

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

Chapter 1 From Cells to Ecosystems

Chapter Concept Map	1
Lesson 1 Lesson Outline	2
Lesson Vocabulary	4
Lesson Cloze Activity	5
Lesson 2 Lesson Outline	6
Lesson Vocabulary	8
Lesson Cloze Activity	9
Lesson 3 Lesson Outline	10
Lesson Vocabulary	12
Lesson Cloze Activity	13
Writing in Science	14
Lesson 4 Lesson Outline	16
Lesson Vocabulary	18
Lesson Cloze Activity	19
Chapter Vocabulary	20

Chapter 2 Heredity and Diversity

Chapter Concept Map	22
Lesson 1 Lesson Outline	23
Lesson Vocabulary	25
Lesson Cloze Activity	26
Writing in Science	27
Lesson 2 Lesson Outline	29
Lesson Vocabulary	31
Lesson Cloze Activity	32
Reading in Science	33
Lesson 3 Lesson Outline	35
Lesson Vocabulary	37
Lesson Cloze Activity	38
Reading in Science	39
Lesson 4 Lesson Outline	41
Lesson Vocabulary	43
Lesson Cloze Activity	44
Writing in Science	45
Chapter Vocabulary	47
Life Science Literature	49

Contents

EARTH SCIENCE

Chapter 3 The Universe

Chapter Concept Map	50
Lesson 1 Lesson Outline	51
Lesson Vocabulary	53
Lesson Cloze Activity	54
Lesson 2 Lesson Outline	55
Lesson Vocabulary	57
Lesson Cloze Activity	58
Reading in Science	59
Lesson 3 Lesson Outline	61
Lesson Vocabulary	63
Lesson Cloze Activity	64
Chapter Vocabulary	65

Chapter 4 Our Dynamic Earth

Chapter Concept Map	67
Lesson 1 Lesson Outline	68
Lesson Vocabulary	70
Lesson Cloze Activity	71
Writing in Science	72
Lesson 2 Lesson Outline	74
Lesson Vocabulary	76
Lesson Cloze Activity	77
Lesson 3 Lesson Outline	78
Lesson Vocabulary	80
Lesson Cloze Activity	81
Reading in Science	82
Lesson 4 Lesson Outline	84
Lesson Vocabulary	86
Lesson Cloze Activity	87
Chapter Vocabulary	88
Earth and Space Science Literature	90

PHYSICAL SCIENCE

Chapter 5 Properties of Matter

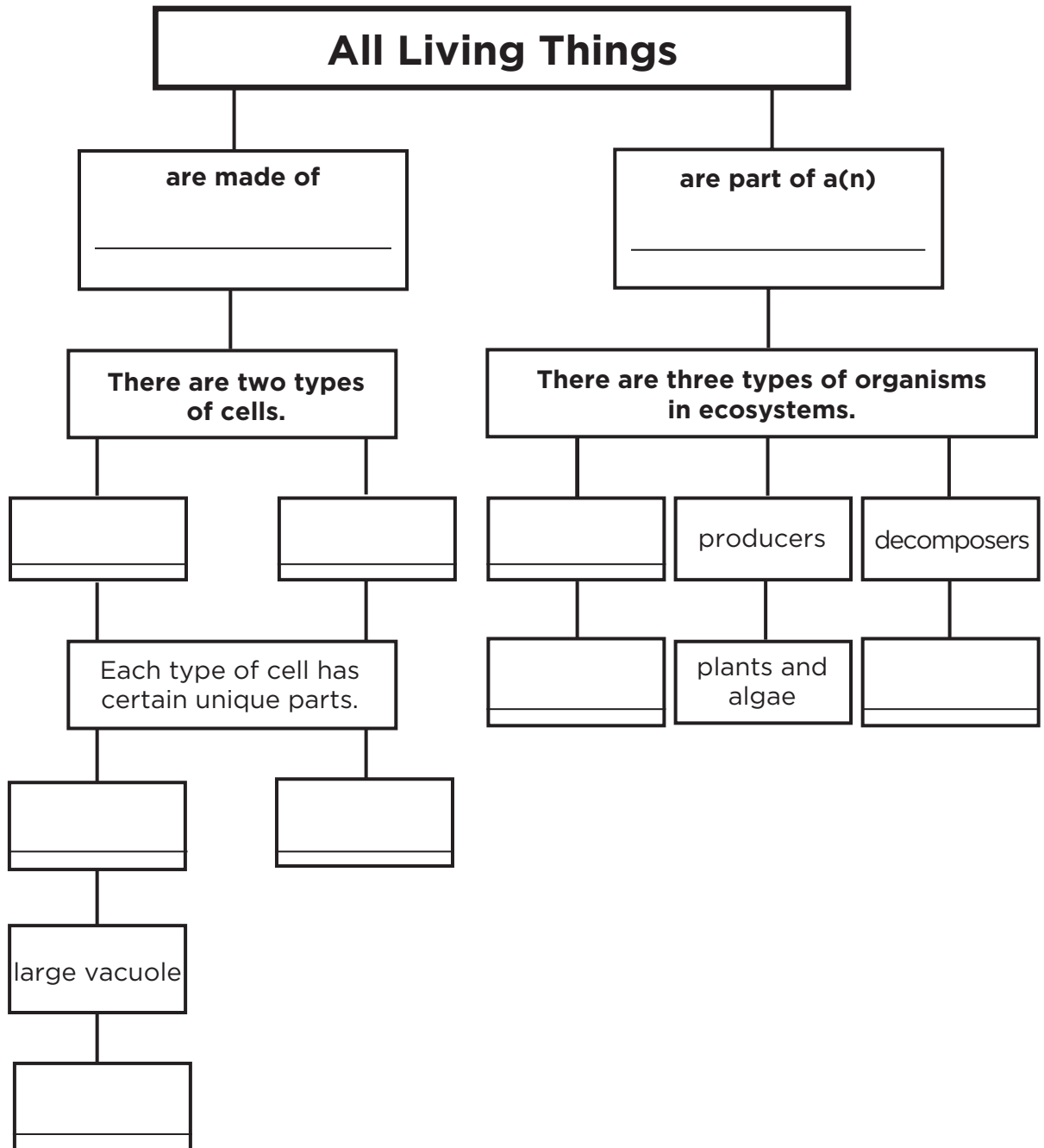
Chapter Concept Map	91
Lesson 1 Lesson Outline	92
Lesson Vocabulary	94
Lesson Cloze Activity	95
Reading in Science	96
Lesson 2 Lesson Outline	98
Lesson Vocabulary	100
Lesson Cloze Activity	101
Lesson 3 Lesson Outline	102
Lesson Vocabulary	104
Lesson Cloze Activity	105
Lesson 4 Lesson Outline	106
Lesson Vocabulary	108
Lesson Cloze Activity	109
Chapter Vocabulary	110

Chapter 6 Motion and Energy

Chapter Concept Map	112
Lesson 1 Lesson Outline	113
Lesson Vocabulary	115
Lesson Cloze Activity	116
Reading in Science	117
Lesson 2 Lesson Outline	119
Lesson Vocabulary	121
Lesson Cloze Activity	122
Lesson 3 Lesson Outline	123
Lesson Vocabulary	125
Lesson Cloze Activity	126
Lesson 4 Lesson Outline	127
Lesson Vocabulary	129
Lesson Cloze Activity	130
Chapter Vocabulary	131
Physical Science Literature	133

From Cells to Ecosystems

Complete the concept map by filling in answers where blanks appear.



Cells

Use your textbook to help you fill in the blanks.

What are cells?

1. All organisms, or living things, are made of _____ .
2. Every cell in every living thing comes from another cell that _____ .
3. A single-celled organism that can carry on all its life processes is called _____ .
4. Organisms made up of more than one cell are called _____ .
5. Scientists have identified more than _____ different kinds of organisms.
6. Scientists estimate there may be more than _____ kinds of unicellular organisms.

What is inside an animal cell?

7. Both plant and animal cells perform life processes by using _____ .
8. All cells are surrounded by a(n) _____ that controls the materials that move in and out of the cell.
9. The region between the cell membrane and the nucleus is filled with _____ .
10. The cell's control center is called the _____ .

- 11. The tiny power plants in the cell where food is burned and energy is released are called _____ .
- 12. A structure in a cell used for storage of water, food, and waste is the _____ .

What is inside a plant cell?

- 13. Plant cells have a(n) _____ ; a rigid structure that serves as an outer covering.
- 14. A green structure, called a(n) _____ , uses the energy from the sun to produce food for the plant.

How are cells organized?

- 15. Cells working together at the same job form a(n) _____ .
- 16. Groups of tissues working together form organs, and groups of organs working together form _____ .

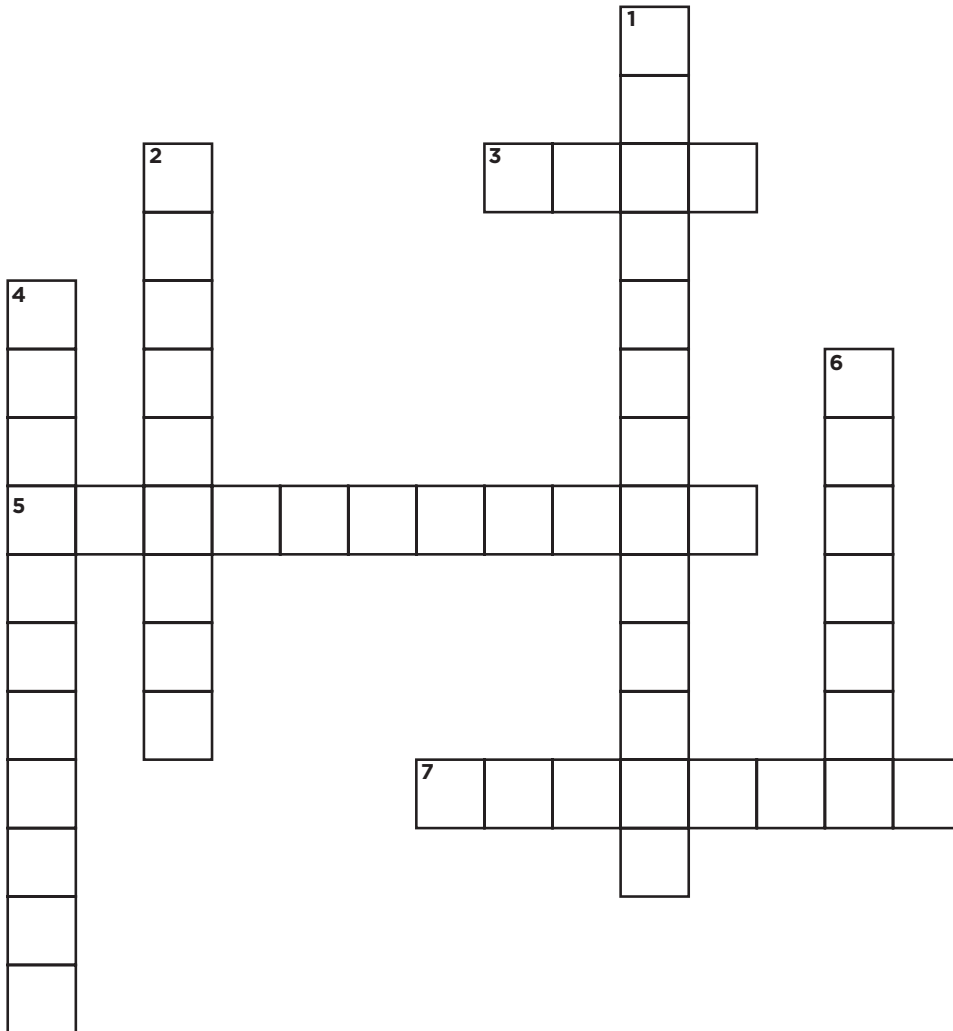
Critical Thinking

- 17. Compare and contrast the cells of plants, animals, and unicellular organisms.

Cells

Read each clue and fill in the crossword puzzle.

cell	cytoplasm	nucleus	organism
chlorophyll	multicellular		



Across

- 3. the smallest unit of a living thing that can carry out the basic processes of life
- 5. sunlight-absorbing chemical
- 7. a living thing

Down

- 1. organisms that contain many different types of cells
- 2. a gel-like liquid inside the cell
- 4. organisms having one cell
- 6. a cell's control center

Cells

Fill in the blanks.

cell membrane

cytoplasm

nucleus

cell wall

mitochondria

organelles

cells

multicellular

unicellular

All living things are made up of units called _____ . Some organisms are _____ ; that is, they consist of only one cell. More complex organisms, including plants and animals, are called _____ organisms.

All cells are surrounded by a(n) _____ that controls what moves into and out of the cell. The insides of cells are filled with a gel-like fluid called _____. Within this liquid are the cell _____. Both plant and animal cells, as well as many unicellular organisms, contain a(n) _____ and _____ , which supply energy for the cell. Plant cells have a(n) _____ , one large central vacuole, and chloroplasts. Chloroplasts contain chlorophyll which uses energy from sunlight to produce food for the plant.

Relationships in Ecosystems

Use your textbook to help you fill in the blanks.

What is in an ecosystem?

1. The living things in an environment are _____ factors.
2. The nonliving things in an environment are _____ factors.
3. All the living and nonliving things interacting in an environment make up a(n) _____ .
4. All the members of a species within an ecosystem are a(n) _____ .
5. Together, the populations in an ecosystem form a(n) _____ .

How are food chains alike?

6. The path that energy takes in an ecosystem as it flows from organism to organism is a(n) _____ .
7. At the base of each food chain are _____ that use the Sun's energy to make sugar and oxygen .
8. Sugar molecules are the original source of food for _____ , or any animal that eats plants or other animals.

9. Organisms in an ecosystem that break down dead or decaying plants and animals are _____ .

What are food webs made of?

10. A network of food chains that share some links is a(n) _____ .
11. Organisms that are eaten by other animals are _____ .

What are symbiotic relationships?

12. A symbiotic relationship that benefits both organisms is called _____ .
13. In _____ one organism benefits and the other is not harmed.

What are parasites?

14. An organism that lives on or in another organism and harms it is a(n) _____ .

Critical Thinking

15. What would happen if producers were removed from an ecosystem?

Relationships in Ecosystems

Who am I? What am I?

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

- | | | |
|------------------------|----------------------|--------------------|
| a. commensalism | d. food web | g. predator |
| b. ecosystem | e. parasite | h. prey |
| c. food chain | f. population | |

- _____ I am a symbiotic relationship that benefits one organism without harming the other. What am I?
- _____ I am an organism that lives off of and harms its host. What am I?
- _____ I am a network of food chains that are connected. What am I?
- _____ I am an animal that hunts other animals for food. Who am I?
- _____ I include all living and nonliving things in an environment. What am I?
- _____ Predators hunt me for food. Who am I?
- _____ All the members of a single species in an ecosystem are part of me. What am I?
- _____ I am the path that energy takes as it moves from one organism to another in an ecosystem. What am I?

Relationships in Ecosystems

Fill in the blanks.

carnivores	food chain	herbivores	population
community	food web	plants	symbiosis

All the living and nonliving things in an environment make up an ecosystem. Within an ecosystem, all living things make up a(n) _____. All individuals of one species are a(n) _____. An ecosystem can be as large as a forest or as small as a fallen log.

The path that energy takes as it moves from one organism to another in an ecosystem is a(n) _____. A group of connected food chains is a(n) _____. Producers, such as _____ and algae, are at the base of each food chain. Consumers include _____ that eat plants and _____ that eat other animals.

A close relationship between two or more kinds of organisms that lasts over time is called _____.

Photosynthesis

Use your textbook to help you fill in the blanks.

What is photosynthesis?

1. Plants get energy to make food from _____ .
2. _____ is the process of making food using sunlight.
3. Photosynthesis occurs in cells that have _____ .
4. Sunlight, _____ and _____ are needed to perform photosynthesis.
5. Chloroplasts act like tiny factories that make food in the form of _____ .

What do leaves do?

6. Tiny pores, called stomata, on the bottom of leaves take in _____ from the air.
7. The opening and closing of stomata is controlled by _____ .
8. When a plant has enough water, the _____ swell and pull open the stomata so the plant can breathe.
9. In most plants, photosynthesis occurs in the chloroplast of the cells that are under the _____ .
10. When plants store sugar, they store it as a molecule made up of long chain of sugars called _____ .
11. Scientists express what happens during photosynthesis using this chemical equation: _____ .

What is the photosynthesis and respiration cycle?

- 12. The sugar that plants produce during photosynthesis is a _____, a compound made from carbon, hydrogen, and oxygen.
- 13. Cellulose, the main substance that makes up the _____ in plants, is a carbohydrate.
- 14. When you eat a vegetable, your body _____ from the carbohydrates stored in the plants .
- 15. _____ is the processes in which plant and animal cells use oxygen to break down stored carbohydrates.
- 16. Plant and animal cells produce _____ and _____ during cellular respiration.

What are energy pyramids?

- 17. A diagram that shows the energy that is available at each level of an ecosystem is a(n) _____ .
- 18. At each level of an energy pyramid, about _____ percent of the energy from the level below is lost.

Summarize the Main Idea

- 19. How do plants make and use energy?

Photosynthesis

- | | | |
|--------------------------------|--------------------------|-------------------|
| a. carbohydrate | c. energy pyramid | e. stomata |
| b. cellular respiration | d. photosynthesis | |

Fill in the blanks.

1. _____ the process that uses energy from the Sun to make food from water and carbon dioxide
2. _____ a diagram that shows the amount of energy available at each level of an ecosystem
3. _____ tiny pores in the bottom of leaves take in carbon dioxide from the air
4. _____ a compound made from carbon, hydrogen, and oxygen
5. _____ Starches and sugars are broken down in the cells in this process.

Photosynthesis

carbohydrate	chloroplasts	starch
cellular respiration	energy	stomata
chlorophyll	photosynthesis	water

Fill in the blanks.

How does the Sun give you the energy you need to do your schoolwork? When a plant gets enough water, the guard cells in the leaf swell and pull open the _____. The Sun shines on the plant so its leaves can make food from _____ and carbon dioxide. This process is called _____, which means “putting together by light.” Photosynthesis takes place in the _____ of the cells underneath the epidermis, or skin of the leaf. Chloroplasts contain _____, a green chemical that absorbs and stores the energy of sunlight. Sugar is a _____ made from carbon, hydrogen, and oxygen. Plants store sugar as a _____. When the plant needs energy to grow or repair itself, it breaks down starches and sugars in a process called _____. When you eat a vegetable, or when you eat meat from an animal that eats plants, your body gets _____ from the sugars and carbohydrates stored in the plant.

Saving Water the Yucca Plant Way

Read the Writing in Science feature in your textbook.



Write About It

Explanatory Writing Write an article for young gardeners. Explain the process of CAM photosynthesis. Research facts and details for your article.

Planning and Organizing

Help Ray create an outline for his article. Here are some topics he wants to cover. Place them in the outline form below.

- ▶ What happens during the day in CAM photosynthesis?
- ▶ What is the purpose of CAM photosynthesis?
- ▶ What is photosynthesis?
- ▶ What happens at night during CAM photosynthesis?
- ▶ How does the process of CAM photosynthesis work?

I. _____

II. _____

III. _____

A. _____

B. _____

IV. Why is the yucca plant special?

Now create an outline for your own article on a separate sheet of paper. Make it as detailed as possible. Add A, B, C points and subpoints (1, 2, 3) under these as necessary.

Now use a separate sheet of paper to write the first draft of your article.

Revising and Proofreading

Here is part of the report that Ray wrote. Help him combine his sentences. Use the transition word in parentheses. Make sure you punctuate the new sentence correctly.

1. In CAM photosynthesis, the stomata open at night.
The air is cooler and the humidity is higher. (when)

2. CAM photosynthesis is effective. It results in more efficient water use. (since)

Now revise and proofread your article. Ask yourself:

- ▶ Have I introduced my main idea about photosynthesis in yuccas?
- ▶ Have I included facts and details to show how this process works?
- ▶ Have I used examples and language appropriate for my audience?
- ▶ Have I used transition words and phrases to connect ideas?
- ▶ Have I ended with a strong conclusion about why yucca plants are special?
- ▶ Have I corrected all grammar errors?
- ▶ Have I corrected all problems in spelling, punctuation, and capitalization?

Changes in Ecosystems

Use your textbook to help you fill in the blanks.

How can ecosystems change?

1. Ecosystems are changed by living _____ that change the environment around them, and by _____ events such as floods.
2. Humans can change ecosystems by _____ new species or _____ existing species.

How do people affect the environment?

3. Pollution is a(n) _____ change in the natural environment.
4. Air pollution from burning fuels causes _____ .

How does waste affect the land?

5. Some household garbage breaks down, but some garbage is not _____ .
6. _____ contains poisonous chemicals and metals.

What happens when ecosystems change?

7. When a type of organism cannot respond to changes in an ecosystem, it may become _____ .
8. When a species is in danger of extinction, it is called an _____ species.
9. Species that could become endangered are known as _____ species.

How do ecosystems come back?

- 10. Over time, a group of species in an ecosystem is replaced by a different group of species through _____ .
- 11. In regions where few species existed before or where species were wiped out, _____ occurs.
- 12. The first species to take hold in barren areas are _____ species, such as mosses and lichens.
- 13. As larger plants and predators begin to live in an area, the community may become a(n) _____ , such as a prairie.
- 14. With enough moisture, _____ may start to grow in a grassland.
- 15. A fully developed ecosystem supports the final stage of succession, a(n) _____ community.

What is secondary succession?

- 16. When a new community develops where a community had once existed, it is called _____ succession.

Critical Thinking

- 17. What are some of the ways that people cause harm to the land?

Changes in Ecosystems

Match the correct letter with the description.

- | | |
|------------------------------|--------------------------------|
| a. climax community | e. pollution |
| b. endangered species | f. primary succession |
| c. extinct | g. secondary succession |
| d. pioneer species | h. threatened species |

- When Earth's land, water, and air have reached their capacity to absorb and recycle wastes naturally, _____ occurs.
- When a species dies out completely, the species is _____ .
- The establishment of a new community where a community had already existed is called _____ .
- Species with low numbers that could become endangered are called _____ .
- A species that is in danger of becoming extinct is a(n) _____ .
- In the final stages of succession, a(n) _____ develops.
- One of the first species to live in an area that used to be lifeless is a(n) _____ .
- Succession that occurs where there is no soil and where few, if any, living things exist is _____ .

Changes in Ecosystems

Fill in the blanks.

animal

plants

species

habitat

primary succession

trees

pioneer

secondary succession

Ecosystems change over time. People cause some of the changes, through pollution, _____ destruction, or hunting, or by introducing or removing _____.

However, many ecosystem changes are natural. When land is burned by a fire or a farm field is abandoned, _____ occurs. New _____ begin to grow in the soil. Weeds, then shrubs, and finally _____ grow. When few, if any, living things exist in an area, _____ will establish a first community. The first organisms to live in the area are called _____ species. After soil is established, larger plants can grow, and larger _____ species can arrive. Eventually, forests develop. Finally, in the last stage of succession, a climax community is established.

From Cells to Ecosystems

Choose the letter of the best answer.

- All living and nonliving things in an environment make a(n)
 - population.
 - ecosystem.
 - food web.
 - food chain.
- The part of a cell that controls all of its activity is the
 - cell wall.
 - cytoplasm.
 - nucleus.
 - vacuole.
- Structures in plant cells that turn energy from sunlight into food are called
 - chloroplasts.
 - cell walls.
 - cytoplasm.
 - mitochondria.
- An individual living thing is a(n)
 - nucleus.
 - parasite.
 - organism.
 - organ.
- The first organisms to occupy an environment are called the
 - extinct species.
 - threatened species.
 - endangered species.
 - pioneer species.
- The smallest unit of a living thing that carries out basic life processes is a(n)
 - cell.
 - cell membrane.
 - cell wall.
 - chloroplast.
- In living things, tissues of different kinds come together to make up a(n)
 - organ.
 - organism.
 - organ system.
 - tissue.
- The outside layer that controls what moves in and out of the cell is its
 - cell membrane.
 - tissue.
 - cytoplasm.
 - nucleus.

Choose the letter of the best answer.

- 9.** In mitochondria, food is broken down and turned into energy through the process of
- a.** photosynthesis. **c.** pollution.
b. cellular respiration. **d.** recycling.
- 10.** Structures in cells that store water, food, and wastes are called
- a.** chloroplasts. **b.** cytoplasm. **c.** mitochondria. **d.** vacuoles.
- 11.** Organisms that are made of many different kinds of cells are called
- a.** invertebrate. **b.** multicellular. **c.** unicellular. **d.** vertebrate.
- 12.** The sugar that plants produce during photosynthesis is a
- a.** carbohydrate. **c.** parasite.
b. pollutant. **d.** chloroplast.
- 13.** The gel-like substance in a cell that supports all of the cell structures is the
- a.** cell wall. **b.** chloroplast. **c.** cytoplasm. **d.** mitochondria.
- 14.** A one-celled organism is
- a.** monocellular. **b.** multicellular. **c.** single cellular. **d.** unicellular.
- 15.** Plants release water and oxygen through their
- a.** cellulose. **c.** stomata.
b. carbohydrate. **d.** starch.
- 16.** A collection of poisonous materials that must be carefully disposed of is called
- a.** acid rain. **b.** toxic waste. **c.** incineration. **d.** fossil fuel.
- 17.** When pollution mixes with moisture in the atmosphere it forms
- a.** acid rain. **b.** tissue. **c.** population. **d.** stomata.

Heredity and Diversity

Complete the concept map with information you have learned about different types of reproduction. Some answers have been written for you.

All Living Things Reproduce

Types of Reproduction	Organisms That Use This Type of Reproduction	Does this type of reproduction enhance genetic variation?	Disadvantages or Advantage to This Type of Reproduction
_____	_____	_____	_____ _____ _____
_____	bacteria	_____	_____ _____ _____ _____

Reproduction

Use your textbook to help you fill in the blanks.

What are sexual and asexual reproduction?

1. Survival of a(n) _____ depends on its ability to produce offspring.
2. Every organism comes from a parent through the process of _____ .
3. The transfer of _____ from parents to their offspring is known as reproduction.
4. Genetic material contains the information that controls an organism's _____ .
5. The production of a new organism from two parents is called _____ reproduction.
6. When an egg cell joins with a sperm cell, _____ occurs.
7. A fertilized egg develops into an individual with traits from each _____ .
8. The production of a new organism from a single parent is called _____ reproduction.

How do organisms reproduce asexually?

9. Most bacteria and unicellular protists reproduce by making a copy of their genetic material and _____ .

- 10. Cnidarians, sponges, and some fungi can reproduce through _____ .
- 11. The eggs of insects, fish, frogs, and lizards sometimes develop into new animals without being _____ .
- 12. New plants can grow from leaves, roots, or stems. This type of asexual reproduction is called _____ .
- 13. Strawberry plants and ferns can reproduce asexually by forming _____ .

How do sexual and asexual reproduction compare?

- 14. An organism that reproduces asexually does not have to find a(n) _____ .
- 15. Organisms that reproduce asexually tend to be well-suited to their _____ .

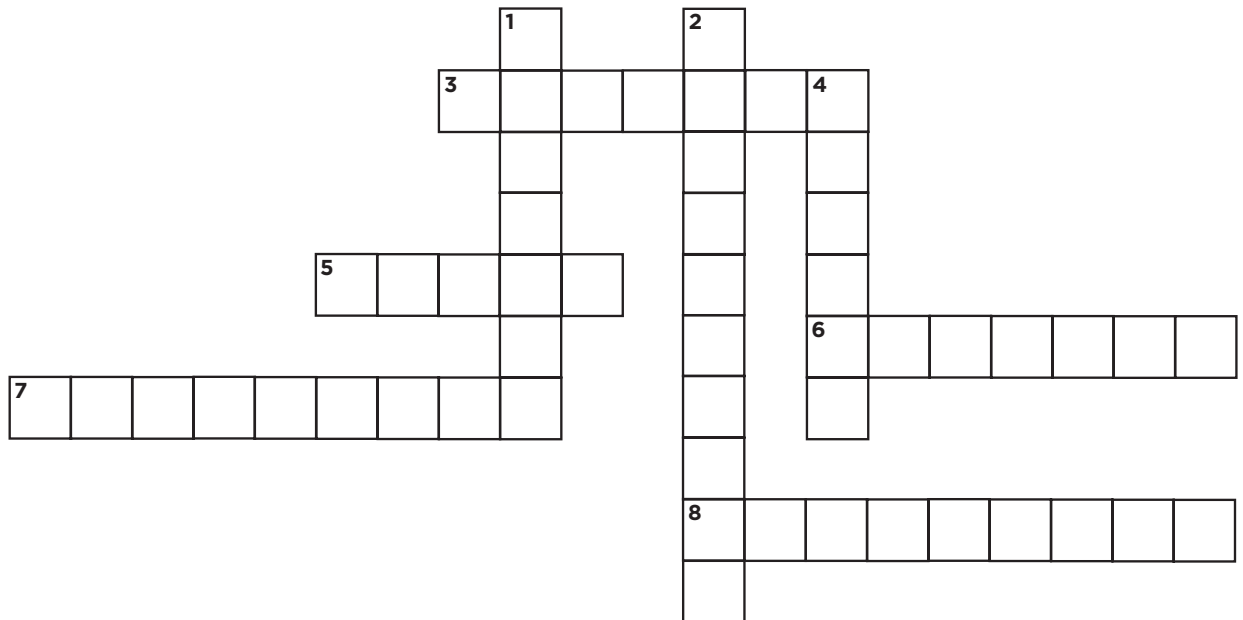
Critical Thinking

- 16. Why is sexual reproduction better than asexual reproduction for ensuring the survival of a species in a changing environment?

Reproduction

Read each clue. Write the answer in the blanks using the words below. Then fill in the crossword puzzle.

asexual	runners	splitting	variation
budding	sexual	trait	vegetative



Across

3. plant stems that run along the ground and sprout as new plants
5. any characteristic of a living thing
6. type of reproduction in which a new organism is produced from one parent
7. manner in which bacteria reproduce

8. Sexual reproduction gives rise to this in a species.

Down

1. a bud growing from a fungus to become a new individual.
2. type of propagation in which a new plant grows from a leaf
4. type of reproduction in which a new organism is produced by two parents

Reproduction

Fill in the blanks.

asexual

mate

sexual

variety

splitting

reproduce

sperm

No organism lives forever. This means all organisms must _____ . There are two types of reproduction: _____ and _____ . Sexual reproduction requires two parents. A female egg cell unites with a male _____ cell to produce a fertilized egg. The fertilized egg grows into a new, unique individual. Asexual reproduction requires only one parent and results in offspring that are genetically identical to the parent.

The main advantage of sexual reproduction is that it promotes _____ within a species. An advantage of asexual reproduction is that it does not require finding a(n) _____ . There are several methods of asexual reproduction. Simple, one-celled organisms, like bacteria and protists, undergo _____. Animals such as cnidarians, sponges, and fungi undergo a process called budding.

How Do Sea Stars Regenerate?



Write About It

Explanatory Writing Explain how sea stars produce offspring using regeneration. Choose another animal that reproduces asexually. Write an explanation of how this process takes place.

Getting Ideas

Choose an animal to write about. Think about how it reproduces without parents. Write the steps below.

First
↓
Next
↓
Last

Planning and Organizing

Xavier wants to explain how flatworms reproduce. Here are three sentences he wrote. Put them in order.

_____ Finally, each half grows into a separate flat worm.

_____ First, the flatworm divides in two.

_____ Stem cells turn into the types of cells needed to reproduce the missing part.

Drafting

Write a sentence to begin your explanation. Name the animal you are writing about. Tell your main idea about how this animal reproduces. This is your topic sentence.

Now write your explanation. Use a separate piece of paper. Begin with your topic sentence. Explain how the animal reproduces. Write the steps in time order.

Revising and Proofreading

Here are some sentences Xavier wrote. Combine each pair. Use the time order word in parentheses. Write the new sentence on the line.

- 1. The stem cells multiply. They turn into specialized cells. (before)

- 2. A message is sent out to specialized cells. The cells near the wound cover it. (after)

Now revise and proofread your writing. Ask yourself:

- ▶ Did I explain how the animal can reproduce without parents?
- ▶ Did I include time order words?
- ▶ Did I correct all mistakes?

Traits and Heredity

Use your textbook to help you fill in the blanks.

What is heredity?

1. The passing of traits from one generation to the next is called _____ .
2. Traits that offspring receive from their parents are _____ traits.
3. A way of acting or behaving with which an animal is born is called a(n) _____ .
4. A behavior that develops during an animal's lifetime is a(n) _____ behavior.
5. When ducks hatch, they learn to recognize and follow their mother, a behavior called _____ .

How are traits inherited?

6. Mendel discovered that each inherited trait is controlled by _____ , one from each parent.
7. Today scientists refer to Mendel's factors as _____ .
8. Genes are found in the nucleus of the cell. They are stored on _____ .
9. A trait that masks another trait is called a(n) _____ trait.
10. A trait that is masked is called a(n) _____ trait.

11. In pea plants, purple flowers are a dominant trait and white flowers are a recessive trait. The purple trait is represented by _____ and the white trait by p.

How do we trace inherited traits?

12. A chart used to trace the history of traits in a family is called a(n) _____ .
13. On a pedigree chart, horizontal lines connect parents and vertical lines connect parents to _____ .
14. Males are represented by squares, and _____ are represented by circles.
15. Shaded shapes represent individuals with a particular _____ , and unshaded shapes represent individuals without that trait.
16. Dimples are a dominant trait, represented by the letter D. A child who is a carrier of the recessive trait is represented by _____ .

Critical Thinking

17. Both a father and mother have dimples. Their son has dimples, but their daughter does not. Which genes, DD, Dd, or dd, does each family member have?

Traits and Heredity

Match the correct letter with the description.

- | | | |
|--------------------|---------------------|---------------------|
| a. carrier | d. heredity | g. pedigree |
| b. dominant | e. inherited | h. recessive |
| c. gene | f. instinct | |

- _____ a trait that an offspring receives from its parents
- _____ the passing down of traits from one generation to the next
- _____ behavior that is inherited
- _____ a trait that masks another trait
- _____ a trait that is masked or covered by another trait
- _____ chart used to trace the history of traits in a family
- _____ contains the chemical instructions for an inherited trait
- _____ individual who has inherited a gene for a trait, but does not show the trait physically

Traits and Heredity

Fill in the blanks.

chromosomes

heredity

Gregor Mendel

sperm cell

genes

instincts

pedigree

trait

Parents pass on features of themselves to their offspring.

Any notable feature of an organism is called a(n)

_____ . The passing down of traits from parents to offspring is called _____ . Some traits, such as

hair or eye color, are physical traits. Other inherited traits are behavioral and are called _____ . An Austrian

monk, _____ , discovered how traits are inherited.

Today, Mendel's factors are called _____ .

They are stored on the _____ inside the nucleus of cells. Offspring receive one set of genes from an egg cell and the other from the _____ that fertilized the egg cell.

Humans have an estimated 20,000 gene pairs. Some of these traits are easy to see. The history of a family trait and the way it has been inherited can be charted in a

_____ . These charts can be used to study heredity patterns.

Genetically Modified Corn

Read the Reading in Science feature from your textbook.
Look for cause and effect relationships.

Cause and Effect

Fill in the Cause and Effect Chart with cause and effect relationships you find in the article.

Cause	Effect
Corn borer eats corn.	
Bt powder sprayed on corn.	
	Corn plants make Bt toxin in their own cells, so the corn plants can protect themselves.
Other living things eat Bt corn.	



Write About It

Cause and Effect

1. Explain how the bacterium Bt affects corn borers.
2. Tell how genetically modified corn might cause problems for other insects and the environment.

Planning and Organizing

Answer these questions in detail.

3. What does the Bt bacterium produce, and what effect does it have on corn borers?

4. What enables the Bt bacterium to make a protein that is toxic to corn borers?

5. What was transferred from the Bt bacterium to Bt corn?

6. How does Bt corn affect corn borers?

7. How might Bt corn affect other living things, such as Monarch butterflies?

Animal Adaptations for Survival

Use your textbook to help you fill in the blanks.

What is adaptation?

1. A characteristic that helps an organism survive in its natural environment is a(n) _____ .
2. Organisms that are best adapted to their environment _____ and pass on their traits to offspring.
3. A trait that helps an organism survive in its environment, such as the _____ of an animal's fur, is a(n) _____ adaptation.

What are behavioral adaptations?

4. A characteristic that is an organism's response to its environment is a(n) _____ adaptation.
5. A(n) _____ is an inherited behavior.
6. Some birds and mammals perform elaborate attention-getting dances to attract a(n) _____ .
7. Some adaptive behaviors can also help organisms take care of their _____ .

What are adaptations to climate?

- 8. To keep warm in cold climates, animals have _____ fur.
- 9. In hot deserts, animals are often more active at _____, when temperatures drop.

What adaptations do predators and prey have?

- 10. Any color, shape, or pattern that lets an organism blend into its environment is _____.
- 11. A type of camouflage in which an organism's coloring helps it blend in with its background is _____ coloring.
- 12. When an organism matches the color, shape, and texture of the environment around it, it is showing protective _____.

What is mimicry?

- 13. An adaptation in which an organism gets protection from predators by looking like a dangerous animal is _____.
- 14. Predators also use this characteristic to fool _____; believing that the predators are harmless, prey come close enough to be caught.

Critical Thinking

- 15. How do adaptations help an organism survive in its environment?

Animal Adaptations for Survival

Use the clues below to help you find the words hidden in the puzzle.



1. An organism that matches the color, shape, and texture of its environment is using protective _____.
2. A type of coloring, shape, or pattern that allows an organism to blend in with its environment is _____.
3. Any characteristic that helps an organism survive in a certain environment is a(n) _____.
4. An adaptation in which an animal is protected against predators by its resemblance to an unpleasant or dangerous animal is _____.
5. A type of camouflage in which the color of an animal blends in with the animal's background is protective _____.

Animal Adaptations for Survival

Fill in the blanks.

camouflage

mimicry

scarce

chemicals

penguin

streamlined

insulation

prey

Animals have adaptations that help them survive in their environments. For example, birds such as the _____ have thick layers of soft feathers to provide _____ against the cold. The humps of camels store fat for when food is _____. Ocean animals are more _____ than land animals so that they can swim faster.

Some adaptations developed because of predator-_____ relationships. Skunks use bad-smelling _____ that make predators avoid them. Prey can use _____ to blend in with their environments. Some animals also demonstrate _____, the ability to look like another animal that a predator finds unpleasant. For example, some predators stay away from the viceroy butterfly because it mimics the bad-tasting monarch butterfly.

Meet Caroline Chaboo

Read the Reading in Science feature in your textbook.

Look at the chart below. In each row, read the information in the two “What I Know” columns. Use it to infer something that is not directly stated in the text. Write that statement in the “What I Infer” column.

Clues	What I Know	What I Infer
<p>1. The Sabal palm stands up to high winds, drought, and driving rain in the _____ region.</p>	<p>The Sabal palm is well-adapted for the Caribbean region.</p>	
<p>2. The _____ beetle harms Sabal palm trees in regions where it lives.</p>	<p>The tortoise beetle lives in _____.</p>	
<p>3. The tortoise beetle weakens the Sabal palm, but _____.</p>	<p>Caroline Chaboo studies plants, such as the Sabal palm, to discover whether they have adapted natural protection against insect pests.</p>	



Write About It

Infer

1. How might a natural pesticide produced by the Sabal palm help other organisms?
2. Research tortoise beetles. What other plants do they eat? Write a report that tells how such a pesticide could help other plants.

Using Ideas to Infer

To answer question #1, first determine how a natural pesticide inside the Sabal palm would help the tree.

Then, write your answer to the question:

How might a natural pesticide in the Sabal palm help other organisms?

Planning and Organizing

Imagine that you have been told to research tortoise beetles to find out what other plants they eat.

In order to conduct this research, first list the types of sources that would contain this information.

- a. _____
- b. _____
- c. _____

Then, list key words you could use to look up the information in these sources.

- a. _____
- b. _____

Change over Time

Use your textbook to help you fill in the blanks.

What are variations?

1. Darwin studied different types of finches while visiting the _____ .
2. The birds were similar in every aspect except for their _____ , which were suited to different environments.
3. Darwin thought that the finches might all have come from one _____ .
4. Variations that favor survival are _____ likely to be passed on to the next generation, and variations that do not favor survival are _____ likely to be passed on.
5. Variations can help a species live long enough to successfully _____ .

What is natural selection?

6. In nature organisms compete for natural resources such as food, _____ , sunlight, and space.
7. “Survival of the fittest” is another way to describe the process of _____ .
8. Plants and animals have more offspring than their environments can support to ensure that enough will _____ to carry the species into the future.

What is evidence of change over time?

- 9. The history of Earth's changes can be found in _____ .
- 10. Fossils can tell us about what an _____ was like in the past.

How old are fossils?

- 11. The _____ of a rock is how old it is compared to another rock.
- 12. The _____ is the age of a fossil in years.

Is Earth still changing?

- 13. New islands may form due to _____ activity.
- 14. Some species previously thought to be extinct are now _____ .

Critical Thinking

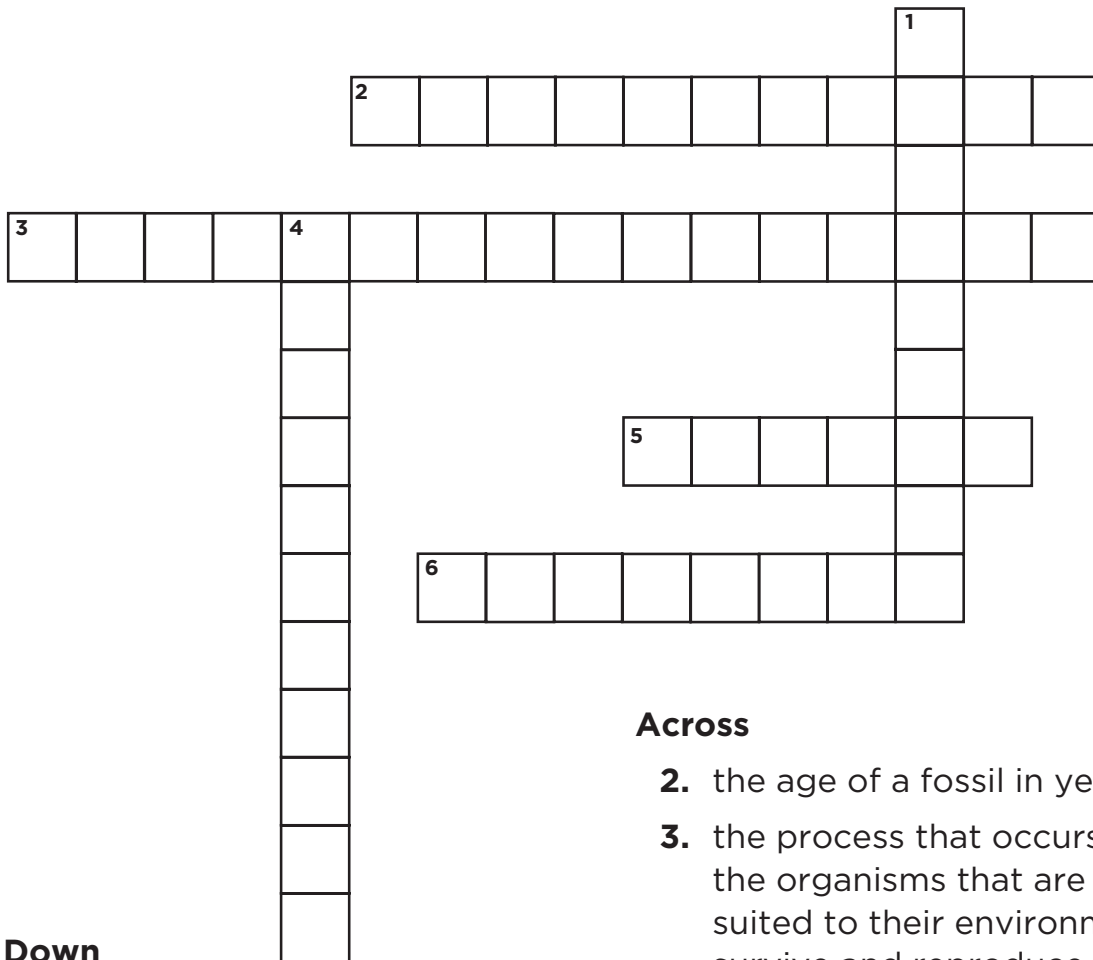
- 15. If the climate were suddenly to become colder, what variations do you think would most help animals to survive?

Copyright © Macmillan/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Change over Time

Use the clues to fill in the crossword puzzle.

absolute age	mutation	relative age
fossil	natural selection	variation



Down

1. a difference among members of the same species that enables some individuals to better survive and reproduce
4. the age of a rock compared to another

Across

2. the age of a fossil in years
3. the process that occurs when the organisms that are best suited to their environment survive and reproduce successfully
5. the remains, traces, or imprints of living things preserved in Earth's crust
6. a change in an organism's genetic material

Change over Time

Fill in the blanks.

absolute age

fossils

resources

changed

Galápagos

variation

environments

reproduce

The first person to organize observations for the origin of species was Charles Darwin. While visiting the _____ Islands, Darwin noticed that the beaks of different finches were suited to different types of food. He believed that the different types of finches all came from one _____. Over time the birds that lived on the different islands _____ to adapt to their particular _____.

In order to survive, organisms must find enough _____ to support life. Those that survive will _____ successfully, and their species will continue. Sometimes a difference, mutation, or _____ can help a species to survive. _____ can indicate what past organisms and environments were like. The _____ of rocks and fossils help explain how Earth has changed over its long history.

So You Want to Be a Fossil Hunter

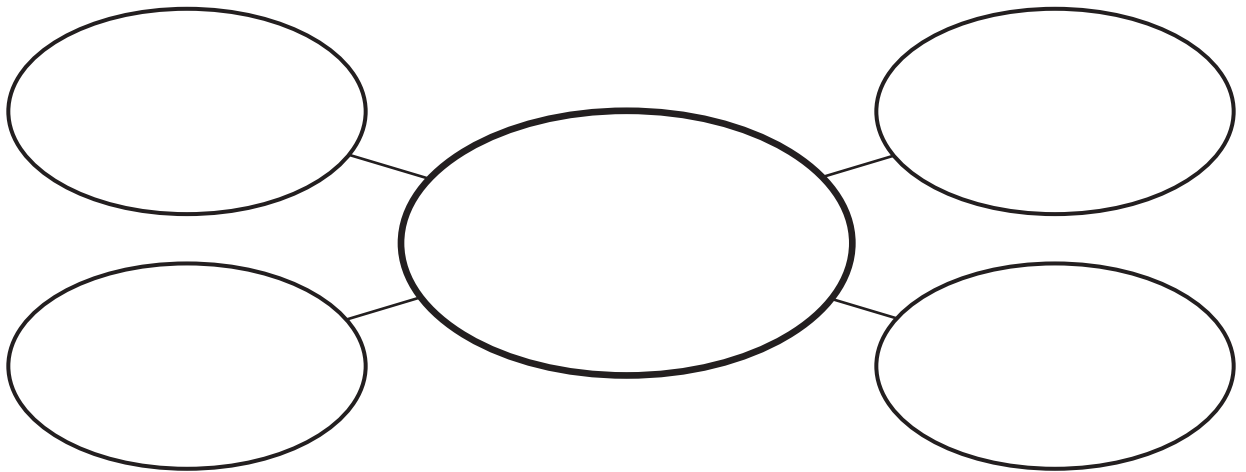


Write About It

Descriptive Writing Select a fossil discovery and write a description of it. Use sensory words and specific details to describe characteristics about the organism such as what it ate, what it looked like, and its habitat. Does the fossil resemble any organisms that are alive today? How old is the fossil?

Getting Ideas

What fossil will you describe? Write its name in the center circle of the web below. Write details that describe the fossil in the outer circles. You can add circles to the web if you like.



Planning and Organizing

Jorge wants to describe a fossil of a dinosaur footprint. Here are some sentences that he wrote. Write Yes if the sentence describes the fossil. Write No if it does not.

1. The huge footprint was $2\frac{1}{2}$ feet across. _____
2. It showed that the dinosaur had three long, bony toes. _____
3. I got scared when I looked at the footprint. _____

Drafting

Write a sentence to begin your description. Tell what fossil you will describe. Tell an important idea about this fossil.

Now write your description. Use a separate piece of paper. Start with the sentence you just wrote. Then write your description. Use words that appeal to the senses. Use details that will help your readers picture the fossil.

Revising and Proofreading

Help Jorge improve his description. Add sensory words in the blanks. Choose a word from the box or pick your own.

deep

gray

narrow

sharp

spiky

The fossil footprint in the cold, _____ stone reveals secrets of this creature that lived millions of years ago. The footprint had made a _____ impression in the earth. This suggested that the dinosaur was very big and heavy. It showed long _____ shapes at the end of the toes. Maybe this is where its _____ claws dug into the earth. The heel of the foot was _____, not wide.

Now revise and proofread your writing. Ask yourself:

- ▶ Did I include enough details to help readers picture the fossil?
- ▶ Did I use sensory words to bring my description to life?
- ▶ Did I correct all mistakes?

Heredity and Diversity

Choose the letter of the best answer.

- Which of the following organisms reproduces by using budding?
 - sponge
 - cat
 - lizard
 - frog
- Which of the following plants reproduces by using runners?
 - corn plant
 - moss
 - strawberry plant
 - apple tree
- Which of the following is an example of sexual reproduction?
 - cloning
 - budding
 - seed production
 - vegetative propagation
- Which organism can develop from an unfertilized egg?
 - human
 - sheep
 - bird
 - lizard
- Which of the following is an advantage of asexual reproduction?
 - It requires a mate.
 - It promotes species variety.
 - It is convenient.
 - It produces offspring that adapt easily to change.
- A characteristic that helps an organism survive in its environment is a(n)
 - trait.
 - style.
 - adaptation.
 - gene.
- A type of camouflage in which the color of the animal blends in with its background is called
 - protective coloration.
 - protective resemblance.
 - adaptation.
 - mimicry.
- A butterfly that looks like a bad-tasting butterfly exhibits
 - protective resemblance.
 - protective coloration.
 - hibernation.
 - mimicry.

Choose the letter of the best answer.

9. A walking stick insect looks like a stick. This is an example of
- protective coloration.
 - protective resemblance.
 - instinct.
 - mimicry.
10. A difference that allows an individual to better reproduce is
- fossils.
 - imprinting.
 - variation.
 - natural selection.
11. Which causes variation?
- climate staying the same
 - a species having little room to expand
 - all members of a species dying out
 - mutation
12. Sick animals often do not live to reproduce. This is part of
- natural selection.
 - inherited behavior.
 - mimicry.
 - camouflage.
13. What do fossils that are dated using the half-life of an element tell us about the rock in which they were found?
- relative age
 - absolute age
 - half-life
 - position
14. The passing of traits to offspring is known as
- genetics.
 - heredity.
 - hibernation.
 - adaptation.
15. Which of these represents a carrier for the recessive trait?
- DD
 - Dd
 - dd
 - d
16. An instinct is an example of
- a learned behavior.
 - an inherited behavior.
 - an inherited physical trait.
 - imprinting.
17. If purple is the dominant gene for flower color, which item represents a white flower?
- PP
 - pp
 - Pp
 - p

Monarch Butterflies at Risk

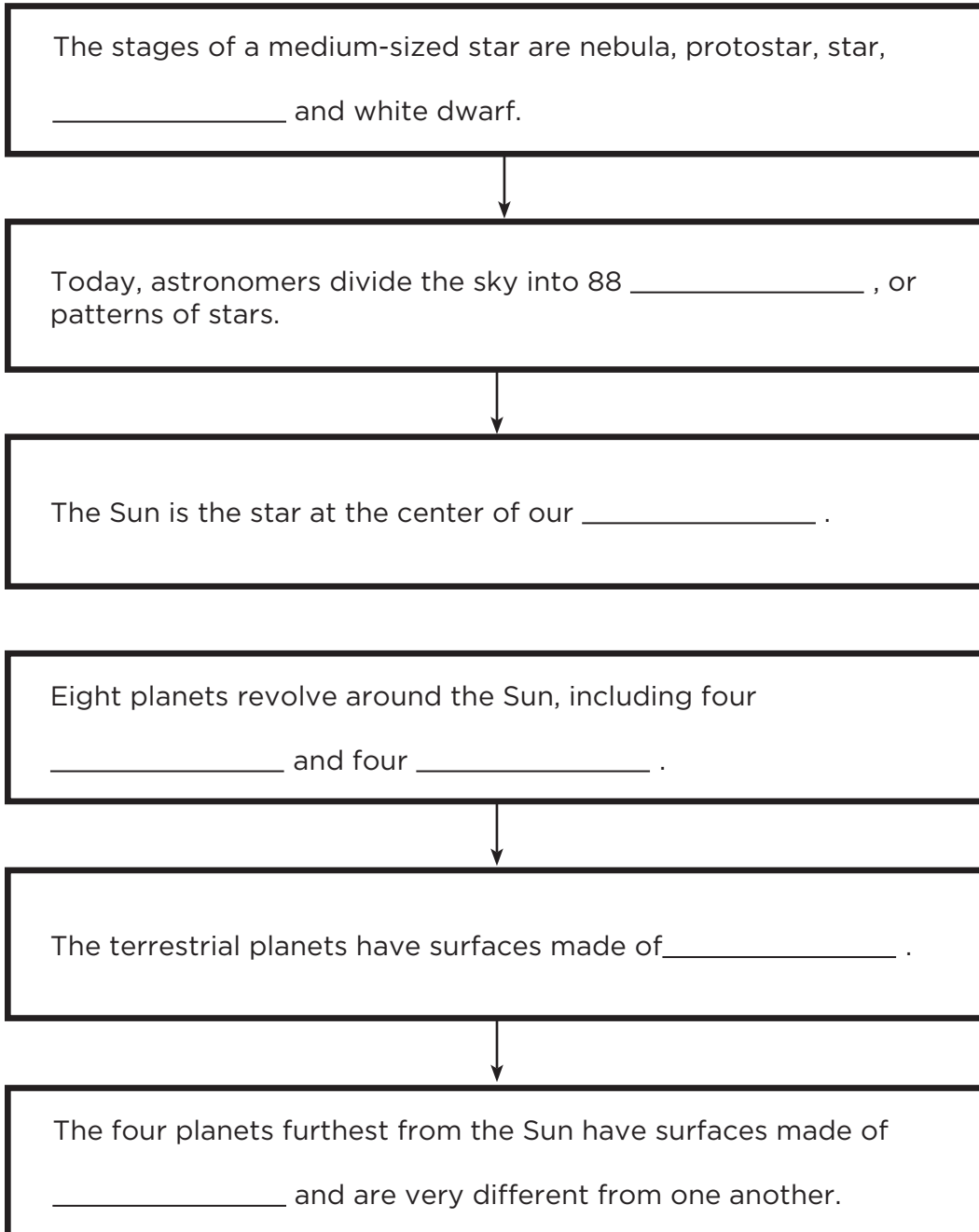


Write About It

Response to Literature In this article the author discusses monarch butterflies. What conditions affect these butterflies? What role does weather play? Think about a severe weather condition you have experienced. Write a personal narrative describing the severe weather and how it affected you and other people.

The Universe

Complete the concept map with information you learned about the universe.



The Inner Planets

Use your textbook to help you fill in the blanks.

What are planets?

1. A _____ is made up of a star and the objects that surround it.
2. Large objects that orbit stars are called _____ .
3. Some planets have objects called _____ that orbit them.
4. Our solar system includes eight planets that orbit the _____ .
5. Most of the solar system's _____ orbit the Sun in a belt between Mars and Jupiter.
6. The planet closest to the Sun is _____ , and the planet farthest away from the Sun is _____ .

What do we know about Mercury, Venus, and Earth?

7. Mercury, Venus, Earth, and Mars are planets with surfaces made of _____ .
8. Mercury takes 88 Earth days to make one _____ around the Sun.
9. Venus has an atmosphere made mostly of _____ , which holds in heat and gives this planet the hottest surface in the solar system.
10. The most noticeable feature about _____ is that it is covered in water.

What is Mars like?

- 11. The fourth planet in our solar system is called _____ .
- 12. Phobos and Deimos are the names of Mars's _____ .
- 13. The reddish _____ in Mars's atmosphere makes its sky look pink.

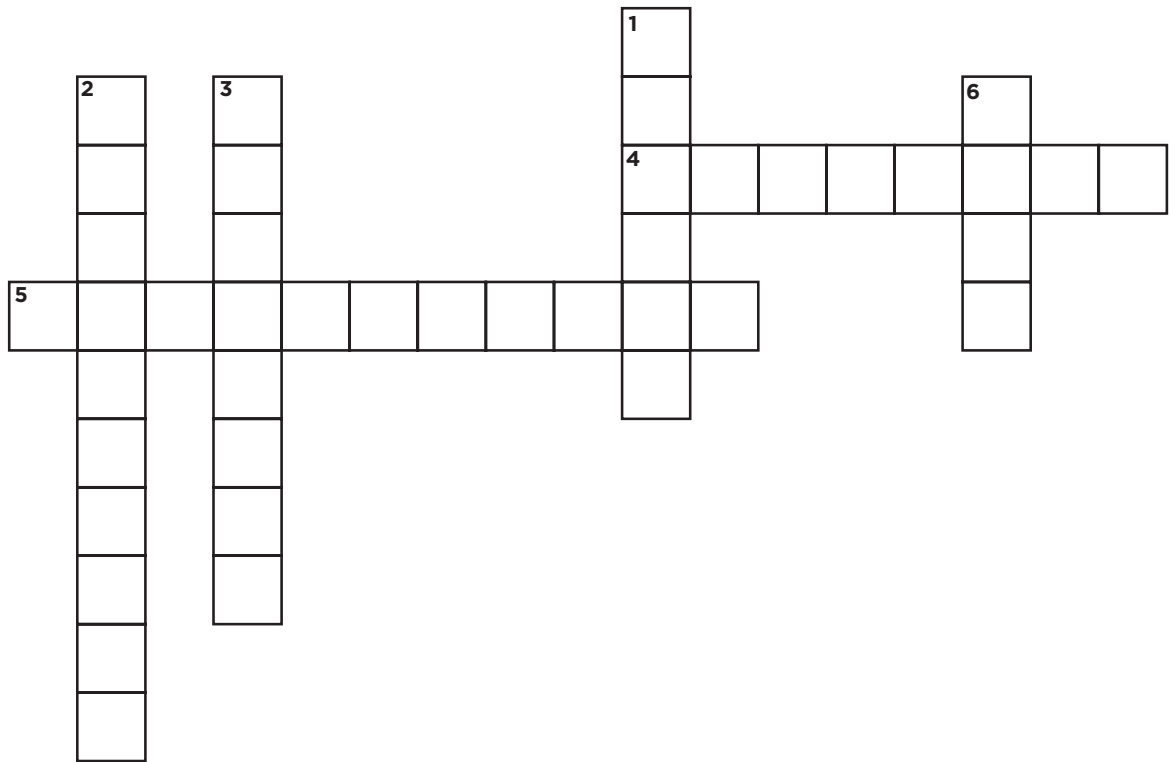
Critical Thinking

- 14. Why do you think many of the craters on Earth are no longer visible?

The Inner Planets

Match the correct letter with the description and fill in the crossword puzzle.

asteroid	planet	rotation
moon	revolution	solar system



Across

4. a rock that revolves around the Sun in a belt between Mars and Jupiter
5. a star and the objects that orbit it

Down

1. a large object that orbits a star but does not give off its own light
2. one complete trip around the Sun
3. a complete spin on an axis
6. a natural object that orbits a planet

The Inner Planets

Fill in the blanks.

asteroids

Earth

Mercury

terrestrial

craters

Mars

none

Venus

The major objects of the solar system are eight planets that orbit the Sun and their moons. Earth is one of the _____ planets, which have rocky surfaces. Many of the inner planets have surfaces with large _____. Earth has one moon, some planets (such as Mercury and Venus) have _____, and other planets (such as Jupiter and Saturn) have dozens.

Other objects in the solar system include the _____ that orbit the Sun between _____ and Jupiter. Scientists study _____ to learn about the inner planets because they are made of the same kinds of materials. _____ has some of the hottest surface temperatures in the solar system because of its thick carbon dioxide atmosphere. _____ is sometimes hard to see from Earth because it is so close to the Sun. Astronomers study the solar system with many types of telescopes.

The Outer Planets

Use your textbook to help you fill in the blanks.

What are the outer planets?

1. The _____ planets are much larger than the _____ planets.
2. Jupiter, Saturn, Uranus, and Neptune are planets with surfaces made of _____ .
3. _____ is the largest planet in the solar system; it has more mass than all the other planets combined.
4. Jupiter completes one _____ in 4,333 Earth days.
5. Ganymede, Callisto, Io, and Europe are Jupiter's _____ .

What are Saturn and Uranus like?

6. The most noticeable feature about Saturn is its large set of _____ that are made of ice and rock.
7. Saturn _____ once every 10 hours and 39 minutes.
8. Uranus is unusual because its _____ of rotation makes it look like it was knocked on its side.

What are Neptune and dwarf planets like?

- 10. The planet farthest from the Sun is _____ .
- 11. Neptune has some of the strongest _____ of any planet in the solar system—speeds have been recorded at 2,000 kilometers per hour (1,250 miles per hour).
- 12. Pluto was once considered a planet even though its diameter is only two-thirds the size of _____ .
- 13. The dwarf planet _____ is slightly larger than Pluto and takes 557 Earth-years to orbit the Sun.

Critical Thinking

- 14. Why is it not possible to land a spacecraft on Jupiter or Saturn?

The Outer Planets

Who am I? What am I?

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

- | | | |
|--------------------------|------------------------------|------------------------|
| a. rings | d. the Great Red Spot | g. dwarf planet |
| b. comet | e. methane | |
| c. Galilean moons | f. Triton | |

1. ____ I am a ball of rock and ice that orbits the sun.
What am I?
2. ____ I am the area of Jupiter that has enormous and powerful storms. What am I?
3. ____ I am one of four large objects that orbits Jupiter.
I was discovered by Galileo with his telescope. What am I?
4. ____ I can be found orbiting all the outer planets, but I am more noticeable around Saturn. I am made of ice and rocks.
What am I?
5. ____ I give Neptune its blue color. What am I?
6. ____ I am a moon of Uranus. I have some characteristics in common with Earth. What am I?
7. ____ My name is Pluto. What am I?

The Outer Planets

Fill in the blanks.

axis of rotation

dwarf planets

gas

methane

comets

Eris

Jupiter

rocks and ice

The four outer planets share many properties.

They are all very large, are mostly made of _____ , and rotate very fast. _____ is a ball of gas so large that more than 1,000 Earths could fit inside it. Saturn has a recognizable series of rings made of _____ that orbit the planet. Some scientists believe these rings may be the remains of _____ that collided with or near Saturn.

Uranus's _____ is tipped so far that it looks like it is rotating on its side. It may have been struck by some object and knocked on its side. Neptune's layers of gas include large amounts of _____ , which gives the planet its blue color. Pluto, Eris, and other _____ are smaller than some of the moons of the planets in the solar system. _____ takes over 557 Earth-years to revolve around the Sun.

Voyager Discoveries

Read the following passage.

In 1977, NASA launched the Voyager Interstellar Mission to explore Jupiter, Saturn, Uranus, Neptune, and their moons. The trip had to be very precisely planned. Speeds and distances had to be accurately calculated. The two *Voyager* spacecraft had to be close enough to each planet to collect data and to get a pull from that planet's gravity in order to be propelled toward their next destination. At the same time, the spacecraft had to be far enough away from the planets that they would not go into orbit around them. All of NASA's careful planning worked. The *Voyager* Mission has provided scientists with new and closer looks at our farthest neighbors.

Voyager Spacecraft Travel

Jupiter—1979:

Images show Jupiter's rings. Volcanic activity is observed on Io, one of Jupiter's moons.

Saturn—1980–91:

Scientists get a close look at Saturn's rings. They contain structures that look like spokes, or braids. Scientists observed that Titan, one of Saturn's moons, has a thin atmosphere and active, geyser-like landforms.

Uranus—1986:

Voyager photographs the dark rings around Uranus. It also sees ten new moons, bringing Uranus's total to 15 moons. *Voyager* sends back detailed images and data on the planet, its moons, and dark rings.

Neptune—1989:

Large storms are seen on the planet. One of these storms is Neptune's Great Dark Spot. Neptune was originally thought to be too cold to support this kind of weather.

After observing these planets, the *Voyager* spacecraft keep traveling. They are the first human-made objects to go beyond the heliosphere. The heliosphere is the region of space reached by the energy of our Sun. It extends far beyond the most distant planets in the solar system.



Write About It
Cause and Effect

- ▶ What caused the *Voyager* spacecraft to be propelled from one planet toward the next?
- ▶ How did scientists benefit from the *Voyager* missions?

1. What caused the *Voyager* spacecraft to be propelled from one planet toward the next?

2. How did scientists benefit from the *Voyager* missions?

GLE 0507.6.2

Stars

Use your textbook to help you fill in the blanks.

What are stars?

1. Stars form from a huge cloud of gases and dust called a(n) _____ .
2. When the cloud contracts and powerful reactions start to turn hydrogen atoms into helium atoms to produce energy, a(n) _____ forms.
3. After billions of years, the hydrogen fuel of a star begins to run out and the star expands to become a(n) _____ .
4. A star that begins life with much more hydrogen than a medium-sized star such as our Sun ends its life as an exploding star called a(n) _____ .

How are stars characterized?

5. A star's _____ is the star's actual brightness.
6. A star's _____ is how bright the star appears in Earth's night sky.
7. The Sun is a medium-sized _____ star with a surface temperature of about 6,000°C.
8. By using gravitational microlensing, scientists have discovered _____ outside our solar system.

What are constellations?

- 9. Patterns of stars in the sky are _____ .
- 10. _____ , the North Star, is located in the Little Dipper constellation.

What are star charts?

- 11. Astronomers have created maps of the night sky called _____ .
- 12. _____ is how far north or south a star is from the equator.
- 13. _____ is how far around the map the star is.

Why do constellations seem to move?

- 14. The constellations appears to move because the Earth is _____ on its axis.

Critical Thinking

- 15. Will the Sun always shine?

Stars

Match the correct letter with the description.

- | | | |
|-------------------------|------------------|-----------------------|
| a. constellation | c. nebula | e. supernova |
| b. star chart | d. star | f. white dwarf |

1. An exploding star is a(n) _____ .
2. An object in space that produces its own energy, including heat and light, is a(n) _____ .
3. A map of the night sky is called a(n) _____ .
4. A huge cloud of gases from which stars form is a(n) _____ .
5. A group of stars that forms a pattern is a(n) _____ .
6. A small, very dense star is a(n) _____ .

Stars

Fill in the blanks.

10 billion
elliptical
energy

gravitational microlensing
helium
nebulas

Sun
white dwarf

A star is an object that produces its own _____. The _____ is an average star with planets in _____ orbits around it. Planets have been discovered around other stars using _____.

Like living things, stars have life cycles. Stars are born from clouds of gas called _____. When gravity causes nebulas to contract enough, temperature rises and reactions that change hydrogen into _____ start. When the helium is also gone, the star shrinks and cools to become a _____. The life cycle of a medium-size star, such as our Sun, is about _____ years. Our Sun is about 5 billion years old.

The Universe

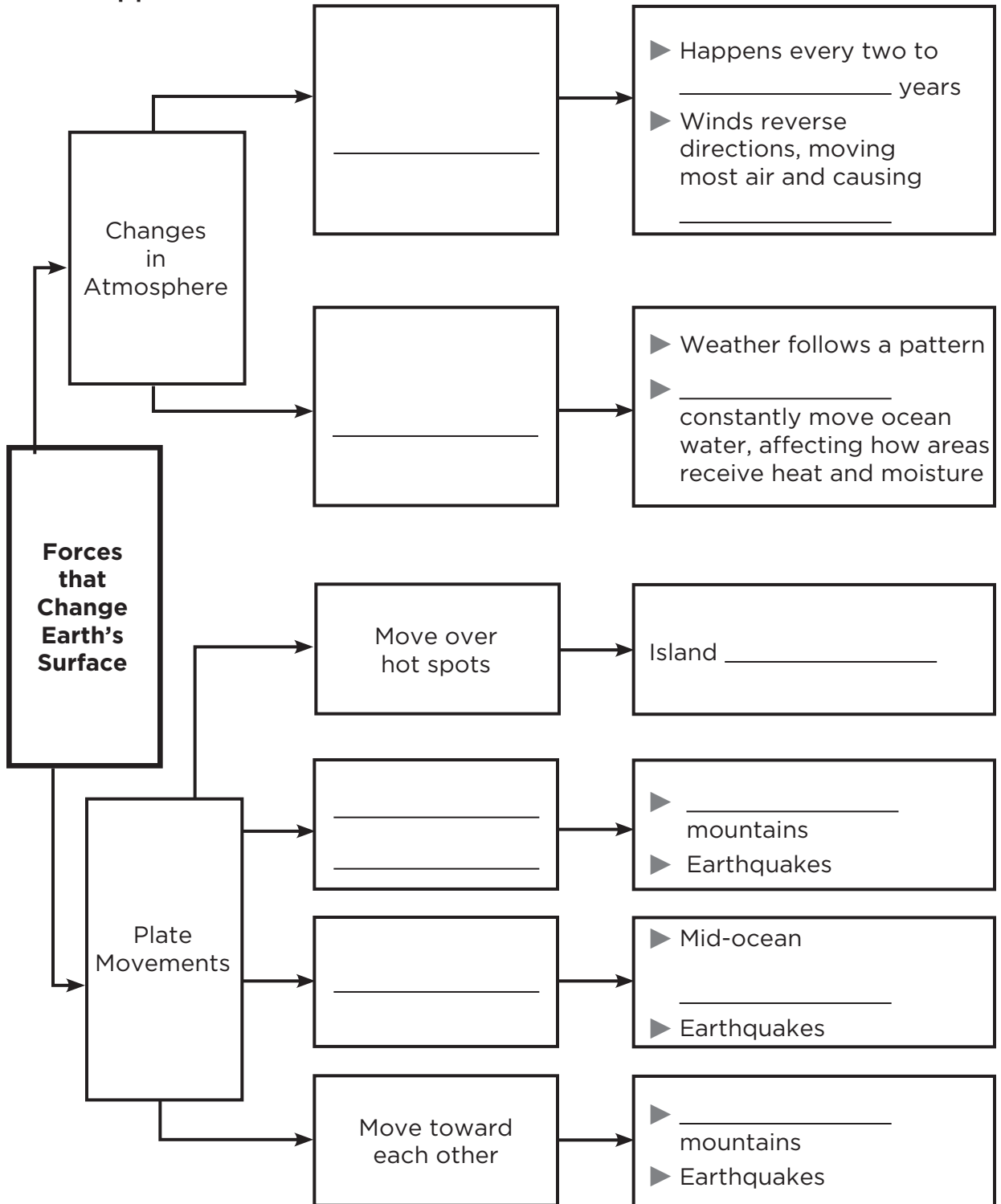
Choose the letter of the best answer.

1. The Sun and all the objects that orbit it make up the
 - a. moon.
 - b. solar system.
 - c. nebula.
 - d. universe.
2. What is an orbit?
 - a. the speed of a planet moving around the Sun
 - b. the order of planets in distance from the Sun
 - c. the path a planet takes as it moves around the Sun
 - d. the tilt of Earth on its axis
3. A comet is usually made of
 - a. spinning gas.
 - b. rock and ice.
 - c. hydrogen and helium.
 - d. red dust.
4. What is Earth's revolution?
 - a. its spinning motion on its axis
 - b. its lunar gravitational pull
 - c. its changing of seasons
 - d. its movement in orbit around the Sun
5. Callisto, Io, Europa, and Ganymede are the
 - a. asteroid belt.
 - b. Galilean moons.
 - c. constellations.
 - d. dwarf planets.
6. A small, dense star that forms at the end of a medium star's life cycle is a
 - a. white dwarf.
 - b. red giant.
 - c. nebula.
 - d. blue protostar.
7. A distant group of stars that form a pattern are known as a(n)
 - a. solar system.
 - b. universe.
 - c. nebula.
 - d. constellation.

8. The explosion of a star is called
 - a. a nebula.
 - b. a supernova.
 - c. a protostar.
 - d. gravitational microlensing.
9. A natural object that orbits a planet is a(n)
 - a. asteroid.
 - b. comet.
 - c. moon.
 - d. star.
10. In the solar system, most asteroids are
 - a. beyond Neptune.
 - b. orbiting Saturn.
 - c. between Mars and Jupiter.
 - d. next to the Sun.
11. The largest planet in our solar system is
 - a. the asteroid belt.
 - b. Jupiter.
 - c. the Sun.
 - d. the Moon.
12. What is absolute magnitude?
 - a. the actual brightness of a star
 - b. how far north or south from the equator a star appears
 - c. the position of a star on a star chart
 - d. the way a star looks in Earth's night sky
13. Stars form from a cloud of gas called a
 - a. constellation.
 - b. nebula.
 - c. universe.
 - d. neutron star.
14. The Sun is a
 - a. yellow star.
 - b. neutron star.
 - c. white dwarf.
 - d. red giant.
15. What is the name of the process by which distant planets are found as they pass in front of stars?
 - a. The Gravitational Microlensing Method
 - b. The Stellar Life Cycle Theory
 - c. The Big Bang Theory
 - d. The Expanding Universe Theory

Our Dynamic Earth

Complete the concept map by filling in answers where blanks appear.



Copyright © Macmillan/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Plate Tectonics

Use your textbook to help you fill in the blanks.

What are Earth's layers?

1. The center part of Earth is made up of two parts the molten outer core and the _____ inner core.
2. The layer above the core is called the _____.
3. Continents and the ocean floor are part of Earth's solid, rocky surface called the _____.

Are the continents moving?

4. Alfred Wegener stated that Earth's _____ were once joined in one landmass, but gradually pulled apart and drifted.
5. Wegener's showed that the age and composition of rocks in the _____ on South America's east coast matched of those on Africa's west coast.
6. Scientists also discovered evidence in _____ that Africa and South America were once joined.

What causes the ocean floor to move?

7. Scientists developed the _____ theory to explain how the continents have moved over millions of years.
8. Earth's lithosphere is made of huge pieces of solid rock called _____.
9. Melted rock called _____ rises up through the crack where plates move apart under the ocean.

- 10.** As the ocean floor spreads at the plate boundary, the _____ resting on the plates also move apart.

What forces change Earth’s crust?

- 11.** The force that causes rocks to break as plates rub past each other is called _____ .
- 12.** A break or crack in the rocks of the lithosphere along which movements take place is called a(n) _____ .
- 13.** Three types of faults include a strike-slip fault, a(n) _____ fault, and a reverse fault.

What are the different types of mountains?

- 14.** When plates push together, compression causes the ground to form _____ mountains.
- 15.** A mountain range in Asia, the _____ , began to form millions of years ago as folded mountains.
- 16.** When rock on one side of a fault moves down and rock on the other side moves up, a _____ mountain is formed.

Critical Thinking

- 17.** Compare how two types of mountains are formed.

Plate Tectonics

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

core	magma
fault	mantle
geological features	plate tectonics
hydrosphere	

1. Earth has several layers. The planet itself is divided into the crust, the _____ beneath it, and the core at the center.
2. The _____ is made up of Earth's liquid and solid water, including oceans, lakes, rivers, glaciers, and underground water.
3. Hot, melted rock is called _____ .
4. A _____ is a crack in the rock of the lithosphere, along which movements take place.
5. The physical features of Earth are part of Earth's surface. Earth's surface has many types of _____ .
6. At the center of the Earth is its _____ .
7. The model that states that Earth's surface is composed of large rock plates that fit together like jigsaw puzzle pieces is called _____ .

Plate Tectonics

Fill in the blanks.

compression	continents	fossils	shear
continental drift	folded	plate tectonics	

The continents were not always where they are today. About 100 years ago, Alfred Wegener developed the theory of _____. The theory states that Earth's _____ were once one landmass. The landmass broke up millions of years ago, and the continents drifted to the positions we know today. Wegener supported his theory with evidence from rocks and _____. Later, scientists developed the theory of _____.

When plates push together, they produce the force of _____. This force can push the ground at the boundary upward, forming _____ mountains. When plates slide past each other, they create _____. This force can make huge blocks of crust break apart along faults. Over millions of years, the blocks can shift upward to form fault-block mountains.

Pangaea and Other Supercontinents

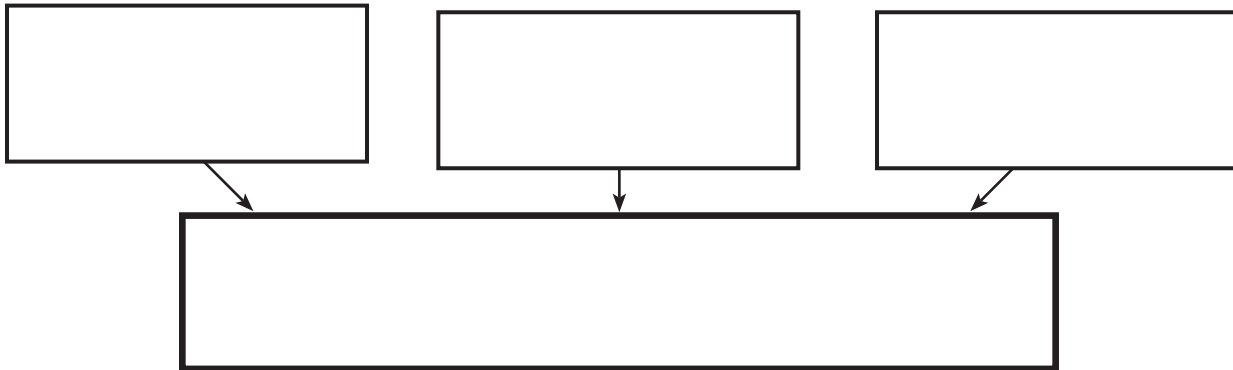


Write About It

Expository Writing Research the movement of Rodinia and Pannotia. Select a main idea. Write an expository essay with details that support your main idea.

Getting Ideas

Do some research to find out whether Rodinia and Pannotia actually existed. Use the chart below. In the boxes on the top, write details that you find. In the box on the bottom, summarize this information.



Planning and Organizing

Here are two sentences that Mai wrote. Write Yes if the sentence supports the idea that Rodinia and Pannotia actually existed. Write No if it does not.

1. There are common rock types and structural features along the coastlines of continents today. _____
2. Figuring out how supercontinents formed and broke apart is a lot like detective work. _____

Drafting

Write a sentence to begin your essay. This sentence should tell your main idea about Rodinia and Pannotia.

Review the evidence you found and your summary. Now write the first draft of your essay. Use a separate piece of paper. Include facts and details that back up your main idea. Draw a conclusion at the end.

Revising and Proofreading

Help Mai revise her writing. Use the word *but* to combine each pair of sentences. Put a comma before this word. Write the new sentence on the lines.

1. Pangaea was a supercontinent. It was not the earliest supercontinent.

2. Rodinia and Pannotia were both supercontinents. They were formed at different times.

Now revise and proofread your writing. Ask yourself:

- ▶ Did I clearly state my main idea?
- ▶ Did I include facts and details to back up my idea?
- ▶ Did I reach a sound conclusion at the end?
- ▶ Did I correct all mistakes?

Volcanoes

Use your textbook to help you fill in the blanks.

Where are volcanoes found?

1. Most of Earth's volcanoes are located at edges of _____ .
2. A string of volcanoes at plate boundaries around the Pacific Ocean is known as the _____ .
3. Volcanoes often erupt at places where one plate is _____ the other.
4. The bottom edge of the diving plate melts in the heat of the _____ .
5. The melted rock rises within the crust, forming a hot pool of _____ .
6. The hot rock sometimes erupts through openings in Earth's surface as a(n) _____ .
7. Magma that reaches Earth's surface is _____ .

How does magma form geological features?

8. When magma hardens inside Earth's crust, it can form vertical _____ and horizontal sills.
9. Magma pushed into a thick sill can form a(n) _____ .
10. The largest underground magma formations are _____ , which can form large hills.

- 11. A volcano that is _____ can erupt with lava, ash, gas, or rock.
- 12. When a volcano stays quiet for a time, it is _____ .
- 13. A volcano that no longer erupts is _____ , or dead.

How do volcanoes build islands?

- 14. The Hawaiian Islands formed over a stationary pool of magma below Earth’s crust called a(n) _____ .
- 15. When the mountains grew high enough to break the ocean’s surface, they became volcanic _____ .
- 16. As the plate moved slowly the islands moved _____ from the hot spot.
- 17. Where two ocean plates meet and one is pushed under the other, an island _____ may form.
- 18. Magma from the edge of the lower plate rises and builds volcanic islands along the plate _____ .
- 19. An example of an island arc is the _____ in Alaska.

Critical Thinking

- 20. Why do volcanoes form when one plate pushes under another?

Volcanoes

Match the correct letter with the description.

- | | |
|-------------------------------|--------------------------|
| a. cinder-cone volcano | f. island chain |
| b. composite volcano | g. lava |
| c. crater | h. shield volcano |
| d. hot spot | i. volcano |
| e. island arc | |

- _____ magma that reaches Earth's surface
- _____ a series of volcanic islands that form along a plate boundary
- _____ a broad volcano with gently sloping sides formed from thin, fluid lava
- _____ an opening in Earth's crust through which magma flows
- _____ a stationary pool of magma below Earth's crust
- _____ a large, cone-shaped volcano built from alternating layers of cinders and hardened lava
- _____ a line of islands
- _____ a cup-shaped depression that forms around a volcano's vent
- _____ a cone-shaped volcano of cinders, with a narrow base and steep sides

Volcanoes

Fill in the blanks.

cinder-cone

lava

plates

volcano

composite

mantle

shield

Openings on the Earth's surface appear on the edges of the crust's plates. An opening in Earth's crust from which magma flows is a(n) _____. Most volcanoes form in places where _____ push toward each other, and one dives under the other. The lower edge of the diving plate melts in the _____, producing hot magma that rises in the crust. Magma that breaks through to Earth's surface is _____.

There are three types of volcanic mountains. A large, broad mountain composed of hardened lava is a(n) _____ volcano. A narrow, steep mountain formed from cinders is a(n) _____ volcano. A large, cone-shaped mountain formed by layers of lava and cinders is a(n) _____ volcano. Volcanoes are built up over time as more material is deposited.

Earthquakes

Use your textbook to help you fill in the blanks.

What is an earthquake?

1. Earthquakes happen when the layers of rock on both sides of a(n) _____ suddenly slip.
2. Waves of energy spread out from the _____, the place where the slipping began.
3. When they reach the surface, waves spread out from the _____ of the earthquake (the point directly above the focus).
4. Most earthquakes happen at faults that are near the boundaries of _____.

What waves do earthquakes make?

5. Scientists use a(n) _____ to detect and measure earthquake waves.
6. The fastest earthquake waves, _____ waves, pass through solids and liquids and move back and forth.
7. An earthquake's _____ waves move up and down and from side to side.
8. The slowest-moving waves, _____ waves, move across Earth's surface like ripples on a pond.

How is an earthquake's energy measured?

9. Scientists use the _____ scale to measure earthquake magnitude.
10. A measure of the amount of _____ that an earthquake releases is magnitude.

- 11. Scientists use the _____ scale to measure an earthquake's effects.
- 12. An underwater earthquake can produce a large wave called a(n) _____ .
- 13. Underwater earthquakes with a magnitude of _____ or greater on the Richter scale are most likely to cause tsunamis.

How can people prepare?

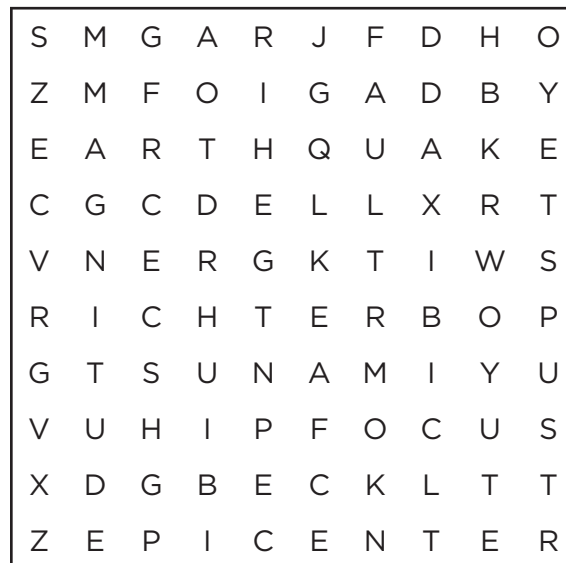
- 14. Layers of rubber and steel between a building and its foundation allow the building to _____ , reducing the damage caused by up-and-down motions.
- 15. Before an earthquake, people should _____ objects that might fall.
- 16. In their attempt to tell when earthquakes might happen, scientists look for possible warning signs such as changes in the angle of the _____ .
- 17. Earthquakes are hard to _____ , but the ability to do so would allow early warnings that could save lives.

Critical Thinking

- 18. Which scale do you think would better explain an earthquake to you—the Richter scale or the Mercalli scale? Why?

Earthquakes

Use the clues below to find the words hidden in the puzzle.



1. A sudden movement of Earth's crust is a(n) _____ .
2. The point on the surface directly above an earthquake's focus is its _____ .
3. A crack in Earth's crust is a(n) _____ .
4. The place along a fault where the slipping that causes an earthquake begins is the earthquake's _____ .
5. A measure of the energy that an earthquake releases is its _____ .
6. A large ocean wave caused by an underwater earthquake is a(n) _____ .
7. The scale that measures the magnitude of an earthquake is called the _____ scale.

Earthquakes

Fill in the blanks.

earthquake	primary or P
energy	Richter
fault	secondary or S
Mercalli	

The plates of the Earth are in motion. A sudden movement of Earth's crust is a(n) _____. Most earthquakes occur near plate boundaries, when layers of rock that usually adhere to each other suddenly slip at a(n) _____. The scale that measures the magnitude of an earthquake is called the _____ scale. The scale that measures how severe an earthquake feels and the amount of damage the quake does to objects is called the _____ scale.

The movement of plates during an earthquake sends out waves of _____ that shake the ground. When an earthquake occurs, _____ waves move forward and back very rapidly. An earthquake's _____ waves move up and down. The slowest waves are surface or L waves. These waves cause the most damage.

Quake Predictors

Read the Reading in Science feature in your textbook.
Look for clues in the article that help you draw conclusions
about earthquakes.

Draw Conclusions

Use the graphic organizer to draw conclusions.

Text Clues	Conclusions



Write About It

Draw Conclusions

1. Before the invention of the seismometer, how do you think people measured earthquakes?
2. Why are satellites a useful source of information about movement on Earth's surface?

Planning and Organizing

Explain one way to measure earthquakes that people could have used before the seismometer was invented.

Drafting

Now draw a conclusion about how satellites provide information about movements on Earth's surface.

The Atmosphere

Use your textbook to help you fill in the blanks.

What are weather and climate?

1. Two variables that are important in determining climate are _____ and _____ .
2. The global variable that has the strongest effect on climate is _____ .

How do oceans affect temperature on land?

3. Air in contact with _____ is warmed in the winter and cooled in the summer.
4. The movement of air from water to land is called a(n) _____ .
5. The movement of air from land to water is called a(n) _____ .

How do mountains and ocean currents affect climate?

6. A(n) _____ is a constant movement of ocean water.
7. Areas near _____ currents tend to have _____ temperatures while areas near _____ currents tend to have _____ temperatures.

- 9. The temperature of an inland city is usually _____ in summer and _____ in winter than the temperature of a coastal city.
- 10. At a given latitude, the higher the altitude, the _____ the climate.
- 11. The climate on the _____ side of a mountain is wetter and cooler than the climate on the _____ side.

What is El Niño?

- 12. A cold current along the coast of Peru causes air pressure to be _____ in the eastern Pacific than it is in the western Pacific.
- 13. El Niño brings _____ to the coasts of North and South America; La Niña brings _____ to these coastal areas.

Critical Thinking

- 14. Location A is near the equator on the windward side of a mountain. Location B is at 30°N latitude on the east side of the Atlantic Ocean. Describe the climate in each location. Explain your answers.

The Atmosphere

Choose a word from the word box below to complete the puzzle.

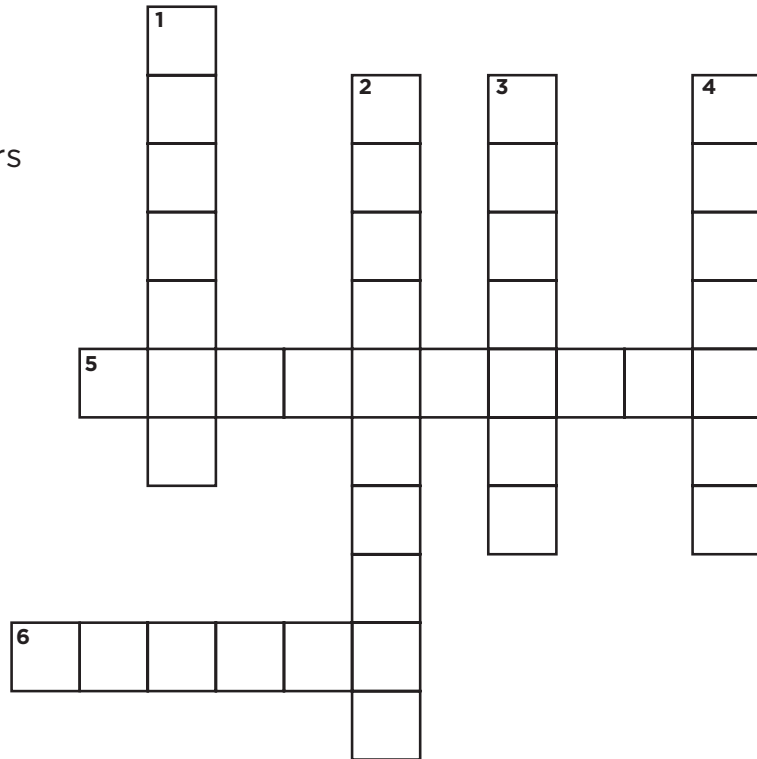
atmosphere	current	rain shadow
climate	El Niño	weather

Across

- 5. layer of gases that surrounds Earth
- 6. causes rain and storms every two to seven years

Down

- 1. average weather of a place
- 2. dry area on the leeward side of a mountain
- 3. condition of the troposphere at a particular time and place
- 4. constant movement of ocean wave



The Atmosphere

Fill in the blanks.

altitude	precipitation
body of water	temperature
latitude	warm
ocean currents	

The type of weather that exists in a place over the long term is its climate. The two most important variables that determine climate are _____ and _____. It is possible to predict the climate of an area if you know its _____.

Areas near the equator have _____ climates and the highest temperatures. They also have heavy precipitation during at least part of the year. Areas between 23.5° and 66.5° latitudes (whether north or south) have temperate climates. Other factors that affect climate are distance from a(n) _____, _____, and _____. All of these factors can give you a general idea of the climate of an area.

Our Dynamic Earth

Choose the letter of the best answer.

- Which is a geological feature on Earth's surface?
 - tsunami
 - volcano
 - mantle
 - hot spot
- The crust and the top part of the mantle make up the
 - atmosphere.
 - hydrosphere.
 - asthenosphere.
 - lithosphere.
- Earth's surface layer is the
 - mantle.
 - crust.
 - biosphere.
 - asthenosphere.
- What layer of Earth's interior lies just below the crust?
 - mantle
 - inner core
 - lithosphere
 - outer core
- The plate tectonics model states that Earth's crust is composed of
 - one solid piece of rock.
 - both liquid and frozen water.
 - huge plates of solid rock that fit together.
 - hot, melted rock.
- What is a fault?
 - energy that an earthquake produces
 - the opening in a volcano
 - a large crack in Earth's crust
 - the boundary between two plates
- Huge slabs of rock moving suddenly against each other in the Earth's crust create
 - earthquakes.
 - abyssal plains.
 - volcanos.
 - a trench stretch.

- 8.** A volcano is
- an opening in Earth's crust through which magma flows.
 - any mountain near a plate boundary.
 - a group of hot spot faults
 - movement at a fault.
- 9.** Almost all weather occurs in the
- stratosphere.
 - asthenosphere.
 - troposphere.
 - lithosphere.
- 10.** The dry area on the leeward side of a mountain is called
- the windward side.
 - a rain shadow.
 - the attitude.
 - a land breeze.
- 11.** What is the term used for melted rock that reaches the Earth's surface?
- lava
 - mantle
 - magma
 - boundary rock
- 12.** This device is used to detect and measure earthquake waves.
- wavometer
 - richtometer
 - barometer
 - seismometer
- 13.** The average weather in a place is called the
- climate.
 - atmosphere.
 - temperature.
 - magnitude.
- 14.** Underwater earthquakes of a great magnitude can create
- continental divides.
 - trenches.
 - tsunamis.
 - aquatic drift.
- 15.** The measure of the weight of air pressing down on an area is called
- air pressure.
 - temperature.
 - precipitation.
 - rain shadow.

Understanding Earthquakes

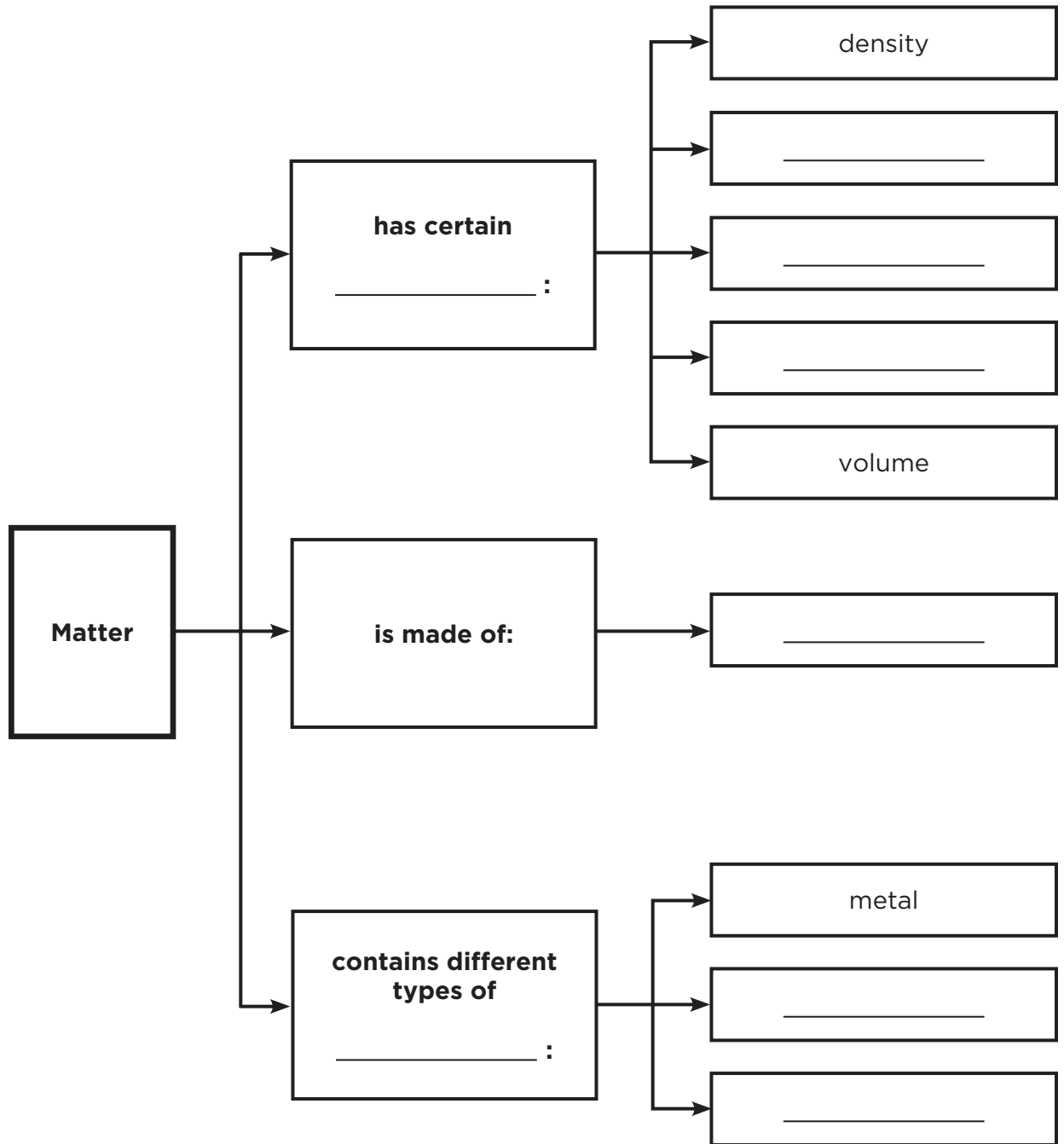
Read the Literature feature in your textbook.



Write About It

Response to Literature This article describes the study of earthquakes over the centuries. It explains how human knowledge about earthquakes has changed. Research a major earthquake that occurred in the past. Then write an essay describing the earthquake and its effects on people’s lives.

Properties of Matter



Copyright © Macmillan/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Matter

Use your textbook to help you fill in the blanks.

What is matter made of?

1. A substance that cannot be broken down chemically into simpler substances is a(n) _____ .
2. Water can be broken down into _____ and _____ .
3. Most elements are solid, some are gases, and a few are _____ at room temperature.
4. Today we know that a(n) _____ is the smallest unit of an element that has that element's properties.

What are atoms and molecules made of?

5. The center of an atom is its _____ .
6. Because an atom has the same number of _____ and electrons, the atom has no overall charge.
7. An atom's nucleus contains particles called protons that have a positive charge and particles called _____ that have no charge.
8. Negatively charged particles called _____ move around the nucleus.
9. The number of protons in an atom is that atom's _____ .

10. An atom's protons and neutrons have about the same mass.

Electrons are _____ and have about 1,800 times less mass than protons and neutrons.

11. The mass of all particles of an atom added together is its _____ .

12. Two or more atoms joined into a single particle form a(n) _____ .

13. Molecules have properties that are different than the _____ that form them.

How are elements grouped?

14. Dmitri Mendeleev created the _____ of elements.

15. The table's columns group elements according to their _____ .

How do we examine elements?

16. A single _____ atom is only 0.0000000001 meters across.

17. Some microscopes use _____ instead of light particles to examine a sample.

Critical Thinking

18. What is matter made of?

Matter

Read each clue. Write the answer in the blanks using the words below.

atom	element	molecule	nucleus
electron	mass	neutron	proton

1. The smallest unit of an element that retains that element's properties is a(n) _____ .
2. The particle in an atom that has a negative charge is a(n) _____ .
3. A substance that chemical reactions cannot break down into something simpler is a(n) _____ .
4. When you add up all the particles in an atom you can find its atomic _____ .
5. Two or more atoms that are joined into one particle are a(n) _____ .
6. In the nucleus of an atom, a particle that has no electrical charge is a(n) _____ .
7. The center of an atom is its _____ .
8. In the nucleus of an atom, a particle that has a positive electrical charge is a(n) _____ .

Matter

Fill in the blanks.

atoms	elements	nucleus	properties
electrons	neutrons	periodic table	temperature

Every substance on Earth is made of one or more _____ . Dmitri Mendeleev created the _____ in the 1860s. It groups elements according to their _____ . One important property of an element is its state at room _____ . Another is the way that it combines or mixes chemically with other elements.

Each element is composed of tiny particles called _____ , the smallest units that retain the element's properties. All atoms have the same parts. The center of an atom is its _____ . The nucleus contains protons and _____ . Atoms also contain _____ , which move around the nucleus. Protons and neutrons have a much larger mass than electrons do.

Meet Adriana Aquino

Read the Reading in Science feature in your textbook.

Main Idea and Details

Use the graphic organizer to list the main idea and the details of the article.

Main Idea	Details



Write About It

Main ideas and Details

- 1.** Tell how fish that live in Arctic and Antarctic oceans are able to keep from freezing.
- 2.** Explain what would happen if one of these fishes did not have this adaptation to the cold water.
- 3.** Research and explain other adaptations that allow fishes in cold environments to survive.

Planning and Organizing

Write a brief description of Adriana Aquino’s job. What does she do while performing this job?

Write a brief summary of the animal adaptation that is discussed in this article.

Drafting

Now explain why fish in Arctic and Antarctic oceans do not freeze. Then explain what would happen if these adaptations were not present.

Physical Properties

Use your textbook to help you fill in the blanks.

What are physical properties?

1. Color is an example of a(n) _____ because color can be observed without changing the identity of the substance.
2. The amount of matter in an object is its _____ .
3. A measure of how strongly gravity pulls on an object is the object's _____ .
4. The greater the _____ of an object, the greater its weight.
5. Weight is measured in _____ .
6. The amount of space an object takes up is its _____ .
7. To measure liquid volume in _____ , scientists use tools such as beakers or graduated cylinders.
8. The volume of solids is measured in _____ .
9. Anything that has mass and volume is _____ .

What is density?

10. The amount of mass for each milliliter of a substance is that substance's _____ .
11. To calculate density, divide an object's _____ by its _____ .

- 12.** If an object covers a large enough area of the water's surface, it can float on the water because of the _____ of water particles.

What are metals, nonmetals, and metalloids like?

- 13.** Most _____ are shiny, malleable, ductile, and good _____ .
- 14.** _____ conduct electricity better than _____ but not as well as metals, so they are called _____ .

How are atoms arranged in different states of matter?

- 15.** Matter can exist as a solid, a(n) _____ , or a gas.
- 16.** A liquid has a definite _____ , but it takes the shape of the container holding it.
- 17.** A gas does not have a definite volume or a definite _____ .

Critical Thinking

- 18.** How can matter be described?

Physical Properties

Fill in the crossword puzzle from the clues below.

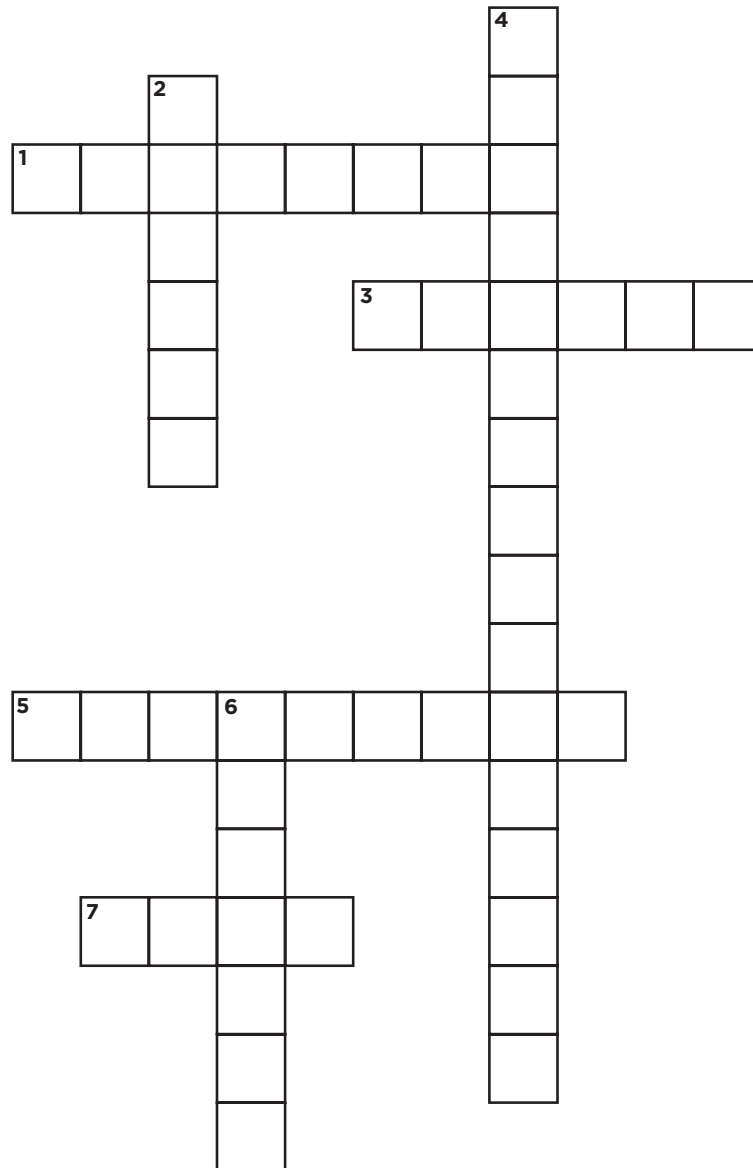
buoyancy	density	physical property	weight
conductor	mass	volume	

Across

- an object's resistance to sinking
- how strongly gravity pulls on an object
- something that allows heat and electricity to flow easily
- the amount of matter in an object

Down

- the amount of space that matter takes up
- can be observed without changing the identity of the object
- the amount of mass for each unit of volume of a substance



Physical Properties

Fill in the blanks.

buoyancy

float

properties

solid

constant

gas

push

volume

density

mass

sink

weight

We describe matter in a number of ways. Matter can exist as a(n) _____, a liquid, or a(n) _____. Scientists use these and other _____ to identify matter.

The amount of matter in an object is the object's _____, a property that is _____. However, the _____ of an object changes as the force of gravity changes. The amount of space that an object takes up is its _____. Scientists also measure the amount of matter for each milliliter of a substance, or its _____. An object's resistance to sinking is _____. When an object is placed on a fluid, the object and the fluid _____ against each other. If the fluid is denser, the object will _____. If the object is denser, the object will _____.

Changes of State

Use your textbook to help you fill in the blanks.

How can matter change state?

1. Altering the form or organization of an object without changing the type of matter within it is called a(n) _____ .
2. The three states of matter are _____ , liquid, and _____ .
3. The state of matter of an object is a(n) _____ property.
4. The average vibration of molecules in an object is measured by _____ .
5. When a solid gains heat energy, its molecules begin vibrating too quickly to stay together, so the solid becomes a(n) _____ .
6. When gases lose heat, they _____ into liquids.
7. A liquid loses heat and _____ into a solid.
8. When a solid changes directly into a gas, it _____ .
9. Most liquids become _____ when they change to a solid.

When does matter change state?

- 10. When a substance melts or boils, it absorbs _____ .
- 11. The temperature at which a substance changes from a solid to a liquid is its _____ .
- 12. The temperature at which a substance changes from a liquid to a gas is its _____ .
- 13. The temperature at which a substance changes from a liquid to a solid is its _____ .
- 14. Nonmetals are weakly attracted to one another, so they have _____ melting and boiling points.
- 15. The slow change from a liquid to a gas at temperatures below the boiling point is called _____ .

What are expansion and contraction?

- 16. An increase in an object's volume when it is heated is called _____ ; a decrease in its volume when it is cooled is called _____ .

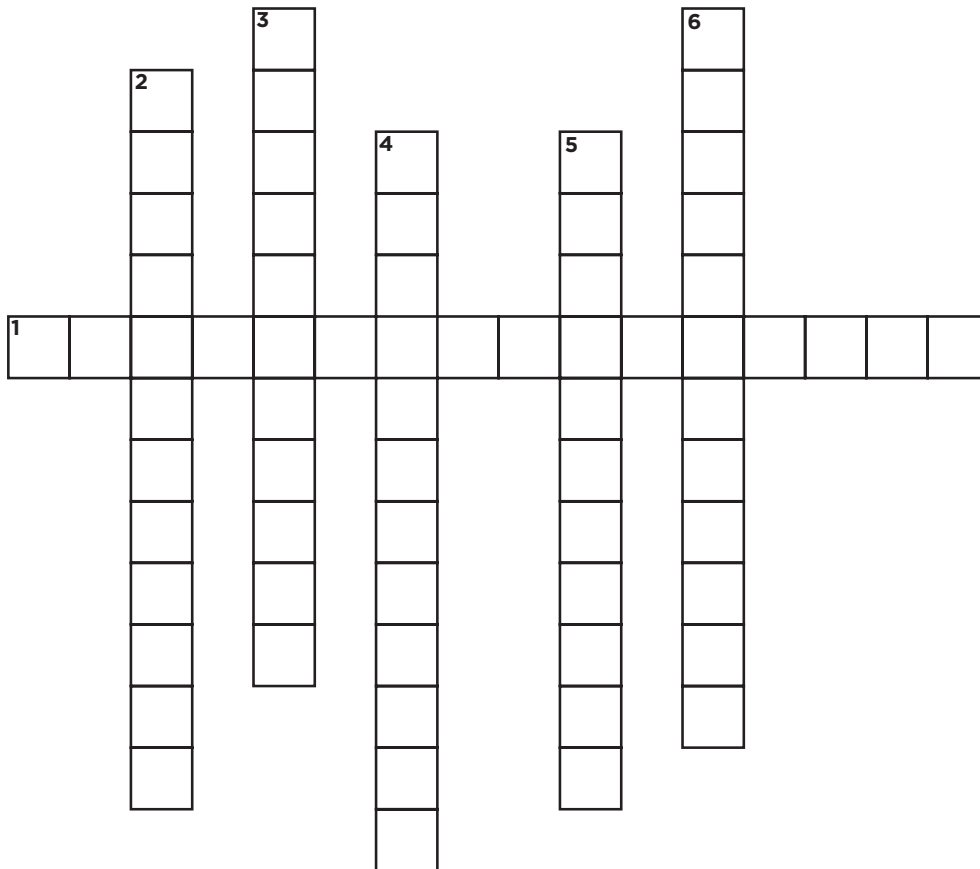
Critical Thinking

- 17. How does water change when heat is added or removed?

Changes of State

Choose words from the word box below to finish the crossword puzzle.

boiling point	evaporation	sublimation
condensation	melting point	thermal expansion



Across

1. an increase in an object's volume because of a change in temperature

Down

2. the changing of a gas into a liquid
3. a change from a solid to a gas

4. temperature at which a water changes from a liquid to a gas
5. a slow change from a liquid to a gas
6. the temperature at which water changes from a solid to a liquid

Changes of State

Fill in the blanks.

boiling point	heat	solid
freezing point	liquid	sublimation
gas	melting point	temperature

All substances have three common forms called physical states. These states are _____, liquid, and _____. The physical state of matter is changed when _____ is added or taken away. A measure of the average energy that a substance has (the average vibration of its molecules) is its _____. When a solid is heated to its _____, its molecules start moving faster, and the solid changes into a(n) _____. When the liquid is heated to its _____, its molecules move even faster, and the liquid turns into a gas. The melting point of water is 0°C, and its boiling point is 100°C. Sometimes a solid changes directly into a gas without passing through the liquid state, a process called _____. When a liquid is cooled to its _____, it becomes a solid. When a gas is cooled, it condenses and becomes a liquid.

Chemical Properties

Use your textbook to help you fill in the blanks.

What are chemical properties?

1. In addition to physical properties, substances have _____ that describe how a substance reacts with other substances.
2. The location of an element on the _____ can be used to determine the chemical properties of an element.
3. The soft and extremely reactive metals located in the far-left column of the periodic table are the _____.
4. The large group of elements that react _____ and are located in the middle of the periodic table are _____.
5. The _____ are nonmetals that do not react naturally with other elements.

What are acids and bases?

6. Litmus paper and red-cabbage juice are called _____ because they change colors when mixed with an acid or a base.
7. The _____ scale measures how acidic or basic something is.
8. An acid tastes _____ and has a low pH.
9. A base tastes _____ and has a high pH.

- 10.** The liquid in your stomach has a pH of about 2, so it is a(n) _____ .
- 11.** Ammonia has a pH of about 11, which means that it is a(n) _____ .

What are salts?

- 12.** When an acid and a base react with each other, they form a(n) _____ .
- 13.** When an acid and a base are mixed, a process called _____ produces water and a salt.
- 14.** A salt is any compound made of positive and negative _____ .
- 15.** Substances that form ions when placed in water are called _____ , and they conduct electricity.

Critical Thinking

- 16.** A solution has a pH of 5. How will the solution taste? What would it react with to form a salt?

Chemical Properties

Match the correct letter with the description.

- | | | |
|-----------------------------|------------------------|--------------------------|
| a. acid | d. corrosion | g. neutralization |
| b. base | e. flammability | |
| c. chemical property | f. indicator | |

- _____ describes the way a substance reacts to other substances
- _____ reaction that occurs when an acid and a base are mixed
- _____ chemical property of a substance that describes its ability to burn
- _____ substance with a low pH level
- _____ substance with a high pH level
- _____ substance that changes colors in the presence of acids and bases
- _____ metals combining with nonmetals

Chemical Properties

Fill in the blanks.

acid	chemical	periodic table	salt
alkali	indicator	pH scale	
base	noble gases	react	

Physical properties of elements include color, density, luster, and ability to conduct heat or electricity. An element's _____ properties describe how it reacts with other elements. Elements are grouped on the _____ according to similar physical and chemical properties. The elements that are most reactive are the _____ metals. The elements that do not react naturally with other elements are the _____.

Chemical properties of elements are determined by how they _____ with one another when they are chemically combined. A substance that changes color in the presence of an acid or a base is a(n) _____. The _____ measures the strengths of acids and bases. During a neutralization reaction, a(n) _____ and a(n) _____ combine to produce water and a(n) _____. Most salts dissolve easily in water.

Properties of Matter

Choose the letter of the best answer.

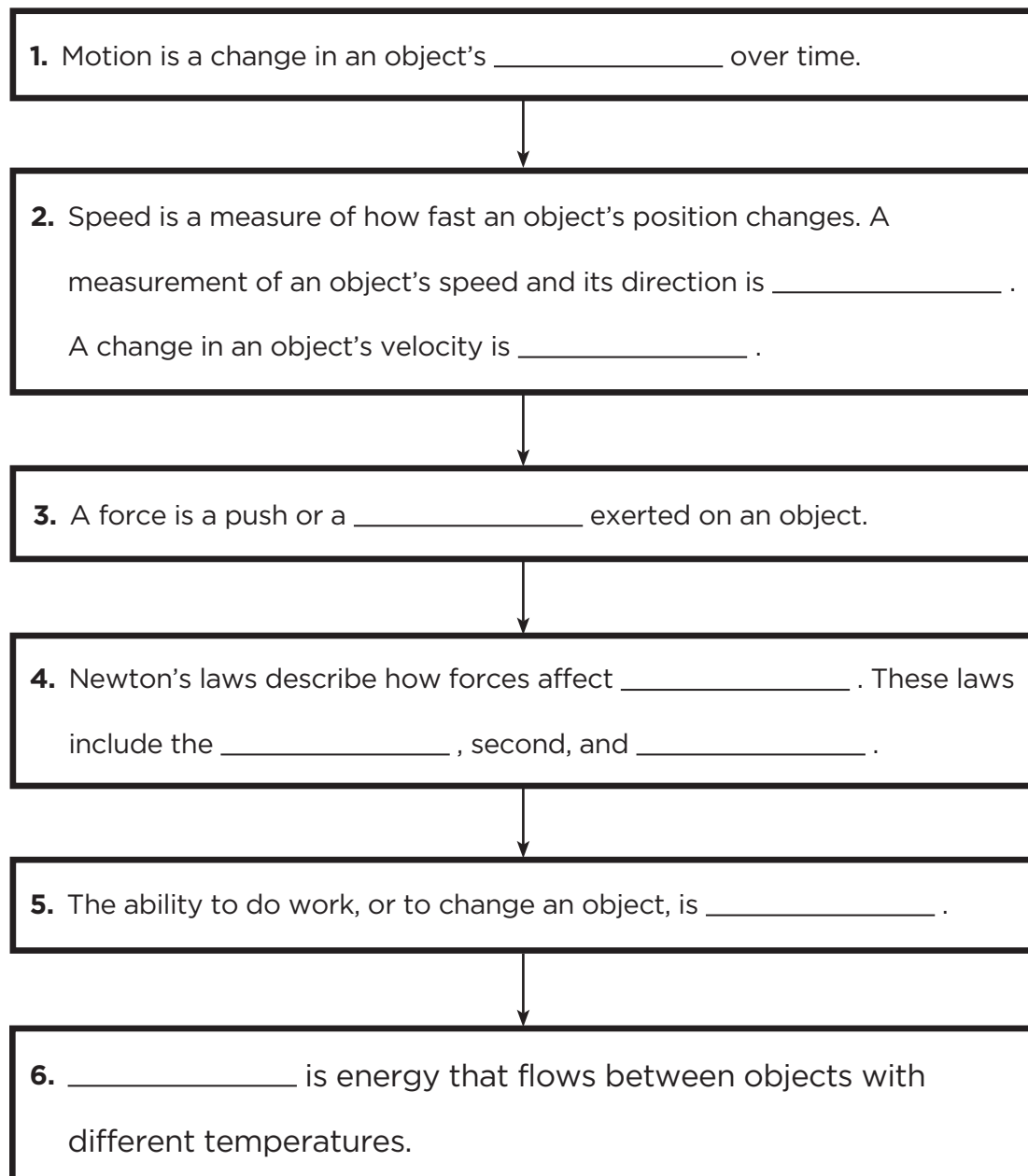
- A material that cannot be broken down into simpler chemical substances is a(n)
 - element.
 - metal.
 - chemical.
 - molecule.
- What is the smallest particle of an element?
 - molecule
 - proton
 - atom
 - metalloid
- The positively charged particles in an atom are called
 - neutrons.
 - electrons.
 - protons.
 - molecules.
- Which particles share the nucleus of an atom with the protons?
 - neutrons
 - protons
 - elements
 - electrons
- Which particles in an atom are negatively charged?
 - protons
 - neutrons
 - molecules
 - electrons
- Two or more atoms can join to form a(n)
 - element.
 - neutron.
 - molecule.
 - superatom.
- The amount of matter in an object is its
 - weight.
 - mass.
 - volume.
 - density.

Choose the letter of the best answer.

8. The strength of gravity on an object determines that object's
- mass.
 - volume.
 - weight.
 - electrical charge.
9. The amount of space being taken up by matter is known as its
- volume.
 - weight.
 - mass.
 - density.
10. When you add enough heat to a solid it will
- freeze.
 - melt.
 - condense.
 - float.
11. The amount of mass for each milliliter of a substance determines the substance's
- weight.
 - buoyancy.
 - density.
 - volume.
12. An object's resistance to sinking is called
- weight.
 - buoyancy.
 - volume.
 - surface tension.
13. The property that allows matter to be bent, flattened, or hammered without breaking is
- malleability.
 - surface tension.
 - ductility.
 - buoyancy.
14. What happens to a metal that is left exposed to the environment and combines chemically with a nonmetal?
- It shrinks.
 - It becomes a metalloid.
 - It corrodes.
 - It becomes a nonmetal.
15. One of the products of the reaction between an acid and a base is a
- neutralization.
 - pH scale.
 - salt.
 - solution.

Motion and Energy

Fill in the concept map below using the information you know about energy.





Motion

Use your textbook to help you fill in the blanks.

What is motion?

1. The location of an object is its _____ .
A change in the position of an object over time is motion.
Motion has two parts: _____ and _____ .
2. Distance can be measured in _____ , _____ , or _____ .
3. To measure direction, you can use a(n) _____ and units of _____ .
4. You need a(n) _____ from which to measure position or motion.

What is speed?

5. To calculate speed, divide the _____ by the _____ .
6. Units of speed can be _____ or _____ .
7. The calculated speed over an entire trip is _____ speed.
8. To state the velocity of an object, you need to know the object's _____ and its _____ .

What is acceleration?

- 9. Any change in the velocity of an object is a(n) _____ .
- 10. If the speed of a car traveling south is increasing 5 m/s, its acceleration is _____ .
- 11. An acceleration can be a change in speed or a change in _____ . Negative acceleration is called _____ .

What is momentum?

- 12. An object's mass multiplied by its velocity is its _____ .
- 13. An object with a mass of 1 kg and a velocity of 10 m/s has a momentum of _____ .
- 14. The more mass an object has, the _____ its inertia.

Critical Thinking

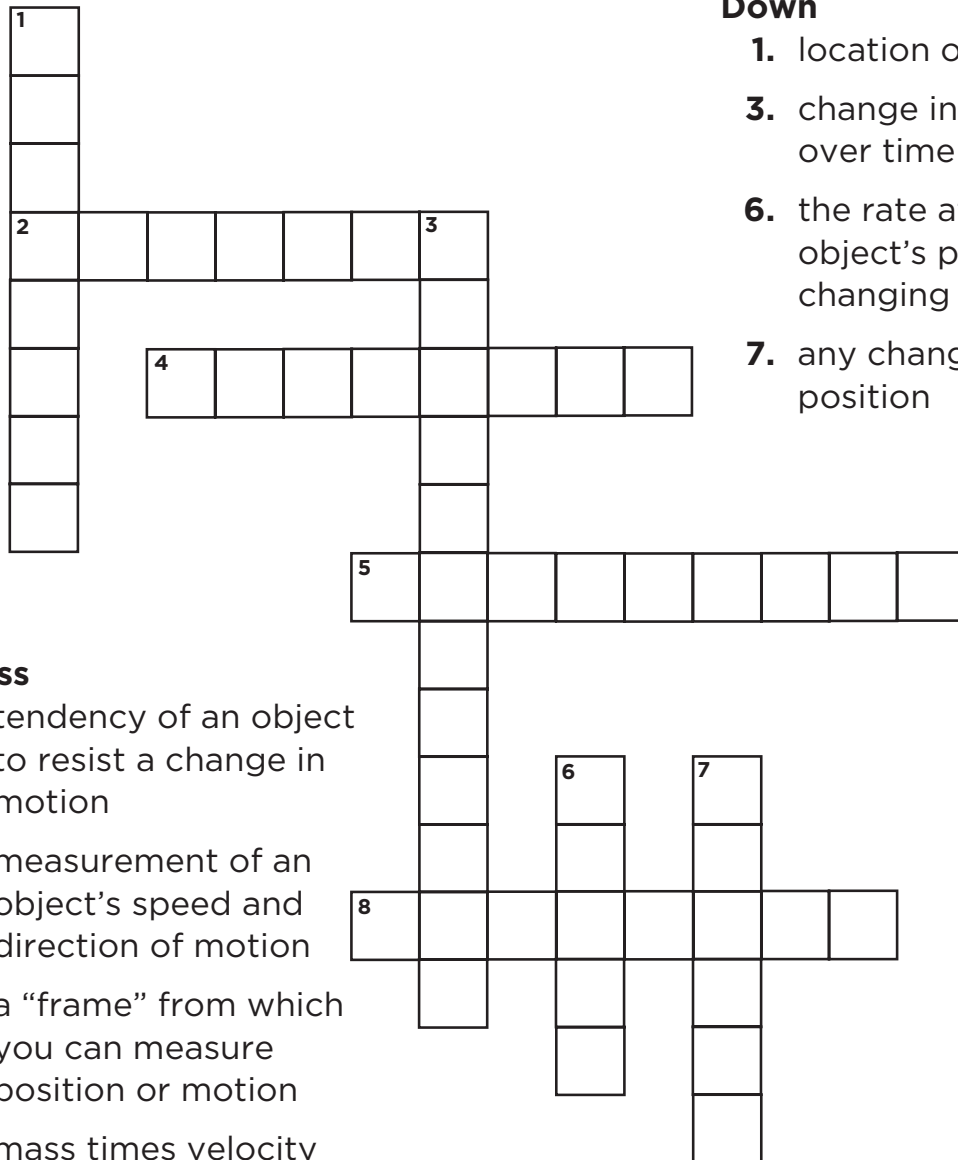
- 15. Would it be more difficult to stop a truck carrying a heavy load or stop the same truck empty? Explain your answer, using the concepts of inertia and momentum.

Copyright © Macmillan/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Motion

Use the words in the word box to finish the puzzle.

acceleration	momentum	position	speed
inertia	motion	reference	velocity



Down

- 1. location of an object
- 3. change in velocity over time
- 6. the rate at which an object's position is changing over time
- 7. any change in position

Across

- 2. tendency of an object to resist a change in motion
- 4. measurement of an object's speed and direction of motion
- 5. a "frame" from which you can measure position or motion
- 8. mass times velocity

Motion

Fill in the blanks.

acceleration

motion

time

momentum

speed

velocity

To describe how an object moves, you need a frame of reference, or a group of objects from which you can measure position. You can then measure the object's _____, or change in position. By dividing the distance an object moved by the _____ it took to move that distance, you describe an object's average _____. If you also measure the direction in which the object moved, you can describe its _____. If you know an object's speed at the beginning and end of a time interval, you can describe the object's _____ over that time interval.

An object's mass multiplied by its velocity is its _____. The greater an object's inertia or resistance to a change in its motion, the greater its momentum.

GLE 0507.Inq.5

The Positions of Earth and the Sun

Read the Reading in Science feature in your textbook.

Main Idea and Details

Use the table below to record the main idea and details described in the time line portion of the reading passage in your textbook.

Main Idea	Details
<p>Many throughout history have made discoveries that help us determine how the planets and stars move.</p>	<p>Aristotle developed a model showing the _____ around _____ .</p>
	<p>Ptolemy used Aristotle’s model and _____ to predict the way the Sun, the Moon, and the planets would appear in the _____ .</p>
	<p>_____ first proposed that the Sun is at the center of the solar system.</p>
	<p>Galileo’s discovery of _____ circling _____ supported Copernicus’s theory</p>
	<p>Einstein explained how _____ works, helping us understand the movement of planets and stars.</p>
	<p>_____ worked on the first 3-D map of the _____ .</p>



Write About It

Main Idea and Details

1. Think about the selection you just read. Look for the main topic or central idea of the selection.
2. Write the main idea of the selection and give one detail that supports the main idea.

Identifying the Main Idea

The main idea is the central point of the passage. It tells you what the passage is about. Review the graphic organizer to find the main idea of the passage. Write that idea on the lines below.

Identifying Supporting Details

Details are important parts of the passage that support the main idea. Look for the supporting details within the list of scientists that follows the opening paragraphs. Give one detail from the article that supports the main idea. You can choose one supporting detail from your table.

GLE 0507.12.1, 0507.12.2, 0507.12.3

Forces and Motion

Use your textbook to help you fill in the blanks.

What are forces?

1. Units of force are the _____ and the _____ .
2. An arrow can be used to represent the _____ and _____ of a force.
3. Forces are pushes, pulls, or _____ that may cause changes in motion.
4. The force that pulls any two objects together is called _____ .

What are friction and air resistance?

5. The amount of friction depends on two factors: the roughness of the _____ of the objects and how hard the objects are _____ together.
6. Although falling objects accelerate as they fall, the air hits them and slows them down. The _____ of an object influences the air resistance and drag force.

What is Newton's first law?

7. According to the law of inertia, an object at rest tends to _____ , and an object in motion tends to _____ , unless acted upon by an _____ .

What is Newton's second law?

8. According to Newton's second law, an object's acceleration increases as the amount of unbalanced force on it _____; an object's acceleration decreases as the object's mass _____.

What is Newton's third law?

9. When one object pushes on a second object, the second object pushes back on the first object with the same amount of _____.
10. According to Newton's third law, for every action there is a(n) _____ but _____ reaction.

Critical Thinking

11. Suppose that you are walking down the street. Describe the forces acting on you, and use Newton's laws of motion to describe your motion.

Forces and Motion

What am I?

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

- | | | |
|------------------------|--------------------|--------------------------|
| a. action force | d. friction | g. reaction force |
| b. balanced | e. gravity | h. unbalanced |
| c. force | f. inertia | |

- _____ I am the word that scientists use for a push or a pull. What am I?
- _____ I am the force that sometimes makes sliding difficult. What am I?
- _____ I am a force whose effect is offset by other forces, so I won't change your motion. What type of force am I?
- _____ I am a force whose effect is not offset, so I change your motion in some way. What type of force am I?
- _____ I am the first force in a pair. Whatever I push pushes back on whatever caused me. What am I?
- _____ I am the second force in a pair. If something gets pushed, I push back. What am I?
- _____ I am the tendency of an object in motion to stay in motion.
- _____ I am the force of attraction between two objects.

Forces and Motion

Fill in the blanks.

accelerate

force

gravity

mass

distance

gravitation

inertia

unbalanced

The motion of any object can be explained using the laws that Newton discovered more than 300 years ago. His universal law of _____ states that objects with more _____ have more force of _____ between them. Objects that are separated by more _____ have less force of gravity between them.

According to Newton's first law, also called the law of _____, an object at rest tends to stay at rest, and an object in motion tends to stay in motion, unless acted upon by a(n) _____ force. The second law can be summed up with the equation $F = ma$. This equation means that an object accelerates more as the size of the unbalanced _____ on it increases and that more massive objects _____ less for a given force. Newton's third law states that for every action force there is an equal and opposite reaction force.

GLE 0507.10.1

Energy

Use your textbook to help you fill in the blanks.

What is energy?

1. Work done on an object changes the amount of _____ that the object has.
2. Work is equal to the _____ used multiplied by the _____ over which the force was applied.
3. The units of work are _____ , or _____ .
4. Energy is measured in units called _____ .
5. A stretched spring has _____ energy.
6. Lifting a ball increases its _____ energy.
7. Chemical energy, elastic energy, and gravitational energy are different forms of _____ energy.

What is kinetic energy?

8. Heat, electricity, sound, and light are different forms of _____ energy.
9. The amount of kinetic energy an object has depends on the object's _____ .

How can energy change?

- 10. Energy cannot be _____ or _____ ; it can only _____ .
- 11. Whenever energy is used to do work, energy _____ .
- 12. Electricity does work in an oven by moving particles around and changing into _____ .

Critical Thinking

- 13. Trace the energy changes that occur in a toaster, in a radio, and in a windmill used to generate electricity.

Copyright © Macmillan/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Energy

Use the words in the word box to finish the puzzle.

chemical	joules	sound
conservation	kinetic	
elastic	potential	

Down

1. Energy that is stored in the position of an object is called

_____ energy.

2. Units of work are

_____.

3. The energy of a moving object is

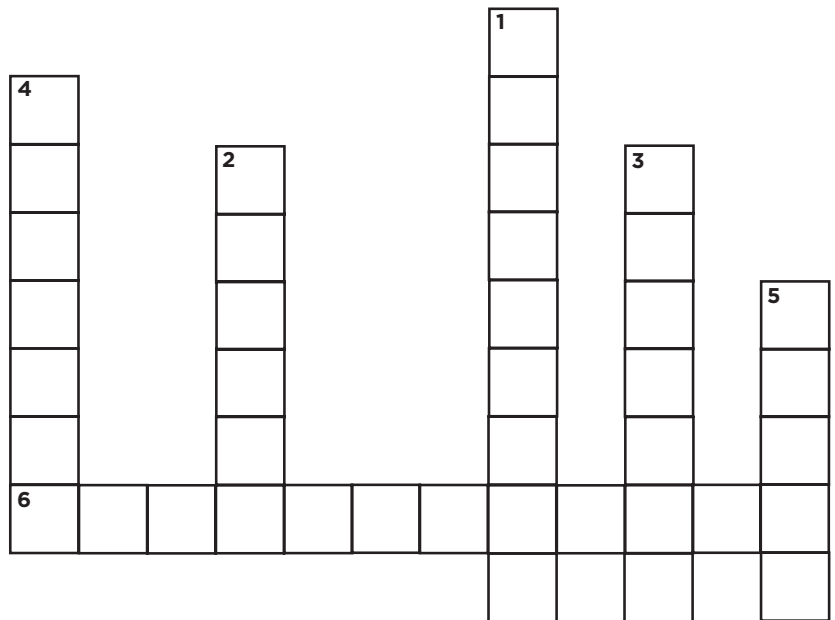
_____ energy.

4. The potential energy of a stretched object is called

_____ potential energy.

5. The kinetic energy of particles as they move in waves is

_____.



Across

6. The law of _____ of energy states that energy cannot be created or destroyed; it can only change form.

Energy

Fill in the blanks.

destroyed

friction

positive

sound

elastic

kinetic

potential

work

Work is defined as an unbalanced force acting on an object through a certain distance. Work will either add to or subtract from the energy of an object. The force of _____ usually takes kinetic energy from a moving object. Energy is defined as the ability to do _____, or to change an object.

If you lift a ball, you give it gravitational _____ energy. If you drop the ball, its potential energy is converted into _____ energy.

Different forms of potential energy include chemical, nuclear, magnetic, and _____ energy. Different forms of kinetic energy include heat, _____, and light.

The law of conservation of energy states that energy cannot be created or _____. Energy can only change forms.

Heat

Use your textbook to help you fill in the blanks.

What is heat?

1. Heat is thermal energy that moves from an object with a(n) _____ temperature to an object with a(n) _____ temperature.
2. Heat continues to flow from one object to another object until both have the same _____.
3. Heat is the _____ amount of thermal energy that an object releases.

How does heat travel?

4. Conduction can occur between objects that are _____.
5. As hot and cool portions of a liquid or gas move, _____ currents form.
6. The heat that you can feel radiating away from hot objects as electromagnetic rays is called _____ rays.

What is thermal conductivity?

7. Convection currents move heat more slowly than do _____ but more quickly than conduction.
8. Heat traveling by conduction moves at the speed at which molecules can _____ one another and change how fast nearby molecules are vibrating.

9. A material that conducts heat poorly is a good _____ .
10. Thermal conductivity increases as _____ increases, so _____ are the best conductors of heat and _____ are the worst conductors.
11. Objects with a low heat capacity change temperature _____ when heated and give off _____ heat as they cool.

When is heat waste?

12. Heat energy caused by friction is usually a waste product that results when energy _____ or _____ .

Critical Thinking

13. Describe how heat is used in a kitchen. What appliances produce heat, and how do they produce it? What objects are used as insulators, and what objects are used as conductors?

Heat

Who am I? What am I?

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

- | | |
|-----------------|----------------|
| a. conduction | d. heat |
| b. conductivity | e. radiation |
| c. convection | f. temperature |

1. _____ I can transfer heat through a vacuum because I am electromagnetic rays. Who am I?
2. _____ I flow from a warmer object to a cooler object until both objects are the same temperature. What am I?
3. _____ I move heat through a material from one atom or molecule to the next. Who am I?
4. _____ I move heat as a liquid or a gas rises and sinks. Who am I?
5. _____ I am a measurement of the average thermal energy of particles. What am I?
6. _____ I can tell you how easily heat moves through a material. What am I?

Heat

Fill in the blanks.

conduction

gases

temperature

convection

liquids

thermal conductors

faster

particles

thermal insulators

Heat is energy that flows from an object at a higher temperature to an object at a lower temperature. The measure of the average kinetic energy of particles is _____ . When a warmer object touches a cooler object, heat moves by _____ . The particles of the warmer object vibrate _____ . The two objects stay in place, but their _____ bump one another and energy passes from the warmer object to the cooler object.

Some materials, such as metals, are good _____ . Other materials, such as gases, are good _____ . Currents of matter spread heat through _____ and _____ , a process called _____ . The transfer of heat by electromagnetic rays is called radiation.

Motion and Energy

Choose the letter of the best answer.

- How fast an object's position is changing over time is the object's
 - velocity.
 - acceleration.
 - speed.
 - mass.
- Momentum is calculated by multiplying an object's mass by its
 - mass.
 - velocity.
 - work.
 - inertia.
- The force of gravity between two objects
 - increases with mass and decreases with distance.
 - increases with distance and decreases with mass.
 - decreases with mass and decreases with distance.
 - increases with mass and increases with distance.
- Friction between objects produces
 - gravity.
 - load.
 - inertia.
 - heat.
- Newton's second law of motion states that force is equal to mass times
 - speed.
 - energy.
 - velocity.
 - acceleration.
- Placing a dish on a higher shelf increases the dish's
 - inertia.
 - kinetic energy.
 - weight.
 - potential energy.

Choose the letter of the best answer.

7. Work is done when
- you push against a wall.
 - you lift a book.
 - you stand on the floor.
 - you hold a box.
8. Kinetic energy is
- the energy of gravity.
 - the energy of springs.
 - the energy of motion.
 - the energy of food.
9. The unit that is used to measure force is the
- meter.
 - kilogram.
 - Newton.
 - joule.
10. Heat flows from a
- warmer object to a cooler object.
 - warmer object to a very hot object.
 - cooler object to a warmer object.
 - cooler object to a very hot object.
11. The law of conservation of energy states that energy cannot be destroyed, it can only be
- changed
 - created
 - lost
 - gained
12. How does heat move through empty space?
- conduction
 - radiation
 - convection
 - It doesn't.
13. Friction usually
- speeds up a moving object.
 - increases with the smoothness of a surface.
 - changes kinetic energy into heat.
 - decreases as mass increases.

What is technology?

Use your textbook to help you fill in the blanks.

Ways People Move

1. _____ is more than just computers, space shuttles, and new inventions.
2. The technology of _____ includes everything from the horse-drawn wagon to the automobile.
3. Over time, technological advances paved the way for _____.
4. Many _____ came about because of the technology of the automobile.

Science and Technology

5. Science and technology _____ on each other.
6. The steam engine was invented at the beginning of the _____.
7. _____ knowledge helps us plan technological solutions.

Critical Thinking

Why should an inventor be concerned with using the right materials for his or her invention?

What is technology?

Match the correct letter with the description.

- | | |
|-------------------------|----------------------------------|
| a. technology | e. technological solution |
| b. mass transit | f. design |
| c. industry | g. Industrial Revolution |
| d. manufacturing | h. maglev |

1. A train that uses the technology of “magnetic levitation” is called a _____.
2. A business that makes goods or provides services is called an _____.
3. The way humans adapt nature to meet human needs and wants is called _____.
4. A system designed to transport large numbers of people is called _____.
5. A plan to show how something looks or functions is a _____.
6. Making products on a large scale is called _____.
7. The period of rapid development of factories and industries that began during the late 18th century is called the _____.
8. A problem that is solved by the use of technology is called a _____.

What is technology?

Fill in the blanks.

adapt	science	design	techniques
industries	technology	invention	

_____ has been around since the beginning of human culture. Generation after generation, people _____ and build new objects to make life easier. Technology is how humans _____ nature to meet their needs and wants.

With new technologies, come new _____ to support them. The _____ of the automobile created a need for companies that built, sold, and fixed cars. Companies were needed to refine oil and sell gasoline. As more highways were built, drivers needed more places to eat and sleep while traveling.

The principles of _____ are used to make the materials for new inventions. New technologies also help scientists and the public develop new _____ for doing things.

Right on Track!



Write About It

Use the Internet to identify what problems mass transit systems are designed to address. Write a plan to develop or improve a system near you. Find real-life examples to help you predict how much time, materials, and money it would take. Then draw a picture, or make a model.

Getting Ideas

Think of a mass transit system near you that needs improvement.

Mass Transit System
Problem: Town buses should be replaced with alternative fuel vehicles.
Research: Many cities replace traditional buses with hybrids
Solution Ideas: Raise money to buy hybrid buses

Planning and Organizing

Jessie writes some sample sentences for her essay. Here are some of the sentences that she wrote. Write Yes if the sentence describes a mass transit system that needs improvement. Write No if it does not.

- The current buses burn fossil fuels and pollute the air.

- The current buses run through the center of town every half hour. _____
- Hybrid buses would use half the gasoline of the current bus system. _____

Drafting

Write a sentence to begin your paragraph. Mention the mass transit system you will be addressing. Explain why you feel the system needs improvement.

Revising and Proofreading

Help Jessie improve her essay. Place the steps in the correct order.

1. _____ Switching to hybrid bus technology will be costly and will take several years for the town to afford.
2. _____ Mass transit systems that do not rely on fossil fuels include hybrid vehicles, and vehicles that run on biomass fuels.
3. _____ There are currently mass transit bus systems that run on hybrid technology.

Now revise and proofread your writing. Ask yourself:

- ▶ Did I write a plan to develop a mass transit system?
- ▶ Did I predict the time, materials, and money needed for the plan?
- ▶ Did I discuss the steps in the correct order?
- ▶ Did I correct all mistakes?
- ▶ Did I draw a picture or make a model?

The Design of Things

Use your textbook to help you fill in the blanks.

Improving Old Ideas

1. Today's passenger planes have built on the designs of the _____ from the early 1900s.
2. A designer or engineer develops a _____ solution to a problem.

The Design Process

3. Research helps designers identify a problem or a _____.
4. A _____ helps a designer turn an idea into a model.
5. A working _____ will help a designer identify design problems.

Engineers and Their Work

6. Engineers use science and _____ to design a product or process.
7. An aerospace engineer deals with _____ such as gravity and friction.

More Is Less?

Critical Thinking What does today's computer technology have to do with the 1947 invention of the transistor?

The Design of Things

Match the correct letter with the description.

- | | |
|-------------------|----------------|
| a. design process | e. designer |
| b. schematic | f. criteria |
| c. prototype | g. constraints |
| d. transistor | h. engineer |

1. Ways to evaluate the pros and cons of a design solution are called the _____.
2. A designer's detailed drawing of a solution is called a _____.
3. A person who uses math and science to turn ideas into products and processes is called an _____.
4. The steps that a person goes through to find the solution to a design problem is called the _____.
5. A working model of a design is called a _____.
6. A tool invented in the 1940s that conducts electricity faster than a vacuum tube is called a _____.
7. Someone who takes an idea and designs a detailed plan to make it is called a _____.
8. Obstacles that must be overcome to make a successful design are _____.

The Design of Things

Fill in the blanks.

constraints

engineers

prototype

solution

criteria

improvements

schematic

survey

Designers and _____ are people who come up with technological solutions. Many technological solutions are _____ to old designs. Airplane design has changed in the past 100 years. Today planes can fly farther and faster than ever before.

The design process starts when people have a problem that needs a _____. A _____ can help people identify trends or patterns. This will help the designer decide on a solution. Then the designer thinks of the _____, or obstacles that must be overcome.

The _____ is the part of the process that shows a detailed drawing of the plan. A _____ can then be built from the drawing. The working model can help a designer identify the _____ of the design.

Designing Safer Cars



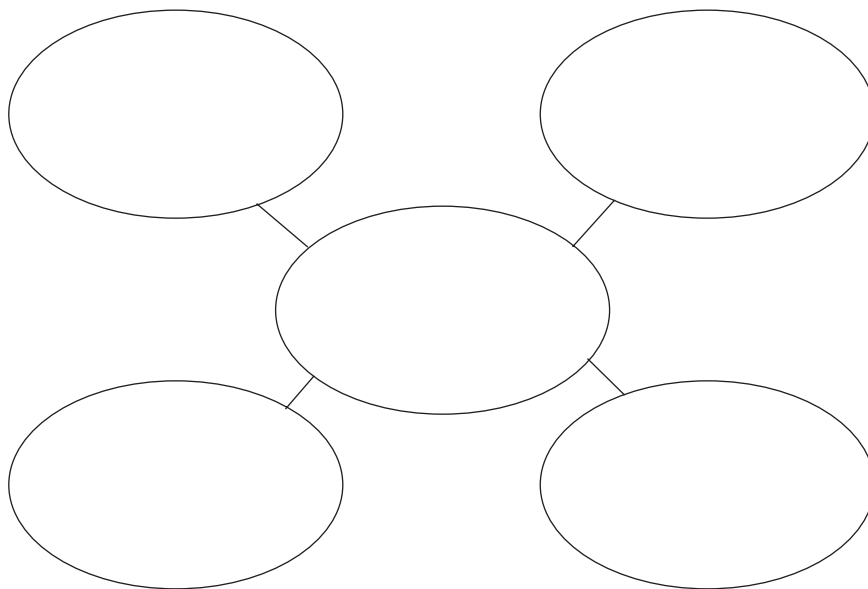
Write About It

Create a survey that asks drivers what problems they have.

Give it to people who drive and use their responses to come up with ideas to solve a specific need. Research the solutions to get an idea of possible constraints, such as time, money, and materials. Then draw a schematic of the best solution.

Getting Ideas

Think of problems that you have as a passenger in a car. Use some of these ideas to write your survey for drivers. Use a concept map like the one below to record your ideas.



Planning and Organizing

Carla chose to write a survey about the need for safer seat belts for children. Here are some sentences she wrote. Write **Yes** if the sentence relates to her chosen topic. Write **No** if it does not.

1. _____ Many seat belts are attached to the car too high to work well for children or shorter adults.
2. _____ Burning fossil fuels adds carbon dioxide to the atmosphere.
3. _____ A lower seat belt can improve safety for children.

Technology in Communications

Use your textbook to help you fill in the blanks.

1. Talking, writing letters, using gestures, and using the phone are all forms of _____.
2. _____ allowed people to communicate quickly over long distances.

Communication Systems

3. Examples of communication _____ are cell towers, traffic signals, and phones.
4. Wireless technology systems send signals through the air using _____.
5. The parts of a system are _____, process, output, and _____.

Picture That!

6. The history of photographic technology dates back to the _____.
7. Today's _____ cameras use electronic image sensors instead of film.

Critical Thinking How were the first moving pictures different from today's films?

Technology in Communications

Match the correct letter with the description.

- | | |
|-------------------------|--------------------|
| a. communication | e. input |
| b. system | f. process |
| c. fiber optics | g. output |
| d. Internet | h. feedback |

1. A newer kind of hardware that sends signals by light is called _____.
2. A huge system of computers and files shared by people all over the world is called the _____.
3. A group of separate parts that work together to do something is called a _____.
4. The exchange of ideas and information is called _____.
5. The information that is put into a system is called the _____.
6. The way information is sent through a technological system is called the _____.
7. The information that is received in a technological system is called the _____.
8. A return signal sent as a result of a system output is called _____.

Technology in Communications

Fill in the blanks.

cell	film	process	telegraph
digital	input	system	telephone

Communication is faster and easier today than it was long ago. Electricity allowed for the invention of many other technologies. The _____ machine used Morse code to send messages with electricity. Then the _____ allowed people to talk to people across the country. With improvements to technology, people can now talk on _____ phones using wireless technology.

A technological _____ is a group of separate parts that work together to do something. When sending a signal through a system, the _____ is the first stage. The way the message is transmitted is called the _____.

Photography and film has changed over the years also. For many years, cameras used light-sensitive _____ to capture images. Today, _____ photography allows us to see our images immediately.

What's on TV?



Write About It

Research more about the history of the television. Write a report using the details you find in your research. Then make a time line to identify how television has impacted society at various times.

Getting Ideas

Think about the most important events in TV history. Make a time line and then use the information to write your report. Record the information for your time line on a chart like the one below.

Time Line of Television History
1887: Thomas Edison invents motion picture camera.
1907: Cathode ray tube makes first TV images.
1936: First television broadcast made in London.
1946: Television networks begin in the United States.
1965: Color television is broadcast for first time.
1969: Moon landing shown live on TV.
2005: Flat screen TVs and HDTV become popular.

Planning and Organizing

Miguel writes some sample sentences for his report. Here are some of the sentences that he wrote. Write Yes if the sentence relates to the history of television. Write No if it does not.

- Millions of Americans witnessed the Moon landing live on television, and the experience brought the country together. _____
- People were amazed at the technology of television in the 1940s. _____
- In the future, television may be broadcast over the Internet.

Drafting

Write a sentence to begin your report. Tell what the topic of your report is.

Revising and Proofreading

Help Miguel improve his essay. Place the steps in the correct order.

1. _____ Color television was first broadcast on the NBC network.
2. _____ HDTV has greater resolution than tube televisions that came before them.
3. _____ The technology of television was made possible by the motion picture camera and the cathode ray tube.

Now revise and proofread your writing. Ask yourself:

- ▶ Did I list events in the history of television that have impacted society?
- ▶ Did I discuss the events in the correct order?
- ▶ Did I make a time line of the events in television history?
- ▶ Did I correct all mistakes?

Technology in Medicine

Use your textbook to help you fill in the blanks.

Modern Medicine

1. Long ago, pharmacists used plant parts to make _____.
2. Today, vaccines can keep people healthy. They use weakened _____ to help the body build a defense against a disease.

Modern Medical Techniques

3. Medical advances have helped people live _____ and healthier lives
4. Doctor's may use a camera called an _____ to look inside a patient's body.
5. Lasers are often used by doctors who perform _____.

Into the Twenty-First Century

6. Doctors use _____ to move robotic arms and hands which use surgical instruments.

Getting Down to Genes

7. Scientists use genetic engineering to control the characteristics of some _____.

Bio-basics for Solutions

8. One example of _____ is genetic engineering.

Critical Thinking What is a positive and a negative effect of using biological pesticides?

Technology in Medicine

Match the correct letter with the description.

- | | |
|----------------|------------------------|
| a. pharmacists | e. traits |
| b. vaccine | f. genetic engineering |
| c. laser | g. biotechnology |
| d. genetics | h. prosthesis |

1. A tool that focuses intense light waves that travel in a straight line is called a _____.
2. A weakened microorganism, or germ, put into a person's body is called a _____.
3. The use of living things to make products that improve the quality of life is called _____.
4. The study of how traits are passed in genes from one generation to the next is called _____.
5. People who prepare and give out medicine are called _____.
6. Characteristics of living things are called _____.
7. An artificial limb is called a _____.
8. Technology that allows scientists to work with genes to control characteristics is called _____.

Technology in Medicine

Fill in the blanks.

electricity	medicine	pharmacist	vaccine
electrocardiogram	pacemaker	sanitation	

Long ago, people used herbs and vegetables as a kind of _____ . Even in ancient times, people had their medicines made by a _____ . In the 1800s, diseases spread quickly because people lived in cities with poor _____ and crowded conditions. Then, the invention of the _____ allowed people to avoid getting some illnesses in the first place.

Today people live longer lives because of medical technology. An EKG, or _____ , is a machine that can sense problems with the heart. A _____ is a device that can be put in the body to send an electric pulse to make a person's heart contract, or beat. Many of today's most important technologies rely on _____ .

Spare Body Parts

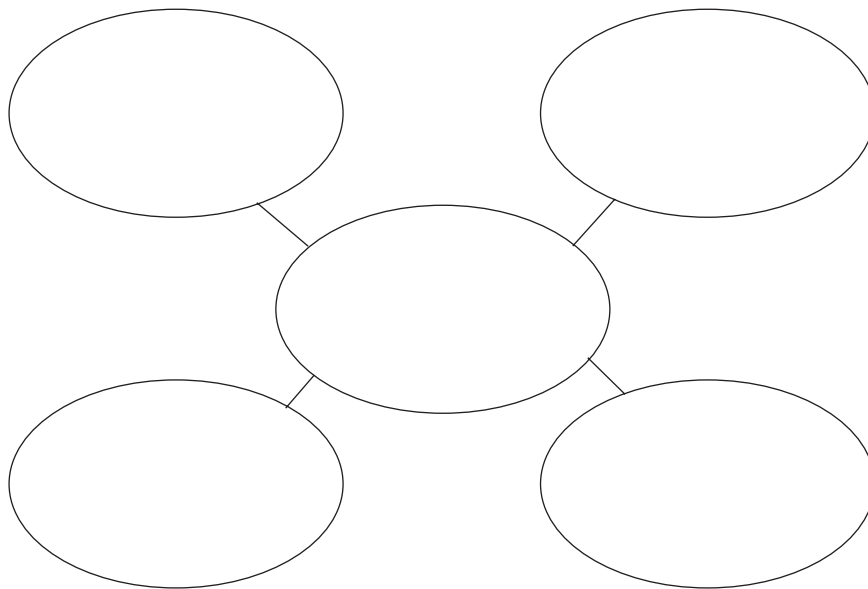


Write About It

Research some more information about prosthetic limbs. Write a report about how technology is improving the lives of people with prosthetics. Include specific examples, and detail what materials are being used.

Getting Ideas

Think of problems that you have as a passenger in a car. Use some of these ideas to write your survey for drivers. Use a concept map like the one below to record your ideas.



Planning and Organizing

Carla began her report about the technology behind new prosthetics. Here are some sentences she wrote. Write Yes if the sentence relates directly to her chosen topic. Write No if it does not.

1. _____ A microprocessor helps the newest prosthetic devices to function properly.
2. _____ It is important to consider how a new technology will affect people.
3. _____ Lightweight materials allow patients to do more than ever before with their prosthesis.

Exploring the Impact of Technology on Society

Use your textbook to help you fill in the blanks.

Using Technology Responsibly

1. Technology in our society has both a positive and negative _____.
2. Cars are a convenient technological travel solution. However, a trade-off is the traffic and _____ cars cause.
3. Governments help to set up ethics for technology by passing _____.

It's Not Easy!

4. People do not always agree on what is _____ when it comes to technological solutions.

Similar Systems, Different Technologies

5. In Ancient Rome, _____ were built to bring water to the city.
6. The idea of carrying water long distances to a city was used for modern-day _____.
7. Today, large _____ are used to bring water from reservoirs to cities for use.

Critical Thinking Use a two-column chart to list the similarities and differences between between the ancient Roman and modern New York systems for delivering water.

<p>Rome</p> <p>New York City</p>	
---	--

Exploring the Impact of Technology on Society

Match the correct letter with the description.

- | | |
|--------------|--------------|
| a. impact | e. risk |
| b. trade-off | f. benefit |
| c. ethics | g. tracking |
| d. aqueducts | h. reservoir |

1. Long channels that carried water from one place to another were called _____.
2. Something you have to give up to get what you want is called a _____.
3. Rules that people follow so that they behave responsibly are called _____.
4. A large area used as a water supply is a _____.
5. The effect something has on other things is called an _____.
6. The action of following the trail of someone or something is called _____.
7. Another word for a danger is a _____.
8. An advantage that we get from something is called a _____.

Exploring the Impact of Technology on Society

Fill in the blanks.

aqueducts

ethics

pollution

trade-off

decisions

negative

solution

tunnels

Technology improves the way we live. However, technology can also have a _____ impact on society. A _____ is something you have to give up to get what you want. For example, trash collection helps keeps our towns clean. It also adds _____ to landfills. When thinking of a technological _____, we must consider its impact on the way we live.

It is important to use _____ when using technology. Sometimes laws tell us how we can and cannot use technology. Other times, individuals and companies must make their own _____.

Some technological systems are built on older ideas. Think about the _____ that bring water from reservoirs in upstate New York to the city for use as drinking water. This idea is based on the _____ in Ancient Rome.

Tracking with Technology



Write About It

Do some research about satellites and how they work. How are they part of a system? What other uses do they have for society? What about their trade-offs? Write a compare and contrast report of your findings in which you evaluate the good and the bad. Do you think satellites are worth the trade-offs?

Getting Ideas

All technologies have some kind of trade-off. What are the positive and negative effects of satellites? Compare and contrast them in a chart like the one below.

Satellites

Positive Effects	Negative Effects
Help track endangered species.	Relaying information is complex.
Can broadcast communications around the world.	Expensive to build and launch.
Can keep people safe by observing weather patterns from space.	Difficult to repair in space.

Planning and Organizing

Evan began his report about the positive and negative effects of satellites. Here are some sentences he wrote. Write **Yes** if the sentence contains words and details that create a clear picture for the reader. Write **No** if it does not.

- _____ Satellites can have good and bad effects.
- _____ Satellites allow us to transmit messages and important information through space and around the world in an instant.
- _____ Satellites use a complex and expensive system to gather and broadcast information.

Drafting

Write a sentence to begin your report. Tell what your topic is. Explain that you will discuss the positive and negative effects of technology on society.

Now write your description. Use a separate sheet of paper. Begin with the sentence you wrote above. Tell what some of the impacts and trade-offs of satellites are. Include descriptive words and details to help the reader visualize what you are writing.

Revising and Proofreading

Here are three sentences that Evan wrote for his report. Help him improve them. Replace each *italic word* or words with a more descriptive word from the box. Write the word in the blank.

millions of	transmit	depend on
-------------	----------	-----------

1. _____ A satellite system is an expensive way to send information.
2. _____ Meteorologists use satellite technology every day.
3. _____ Many people use information gathered by satellites.

Now revise and proofread your writing. Ask yourself:

- ▶ Did I discuss the benefits and trade-offs of satellites?
- ▶ Did I use words that create a clear picture for the reader?
- ▶ Did I use descriptive words to discuss the topic?
- ▶ Did I correct all mistakes in grammar, spelling, punctuation, and capitalization?