “MI” if the sentence tells a main idea. Write “D” if it gives a detail.

1. ____ D Large rocks get worn away by scraping against smaller rocks.
2. ____ D Wind can cause the soil to erode.
3. ____ MI There are several causes of weathering and erosion.
Drafting

Write a topic sentence. Make sure it states your main idea about weathering and erosion.

Possible sentence: There are several causes of weathering and erosion.

Now write your paragraph. Use a separate piece of paper. Begin with your topic sentence. Then write about other causes of weathering and erosion. Reach a conclusion at the end.

Revising and Proofreading

Here are some sentences Suki wrote. Combine each pair, using the word in parentheses after each sentence.

1. Machines can cause weathering. They dig up the ground. (because)

   Machines can cause weathering because they dig up the ground.

2. The roots of a tree can break a rock apart slowly. They grow. (when)

   The roots of a tree can break a rock apart slowly when they grow.

3. Rocks will weather. An animal digs them up. (after)

   Rocks will weather after an animal digs them up.

Now revise and proofread your writing. Ask yourself:

- Did I begin with a topic sentence?
- Did I include facts and details?
- Did I correct all mistakes?
Earth Changes

Circle the letter of the best answer.

1. The middle layer of Earth is the
   a. crust.
   b. mantle.
   c. inner core.
   d. outer core.

2. The continents and ocean floor make up Earth’s
   a. mantle.
   b. coast.
   c. crust.
   d. core.

3. What forms when water suddenly flows over land that is usually dry?
   a. an ocean
   b. a volcano
   c. a landslide
   d. a flood

4. A continental shelf is flat and slopes off into the ocean. It is similar to a
   a. plateau.
   b. coast.
   c. plain.
   d. trench.

5. Most of Earth is covered by
   a. sand and soil.
   b. oceans.
   c. lakes.
   d. melted rock.

6. When water freezes, it
   a. flows.
   b. expands.
   c. shrinks.
   d. melts.
Circle the letter of the best answer.

7. What change occurs when rocks are carried to a new place?
   a. erosion  
   b. melting  
   c. freezing and thawing  
   d. formation of a new rock

8. Melted rock that flows out onto land is called
   a. magma.  
   b. lava.  
   c. a landslide.  
   d. a slab of rock.

9. An earthquake occurs when slabs of rock in the Earth’s crust
   a. move slowly.  
   b. explode.  
   c. move suddenly.  
   d. ooze onto land.

10. An earthquake can happen because rocks in Earth’s crust can
    a. melt and harden.  
    b. bend and snap back.  
    c. freeze and thaw.  
    d. ooze and explode.

11. Gravity causes erosion on a hillside when it
    a. pushes rocks along.  
    b. holds rocks in place.  
    c. pulls rocks downhill.  
    d. bends rocks.

12. What makes a slowing wind drop pieces of weathered rock?
    a. moving water  
    b. gravity  
    c. glaciers  
    d. animals

13. The deepest part of an ocean is its
    a. abyssal plain.  
    b. coast.  
    c. continental shelf.  
    d. trench.
Using Earth’s Resources

Complete the concept map with the information you learned about Earth’s resources.

Minerals and Rocks
The three types of rock are ___________, ___________, and ___________. Rocks and minerals are used to make ___________, ___________, ___________, ___________, and ___________.

Air and Water
Air is important because it has ___________ that ___________ need. People need water for ___________ and ___________.

Soil
Soil is made of ___________, ___________, ___________, and ___________. It provides a place for plants to ___________.

Fossils and Fuels
Some types of fossils are ___________, ___________, ___________, and ___________. Fossil fuels are a source of ___________.

Earth’s Resources

Name ___________________ Date __________
Minerals and Rocks

Use your textbook to help you fill in the blanks.

What are minerals?

1. Solid, nonliving substances called _________ minerals _______ are found in rocks and soil.

2. It is possible to tell one mineral from another because minerals have their own _________ properties _______ .

3. Minerals cannot be identified by _________ color _______ alone because some minerals come in many colors.

4. One property of minerals is the color of their powder, or _________ streak _______ .

5. A mineral’s _________ luster _______ can be described by the way light bounces off of it.

6. Minerals are scratched in order to investigate the property called _________ hardness _______ .

What are rocks?

7. A rock with large grains has a coarse _________ texture _______ .

8. A rock that forms from magma or lava is classified as a(n) _________ igneous rock _______ .

9. Granite that has formed from melted rock inside Earth is called _________ magma _______ .
10. Basalt that has formed from melted rock on Earth’s surface is called _____________.

What are sedimentary and metamorphic rocks?

11. A rock that forms from layers of sediment is classified as a(n) _____________.

12. Another name for the tiny bits of rock that make up shale is _____________.

13. Heating and squeezing rocks inside Earth can form a kind of rock called _____________.

How do we use minerals and rocks?

14. Minerals called _____________ are valued for their beauty.

15. People make cement from _____________ and burn _____________ for fuel.

Critical Thinking

16. Choose three rocks or minerals mentioned in the textbook that you would use to make a necklace. Explain your choices based upon their qualities.

Possible answer: I would use the mineral turquoise because of its pretty color, the rock granite because of its coarse texture, and the mineral gold because of its color and common use in jewelry.
Minerals and Rocks

What am I?

Choose a word from the box that answers each question below.

a. igneous rock  
b. luster  
c. metamorphic rock  
d. mineral  
e. sediment  
f. sedimentary rock

1. I am the property of a mineral that describes how light reflects from the mineral. What am I? _______b______

2. I am tiny bits of animals, plants, or weathered rock. What am I? _______e______

3. I am a solid, nonliving substance found in nature. What am I? _______d______

4. I formed when layers of sediment piled up and were pressed together. What am I? _______f______

5. I formed deep inside Earth. I was heated and squeezed by the weight of rocks above me. What am I? _______c______

6. I formed when melted rock cooled and hardened, either inside Earth or on Earth’s surface. What am I? _______a______
Minerals and Rocks

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>animals</th>
<th>lava</th>
<th>metamorphic</th>
<th>sedimentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>hardness</td>
<td>luster</td>
<td>minerals</td>
<td>plants</td>
</tr>
<tr>
<td>igneous</td>
<td>magma</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rocks are classified into three groups based on the way they form. A rock that formed from melted rock is called a(n) ________ rock. Rocks with large mineral grains formed from ________ . Rocks with small mineral grains formed from ________ . Shale is a(n) ________ rock because it formed when tiny bits of rocks pressed together in layers.

Other rocks of this kind can contain tiny bits of ________ and ________ . When rocks are heated and squeezed inside Earth, new rocks called ________ rocks can form. Rocks are made of solid, nonliving materials called ________ . They can be identified by their ________ , ________ , and streak. Rocks and minerals are very useful.
Marble Memorials

Read the Writing in Science feature in your textbook.

Write About It

Descriptive Writing  Choose two objects made from rock. Write a paragraph that describes and compares them.

Getting Ideas

Write the names of the two objects above the ovals below. In the outer part of each oval, write how they are different. In the overlapping part, write how they are alike.

Planning and Organizing

Lily wrote two sentences. Write “compare” or “contrast” depending on whether each sentence is alike or different.

1. **compare**  Both necklaces were made of blue stones.

2. **contrast**  Another necklace had smooth stones, but the stones were black.

Marble Memorials

Name ______________________ Date ____________
Drafting

Begin your paragraph by writing a sentence that identifies the two objects you will compare. Write a main idea about them.

Possible answer: I have two necklaces made of different stones.

Now write your paragraph. Use a separate piece of paper. Start with the sentence you wrote above. Then compare the two things and include details.

Revising and Proofreading

Here is part of a paragraph that Lily wrote. She made five mistakes. Proofread the sentences. Find the mistakes and correct them.

There are two statues that I like. Both of them are made of marble. One statue is made of white marble. It is a sculpture of a jack rabbit. The other statue is made of black marble. It is a sculpture of a giant black spider. The marble on both sculptures is very smooth and cold. Even when it’s hot outside, the marble is still cold.

Now revise and proofread your writing. Ask yourself:

- Did I compare two things made from rocks?
- Did I use details that show how they are alike and different?
- Did I correct all mistakes?
Soil

Use your textbook to help you fill in the blanks.

What is soil?

1. Minerals, weathered rocks, and bits of decayed plants and animals make up soil.
2. Plants use nutrients that humus adds to soil.
3. A plant’s roots take in water and hold the soil in place.
4. Bits of rock, minerals, and a lot of humus make up the soil layer called topsoil.
5. The soil layer called subsoil has less humus than the layer of soil above it.
6. Below topsoil and subsoil is solid rock, or bedrock.

How are soils different?

7. Soils with thick layers and lots of humus are good for growing plants.
8. Soils are different because they have different minerals and amounts of humus.
9. When you say that soil has large or small grains, you are describing the texture of the soil.
10. The type of soil with the largest grains is _______ sandy soil ____.

11. Soil with grains smaller than those of sand but larger than clay is _______ silty soil ______.

12. Some plants may not grow well in _______ clay soil ______ because it is too wet.

13. The best soil for growing many plants is _______ loam ______.

Why is soil important?

14. Soil is a(n) _______ natural resource ____ and is important because people need the plants that grow in soil.

15. People can keep soil _______ healthy ______ by preventing soil erosion and keeping soil clean.

Critical Thinking

16. If you were a farmer looking to buy land to grow plants, which kind of soil would you look for? Describe the qualities you would like the soil to have.

Possible answer: I would look for soil that has a rich layer of 

________________________ 

________________________ 

topsoil, that has plenty of humus, and that is dark brown or black. Loam would be good because it is not too dry or wet.

________________________

________________________
Soil

Match the correct word to its description below. Write the letter of the word in the blank provided.

1. _____ soil made up of a mixture of sand, silt, and clay
2. _____ the top layer of soil
3. _____ the layer of soil that has a lighter color and less humus than the layer above it
4. _____ bits of decayed plants and animals that add nutrients to soil
5. _____ material on Earth that is necessary or useful to people
6. _____ solid rock
7. _____ a mixture of minerals, weathered rocks, water, air, and living things

a. bedrock  b. humus  c. loam  d. natural resource  
e. soil  f. subsoil  g. topsoil
Soil

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>clay soil</th>
<th>minerals</th>
<th>subsoil</th>
</tr>
</thead>
<tbody>
<tr>
<td>humus</td>
<td>mixture</td>
<td>topsoil</td>
</tr>
<tr>
<td>loam</td>
<td>natural resource</td>
<td>weathering</td>
</tr>
</tbody>
</table>

Soil is important because plants need it to grow. Because soil is found in nature and is useful to people, it is a(n) [natural resource]. Soil is made up of minerals, weathered rocks, and [humus]. The soil in which plants grow well is called [loam]. This kind of soil is a(n) [mixture] of sand, silt, and clay. Sandy soil holds little water, and [clay soil] holds a lot of water.

Soils vary because they contain different rocks and [minerals]. Soil starts forming when rocks are broken down by [weathering]. The first layer of soil is called [topsoil] and the next layer is called [subsoil]. Solid rock called bedrock is below the soil layers.
Fossils and Fuels

How are fossils formed?

1. The bone of an animal that lived long ago is an example of a(n) ________.

2. An animal footprint in solid rock is a type of fossil called a(n) ________.

3. Fossils can be in the form of bones, leaves, skin, footprints, or ________.

4. An organism buried in sediment can turn into a type of fossil called a(n) ________.

5. An empty space in rock in the shape of a living thing’s remains is a(n) ________.

6. A copy of a mold’s shape that formed in hardened minerals is a(n) ________.

What are fossil fuels?

7. People get energy to heat homes by burning material called ________.

8. After ancient plants and animals died, their remains turned into a fuel called a(n) ________.

9. Fossil fuels, plants, animals, water, and air are ________.
10. Plants and animals are ____ renewable resources because they can be replaced.

11. Oil and gas are ____ nonrenewable resources because they cannot be replaced.

What are some other sources of energy?

12. We have many ____ sources of energy besides fossil fuels.

13. A renewable resource that comes from the Sun is ____ solar energy.

14. People can use the Sun, wind, and moving water to make ____ electricity.

Critical Thinking

15. Which kind of fossil would you like to discover and what do you think can be learned from it?

Possible answer: I would like to discover a stony model of an organism from a long time ago so that I can learn about what the organism looked like and research how it lived.
Match the correct word with its description below. Write its letter in the blank provided.

- a. cast
- b. fossil
- c. fuel
- d. imprint
- e. mold
- f. nonrenewable resource
- g. renewable resource
- h. solar energy

1. _____ a type of fossil that is a copy of a mold’s shape
2. _____ a type of fossil that is a mark in solid rock
3. _____ energy from the Sun
4. _____ a resource that can be replaced or used again and again
5. _____ a material that is burned for its energy
6. _____ a type of fossil that is an empty space in rock where the remains of an animal or plant lay
7. _____ a resource that cannot be replaced or reused easily
8. _____ the trace or remains of something that lived long ago
Fossils and Fuels

Use the words in the box to fill in the blanks below.

- cast
- imprint
- nonrenewable
- solar energy
- energy
- minerals
- organisms
- fossils
- mold
- sediment

Fossil fuels are an important natural resource.

These fuels formed from the remains of _______organisms____ that lived long ago. Remains or traces of ancient plants and animals are called _______fossils_____. A footprint of an animal in solid rock is a(n) _______imprint_____.

Organisms that have died can be buried in _______sediment_____. As the sediment becomes rock, _______minerals____ replace the hard parts of the organism, making a(n) _______stony model_____.

A space in the shape of an organism’s remains is a(n) _______mold_____. If this fossil fills with water, minerals can harden and form a(n) _______cast_____. Because fossils take so long to form, they are _______nonrenewable____ resources. However, fossils are not our only source of _______energy_____. Other sources include wind, moving water, and _______solar energy____. These sources are renewable because they can be replaced.
Turning the Power On

Read the Reading in Science feature in your textbook.

Fill in the blanks in the graphic organizer below. When you have finished, you will see how text clues help you draw conclusions.

<table>
<thead>
<tr>
<th>Text Clues</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>People need _____ energy. Some energy sources like _____ coal or oil will be used up one day. Some energy sources are _____ renewable and can be used again and again.</td>
<td>People need to use more _____ renewable energy sources so that nonrenewable energy sources will not be used up.</td>
</tr>
<tr>
<td>Hydropower, wind, geothermal, solar, and biomass energy can all produce _____ electricity. This form of energy _____ powers our cars, _____ heats our homes, and _____ runs our machines.</td>
<td>Renewable resources can supply our need for _____ electricity or energy.</td>
</tr>
</tbody>
</table>
Write About It

Draw Conclusions Why is it important for people to use renewable energy sources? Use what you already know and what you read in the article to draw a conclusion.

Planning and Organizing

Answer the following questions.

1. Why do people need energy?
   People need energy to power their cars, heat their homes, and run their machines.

2. What will happen if people use coal and oil instead of renewable resources?
   These resources will be used up.

3. Can renewable resources meet people’s energy needs? Explain.
   Yes. Renewable resources can be replaced and will not be used up.

Draw Conclusions

Now, use your answers to the questions above to write an answer to this question: “Why is it important for people to use renewable resources?”

Possible answer: It is important for people to use renewable resources because they can be replaced, so people’s energy needs will always be met.
Air and Water Resources

Use your textbook to help you fill in the blanks.

How do we use air and water?

1. Air is important because it has __________ that people need in order to breathe.
2. Water is a(n) __________ because it can be replaced by rain or snow.
3. People cannot drink most of Earth’s water because it is very __________.
4. Rivers, ponds, and water below ground, or __________, are fresh-water sources.
5. People cannot use most of Earth’s fresh-water sources because the water is __________.

How do people get water?

6. Water is carried to people through __________.
7. A wall that is built on a river is called a(n) __________.
8. People can use the water that is stored in a(n) __________ behind a dam.
9. People dig __________ to pump groundwater to Earth’s surface.
10. At a water treatment plant, water is cleaned so that it is __________ to drink.

Outline

1. o_____ygen
2. r_____n_____able r_____source
3. s_____l_____ty
4. g_____roundw_____ater
5. f_____rozen
6. a_____queducts
7. d_____am
8. r_____eservoir
9. w_____ells
10. s_____afe
What can happen to air and water resources?

11. Living things can become sick from ______ pollution to water, air, or land.

12. Air becomes polluted when people burn ______ fossil fuels.

13. Water becomes polluted when people use ______ fertilizers to make plants grow.

14. If people ______ waste water, they may eventually use all of the available water on Earth.

How can you conserve resources?

15. When people use less water, they ______ conserve resources.

Critical Thinking

16. Why are Earth’s air and water resources important? How might these resources be harmed by human activities?

Possible answer: Air is important because people need the oxygen in air to breathe. Water is important because people need it to farm, cook, make things, and swim. If air or water get polluted, living things can become sick. If people waste water, it can be used up before it is replaced.
Air and Water Resources

Match each word with its description. Then write its letter in the blank provided.

- a. aqueducts
- b. conserve
- c. groundwater
- d. pollution
- e. reservoir
- f. well

1. ______ a hole that has been dug to reach underground water
2. ______ to use resources wisely
3. ______ pipes or ditches that carry water
4. ______ water stored behind a dam
5. ______ harmful things in the water, air, and land
6. ______ water held in rocks below ground
# Air and Water Resources

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th></th>
<th>fresh water</th>
<th>pollution</th>
<th>water treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>air</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>aqueducts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fossil fuels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>groundwater</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nature</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>renewable</td>
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</tr>
<tr>
<td>reservoirs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wells</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We must use resources wisely so that we will not run out of them. Two important resources are water and ___________. These resources are ___________, but they can be harmed by ___________. Volcanoes and wildfires are pollution caused by ___________. People cause air pollution when they burn ___________. Fertilizers can pollute rivers, lakes, and ___________, an important source of ___________.

People get groundwater by digging ___________. Some people do not live near fresh water. They use ___________ to store water and ___________ to transport water to them. Some cities and towns use ___________ plants to make water clean and safe. Because fresh water is limited, people should practice conservation.
Using Earth’s Resources

Circle the letter of the best answer.

1. Which of the following is a solid, nonliving substance found in nature?
   a. sediment
   b. humus
   c. a mineral
   d. a fossil

2. Which of the following is made up of bits of decayed plants and animals that add nutrients to soil?
   a. fossils
   b. topsoil
   c. loam
   d. humus

3. Which of the following is an example of a nonrenewable resource?
   a. air
   b. soil
   c. coal
   d. water

4. Which kind of rock forms from magma?
   a. metamorphic
   b. igneous
   c. sedimentary
   d. fossil

5. Which of the following is a mixture of minerals, weathered rocks, and living things?
   a. soil
   b. humus
   c. a fossil
   d. nutrients

6. A dinosaur’s footprint in hardened mud is a(n)
   a. mold.
   b. cast.
   c. stony model.
   d. imprint.
Circle the letter of the best answer.

7. What do people use to get water from below Earth's surface?
   a. aqueducts  
   b. wells  
   c. reservoirs  
   d. dams

8. Rock formed from heat and pressure inside Earth is classified as
   a. bedrock.  
   b. igneous rock.  
   c. sedimentary rock.  
   d. metamorphic rock.

9. Which of the following is Earth's main source of energy?
   a. fossil fuels  
   b. magma  
   c. the Sun  
   d. moving water

10. What kind of resource are plants, animals, water, and air?
    a. nonrenewable  
    b. renewable  
    c. energy  
    d. limited

11. Which kind of rock forms from tiny bits of plants, animals, or weathered rock?
    a. sedimentary  
    b. metamorphic  
    c. igneous  
    d. mineral

12. Which of the following is a material that is burned for its energy?
    a. magma  
    b. solar energy  
    c. fossils  
    d. fuel
What a Difference Day Length Makes

Read the Unit Literature feature in your textbook.

Write About It

Response to Literature: Animals respond to changing seasons in many ways. What are some ways you have seen nature change from season to season? Write about it.

Paragraphs should have a clear topic sentence that directly addresses ways that students have seen nature change from season to season. The sentences that follow the topic sentence should support the topic sentence by providing details, such as the changing of color of leaves in autumn. Students should use a closing sentence that restates the main idea of the paragraph. Good paragraphs should include correct grammar and mechanics, and demonstrate a proper transition from one idea to another.
Changes in Weather

Complete the concept map with information that you learned about the events in the water cycle. Some information has been written for you.

1. The Sun
   heats
   water, causing it to
   evaporate
   from Earth’s lakes, rivers, and oceans.

2. When water evaporates, it forms tiny drops called
   water vapor,
   which cannot be seen.

3. Water vapor
   rises
   into the
   atmosphere.

4. Clouds form when water vapor
   condenses
   around tiny
   dust
   particles in the air.

5. Precipitation, such as rain,
   snow
   or sleet, falls into Earth’s
   oceans, rivers, and
   lakes.
Weather

Use your textbook to help you fill in the blanks below.

What is weather?

1. Weather is what the ________ air is like in the lowest layer of the atmosphere at a certain time and place.

2. Air is a(n) ________ that takes up space and can move things.

3. The air that surrounds Earth makes up part of the ________ atmosphere.

4. Earth’s atmosphere consists of ________ gases and some ________ dust.

5. The measure of how hot or cold something is can be found by taking its ________ temperature.

How can you describe the weather?

6. Weather is described in terms of amounts of ________ precipitation and ________ wind, as well as ________ air pressure and air temperature.

7. Water that falls from the ________ atmosphere to the ground is called precipitation.
8. Two forms of precipitation are _______ rain _______ and _______ snow _______.  

9. Air that moves is called _______ wind _______.  

10. The weight of air pressing down on Earth is called _______ air pressure _______.  

How do we predict weather?  

11. Scientists collect data about the atmosphere by using _______ weather balloons _______.  

12. To observe weather from above Earth, _______ satellites _______ are used.  

13. Data from _______ maps _______ , balloons, and satellites are used to _______ predict _______ weather.  

Critical Thinking  

14. What information would you need to collect to describe the weather in your town every day for a week?  

Possible answer: I would need to know the temperature every day. I would also need to know the air pressure, the wind speed, and the wind direction. I would have to note any precipitation and record it as rain, hail, sleet, or snow.
Weather

Match each word from the box to its definition.

a. atmosphere  
b. hail  
c. precipitation  
d. sleet  
e. temperature  
f. thermometer  
g. weather  
h. wind

1. ________  a type of precipitation that involves mixed states of matter
2. ________  water that falls to the ground from the atmosphere
3. ________  the measure of how hot or cold something is
4. ________  what air is like at a certain time and place
5. ________  the layers of gases and tiny bits of dust that surround Earth
6. ________  lumps of ice that fall during a thunderstorm
7. ________  a tool that measures temperature
8. ________  moving air
Weather

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>air pressure</th>
<th>moves</th>
<th>speed</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>atmosphere</td>
<td>precipitation</td>
<td>temperature</td>
<td>wind</td>
</tr>
<tr>
<td>direction</td>
<td>rain</td>
<td>thermometer</td>
<td></td>
</tr>
</tbody>
</table>

Weather forms in the lowest layer of gases that surround Earth. This layer makes up part of Earth’s atmosphere. Scientists use a tool called a(n) thermometer to measure the temperature of air. Air takes up space and has weight. The weight of air as it presses down on Earth is called air pressure.

Air also moves wind. This movement is called direction and speed of wind. Occasionally, precipitation falls from the atmosphere to Earth. Precipitation may be in the form of sleet, snow, or rain. These are all different forms of water.
The Water Cycle

Use your textbook to help you fill in the blanks below.

What are clouds?

1. A collection of tiny drops of water or ice that can be seen in the air is a(n) ______ cloud.

2. Low, flat layers of clouds covering most of the sky are ________ clouds.

3. On a sunny day, it is possible to see white, puffy clouds with flat bottoms, or ________ clouds.

How do clouds form?

4. A stratus cloud that forms near the ground is ________.

5. Liquid water ________ and becomes a(n) ________ when the Sun shines on it.

What is the water cycle?

6. The path that water takes between Earth’s surface and the ________ is called the water cycle.

7. The Sun causes the ________ of water by heating it.
8. Clouds form as water condenses on tiny specks of dust in the air and returns to Earth as precipitation, continuing the cycle.

9. A storm that forms over an ocean and brings heavy rain and strong winds is a(n) hurricane.

10. A powerful storm shaped like a tall funnel that forms over land is a(n) tornado.

11. A blizzard has strong winds, snow, and cold temperatures.

How can you stay safe in severe weather?

12. During most severe storms, stay inside a building. During a tornado, go to a(n) basement or lie flat in a(n) low place.

Critical Thinking

13. How are clouds related to the water cycle and storms?

Clouds form as part of the water cycle. Heat from the Sun causes water to evaporate from Earth’s surface. Water vapor rises and condenses around pieces of dust, forming clouds. The water that falls from clouds may be part of a thunderstorm, blizzard, or hurricane.
The Water Cycle

What am I?

Choose a word from the box below that answers each question. Write its letter in the space provided.

- a. cloud
- b. cumulus clouds
- c. evaporation
- d. hurricane
- e. stratus clouds
- f. tornado
- g. water cycle

1. I am white and puffy with a flat bottom. What am I? ______

2. I form over the ocean and come with strong winds and heavy rain. What am I? ______

3. I form when water vapor rises and cools around tiny dust particles. What am I? ______

4. I have a long funnel and cause damage on land. What am I? ______

5. I am made of low, flat layers of clouds. What am I? ______

6. I am the path that water takes from Earth to the atmosphere and back again. What am I? ______

7. I am the process by which a liquid changes to a gas. What am I? ______
The Water Cycle

Use the words in the box to fill in the blanks below.

clouds  precipitation  water cycle
dust  Sun  water vapor
evaporation  tornado

Every day, water moves from Earth to the atmosphere and back again. This process is called the **water cycle**. During the water cycle, the **Sun** heats water on Earth’s surface. This causes the **evaporation** of water, changing it to a gas. The **water vapor** rises and condenses around **dust** particles in the atmosphere, forming **clouds**. Water that falls from clouds is **precipitation**.

Hurricanes, thunderstorms, tornadoes, and blizzards are all types of severe weather. During a(n) **tornado**, it is best to find shelter in a basement or to lie flat in a low area. People must be aware of the dangers of extreme weather.
Tracking Twisters

Read the text below, and answer the questions that follow.

When a tornado, or twister, touches down, it can destroy almost anything in its path. For this reason, scientists gather information about tornadoes to help predict where they may happen.

First, scientists observe and measure weather to see if conditions are right for a tornado to form. Tornadoes occur when warm, moist air near the ground mixes with cool, dry air above it and rises rapidly.

Doppler radar is used to track storms. Radar works by sending out radio waves from an antenna. Objects in the air, such as raindrops, bounce the waves back to the antenna. Doppler radar can track the direction and speed of a moving object, such as a tornado or other storm.

People called storm chasers get a close-up look at tornadoes from planes or cars. The information they gather is used to warn communities about tornadoes before they strike.

1. What might happen if a tornado touches down?
   It could destroy anything in its path.

2. What is Doppler radar used to track?
   It is used to track storms.

3. How do storm chasers help communities?
   They warn them about tornadoes before they strike.
**Write About It**

Predict What if there were no storm chasers? What if there was no technology to warn people of tornadoes? Write about what might happen.

Fill in the graphic organizer below.

<table>
<thead>
<tr>
<th>What I Predict</th>
<th>What Happens</th>
</tr>
</thead>
<tbody>
<tr>
<td>A(n) _______ touches down.</td>
<td>It may ______ destroy anything in its path.</td>
</tr>
<tr>
<td>Scientists do not have ______ to track storms.</td>
<td>They cannot track the ______ and ______ of a tornado.</td>
</tr>
<tr>
<td>There were no ______ to gather ______.</td>
<td>Communities could not be ______ about tornadoes before they ______.</td>
</tr>
</tbody>
</table>

Write a paragraph telling what might happen if there were no storm chasers or technology to warn people about tornadoes.

Answers will vary but should demonstrate an understanding that people cannot prepare for a tornado strike if they are not warned ahead of time. Answers might include examples of safety measures that people would not take, such as staying outside instead of going to a basement.
Climate and Seasons

Use your textbook to help you fill in the blanks below.

What is climate?

1. Every day, the _______ changes.
2. The pattern of weather in a certain place over a long time is its _______.
3. The climate of a certain place is described by its average _______ and amount of _______.
4. Earth is shaped like a ball, or a(n) _______.
5. Earth spins around its _______, a(n) _______ through the center of a spinning object.
6. Earth’s axis is _______ slightly.
7. Places on Earth with _______ climates are hit directly by the Sun’s rays.
8. When the Sun’s rays strike Earth at a(n) _______ , energy is spread out more, so the areas that receive these rays have colder climates.

What affects climate?

9. The climate becomes _______ in areas that are high in the atmosphere.
10. Mountains next to an ocean can block moist air from going inland and force that air **upward**, causing precipitation.

11. On the ocean side of a mountain, the climate is often **wet**, and on its opposite side, the climate is often **dry**.

**What are seasons?**

12. Times of year with different weather patterns are **seasons**.

13. The four seasons are **summer**, **fall**, winter, and spring.

**Critical Thinking**

14. How are climate and weather different?

Weather is what the air is like at a certain time and place. Weather changes from day to day. Climate is the pattern of weather in a certain place over a long time. Climate does not change every day.
Climate and Seasons

Match the word with its definition.

- a. axis
- b. climate
- c. mountain
- d. ocean
- e. seasons
- f. slant
- g. sphere
- h. weather

1. _____ the direction in which the Sun's rays strike Earth, causing energy to be spread out
2. _____ the pattern of weather in a certain place over a long time
3. _____ the shape of Earth
4. _____ times of the year with different weather patterns
5. _____ a landform that keeps the air temperature of nearby land from becoming too hot or cold, producing a milder climate
6. _____ the real or imaginary line through the center of a spinning object
7. _____ affects how wet a climate is by blocking moist air from some places
8. _____ changes every day
Weather changes every day. The _______ temperature stays the same. The yearly _______ and _______ of an area describe the climate.

The Sun also affects climate. Earth spins on a slightly tilted _______ . Because of this, the Sun’s rays strike some places on Earth directly. These places get much more of the Sun’s energy and have _______ climates. In other places, the Sun’s rays strike an area on a(n) _______ . These areas get less of the Sun’s energy, so the climate is _______. Land that is near a(n) _______ or large lake has a(n) _______ climate. Land on the far side of mountains near an ocean tends to be dry.
A Season Myth

Read the Writing in Science feature in your textbook.

Write About It

Fictional Narrative  Write your own myth about how a season came to be. Use an animal as a character in the story. Use all the parts of a good story when writing.

Getting Ideas

Choose a season. How could you create a myth about how this season came about? Fill in the sequence chart below. Your main character should be an animal.

Planning and Organizing

Jake wrote three sentences. Put the sentences in time order. Write 1, 2, or 3 in each blank.

1. ______ Wise Owl agreed to cover the land with snow.
2. ______ Bear wanted a cold season, so he visited Wise Owl.
3. ______ Long ago, there was only one hot season.
**Drafting**

Begin your myth. Write a sentence that introduces the main character. Describe what it was like in the beginning of time. Get the reader interested!

Possible answer: Big Bear shook his furry coat and said, “I’m tired of being hot all the time.”

Now write your story on a separate piece of paper. Start with the sentence you wrote above. Tell about the character and where and when the story takes place.

**Revising and Proofreading**

Jake wrote some sentences and wants to join them together. Read the sentences and look at the two words that follow. Circle the word that best connects the two sentences. Then write the new sentence on the line, adding a comma before the connecting word.

1. The Earth was snowy. All of the animals slept or hid in trees. **so** but

   The Earth was snowy, **so** all of the animals slept or hid in trees.

2. Bluebird wanted to sing. It was too cold. **and** but

   Bluebird wanted to sing, **but** it was too cold.

Now revise and proofread your writing. Ask yourself:

- Did I tell how a season came to be?
- Did I include a beginning, middle, and end?
- Did I correct all mistakes?
Changes in Weather

Circle the letter of the best answer.

1. The warmest season is
   a. winter.
   b. spring.
   c. summer.
   d. fall.

2. Rain, snow, and sleet are examples of
   a. clouds.
   b. condensation.
   c. evaporation.
   d. precipitation.

3. During condensation, a
   a. solid changes to a liquid.
   b. liquid changes to a solid.
   c. gas changes to a liquid.
   d. solid changes to a gas.

4. Earth’s air, land, and water are heated by
   a. clouds.
   b. precipitation.
   c. condensation.
   d. the Sun’s energy.

5. In the water cycle, the Sun’s energy heats water and causes
   a. condensation.
   b. evaporation.
   c. precipitation.
   d. boiling.

6. A person can stay safe during a lightning storm by
   a. standing under a tree.
   b. using appliances.
   c. lying flat in a low place.
   d. staying inside a building.

7. A thermometer is used to measure
   a. air pressure.
   b. the weight of air pressing on Earth.
   c. air temperature.
   d. wind speed and direction.
Circle the letter of the best answer.

8. Which type of cloud is thin and wispy and forms high above the ground?
   a. fog
   b. cirrus
   c. stratus
   d. cumulus

9. Which type of large, severe storm forms strong winds and heavy rains over the ocean?
   a. tornado
   b. hurricane
   c. blizzard
   d. thunderstorm

10. Places on the ocean side of mountains tend to have a
    a. hot climate.
    b. wet climate.
    c. dry climate.
    d. cold climate.

11. The layers of gases and dust that surround Earth make up the
    a. atmosphere.
    b. Sun’s rays.
    c. four seasons.
    d. fog.

12. Parts of Earth that are hit directly by the Sun’s rays have
    a. warmer climates.
    b. colder climates.
    c. mild climates.
    d. summer all year long.

13. Around which of the following items does water vapor condense to make clouds in the atmosphere?
    a. fog on the ground
    b. specks of dust
    c. hail
    d. sleet
# Planets, Moons, and Stars

Complete the concept map with causes and effects described in the chapter.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth <strong>rotates</strong> on its <strong>axis</strong>.</td>
<td>Earth has both day and <strong>night</strong>.</td>
</tr>
<tr>
<td>Earth <strong>revolves</strong> around the Sun.</td>
<td>Earth has seasons.</td>
</tr>
<tr>
<td>Earth’s <strong>axis</strong> is tilted.</td>
<td>Earth has opposite <strong>seasons</strong> in the Northern and Southern Hemispheres at any given time.</td>
</tr>
<tr>
<td>The <strong>Moon</strong> revolves around <strong>Earth</strong>.</td>
<td>We see phases of the Moon.</td>
</tr>
<tr>
<td>Sunlight <strong>reflects</strong> off of the Moon and planets.</td>
<td>The Moon and planets appear to shine.</td>
</tr>
<tr>
<td>The Sun is the <strong>closest</strong> star to Earth.</td>
<td>The Sun appears to be <strong>biggest</strong> in size.</td>
</tr>
<tr>
<td>Stars are big balls of <strong>hot gases</strong>.</td>
<td>Stars give off <strong>heat</strong> and <strong>light</strong>.</td>
</tr>
</tbody>
</table>
The Sun and Earth

Why is there day and night?

1. The Sun seems to move across the sky because Earth spins, or **rotates**.
2. The side of Earth that faces the Sun has **daytime**.
3. The Sun appears to rise in the **eastern** sky and is highest in the sky at **midday**.
4. Shadows are long at **sunrise** and at **sunset**.
5. The imaginary line on which Earth spins is its **axis**.
6. Earth turns once on its axis every **24** hours.

Why are there seasons?

7. The path that Earth follows as it moves around the Sun is called a(n) **orbit**.
8. It takes 365 days, or one **year**, for Earth to revolve around the Sun.
9. Seasons change because Earth's axis is **tilted** and different areas of Earth are closer or farther away from the Sun.
Name __________________________ Date __________

10. When the Northern Hemisphere is tilted toward the Sun, it has __________ .

11. When it is summer in the Northern Hemisphere, it is __________ in the Southern Hemisphere.

12. During winter, days are __________ than they are in summer.

What is the Sun like?

13. Earth revolves around a(n) __________ called the Sun.

14. Life on Earth exists because the Sun provides __________ and __________.

Critical Thinking

15. If summer starts on June 21 in the Northern Hemisphere, when does summer start in the Southern Hemisphere? Explain.

__Summer starts in the Southern Hemisphere on December 21.__

When the Southern Hemisphere is tilted toward the Sun it is __________ there. At that time, the Northern Hemisphere is tilted away from the Sun and having winter.

__________
The Sun and Earth

Match the words in the box to their definitions below. Then find the words hidden in the puzzle.

a. axis  b. day  c. orbit  d. revolve  e. rotation  f. star  g. year

1. _____ a real or imaginary line through the center of a spinning object
2. _____ to move around another object
3. _____ a regular path Earth follows around the Sun
4. _____ the time it takes Earth to make one complete trip around the Sun
5. _____ a ball of hot, glowing gases
6. _____ the time it takes Earth to make one complete turn
7. _____ the movement of Earth when it spins

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The Sun and Earth

Use the words in the box to fill in the blanks below.

Earth’s movement around the Sun causes daytime, nighttime, and seasons. Earth follows a(n) _______ orbit around the Sun. A complete trip takes one _______ year. As Earth revolves around the Sun, different parts of Earth are _______ tilted toward or away from the Sun. If the upper half of Earth is tilted toward the Sun, it is _______ summer in the Northern Hemisphere. At the same time, the lower half of Earth is tilted away from the Sun, and it is _______ winter in the Southern Hemisphere.

Earth also moves by _______ rotating on its _______ axis every 24 hours. When one side of Earth faces the Sun, it is _______ daytime. On the side that faces away from the Sun, it is nighttime.
Seasons Where You Live

Write About It

**Personal Narrative** Choose a season. Tell a true story about something you did during that season. Explain why you still remember the event. How did it make you feel? Describe what the weather was like.

Getting Ideas

Think about something you did this season. Write the events in the chart below. Write them in time order.

Possible answer:

- Snow fell.
- I put on snowshoes.
- I hiked to the cabin in the woods.

Planning and Organizing

Here are three sentences that Brian wrote. Put them in time order. Write 1 by the first event, 2 by the second event, and 3 by the last event.

1. The snow fell heavily all through the night.
2. The next morning, I strapped on my snowshoes and set out.
3. I hiked through the woods to the cabin for steaming hot cider.
Drafting

Write a sentence to begin your personal narrative. Use “I” to refer to yourself. Include the name of the season you are writing about.

Possible sentence: Last winter, I walked through the woods.

Now write your personal narrative. Use a separate piece of paper. Begin with the sentence you wrote. Write about what you did in time order. Remember to describe the weather. Explain why this event is memorable.

Revising and Proofreading

Here are some sentences that Brian wrote. He did not use the first-person pronoun “I” to refer to himself. Rewrite each sentence by changing the pronouns to the first person.

1. He looked up in wonder at the branches covered with snow.
   I looked up in wonder at the branches covered with snow.

2. Snow fell on his head when two squirrels jumped on a branch.
   Snow fell on my head when two squirrels jumped on a branch.

3. He laughed as he shook the snow off his cap.
   I laughed as I shook the snow off my cap.

Now revise and proofread your writing. Ask yourself:

- Did I tell about something that happened to me?
- Did I use the pronoun “I”?
- Did I correct all mistakes?
The Moon and Earth

Use your textbook to help you fill in the blanks.

What are the phases of the Moon?

1. The different shapes that we see of the Moon are called _______phases______.
2. There are _______eight______ main phases of the Moon.
3. The Moon seems to move across the sky because of Earth’s _______rotations______.
4. The Moon seems to be lit because _______sunlight______ reflects off of it.
5. Because the Moon revolves around Earth, it is a(n) _______satellite______ of Earth.

Why does the Moon’s shape seem to change?

6. The Moon is always a(n) _______sphere______.
7. The Sun always lights one _______half______ of the Moon’s surface.
8. When we see a phase of the Moon, we see some of the Moon’s _______lighted______ half.
9. The dark half of the Moon faces Earth during the _______new-Moon______ phase.
10. The dark half of the Moon faces away from Earth during the _______ phase.

11. One complete cycle of the Moon’s phases takes about _______ .

What is it like on the Moon?

12. The Moon and Earth both get _______ from the Sun.

13. Three features that Earth has but the Moon does not have are _______, a(n) _______, and _______.

14. Unlike Earth, the Moon is covered with _______.

15. Craters are made when _______ crash into the surface of the Moon.

Critical Thinking

16. A new Moon can be seen when the Moon is between Earth and the Sun. How do these three objects line up when we see a full Moon? How do you know?

During a full Moon, Earth is situated between the Sun and the Moon. The entire lighted half of the Moon is facing Earth, so the Sun must be on the other side of Earth, opposite the Moon.
The Moon and Earth

Match the correct word with its definition. Write its letter in the space provided.

a. crater  
d. full Moon  
g. new Moon  
b. crescent Moon  
e. gibbous Moon  
h. phases  
c. first-quarter Moon  
f. last-quarter Moon

1. _____ the phase of the Moon that happens just before and after a full Moon
2. _____ a hollow area in the ground
3. _____ the phase of the Moon that happens when the lighted half faces away from Earth
4. _____ the phase of the Moon that happens when we see the entire lighted half
5. _____ the phase of the Moon that happens about 7 days after the new Moon
6. _____ the phase of the Moon that happens about 21 days after the new Moon
7. _____ the phase of the Moon that happens just before and after a new Moon
8. _____ the different shapes that we see of the Moon
The Moon and Earth

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>craters</th>
<th>living things</th>
<th>reflects</th>
<th>rotate</th>
</tr>
</thead>
<tbody>
<tr>
<td>faces</td>
<td>phases</td>
<td></td>
<td>satellite</td>
</tr>
</tbody>
</table>

In space, the Moon is the closest natural object to Earth. It is called a(n) [satellite] because it revolves around Earth. The Moon is smaller than Earth and has many [craters]. There are no [living things] on the Moon because it has no atmosphere or liquid water.

Earth and the Moon [rotate] on their own axes and [revolve] around larger objects. As the Moon revolves, we see different amounts of its lighted side, or [phases]. Half of the Moon is always lit because sunlight [reflects] off of it. We see a full Moon when the entire lighted side [faces] Earth. A new Moon is visible when the entire lighted side faces away from Earth.
The Planets

Use your textbook to help you fill in the blanks.

What is our solar system?

1. The Sun and the objects that move around it make up a(n) _____ solar system. 
2. Large bodies of rock or gas that revolve around a star are called _____ planets. 
3. There are _________ planets that revolve around the Sun.
4. All of the planets follow a(n) _____ orbit as they _______ revolve around the Sun.
5. The planet with the shortest orbit is _______ Mercury. 
6. The planet with the longest orbit is _______ Neptune. 
7. Planets look like _______ stars when viewed from Earth because sunlight reflects off of them.
8. Planets look _____ smaller than the Moon when viewed from Earth because they are farther away.

What are the inner and outer planets?

9. The four planets closest to the Sun are called the _____ inner planets. 
10. The inner planets are made of **rocky material** and are some of the **smallest** planets in our solar system.

11. The names of the inner planets are **Mercury**, **Venus**, **Earth**, and **Mars**.

12. The four planets farthest from the Sun are called the **outer planets**.

13. The names of the outer planets are **Jupiter**, **Saturn**, **Uranus**, and **Neptune**.

14. The largest planet in our solar system is **Jupiter**.

**How can we view the planets?**

15. To see a planet’s surface, we can use a tool called a(n) **telescope**.

16. Telescopes have **mirrors** and **lenses** that gather light.

**Critical Thinking**

17. Which planets were discovered with telescopes? Why?

   **Uranus and Neptune were discovered with telescopes. We can see Mercury, Venus, Mars, Jupiter, and Saturn in the sky with our eyes, but not Uranus and Neptune.**
The Planets

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>inner planets</th>
<th>outer planets</th>
<th>space probe</th>
<th>telescope</th>
<th>planet</th>
<th>solar system</th>
<th>year</th>
</tr>
</thead>
<tbody>
<tr>
<td>lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. A large body of rock or gas that revolves around a star is called a(n) ________ planet.
2. The four planets closest to the Sun are called the ________ inner planets.
3. A star and the objects that move around it make up a(n) ________ solar system.
4. A machine that leaves Earth and travels through space is a(n) ________ space probe.
5. The four planets farthest from the Sun are called the ________ outer planets.
6. It takes Earth one ________ year to complete a trip around the Sun.
7. A clear material that helps us see objects in more detail is a(n) ________ lens.
8. A tool used to make faraway objects appear larger is a(n) ________ telescope.
The Planets

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>closest</th>
<th>light</th>
<th>solar system</th>
<th>warmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>farthest</td>
<td></td>
<td>Neptune</td>
<td></td>
</tr>
<tr>
<td>inner planets</td>
<td>outer planets</td>
<td></td>
<td>telescope</td>
</tr>
</tbody>
</table>

Earth and seven other planets revolve around the Sun. They form part of a(n) **solar system**. The planets look like **stars** because they appear to shine. However, planets do not make their own **light** but reflect the Sun’s light.

Earth is one of the four **inner planets**. This group of planets is **closest** to the Sun. This makes them **warmer** than the other planets. The other planets are called the **outer planets**. This group of planets is **farthest** from the Sun. The planet that is farthest away is **Neptune**.

To see the planets beyond Saturn, we must use a(n) **telescope**. A tool called a space probe lands on planets and takes pictures of them.
The Stars

Use your textbook to help you fill in the blanks.

**What are stars?**

1. Stars are balls of hot gasses that give off _______**light**____ and _______**heat**____.

2. The only star in our solar system is _______**the Sun**____.

3. The Sun’s light keeps us from seeing other _______**stars**____ during the _______**day**____.

4. Because it is closest to Earth, the Sun seems _______**bigger**____ than other stars.

5. Stars differ in size and whether they are _______**hotter**____ or _______**brighter**____ than other stars.

6. You can tell how hot a star is by its _______**color**____.

7. The hottest stars are the color _______**blue**____.

8. The coolest stars are the color _______**red**____.

9. Long ago, people thought groups of stars formed pictures, which today we call _______**constellations**____.

**Why do we see different stars during different seasons?**

10. We do not see the same stars each _______**season**____.
LESSON Outline

11. We see different stars as Earth _______ revolves _______ around the Sun and we observe different views of the sky.

12. We see different stars when Earth faces different _______ directions _______.

13. A constellation that we see only in winter is _______ Orion _______.

14. In winter, Orion is in the sky at _______ night _______ because we look out into space and away from the Sun.

15. In summer, Orion is in the sky during the _______ day _______ because we look out into space in the same direction as the Sun.

Critical Thinking

16. Why might some stars seem brighter in the night sky than other stars?

The stars that seem brighter could be closer to Earth than other stars. They also could be hotter and brighter than other stars.
The Stars

Match the correct word to its definition.

a. blue star  

b. color  
c. constellation  
d. Orion  
e. red star  
f. star  
g. Sun

1. __________ a group of stars that seem to form a picture
2. __________ the hottest kind of star
3. __________ a constellation that we can see in winter but not in summer
4. __________ a way to tell how hot a star is
5. __________ a glowing ball of hot gases that gives off light and heat
6. __________ the coolest kind of star
7. __________ the only star in our solar system
The Stars

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>closer</th>
<th>different</th>
<th>season</th>
</tr>
</thead>
<tbody>
<tr>
<td>color</td>
<td>gases</td>
<td>Sun</td>
</tr>
<tr>
<td>constellations</td>
<td>revolves</td>
<td>sunlight</td>
</tr>
</tbody>
</table>

There are millions of stars in space. We only see stars at night when _________ sunlight does not block them. We can see pictures called _________ constellations that are formed by groups of stars. One of these is Orion. Whether we see Orion depends on the _________ season. Orion stays in the same place, but we see _________ different parts of the sky as Earth _________ revolves around the Sun.

Stars are balls of hot _________ gases. Our _________ Sun is a star, and it is _________ closer to Earth than to any other star. Stars differ in _________ color, size, and brightness. A blue star is the hottest star, and a red star is the coolest star.
Meet Orsola De Marco

Do you ever wonder about the stars? Orsola De Marco does. She is an astrophysicist at the American Museum of Natural History in New York. An astrophysicist is a scientist who studies stars. Orsola studies stars that are found together in pairs. As far as we know, our Sun is a star that stands alone. Most stars in the universe have a partner. They are called binary stars.

These binary stars orbit each other at a very close distance. Scientists think that one star is being absorbed by the other. The butterfly-shaped wings are probably caused by gases from the surface of the central star.

Of course Orsola cannot go to the stars to learn about them. Instead, she travels to Arizona, Hawaii, and Chile to use large telescopes. She gazes billions of miles into space to get a good look at binary stars. She watches how the stars affect each other. When a star gets old it becomes larger. If there is another star nearby, it might get eaten up, or absorbed, by the old star. No one is sure what will happen after that. Orsola is working to find out.

Write About It

Summarize Read the article with a partner. List the most important information in a chart. Then use the chart to help you summarize the article. Remember to start with a main-idea sentence and to keep your summary brief.
Planning and Organizing

List the most important information in the article in the chart below.

<table>
<thead>
<tr>
<th>Most Important Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Drafting

- Start by writing a clear statement that describes the main idea of the article.
- Write three supporting details.
- Read what you have written. Cross out anything that does not directly support the main idea.
- Exchange papers with your partner and ask him or her to check your choice of a main idea. Have your partner also check your choice of supporting details.

Summarize  Write your summary on a separate piece of paper. Use your own words. Include the main ideas and details you wrote.
Planets, Moons, and Stars

Circle the letter of the best answer.

1. We have daytime and nighttime because Earth
   a. tilts.
   b. orbits.
   c. rotates.
   d. revolves.

2. What is the name for the different shapes of the Moon?
   a. revolutions
   b. spheres
   c. craters
   d. phases

3. What is the imaginary line on which Earth spins?
   a. rotation
   b. revolution
   c. axis
   d. orbit

4. Which of the following best describes Jupiter?
   a. inner planet
   b. planet
   c. moon
   d. star

5. Which of the following describes the movement of an object around another object?
   a. phase
   b. tilting
   c. rotating
   d. revolving

6. The Sun and planets are part of a(n)
   a. solar system.
   b. constellation.
   c. revolution.
   d. orbit.
Circle the letter of the best answer.

7. Which of the following is a group of stars?
   a. solar system
   b. constellation
   c. satellite
   d. hot gases

8. Which of the following does Earth complete in one year?
   a. phase
   b. rotation
   c. season
   d. orbit

9. Which of the following takes pictures of planets?
   a. space probe
   b. telescope
   c. lens
   d. constellation

10. Which of the following gives off light?
    a. star
    b. moon
    c. planet
    d. lens

11. People on Earth need a telescope to see
    a. the Sun.
    b. the Moon.
    c. Neptune.
    d. Venus.

12. Which of the following is found on the Moon?
    a. phases
    b. craters
    c. atmosphere
    d. liquid water
The Good Ship Popsicle Stick

Read the Unit Literature feature in your textbook.

Write About It

Response to Literature This article is about a ship made from ice cream sticks. What words are used to describe the ship? Choose an object around you. Then use words to tell about it.

Paragraphs should have a clear topic sentence that directly addresses the object students are writing about. The sentences that follow the topic sentence should support the topic sentence by providing details such as size, shape, color, smell, and feel. Students should use a closing sentence that restates the main idea of the paragraph. Good paragraphs will stay on topic, demonstrate vivid word choice, and include correct grammar and mechanics.
Complete the chart below to show some of the characteristics of matter. Some answers have been written for you.

### Matter

<table>
<thead>
<tr>
<th>has certain properties</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>volume</td>
<td>color</td>
</tr>
<tr>
<td>shape</td>
<td>mass</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>can be measured</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>tool</td>
<td>used to measure</td>
<td>metric unit</td>
</tr>
<tr>
<td>thermometer</td>
<td>temperature</td>
<td>degrees Celsius</td>
</tr>
<tr>
<td>ruler</td>
<td>length</td>
<td>meter</td>
</tr>
<tr>
<td>beaker or graduated cylinder</td>
<td>volume</td>
<td>liters</td>
</tr>
<tr>
<td>pan balance</td>
<td>mass</td>
<td>grams</td>
</tr>
<tr>
<td>spring scale</td>
<td>weight</td>
<td>newtons</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>exists in different states</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>state</td>
<td>definite volume?</td>
<td>definite shape?</td>
</tr>
<tr>
<td>solid</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>liquid</td>
<td>yes</td>
<td>No. It takes the shape of its container.</td>
</tr>
<tr>
<td>gas</td>
<td>No. It takes the shape of its container.</td>
<td>No. It takes the shape of its container.</td>
</tr>
</tbody>
</table>
Properties of Matter

Use your textbook to help you fill in the blanks.

What is matter?

1. Everything that takes up space is __________ matter.

2. The amount of space that an object takes up is its __________.

3. A large object has more volume than a(n) __________ object.

4. An object’s __________ is equal to the amount of matter it has.

5. An object that feels light, such as a beach ball, has a(n) __________ mass.

6. A characteristic of matter is called a(n) __________.

What are some properties of matter?

7. Two properties of matter are volume and __________ mass.

8. The size, smell, feel, and __________ of an object are also properties.

9. An object will sink or float because of its __________ and mass.

10. An object with a small mass and a large volume will usually __________.
11. An object with a large mass and a small volume will usually \textbf{sink}.

12. A magnet pulls on objects made of \textbf{iron}.

13. Metals are good material for cooking pots because \textbf{heat} can move through them easily.

**What is matter made of?**

14. Matter is made of building blocks called \textbf{elements}.

15. Most matter contains more than \textbf{one} element.

16. The elements hydrogen and \textbf{oxygen} make up water.

17. Sugar contains the elements hydrogen, oxygen, and \textbf{carbon}.

**Critical Thinking**

18. What are some properties that describe the matter in a yellow pencil?

Possible answer: A yellow pencil is usually long, made of wood, and painted yellow on the outside. It contains a gray material in the center, may have a sharp point, and makes marks when I write. It is usually light, so it has a small mass. It isn’t big, so it has a small volume.
Properties of Matter

Match each word in the box to its definition. Write its letter in the space provided.

- a. carbon
- b. elements
- c. magnet
- d. mass
- e. matter
- f. property
- g. volume

1. __________ the amount of space an object takes up
2. __________ something that pulls on an object made of iron
3. __________ the third element in sugar, along with hydrogen and oxygen
4. __________ the size, shape, feel, or smell of something
5. __________ anything that takes up space
6. __________ the building blocks of matter
7. __________ a measure of the amount of matter in an object
Cloze Activity

Properties of Matter

Fill in the blanks.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Mass</th>
<th>Properties</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>magnetism</td>
<td>matter</td>
<td>small</td>
<td></td>
</tr>
</tbody>
</table>

Everything around you takes up space. Anything that takes up space is made of **matter**. The amount of space an object takes up is its **volume**. The volume of an object tells how big or **small** it is. For example, a bowling ball has more volume than a tennis ball. Bowling balls are heavier than tennis balls because bowling balls have more matter. A bowling ball therefore has more **mass** than a tennis ball.

The color, shape, feel, and smell of an object are its **properties**. Objects have many different kinds of properties, such as **magnetism** and conducting heat. All matter is made up of building blocks called **elements**. Different combinations of elements make up all matter.
Meet Neil deGrasse Tyson

Read the Reading in Science feature in your textbook.

Write About It

**Main Idea and Details** Read the article with a partner. What is the main idea? What details add to the main idea? Fill in a main-idea chart. Then write a few sentences to explain the main idea.

Use the graphic organizer to complete the main idea and supporting details found in the article.

**Main Idea**
Your body contains hydrogen, carbon, and many other elements. They formed in stars long ago.

Most elements form inside the centers of stars. Hydrogen combines to form all of the other elements.

Stars scatter elements into space.

Over millions of years, these elements combine to form new stars, planets, or living things.
Planning and Organizing

Answer the questions below about the article.

1. What does Dr. Neil deGrasse Tyson study?
   how the universe works

2. Where does Dr. Tyson work?
   the American Museum of Natural History in New York

3. What is your body made up of?
   hydrogen, carbon, and many other elements

4. Where do most elements form?
   inside the centers of stars

5. What combines to form all the other elements?
   hydrogen

6. How do these elements make their way from the stars to your body?
   Stars explode and scatter elements into space. Over millions of years, these elements combine to form new stars, planets, or living things.

Drafting

➤ Start by writing a clear statement that describes the main idea of the article.

➤ Write three supporting details.

➤ Read what you have written. Cross out anything that does not directly support the main idea.

➤ Exchange papers with your partner and ask him or her to check your choice of a main idea. Have your partner also check your choice of supporting details.
Measuring Matter

Use your textbook to help you fill in the blanks.

**How is matter measured?**

1. The sizes, or amounts, of matter in objects can be compared by **measuring**.

2. A unit of measurement that people agree to use is called a **standard unit**.

3. Standard units of measure in the **metric system** are meters, grams, and liters.

4. A thermometer is used to measure the **temperature** of a substance or an object.

5. In the metric system, volume is measured in **liters**.

6. Scientists use equipment such as **beakers** and **graduated cylinders** to measure volume.

**How do we measure mass?**

7. The mass of an object can be measured on a(n) **pan balance**.

8. The amount of matter in an object is referred to as **mass**.

9. In the metric system, mass is measured in **grams**.
10. An object with particles packed tightly together has more mass than an object in which particles are ________.

How are mass and weight different?

11. The force that pulls objects to Earth is called ________.

12. The measure of the amount of gravity pulling an object toward Earth is its ________.

13. The weights of certain objects can be measured using a(n) ________.

Critical Thinking

14. Why would a brick have the same mass on the Moon as it has on Earth, but weigh less on the Moon?

The mass of the brick would not change, because the brick is still made up of the same number of particles. The weight of the brick, however, is affected by the pull of gravity. The pull of gravity on Earth is more than the pull of gravity on the Moon and therefore its weight will be greater on Earth than on the Moon.

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Measuring Matter

What am I?

Choose a word from the box below that answers each question.

a. gravity  c. meter  e. pan balance  g. spring scale
b. liter  d. metric system  f. standard unit  h. weight

1. _____ I am the unit of length in the metric system. What am I?

2. _____ I am a unit of measure that people agree to use. What am I?

3. _____ I am a tool used to measure mass. What am I?

4. _____ I am different on the Moon than on Earth. What am I?

5. _____ I am a tool used to measure weight. What am I?

6. _____ I am a system used by scientists to make accurate measurements of matter. What am I?

7. _____ I am a unit of liquid volume in the metric system. What am I?

8. _____ I am the force that keeps objects from floating off into space. What am I?
Measuring Matter

Fill in the blanks.

gravity  metric system  weight

mass  tightly

All matter is made of small particles. Some objects contain particles that are far apart and some have many particles packed tightly together. Therefore, an object like a bowling ball has more mass than an object like a balloon because it has more particles that are close together.

The mass of an object on Earth is the same as it is on the Moon because the number of particles in an object stays the same. However, an object’s weight on Earth is greater than it would be on the Moon because the pull of gravity is greater on Earth than it is on the Moon. Scientists use the metric system to measure matter. Scientists use these measures often in their daily work.
Solids, Liquids, and Gases

Use your textbook to help you fill in the blanks.

What are three forms of matter?

1. Three forms of matter are solid, liquid, and _______ gas _______.
2. These three forms are what scientists call the _______ states of matter _______.
3. Solids, liquids, and gases each have certain _______ properties _______.
4. Matter that has a(n) _______ size and shape _______ is a solid.
5. Objects that are made of _______ metal _______, _______ plastic _______, and _______ wood _______ are solids.
6. The particles in a solid are _______ closely packed together _______.

What are liquids and gases?

7. Liquids and gases are matter because they take up _______ space _______ and have _______ mass _______.
8. Anything with a definite volume but not a definite _______ shape _______ is a(n) _______ liquid _______.
9. Milk is a liquid because it takes the _______ shape _______ of its container.
10. Whether a cup of milk is spilled or in a glass, the milk still has the same _______ volume _______.

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11. Particles in liquids are not as close together as particles in solids.

12. Particles in gases have more energy than particles in liquids.

13. Any matter that does not have a definite shape or volume is a(n) __________.  

14. Gases spread out to take the shape and __________ of their containers.

15. Particles in gases move about __________.

How do you use all the states of matter?

16. The handlebars and seat of a bicycle are __________.

17. The air in bicycle tires is a(n) __________. The chain __________ is a liquid.

Critical Thinking

18. How are the three states of matter represented each day when you eat lunch?

Possible answer: Solids are represented by the food I eat, by the table I sit at and the chair I sit on, and by the clothes I wear. Liquids are represented by the water, milk, or juices that I drink. Gas is represented by the air that surrounds me.
Solids, Liquids, and Gases

Match the correct letter to its description.

a. definite  
b. volume  
c. gas  
d. liquid  
e. oxygen  
f. particles  
g. solid  
h. states of matter

1. _____ stays the same in a liquid
2. _____ matter that has particles packed tightly together
3. _____ means “it has a limit to its shape and size”
4. _____ a gas needed by living things
5. _____ matter with particles that can be far apart or squeezed together
6. _____ forms that scientists call gases, solids, and liquids
7. _____ all matter is made of these
8. _____ matter whose particles have no definite shape but take the shape of the matter’s container
Solids, Liquids, and Gases

Fill in the blanks below using the words in the box.

definite  gas  slide past  tightly packed
energy  less  solid
freely  liquid  spread out

Every day, living things use substances in different states of matter. These states of matter are gas, liquid, and solid.

Gases, liquids, and solids have different characteristics. Gases have particles that are far apart from each other. Particles in gases have a lot of energy and move freely. They spread out to fill up whatever container they are in. Liquids are made up of particles that have less energy than gases. Particles in a liquid slide past one another. They take the shape of their container. Solids have a(n) definite shape. Particles in a solid have the least amount of energy and are tightly packed together. They do not move around much.
Describe Matter

Read the Writing in Science feature in your textbook.

Write About It

**Descriptive Writing** Think of an object you use every day, such as your book bag. How would you describe it to someone who has never seen it before? Use the object's properties to write a description of the object.

**Getting Ideas**

Select one object. Write it in the center oval of the web below. Brainstorm details that describe it. Write them in the outer ovals.

Possible web:

- **soft**
- **made of canvas**
- **yellow and green**
- **heavy when filled with books**
- **can be folded**
- **padded straps**

**Planning and Organizing**

Here are two sentences that Malcolm wrote about his book bag. Write “yes” if the sentence includes details that describe the bag. Write “no” if it does not.

1. My book bag is soft and crinkly. __________
2. I carry my book bag to school every day. __________
Drafting

Write a sentence that begins your description. Identify the object that you are describing and the most important idea about it. This is your topic sentence.

Possible sentence: My book bag is one of the most useful things I have.

Now write your description on a separate piece of paper. Begin with your topic sentence. Include details to help your readers picture the object.

Revising and Proofreading

Here is part of Malcolm’s description. Help him improve it by adding descriptive words.

My book bag is ________ and yellow. These are my favorite colors. It has a(n) ________ shape. It is not a simple rectangle, like most bags. Instead, it is shaped like a turtle. It is ________ because it is made of cloth. When it is full, it is very ________. When it is empty, it is ________.

Now revise and proofread your writing. Ask yourself:

► Did I include details to describe how the object looks, sounds, feels, smells, or tastes?

► Did I put these details in an order that makes sense?

► Did I correct all mistakes?
Observing Matter

Circle the letter of the best answer.

1. What is the measure of the amount of matter in an object?
   a. weight
   b. volume
   c. mass
   d. gravity

2. What type of object attracts objects made of iron?
   a. gravity
   b. magnet
   c. gas
   d. liquid

3. In a solid, particles
   a. move freely.
   b. slide past one another.
   c. have a large amount of energy.
   d. do not have much room to move.

4. A standard unit in the metric system is the
   a. inch.
   b. pound.
   c. meter.
   d. gallon.

5. The unit used to measure liquid volume in the metric system is the
   a. meter.
   b. liter.
   c. centimeter.
   d. gram.

6. The amount of space an object takes up is its
   a. mass.
   b. state of matter.
   c. volume.
   d. temperature.
7. Mass is the measure of
   a. the amount of matter in an object.
   b. the volume of an object.
   c. the amount of gravity pulling on an object.
   d. the weight of an object.

8. Which of the following would be different if an object were on the Moon rather than on Earth?
   a. elements
   b. weight
   c. mass
   d. volume

9. Heat moves easily through
   a. wood.
   b. metal.
   c. gases.
   d. magnetic materials.

10. Sugar is made up of the elements hydrogen, oxygen, and
    a. aluminum.
    b. carbon.
    c. iron.
    d. water.

11. The handlebars and seat of a bicycle are examples of
    a. gases.
    b. liquids.
    c. solids.
    d. elements.

12. Liquids and gases are alike because they
    a. are both solids.
    b. have no definite shape.
    c. have particles that are tightly packed together.
    d. have less energy than solids.
Changes in Matter

Complete the concept map with the information you learned about matter and the ways in which matter changes.

**Physical Changes**

A physical change is a change in the way matter looks.

After a physical change, the matter is still the same type of matter.

Three types of physical change are:
1. change in shape
2. change in size
3. change in state

**Chemical Changes**

A chemical change is a change that creates a new type of matter.

After a chemical change, the matter is different and has new properties.

Three signs that a chemical change has taken place are:
1. light and heat
2. color change
3. bubbles
Changes of State

Use your textbook to help you fill in the blanks.

What happens when matter is heated?

1. When something melts, it changes from a(n) _________ to a(n) _________.
2. Matter gains ________ when it is heated.
3. Particles in solids are held ________.
4. Particles in liquids ________ one another.
5. When something boils, it changes from a(n) _________ to a(n) _________.
6. Heat causes particles in a liquid to move _______ and ________.
7. Liquids can change into a gas without boiling, a process known as _________.
8. Water in the form of a gas is called _________.

What happens when matter is cooled?

9. When a solid, a liquid, or a gas is cooled, it _________.
10. When a gas cools to the right temperature, it will _________.

Chapter 10 • Changes in Matter
Reading and Writing
11. A gas that condenses loses energy and becomes a(n) liquid.

12. A liquid can freeze, or change into a solid, when it loses energy.

How is water different from other kinds of matter?

13. Water can be a(n) solid, a(n) liquid, or a(n) gas.

14. When water freezes, it takes up more space.

Critical Thinking

15. How are the particles in matter affected by getting or giving up energy?

Possible answer: If heated to the right temperature, a solid's particles will gain enough energy so that it becomes a liquid. If a liquid gains enough energy, it will evaporate. Its particles will spread out and it will then become a gas. When gas particles lose energy, they will come close together and condense, forming a liquid. If a liquid loses enough energy, it will freeze.
Changes of State

What am I?

Choose the correct word from the box that answers each question. Write its letter in the blank provided.

1. I am the gaseous state of water. What am I?  
   answer: g

2. I am a process in which a liquid changes into a gas without boiling. What am I?  
   answer: d

3. Solids, liquids, and gases have to gain or lose me in order to change phase. What am I?  
   answer: c

4. I happen when liquids heat up and bubbles form. What am I?  
   answer: a

5. I happen when solid matter gains energy and turns into a liquid. What am I?  
   answer: f

6. I happen when particles of water vapor lose energy and come closer together. What am I?  
   answer: b

7. I am the process that locks particles into position to form a solid. What am I?  
   answer: e
Changes of State

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>condenses</th>
<th>expands</th>
<th>gas</th>
<th>liquids</th>
<th>solid</th>
<th>water vapor</th>
</tr>
</thead>
<tbody>
<tr>
<td>energy</td>
<td>freezes</td>
<td>heat</td>
<td>loses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most solids melt when heated to the right temperature. Once they melt, they become _______ liquids. They melt because they gain _______ energy in the form of _______ heat. With enough heat, particles in liquids will move faster and spread apart. When a liquid boils, it evaporates and changes to a(n) _______ gas.

Water exists in three states: solid, liquid, and gas. Water that has changed to a gas is called _______ water vapor. When water vapor cools, it _______ loses energy. It _______ condenses and becomes liquid water again. When liquid water loses enough energy, it _______ freezes.

Particles that are frozen are locked in position and form a(n) _______ solid. When water freezes, it _______ expands. Empty spaces form between the particles and cause the water to take up more space.
Physical Changes

Use your textbook to help you fill in the blanks.

What are physical changes?
1. A change in the appearance of matter is a(n) physical change.
2. Matter may look different after a physical change. However, it is still the same kind of matter.
3. Examples of physical changes are tearing, stretching, cutting, and bending.
4. Three kinds of physical changes are changes in size, changes in shape, and changes in state.

What happens when you mix matter?
5. When different kinds of matter are put together, a(n) mixture forms.
6. In a mixture, the properties of each part of the mixture do not change.
7. When matter is mixed evenly with another kind of matter, a(n) solution forms.
8. A solution is one kind of mixture.
9. An example of a solution is salt water.
10. Even if you stir them for a long time, sand and water will never form a(n) __________ mixture.

11. Not all solutions contain __________ liquids.

12. Air is a solution of different __________ gases.

13. Several different solids make up __________ brass.

**How can mixtures be separated?**

14. Mixtures can be separated using __________ properties such as size, shape, and color.

15. In a salt-water mixture, salt is separated when water __________ evaporates.

**Critical Thinking**

16. Describe two ways in which matter can be changed physically. Use paper and water as examples.

    Matter can change physically, but it will always have the same composition. For example, when a sheet of paper is torn or bent, it may have a different shape or size, but it is still paper. When liquid water freezes or an ice cube melts, the state of the water is changed, but it is still water.
Physical Changes

Match the correct word with its description. Write in the correct letter in the blank provided.

a. evaporation  d. properties  g. solution
b. mixture       e. shape           h. state
c. physical change f. size

1. ______ square, round, or irregular
2. ______ large or small
3. ______ a change in the way matter looks
4. ______ solid, liquid, or gas
5. ______ one or more kinds of matter mixed evenly in another kind of matter
6. ______ the volume, mass, look, smell, feel, and sound of something
7. ______ what happens when a gas forms slowly from a liquid
8. ______ different kinds of matter mixed together
Physical Changes

Use the words in the box to fill in the blanks below.

| gases | matter | shape | solids | mixture | properties | size | solution |

Matter can undergo physical changes. Afterwards, it may look different, but it is still the same _______ matter.

Tearing a sheet of paper changes its _______ shape, but it is still paper. Any change in the _______ size, shape, or state of matter is a physical change.

When different kinds of matter are mixed together, a(n) _______ mixture results. Each kind of matter in a mixture keeps its _______ properties. A mixture in which matter mixes evenly with another kind of matter is called a(n) _______ solution. Some solutions, like air, are mixtures of _______ gases. Other solutions, such as brass, are mixtures of _______ solids. Even two foods, such as spaghetti and meatballs, can be called a mixture!
# Mining Ores

Read the Reading in Science feature in your textbook.

## Write About It

**Infer** Read the article with a partner. Use what you know and what you read in the article to answer this question. Why do you think it is important for people to recycle metals? Write a paragraph to share your ideas.

Use the graphic organizer below to identify what you already know and what you can infer from the passage about obtaining useful metals.

<table>
<thead>
<tr>
<th>Clues</th>
<th>What I Know</th>
<th>What I Infer</th>
</tr>
</thead>
<tbody>
<tr>
<td>I use metals</td>
<td>Spoons and bikes are made of metals.</td>
<td>I can recognize metals because they are used in familiar objects.</td>
</tr>
<tr>
<td>Metals come from Earth</td>
<td>Metals are found in ores.</td>
<td>I infer that there are many ways to separate metals from ores.</td>
</tr>
</tbody>
</table>
Planning and Organizing

Answer the questions to help you write your essay.

1. What does recycling mean?
   Recycling means taking a product that would otherwise be thrown away and breaking it down into parts that can be used to make new products.

2. What do you think happens to mountains or the ground where ores are mined?
   They are flattened because all of the soil has been removed.

3. According to the information in the article, what things might be saved if metals are recycled?
   Mountains, river valleys, and volcanoes will be preserved.

Drafting

Write two or three reasons for recycling metals. Have your partner read your work. Does your partner agree or disagree with your reasons? Why?

1. __________________________
   __________________________
   __________________________

2. __________________________
   __________________________
   __________________________
Chemical Changes

Use your textbook to help you fill in the blanks.

What are chemical changes?

1. Rust and ash are results of chemical changes.

2. A chemical change takes place when a material forms a(n) new kind of matter.

3. The properties of a new material will be different from the original material.

4. Chemical changes break down food in our bodies.

5. Our bodies get energy when food is broken down.

6. Plants and animals stay alive because of chemical changes.

7. Energy from the Sun is used by green plants.

8. Plants change carbon dioxide and water into food and oxygen.

9. Rust on a car shows that chemical changes have happened to parts made of iron.
What are the signs of a chemical change?

10. There are often ____________ signs that a chemical change has taken place.

11. Signs of chemical change are ____________ light, ____________ heat, ____________ color change.

12. When a log burns, ____________ heat and light are released and ____________ new kinds of matter form.

13. Some chemical changes also make ____________ bubbles.

14. When baking soda and vinegar are mixed, bubbles of ____________ carbon dioxide gas form.

Critical Thinking

15. Give an example of a chemical change you have seen that is helpful, and one that is damaging.

Possible answer: A campfire is an example of a positive chemical change. Cucumbers that have become rotten after being left in the refrigerator for too long is an example of a damaging chemical change.
Chemical Changes

Match the correct word with its description. Then write its letter in the blanks below.

- a. baking
- b. bubbles
- c. carbon dioxide
- d. chemical change
- e. green plants
- f. light and heat
- g. properties
- h. rust

1. _____ These are two signs that a chemical change has taken place.
2. _____ Plants change this material into food and oxygen.
3. _____ This process goes on inside you every day and creates a new type of matter.
4. _____ These are the characteristics of a certain type of matter.
5. _____ During this activity, cake batter is changed chemically.
6. _____ When iron is chemically changed, this is made.
7. _____ These use the Sun’s energy to make chemical changes.
8. _____ These show that carbon dioxide gas forms when baking soda is added to vinegar.
Chemical Changes

Use the words in the box to fill in the blanks below.

breaks down  color  light  properties  
bubbles  heat  new type  signs

Every day, chemical changes take place in and around you. For example, food that your body **breaks down** undergoes a chemical change. When something changes chemically, it becomes a **new type** of material and has different **properties** from the original material.

The process of a chemical change can be detected by certain **signs**, or evidence. For instance, **light** and **heat** are given off as logs burn. Another sign of a chemical change is a change in **color**, such as when an apple turns brown. Chemical changes may also give off **bubbles** when some materials are mixed together. The rust on a bicycle and cooked food are also examples of a chemical change.
Changes in Matter

Circle the letter of the best answer.

1. Peas and carrots together in a bowl are an example of a(n)
   a. chemical change.
   b. solution.
   c. mixture.
   d. property.

2. Water vapor collects on the outside of a cold glass. This is an example of
   a. boiling.
   b. condensation.
   c. freezing.
   d. melting.

3. When a liquid evaporates, it
   a. becomes a solid.
   b. changes color.
   c. boils.
   d. changes state.

4. When a string is cut into two pieces, a(n) ____ has occurred.
   a. chemical change
   b. change in state
   c. physical change
   d. change in the string’s properties

5. What can happen when two materials are combined to make a new type of matter?
   a. The shapes of the materials change.
   b. The sizes of the materials change.
   c. Heat and light are released.
   d. The materials can be separated easily.
Circle the letter of the best answer.

6. What new types of matter do green plants produce with the help of the Sun’s energy?
   a. carbon dioxide and water vapor
   b. rust and iron
   c. food and oxygen
   d. bubbles and a color change

7. What forms when one or more types of matter are mixed evenly with another type of matter?
   a. bubbles
   b. a solution
   c. heat and light
   d. a color change

8. What happens when solid water begins to gain energy?
   a. it freezes
   b. it boils
   c. it evaporates
   d. it melts

9. A person put a plastic bottle of water in the freezer. Later, the person observed that the bottle had cracked. What property of water made this happen?
   a. The water gained energy as it froze.
   b. The water expanded, or took up more space, as it froze.
   c. The water condensed on the outside of the bottle as it froze.
   d. The water gave off bubbles of carbon dioxide as it froze.

10. One sign of a chemical change in a banana is a change in
    a. state.
    b. shape.
    c. size.
    d. color.
Read the Unit Literature feature in your textbook.

**Jump Rope**
by Rebecca Kai Dotlich

**Response to Literature** This poet uses rhythm and rhyme to describe how a jump rope moves. How else do things move on the playground? Write a poem about another movement game.

Students' poems should demonstrate vivid word choice and include correct grammar and mechanics. Their poems should include their own observations of how things move in another movement game.
Forces and Motion

Complete the concept map with the information that you learned about forces and motion.

**Motion**

An object's **position** is the place where the object is.

When an object's position is changing, the object is in **motion**.

The **speed** of an object describes how fast the object is moving.

**Forces**

A(n) **force** is a push or a(n) **pull**.

Forces can change an object's **motion** by changing its **speed** or direction.

A(n) **machine** can help people do work. Some machines let people use less **force** to do a job.
Position and Motion

Use your textbook to help you fill in the blanks.

How can you describe position?

1. The location of an object is its ___position___.

2. The words ___over___, ___under___, ___left___, ___right___, ___on top of___, and ___next to___ help describe the position of an object.

3. Position words tell where an object is by ___comparing___ it to the locations of other objects.

4. Measuring is a way to find the ___distance___ between objects.

5. Distance can be measured with a(n) ___ruler___.

6. Distance can be used to help describe the ___position___ of an object.

What is motion?

7. When an object’s ___position___ is changing, it is in motion.

8. An object that is in motion can move ___quickly___ or ___slowly___.

9. A(n) ___swinging___ object moves back and forth.

10. Short, sharp turns from one side to another form a(n) ___zigzag___ path.
What is speed?

11. How fast an object is moving is described by its ________.

12. The speed of a moving object can be ________.

13. To measure an object’s ________, you must know how far the object traveled and how long it took to go that distance.

14. If you ride a bicycle 15 kilometers in one hour, you are moving at a speed of ________ kilometers per hour.

Critical Thinking

15. Choose a group of objects in your classroom or in one room of your house and use position words to describe their relationship to each other. Use at least three objects and three different position words.

Possible answer: In my classroom, the clock is hanging over the blackboard. To the left of the blackboard is a bulletin board. There is a waste basket beneath the bulletin board.
Position and Motion

Matching

Match the words in the box to their descriptions below. Write the correct letter in the space provided.

a. distance  

b. motion  
c. position  
d. position word  
e. ruler  
f. speed  
g. straight line  
h. zigzag

1. ______  the location of an object
2. ______  a path with short, sharp turns from side to side
3. ______  a description of how fast an object moves
4. ______  an item used to measure distance
5. ______  a term such as right, next to, or under
6. ______  the amount of space between two places or objects
7. ______  a change in position
8. ______  a path with no turns
Position and Motion

Use the words in the box to fill in the blanks below.

Comparing  motion  straight line  zigzag
distance  slowly  under

If you describe the position of an object, you are describing where it is. An object’s position can be described by ___ comparing ___ it with the things near it. Words such as over, ___ under ___ , and on top of are useful for describing position. You might also describe an object’s ___ distance ___ based on the things around it.

An object that is changing position is in ___ motion ___. Objects, such as a bicycle, can move quickly or ___ slowly ___. A bicycle can move in a(n) ___ straight line ___ , in a circular pattern, or in a(n) ___ zigzag ___ pattern. The speed of an object tells how fast the object is moving.
Travel Through Time

Read the following passage. Underline the sentences that describe new inventions. Circle the sentences that describe the achievements of those inventions.

1804 In England Richard Trevithick built the first steam engine for a train. The steam engine helped people travel great distances. It also helped them get to their destinations more quickly.

1884 In Germany Karl Freidrich Benz built the first car to run on gasoline. It worked similarly to the cars you see on the road today. However, his car only had three wheels!

1903 Wilbur and Orville Wright constructed the first motorized airplane that flew and landed safely. Their airplane’s engine ran on gasoline. It flew for 12 seconds over 36 meters (120 feet).

1961 Russian astronaut Yuri Gagarin was the first person in space. His spaceship had special engines. They produced a force that was stronger than the pull of Earth’s gravity. These engines helped the spaceship leave Earth’s surface and orbit the planet.

Problem and Solution

Fill in the problem-and-solution graphic organizers. Use the sentences you underlined and circled as clues.
Problem
Before the 1800s it took people a long time to travel great distances.

Steps to Solution
In 1804, [Richard Trevithick] built the first [steam engine] for a(n) [train].

Solution
The [steam engine] helped people travel [long] distances and reach their destinations [quickly].

Problem
Before 1961, people could not travel in space.

Steps to Solution
Russian scientists built a(n) [spaceship] with special engines that were stronger than the [force of gravity].

Solution
Russian astronaut [Yuri Gagarin] was the first person in [space].

Write About It
Problem and Solution How have machines helped people learn about distant places? Read the article again. On a separate piece of paper, write about ways machines have helped people solve problems.
Forces

Use your textbook to help you fill in the blanks.

What are forces?

1. To make an object start moving, an ________ force must be applied to it.

2. A force that makes something move can be an ________ or an ________.

3. More force is needed to move ________ objects than to move light objects.

4. Forces can make objects start moving, ________, ________, or stop moving.

5. Forces can change the ________ of a moving object.

6. When the forces of an object cancel out, like a rope being pulled equally from each side, the forces are ________.

What are types of forces?

7. Forces that happen between objects that touch are ________.

8. Forces such as ________ and ________ can act on an object without touching it.
9. Magnets can _______ attract _______ or _______ repel _______ one another without touching.

10. Magnets attract or repel through _______ solids _______ , _______ liquids _______ , or _______ gases _______.

11. The pulling force between two objects is called _______ gravity _______.

12. A measure of the pull of gravity on an object is its _______ weight _______.

What is friction?

13. The force that occurs when one object rubs against another object is called _______ friction _______.

14. There is very little friction between _______ smooth _______ , slippery surfaces, and a lot of friction between _______ rough _______ surfaces.

Critical Thinking

15. In a baseball game, the first batter hit the ball far into the outfield. The second batter did not hit the ball as far and the ball only made it onto the infield. How do you know that the first batter used more force on the ball?

Possible answer: The first batter used more force because the ball went much farther. It takes more force to hit a ball into the outfield than it does to bunt a ball into the infield.
Forces

Match each word in the box with its definition below. Write the correct letter in the space provided.

- balanced
- force
- friction
- gravity
- magnet
- repel
- unbalanced
- weight

1. _____ forces on an object that cancel each other out because they have equal and opposite effects
2. _____ a push or a pull
3. _____ to push away
4. _____ a force that occurs when objects rub against each other
5. _____ a measure of the amount of gravity between two objects
6. _____ an object with magnetic force
7. _____ when forces on an object do not cancel each other out
8. _____ a pulling force between two objects, such as between you and Earth
Forces

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>contact forces</th>
<th>friction</th>
<th>rough</th>
</tr>
</thead>
<tbody>
<tr>
<td>direction</td>
<td>gravity</td>
<td>slipper</td>
</tr>
<tr>
<td>force</td>
<td>push</td>
<td>touching</td>
</tr>
</tbody>
</table>

What makes a soccer ball move? To make any object move, a(n) ___________ has to be applied to it. The force may be a(n) ___________ or a pull. In soccer, the goalie's job is to use force to stop or change the ___________ of the ball. The goalie uses ___________ to do this.

The force that works against motion when one object rubs another object is ___________. Surfaces that are ___________ have more friction than surfaces that are ___________. Magnets attract or repel each other without ___________. The force of ___________ also can pull objects from a distance. For example, gravity is the force that pulls you toward Earth.
Work and Energy

Use your textbook to help you fill in the blanks.

What is work?

1. In science, ________ work is done when a force changes the motion of an object.

2. Picking up a book is work because a force is used and the book ________ moves.

3. Dropping a book is work because ________ gravity changes the motion of the book.

4. Work is not done on an object when you push it and it does not ________ move.

5. Picking up a boulder is ________ more work than picking up a pebble.

What is energy?

6. People need ________ energy to do work.

7. The ability to do ________ work is a way to describe ________ energy.

8. Energy makes it possible for changes in ________ motion to take place.

9. The two main forms of energy are ________ potential energy and ________ kinetic energy.
10. A flying plane has kinetic energy because it is moving.

11. Energy that is stored is potential energy.

12. A ball at the top of a hill has potential energy because of its position.

13. As the ball rolls down the hill, its potential energy changes into kinetic energy.

14. When wood or food is burned, its potential energy changes into kinetic energy.

How can energy change?

15. Energy can change from one form to another.

16. You transfer energy from your body to a bowling ball when you roll the ball down an alley.

Critical Thinking

17. Use the terms potential energy and kinetic energy to describe what happens when a car uses gasoline.

Possible answer: Gasoline has potential energy stored in it. As the car moves, its gasoline burns and its stored energy is changed into kinetic energy.
**Work and Energy**

**Matching**

Match each word in the box with its definition below. Write the letter of the word in the space provided.

<table>
<thead>
<tr>
<th>a. energy</th>
<th>d. heat</th>
<th>g. work</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. friction</td>
<td>e. kinetic energy</td>
<td></td>
</tr>
<tr>
<td>c. gravity</td>
<td>f. potential energy</td>
<td></td>
</tr>
</tbody>
</table>

1. _____ you feel this when you rub your hands together

2. _____ energy that is ready to be used

3. _____ a force that works to slow your hands when you rub them together

4. _____ energy in running water

5. _____ the ability to do work

6. _____ when a force changes an object’s motion

7. _____ a force that causes an object on Earth to fall
Work and Energy

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>drop</th>
<th>gravity</th>
<th>motion</th>
<th>stored energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>energy</td>
<td>kinetic energy</td>
<td>moved</td>
<td>work</td>
</tr>
</tbody>
</table>

In science, work is done only when a force changes the motion of an object. If you pick up a pencil from the floor, you have done ________ work. That is because a force ________ moved the pencil. If you ________ drop the pencil, more work has been done. By dropping the pencil, you allowed the force of ________ gravity to change the pencil’s motion.

In order to do work, you need ________ energy. Energy is the ability to do work. Energy is what makes it possible to change the ________ motion of objects.

The two main forms of energy are potential energy and ________ kinetic energy. Potential energy is ________ stored energy that is ready to be used. Anything that moves, such as running water or a rolling ball, has kinetic energy.
Using Simple Machines

Use your textbook to help you fill in the blanks.

What are machines?

1. An object that makes work easier is a(n) _______ machine.

2. Machines with few or no moving parts are called _______ simple machines.

3. Six types of simple machines are the lever, the _______ pulley, the wheel and axle, the _______ inclined plane, the wedge, and the _______ screw.

What are levers?

4. A straight bar that moves on a fixed point, such as a seesaw, is a(n) _______ lever.

5. An object that is lifted by a machine is the _______ load.

6. A(n) _______ pulley uses a rope and wheel to lift a load.

7. A wheel that moves around a post is a lever called the _______ wheel and axle.

What are inclined planes?

8. A simple machine with a flat, _______ slanted surface is an inclined plane.
9. Inclined planes ______ reduce the force needed to move an object, but the object has to be pushed a(n) ______ longer distance.

10. A(n) ______ wedge is a simple machine that uses force to split an object apart.

11. A(n) ______ screw is an inclined plane that is wrapped into a spiral.

**How do machines work together?**

12. Two or more simple machines working together make a(n) ______ compound machine.

13. A can opener is a compound machine made up of a(n) ______ wedge, a(n) ______ lever, and a wheel and axle.

**Critical Thinking**

14. What simple machine could you use to lift a heavy rock out of the ground? How would you use the machine?

Possible answer: I could use a crowbar as a lever. I could put one end of the crowbar under the rock, place another rock beneath the bar as a fulcrum, and then push down on the opposite end of the bar to lift the rock.
Using Simple Machines

What am I?

Choose a word from the box that answers each question below. Write its letter in the space provided.

a. compound machine  d. lever  g. screw
b. fulcrum  e. load  h. simple machine
c. inclined plane  f. pulley

1. _______ I am a kind of lever that uses a rope and wheel to lift an object. What am I?
2. _______ I am a fixed point on a lever. What am I?
3. _______ I am a simple machine with a flat, slanted surface. What am I?
4. _______ I am made up of two or more simple machines. What am I?
5. _______ I am a straight bar that moves on a fixed point. What am I?
6. _______ I am the object lifted by a lever. What am I?
7. _______ I am an inclined plane wrapped into a spiral. What am I?
8. _______ I am a lever, pulley, wheel and axle, inclined plane, wedge, or screw. What am I?
Using Simple Machines

Use the words in the box to fill in the blanks below.

Every day, you use machines that make work easier to do. A machine helps you use less _______ force _______ to do a job. A machine can also change the direction of the force you use. Most tools are _______ compound machines _______ made up of two or more simple machines.

There are _______ six _______ types of simple machines. Simple machines have few or no _______ moving _______ parts. A seesaw is an example of a(n) _______ lever _______.
It is a straight bar that moves on a fixed point, called a(n) _______ fulcrum _______ , to lift a load. A(n) _______ pulley _______ uses a rope and wheel to lift a load. A doorknob is an example of a(n) _______ wheel and axle _______. When you slide a box up a ramp, you are using a(n) _______ inclined plane _______. A knife is a wedge that splits food apart.
A Very Useful Machine

Read the Writing in Science feature in your textbook.

Write About It

Explanatory Writing Choose another compound machine. Find out how it works. Then write a paragraph that explains how to use it.

Getting Ideas

Think about how to use the machine you chose and how it works. Then write the steps in the chart below.

Name of Machine: zipper

<table>
<thead>
<tr>
<th>First</th>
<th>Next</th>
<th>Last</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pull the slide up the zipper.</td>
<td>The hooks in the teeth hold the two sides together.</td>
<td>The wedges in the slide force the teeth together.</td>
</tr>
</tbody>
</table>

Planning and Organizing

Eric wrote about how a zipper works. Here are two sentences that he wrote. Write “yes” if the sentence tells how the machine works. Write “no” if it does not.

1. Its slide is made up of wedges that are inclined. **yes**

2. The wedge pushes the edge of the hooks to open them. **no**
Drafting

Write a topic sentence. State what compound machine you are writing about. Write an important idea about it.

Possible sentence: The zipper uses wedges and hooks to fasten things.

Now write your explanation. Use a separate piece of paper. Start with your topic sentence. Then describe how the machine works. Write the steps in order. Use time order words to make the steps easy to follow.

Revising and Proofreading

Here are some sentences that Eric wrote. They explain how a zipper works. Combine each pair of sentences using the time order word in parentheses. Write the new sentence on the line provided.

1. The teeth connect. You pull the slide up the zipper. (as)
   
   The teeth connect as you pull the slide up the zipper.

2. The wedge forces the teeth apart. You pull the slide down. (when)
   
   The wedge forces the teeth apart when you pull the slide down.

Now revise and proofread your writing.

Ask yourself:

- Did I explain how the machine works?
- Did I write the steps in order?
- Did I correct all mistakes?
Forces and Motion

Circle the letter of the best answer.

1. The fixed point at which a lever moves is the
   a. load.
   b. fulcrum.
   c. axle.
   d. pulley.

2. A bus traveled 35 kilometers in one hour. What was the speed of the bus?
   a. 70 kilometers per hour
   b. 10 kilometers per hour
   c. 25 kilometers per hour
   d. 35 kilometers per hour

3. Potential energy is changed into kinetic energy when
   a. a bicycle slows down.
   b. a book rests on a table.
   c. a sled moves down a hill.
   d. paper blows in the wind.

4. When one team in a tug of war pulls harder on the rope than the other team does, the forces are
   a. active.
   b. balanced.
   c. magnetic.
   d. unbalanced.

5. The position of an object is its
   a. age.
   b. color.
   c. location.
   d. size.

6. The force that occurs when one object rubs against another object is
   a. friction.
   b. gravity.
   c. magnetism.
   d. weight.
Circle the letter of the best answer.

7. The ramp on the back of a truck is a simple machine called a(n)
   a. screw.
   b. pulley.
   c. inclined plane.
   d. wheel and axle.

8. When you rub your hands together, some energy of motion is changed to
   a. energy of position.
   b. heat.
   c. stored energy.
   d. water.

9. If you want to measure the distance between two books on your desk, you would use a(n)
   a. barometer.
   b. ruler.
   c. clock.
   d. thermometer.

10. An example of a change in motion caused by a contact force is
    a. gravity pulling you toward Earth.
    b. two magnets pushing each other apart.
    c. hitting a baseball with a bat.
    d. a book falling from your desk.

11. A simple machine that causes sideways forces and splits an object apart is a(n)
    a. inclined plane.
    b. wedge.
    c. lever.
    d. wheel and axle.

12. Work is done when a force changes an object’s
    a. mass.
    b. color.
    c. motion.
    d. weight.
Forms of Energy

Complete the concept map with information you have learned. Some of the answers have been written for you.

**Heat**
1. Heat is the flow of thermal energy from a(n) warmer object to a cooler object.
2. The Sun is Earth's main source of heat energy.

**Sound**
1. Sound begins when something vibrates, or moves back and forth quickly.
2. Volume is how loud a sound is.

**Light**
1. Light is energy that allows you to see.
2. The light that we see is reflected from objects to our eyes.

**Electricity**
1. Electricity is made up of particles that are neither positive nor negative.
2. A(n) circuit is a complete path through which electricity can flow.
Heat

Use your textbook to help you fill in the blanks.

What is heat?

1. Heat always flows from a(n) _______ object to a(n) _______ one.
2. Earth’s main source of heat is the _______ .
3. Heat can move through _______ , _______ , _______ , and space.

How does heat affect matter?

4. Particles in a(n) _______ object have little thermal energy and move _______ .
5. Particles in a(n) _______ object have a lot of thermal energy and move quickly.
6. A measure of thermal energy, or how hot or cold something is, is called _______ .
7. When an object _______ thermal energy, it expands and becomes _______ .
8. When an object loses thermal energy, it _______ and becomes _______ .
9. The instrument used to measure temperature is a liquid-filled tube called a(n) \textbf{thermometer}.

10. The liquid in a thermometer \textbf{expands} and rises when the material around it gets warmer, and the liquid contracts and falls when the temperature \textbf{decreases}.

How can you control the flow of heat?

11. Any material through which heat moves easily, such as a metal pot, is a(n) \textbf{conductor}.

12. Any material through which heat does not move easily is a(n) \textbf{insulator}.

Critical Thinking

13. How do you know that Earth is cooler than the Sun?

Possible answer: Thermal energy or heat always moves from a warmer object to a cooler object. Heat moves from the Sun to Earth, so Earth must be cooler than the Sun.
Heat

Match the words in the box to their definitions below.

<table>
<thead>
<tr>
<th>a. conductor</th>
<th>d. insulator</th>
<th>g. thermometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. contract</td>
<td>e. Sun</td>
<td></td>
</tr>
<tr>
<td>c. expand</td>
<td>f. thermal energy</td>
<td></td>
</tr>
</tbody>
</table>

1. ______ energy that makes particles in materials move
2. ______ to get bigger
3. ______ to get smaller
4. ______ Earth’s main source of heat
5. ______ a material through which heat does not move easily
6. ______ a tool used to measure temperature
7. ______ a material through which heat moves easily
Heat

Use the words in the box to fill in the blanks below.

<table>
<thead>
<tr>
<th>conductor</th>
<th>quickly</th>
<th>thermal energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>loses</td>
<td>smaller</td>
<td>thermometer</td>
</tr>
</tbody>
</table>

Temperature is a measure of how hot or cold something is. It can be measured with a(n) ______ thermometer. Temperature tells how much ______ thermal energy an object has. A high temperature means that the particles in an object have a lot of thermal energy and are moving ______ quickly. A low temperature means that the particles in an object are moving slowly.

When particles in an object move faster, the object expands. When an object ______ loses energy, it gets ______ smaller, or contracts. Any material through which heat moves easily is a(n) ______ conductor.

Heat always travels from a hotter object to a colder object.
Sound

Use your textbook to help you fill in the blanks.

What is sound?

1. Sound is produced when an object moves back and forth quickly, or vibrates.

2. Sound happens only when something moves.

3. When a sound is made, vibrations move through the air in waves in all directions.

4. Sound travels through all types of matter, but at different speeds.

5. Sound travels slowest through a(n) gas. Sound travels more quickly through liquids and most quickly through solids.

How are sounds different?

6. A pitch is how high or low a sound is.

7. The speed of a(n) vibration tells whether a sound will be a high pitch or a low pitch.

8. The length of a musical instrument’s strings affects pitch. An object’s thickness also affects the speed at which it vibrates.

9. The loudness of a sound is its volume.
LESSON 10. An object that vibrates with a lot of energy is loud.

How do you hear sounds?

11. Vibrations in the air are collected by your outer ear. The vibrations make your eardrum move back and forth.

12. Your vibrating eardrum makes three tiny bones in your ear begin to vibrate.

13. The bones pass the vibrations to the inner ear, where nerves send a message to your brain.

14. Loud sounds cause hearing loss because they carry so much energy.

Critical Thinking

15. What would happen if the bones in your ears could not vibrate?

If the bones in my ears could not vibrate, they wouldn’t pass the vibrations to the nerves in my inner ear. If the nerves in my ear could not pass information to my brain, I would not be able to hear sounds.

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Sound

What am I?

Choose a word from the box below that answers each question. Write its letter in the space provided.

a. eardrum  

b. inner ear  

c. outer ear  

d. pitch  

e. three bones  

f. vibration  

g. volume  

h. wave

1. _____ I am how high or low a sound is. What am I?

2. _____ I pass vibrations to nerves in the inner ear. What am I?

3. _____ I am how loud a sound is. What am I?

4. _____ I collect sounds. What am I?

5. _____ I am the way that sound travels out in all directions. What am I?

6. _____ I make three tiny bones vibrate. What am I?

7. _____ I am a quick back-and-forth motion. What am I?

8. _____ I am the place where vibrations make nerves send messages to the brain. What am I?
Sound

Use the words in the box to fill in the blanks below.

- eardrum
- inner ear
- outer ear
- speed
- high-energy
- nerves
- pitch
- waves

Sound waves move out in all directions and reach your ear. Your outer ear collects these vibrations. They make your eardrum vibrate and move three tiny bones inside your ear. These movements cause nerves in the inner ear to send messages to your brain, and you hear sound.

A sound’s pitch may be high or low. Pitch depends on the speed of the vibration. A high-energy vibration will cause a louder sound than a low-energy vibration. Sound travels at many speeds and through a variety of materials.
Light

Use your textbook to help you fill in the blanks.

What is light?

1. The form of energy that allows you to see objects is __________.

2. Some sources of light are ______________, fire, and ______________.

3. Light travels in a(n) ______________.

4. Light strikes an object and bounces, or ____________ , off of it. You see an object when light reflects from it and hits your ____________.

What happens when light hits different objects?

5. Materials that block the passage of light are ____________.

6. The dark space formed by an object that blocks light is a(n) ______________.

7. Materials through which light passes are ______________.

8. Materials are ____________ when they block some of the light but allow the rest of it to pass through.
Why can you see colors?

9. Light from the Sun is a(n) ___________ of different colors.

10. A piece of glass called a(n) ___________ separates white light into the colors that make it up.

11. An object looks black when ___________ light is absorbed. It looks white when all light is ___________.

How do you see?

12. You can see because light passes through your ___________ into an opening called the ___________.

13. Light is then refracted by the ___________ onto the back of your eyeball.

14. Then the ___________ carries information to the brain and you see a picture of an object.

Critical Thinking

15. What facts about light allow you to see that a ball is blue with white stripes?

   Parts of the ball are absorbing all colors but blue, so you see ___________. Some areas absorb no energy. These ___________ parts reflect all the energy, so you see them as white.
Light

Match the correct word with its definition. Write its letter in the space provided.

a. absorbed  c. opaque  e. reflected  g. shadow
b. light     d. prism   f. refract    h. translucent

1. _____ to pass light from one material to another
2. _____ the form of energy that allows you to see objects
3. _____ the types of materials that block light from passing through them
4. _____ the types of materials that block some light and allow some light through them
5. _____ when some or all light is taken in
6. _____ a piece of glass that refracts light
7. _____ when light bounces off an object
8. _____ a dark space formed by opaque materials that block light from passing through them
Light

Use the words in the box below to fill in the blanks.

- energy
- light
- reflected
- translucent
- eyes
- opaque
- refracted
- transparent

There are many different types of energy. The form of \underline{\text{energy}} that lets you see objects is \underline{\text{light}}. Light hits an object and is \underline{\text{reflected}} from the object to your eyes. Light can be bent, or \underline{\text{refracted}} , as it goes from one material to another.

Light does not pass through every material. Materials that block light are \underline{\text{opaque}}. Materials that allow light to pass through them are \underline{\text{transparent}}. Those that let only some light energy through them are \underline{\text{translucent}}. You see objects as light is reflected from them to your \underline{\text{eyes}}. The brain uses this information to create a picture.
Surgeons are doctors who perform operations to fix injuries or treat diseases. They can use scalpels—special tools with sharp blades—to cut through skin, muscles, and organs of the human body. Today, surgeons have another tool they can use to do operations. This tool is a beam of light!

This beam of light is called a laser. Lasers are very powerful. They can cut through the human body without causing much bleeding.

Lasers were first used to remove birthmarks on children’s skin. Today, surgeons also use lasers to treat injuries to the brain, the heart, and many other parts of the body. Lasers are also used to improve people’s eyesight.

Write About It

Summarize Read the article again. List the most important information in a chart. Then use the chart to summarize the article.
Planning and Organizing

- List the most important information from the article in the chart below.

<table>
<thead>
<tr>
<th>Most Important Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Drafting

- Start by writing a clear statement that describes the main idea of the article.
- Write three supporting details.
- Read what you have written. Cross out anything that does not directly support the main idea.
- Exchange papers with your partner and ask him or her to check your choice of a main idea. Have your partner also check your choice of supporting details.

Summarize  Write your summary on a separate piece of paper. Use your own words. Include the main ideas and details you wrote.
Electricity

Use your textbook to help you fill in the blanks.

What is electrical charge?

1. Volume, mass, and **electrical charge** are properties of matter.

2. The two types of electrical charge are **positive** charge and **negative** charge.

3. Objects with opposite charges **attract** each other.

4. Objects with the same charge **repel** each other.

5. Electricity is made up of **charged particles**.

6. Charge is **balanced** on most objects, meaning that they have equal numbers of positive and negative particles.

7. The buildup of electrical charge on an object is **static electricity**.

What is electric current?

8. The flow of an electric charge from one place to another is called **electric current**.
9. The energy from electric currents is used to produce ____________ , light, and ____________.

10. The path on which current flows is a(n) ____________.

11. The flow of current can be controlled by a(n) ____________.

12. When a switch is turned off, a ____________ is open and current does not flow.

13. When a switch is on, the circuit is ______ closed and current ______ flows.

What are conductors and insulators?

14. Current flows easily through ____________, which are made of metals such as copper.

15. Current does not flow easily through ____________, which are made of materials such as plastic.

Critical Thinking

16. Why do electricians wrap copper wires with black plastic tape?

Electricians wrap copper wires with black plastic tape to ____________.

Insulate the wires so that they cannot pass electricity to things that touch them.

__________________________________________
Electricity

What am I?

Choose a word from the box below that answers each question. Then write its letter in the space provided.

- battery
- circuit
- closed circuit
- conductor
- electrical charge
- electric current
- insulator
- negative charge

1. _____ I allow current to flow easily. What am I?
2. _____ I am the path for electric current. What am I?
3. _____ I can be positive or negative. What am I?
4. _____ I keep charges from flowing easily. What am I?
5. _____ I am a power source that provides an electric charge. What am I?
6. _____ I am a flow of electric charge. What am I?
7. _____ I repel negative charges. What am I?
8. _____ My switch is off. What am I?
Electricity

Use the words in the box to fill in the blanks below.

- balanced
- closed
- electric current
- open
- positive
- switch

People depend on electricity for many things.

Electricity is made of particles of matter that have positive or negative electrical charges. Most objects have an equal number of positive and negative charges, or a(n) balanced charge.

Charge that is flowing is a(n) electric current. An electric current needs a path, or circuit, through which to flow. Current flows easily through conductors, such as copper, and poorly through insulators, such as glass and plastic. A circuit may have a(n) switch that opens or closes the circuit. Current will flow when the switch is closed, but not when the switch is open.

Electrical circuits are an important part of many objects that you use every day.
Other Energy Sources

Write About It

**Persuasive Writing** Write a persuasive letter to a community leader. Tell why you think it is important to find other sources of energy. Be sure to follow the form of a formal letter.

**Getting Ideas**

Use the chart below to help you get started. Write your opinion in the top box. Write convincing reasons, facts, and examples in the bottom boxes.

**Opinion:** We must find other energy sources before it's too late.

- Oil, coal, and gas cannot be replaced easily.
- We hurt the land when we look for oil, coal, and gas.
- We depend on other nations for oil.

**Planning and Organizing**

Here are three sentences that Daria wrote. Does the sentence support the opinion that we need to find other sources of energy? If so, write "yes." If not, write "no."

1. **yes** We hurt the land when we mine for coal.
2. _______ We are using up our supply of oil.

3. _______ Some cars run on electricity as well as oil.

**Drafting**

Write a sentence to begin your letter. Tell your opinion about finding other sources of energy.

Possible sentence: *We must find other sources of energy before it's too late.*

Now write your letter. Use a separate piece of paper. Follow the format of a formal letter. Begin with the sentence above. Then give facts, reasons, and examples to support it.

**Revising and Proofreading**

Here is a part of Daria's letter. She made five punctuation errors. Find the mistakes and correct them.

Dear Mr. Alvarez:

We must find other sources of energy before it's too late.

We are using up our oil. Will there be any left when I am grown up? We are hurting the land by digging for coal.

Now revise and proofread your writing. Ask yourself:

- Did I follow the format of a formal letter?
- Did I clearly tell my opinion?
- Did I include convincing facts, reasons, and examples?
- Did I correct all mistakes?
Forms of Energy

Circle the letter of the best answer.

1. Which of the following materials would make a good conductor?
   a. glass  
   b. copper  
   c. plastic  
   d. rubber  

2. A sound is produced when something
   a. contracts.  
   b. expands.  
   c. gets smaller.  
   d. vibrates.  

3. You see a red flower when
   a. only the red color in white light is absorbed.  
   b. every color but red is reflected.  
   c. every color but white is absorbed.  
   d. only the red color in white light is reflected.  

4. When a thermometer gains thermal energy, the particles of liquid in the thermometer
   a. slow down.  
   b. expand.  
   c. contract.  
   d. become cooler.  

5. Earth’s main source of heat is
   a. batteries.  
   b. natural gas.  
   c. the Sun.  
   d. hot water.  

6. The pitch of a sound is how
   a. high or low the sound is.  
   b. warm or cool the sound is.  
   c. close to the ear the sound is.  
   d. loud the sound is.
Circle the letter of the best answer.

7. Light reflected from an object
   a. bends the object.
   b. bounces off the object.
   c. makes a dark area called a shadow.
   d. passes through the object.

8. A tool that separates white light into its different colors is a
   a. conductor.
   b. prism.
   c. switch.
   d. thermometer.

9. When warm and cool objects touch, what moves from the warmer object to the cooler object?
   a. charged particles
   b. sound waves
   c. heat
   d. electric current

10. What describes how much thermal energy an object has?
    a. mass
    b. volume
    c. color
    d. temperature

11. Sound travels best through
    a. solids.
    b. gases.
    c. liquids.
    d. space.

12. What part of your eye sends messages from light to the brain?
    a. cornea
    b. optic nerve
    c. pupil
    d. lens