WORKBOOK

PACEMAKER®

General Science

Third Edition

GLOBE FEARON

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GLOBE FEARON
Pearson Learning Group

Contents

Name _____ Date _____

1.1 From Atoms to Galaxies — Exercise 1

A. Match each term below with its definition. Write the correct letter on the line.

_____	**1.** universe	**a.** the study of nature and the universe
_____	**2.** galaxy	**b.** the careful study of something
_____	**3.** science	**c.** using books and doing experiments to study a subject
_____	**4.** observation	**d.** the smallest part of a substance that can still be recognized as that substance
_____	**5.** atom	**e.** all that exists
_____	**6.** research	**f.** a group of billions of stars

B. Read the following sentences. If the sentence is a process, write *yes* on the line. If it is not, write *no*.

_____ **7.** The Earth is round.

_____ **8.** Scientists learn about stars by using telescopes.

_____ **9.** A biologist takes notes on a plant's growth.

_____ **10.** An earth scientist weighs a piece of rock.

_____ **11.** Lava is from volcanoes.

_____ **12.** If you place a ball on a hill, it will roll down.

_____ **13.** A physical scientist places three balls at the top of a hill to see which ball will roll fastest.

_____ **14.** The ocean is full of salt water.

CRITICAL THINKING

Choose an example of a technology developed in the last ten years. Some examples are the Internet, digital TV, and cell phones. On a separate sheet of paper, describe how the new technology helps people.

Name _____ Date _____

1.2 Science at Work: Science as Solution — Exercise 2

A. Match each subject below with the kind of scientist who would study it. Write the correct letter on the line. Each scientist can be used twice.

_____ **1.** machines

_____ **2.** mountains

_____ **3.** behavior of geese

_____ **4.** mushrooms

_____ **5.** storms

_____ **6.** heat

a. life scientist

b. physical scientist

c. earth scientist

B. Group the scientists below according to their branch of science. Write the number that is next to each scientist's name in the correct box below.

Earth Science	Physical Science	Life Science

7. Thomas Edison invented the lightbulb and many other things.

8. Caroline Herschel made telescopes and studied stars.

9. J. Tuzo Wilson explained why the continents move.

10. Marie Curie discovered the element radium.

11. Jane Goodall studied the behavior of chimpanzees.

12. T. Theodore Fujita developed a scale for classifying tornadoes.

13. Charles Drew showed that blood plasma could be stored longer than whole blood and could be given to a person of any blood type.

CRITICAL THINKING

Explain how a science-related career could combine two or more branches of science. Write your answer on a separate sheet of paper.

Name _____ Date _____

1.2 Science at Work: Making the Right Choices — Exercise 3

A. The director of the National Science Foundation has a budget of about $4,000,000,000. Read the following descriptions of projects that different scientists wrote. Then decide which are the most worthwhile to receive money. Write the amount of money you will give to each project on the line next to its description. You do not have to give money to all the projects.

Budget

$_____ **1.** I would like to do a project that studies how farmers can grow wheat that is healthier for people to eat.

$_____ **2.** In this project, I will look into the possibilities of life in other parts of the universe.

$_____ **3.** My project will study why people are overweight today.

$_____ **4.** This study will show how newborn babies are affected by cigarette smoke.

$_____ **5.** I would like to study ways to make faster jets.

$_____ **6.** My project is looking for a cure for sleepwalking.

$_____ **7.** TOTAL BUDGET (should equal $4,000,000,000)

B. Explain why you divided the money the way you did. Which projects did you feel were the most important and why?

_____

_____

_____

_____

_____

_____

CRITICAL THINKING

What project would you like to add to this list and why? Write your answer on a separate sheet of paper.

Name _____ Date _____

2.1 The Scientific Method: The Five Steps — Exercise 4

A. On the lines below, number the five steps of the scientific method in their correct order.

_____ **1.** Perform experiments.

_____ **2.** Draw conclusions and report the results.

_____ **3.** Describe the problem.

_____ **4.** Suggest an answer.

_____ **5.** Gather information.

B. Scientists observe the world around them. Then they make an educated guess, or hypothesis, about what they see. Next, they run experiments to see if their hypothesis is correct. Below are three hypotheses. For each one, describe an experiment that would test it.

6. Danny has two lawn mowers. He thinks the red lawn mower cuts grass faster than the blue one.

Experiment: _____

_____

7. Maria thinks that taking the bus to school takes longer than walking to school.

Experiment: _____

_____

8. Dawn thinks planting grass on a hillside will stop soil from washing away.

Experiment: _____

_____

CRITICAL THINKING

List three different ways to report the results of an experiment. Write your answer on a separate sheet of paper.

Name _____ Date _____

2.1 The Scientific Method: Using the Five Steps — Exercise 5

You are doing a study that uses the scientific method. The problem is: *Do people learn better in rooms that have windows?*

1. **Gather information.** Talk with the members of your family. Ask: *Do you think you learn better in a room that has windows?* Write what they say below.

_____

_____

_____

2. **Suggest a good answer to the problem.** Decide on a hypothesis. Do windows make a difference in learning? Explain your answer.

_____

_____

_____

3. **Test the hypothesis by performing an experiment.** Discuss how you could design an experiment to test whether people learn better in rooms that have windows. On the lines below, describe how you would do your experiment.

_____

_____

_____

4. **Report the results.** Carry out the experiment in your classroom. Discuss your results with the class. Was your hypothesis correct?

_____

CRITICAL THINKING

Most experiments lead to the discovery of new problems. Based on the results of your experiment, what new problems might turn up that you could design an experiment for? Write your ideas on a separate sheet of paper.

Name _____ Date _____

2.2 Measuring in Science: Comparing Metric and Nonmetric Units

Exercise 6

A. Complete each sentence with the correct word or phrase. Use the table to help you.

Length	Volume	Weight
1 foot = 30.5 cm	1 quart = .95 liter	1 gram = .04 ounce
1 yard = .91 meter	1 gallon = 3.79 liters	1 kilogram = 2.2 pounds
1 kilometer = .62 mile		

1. A liter is a _____ than a quart.
(a) little less (b) lot less (c) little more

2. A gallon is _____ four liters.
(a) a little less than (b) a little more than (c) exactly the same as

3. A kilogram is about _____ as much as a pound.
(a) half (b) four times (c) two times

4. A meter is close to the same length as a _____.
(a) foot (b) yard (c) kilometer

B. To change the miles below into kilometers, multiply by 1.6. For example, 8 miles is 12.8 kilometers ($8 \times 1.6 = 12.8$).

5. We have 10 miles left to go. _____ kilometers

6. It is 6 miles from here to Orlando. _____ kilometers

7. A marathon race is about 26 miles long. _____ kilometers

8. The United States is about 3,000 miles across. _____ kilometers

CRITICAL THINKING

Many people in the United States are not familiar with the metric units of measurement. What could you do to become more familiar with metrics? Write your answer on a separate sheet of paper.

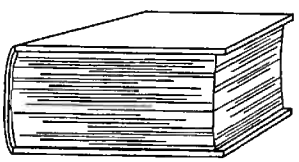
Name _____ Date _____

2.2 Measuring in Science: Changing Values Using Metrics — Exercise 7

A. Below are pictures of items that measure the amounts given. Change each measurement to an equivalent metric unit. Use the table to help you.

Length	Mass	Volume
1 millimeter = $\frac{1}{1,000}$ m	1 milligram = $\frac{1}{1,000}$ gram	1 milliliter = $\frac{1}{1,000}$ liter
1 centimeter = $\frac{1}{100}$ meter	1 kilogram = 1,000 grams	
1 kilometer = 1,000 meters		

1.

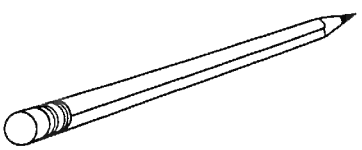


2 kilograms = _____ grams

2.

1,500 milliliters = _____ liters

3.



17 centimeters = _____ millimeters

4.

2.5 kilometers = _____ meters

B. Some metric units are much larger than others. For example, a meter is 1,000 times larger than a millimeter. Think about which metric unit would be best for measuring each item below. Write the names of the metric units on the lines.

5. mass of a person _____

6. length of a football field _____

7. volume of a glass of milk _____

CRITICAL THINKING

On a separate sheet of paper, describe or draw four items and their metric measurements. Choose one item each for length, area, volume, and mass. Do not use the items shown above.

Name _____ Date _____

2.3 Laboratory Science — Exercise 8

Consider a career as a scientist who runs a lab. Then answer the questions below.

1. In what field of science would you like to work? Circle one.

life physical earth

2. What do you want to study in that field? Be as specific as possible.

_____

_____

3. How will the topic you picked to study help people?

_____

_____

4. Describe the laboratory you would use. Explain where it is and what kinds of things are in it.

_____

_____

_____

_____

5. If you needed someone to help you in your research, what kind of person would you hire? Write three questions that you would ask a person who is interested in the job.

_____

_____

_____

CRITICAL THINKING

On a separate sheet of paper, list three safety rules from page 26 of your textbook. After each rule, write why you think it is important to follow that rule.

Name _____ Date _____

3.1 A Home for Life: Earth's Position — Exercise 9

A. If the Earth moved a little *closer* to the sun, what would happen to each thing listed below?

1. The ice caps at the North Pole and the South Pole would _____
2. The oceans would _____
3. Leaves and plants would _____
4. The soil would _____

B. If the Earth moved a little *farther away* from the sun, what would happen to each thing listed below?

5. The lakes would _____
6. The ice caps would _____
7. Leaves and plants would _____
8. Animals would _____

CRITICAL THINKING

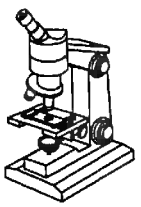
Science fiction deals with the possible effects of science on the world sometime in the future. The stories are made up, though they are based on ideas from science. Write a brief science fiction story about being on Earth during a warming or cooling period. Describe the world and what you see and do in it. What does this different Earth look, sound, smell, and feel like? Write your story on a separate sheet of paper.

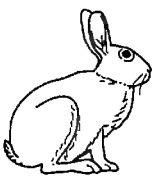
Name _____ Date _____

3.1 A Home for Life: Dividing Up Life Science — Exercise 10

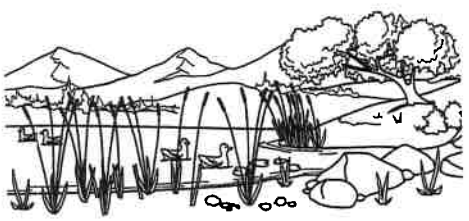
A. Write the name of the science field that fits each picture below. Choose terms from the box.

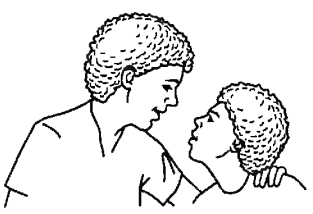
botany	zoology	genetics	microbiology	ecology





1. _____ **2.** _____ **3.** _____





4. _____ **5.** _____

B. Match each kind of scientist below with a field of study. Write the correct letter on the line.

_____ **6.** botanist

_____ **7.** ecologist

_____ **8.** zoologist

_____ **9.** geneticist

_____ **10.** microbiologist

a. studies animals

b. studies organisms too small to be seen with the eye alone

c. studies plants

d. studies how features of organisms are passed along to offspring

e. studies interactions between organisms and their environment

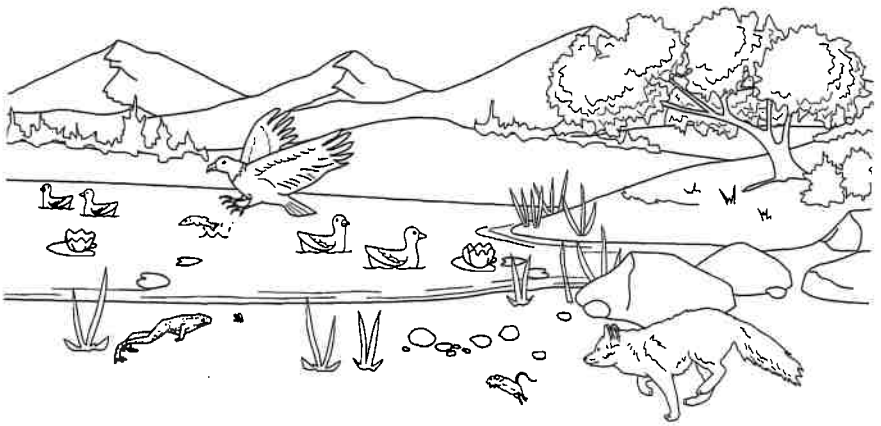
CRITICAL THINKING

What are two different fields of life science? For each one, write what might be studied, where it would be studied, and what tools would be used. Write your answer on a separate sheet of paper.

Name _____ Date _____

3.2 What Is Life? Characteristics of Life — Exercise 11

Use the picture below and information from your textbook to answer the questions about the characteristics of life. Name two organisms for each question. Choose terms from the box.



fox
frog
duck
insect
waterlilies
trees
fish
eagle
bushes
mouse

1. Which animals are moving away from danger?

_____

2. Which animals are moving to get food?

_____

3. Which plants have the easiest time getting sunlight?

_____

4. Which animals walk?

_____

5. Which animals fly?

_____

6. Which animals swim?

_____

CRITICAL THINKING

Which of the above questions could apply to you? Write a brief paragraph that explains your answer. Use a separate sheet of paper.

Name _____ Date _____

3.2 What Is Life? Charting Life's Characteristics — Exercise 12

Use the table to answer the questions below.

1. For each living or nonliving thing listed in the table, answer the questions across the top of the table. Write *yes* or *no* in each box for your answers.

Living or nonliving thing	Gets and uses food?	Moves?	Grows?	Reproduces?	Responds to environment?	Is it alive?
housefly						
grass						
rock						
pine tree						
computer						
crab						
shrub						
squirrel						
glass						

2. Which things are organisms?

_____

_____

3. Name one thing that is *not* an organism. Explain why it is not.

_____

_____

CRITICAL THINKING

Choose an organism that is not on the chart. Explain how it has all five characteristics of life. Write your answer on a separate sheet of paper.

Name _____ Date _____

4.1 The Basic Units of Life — Exercise 13

A. Match each term below with its definition. Write the correct letter on the line.

_____ **1.** chemical bond

_____ **2.** cell

_____ **3.** molecule

_____ **4.** element

a. the smallest, most basic unit of life

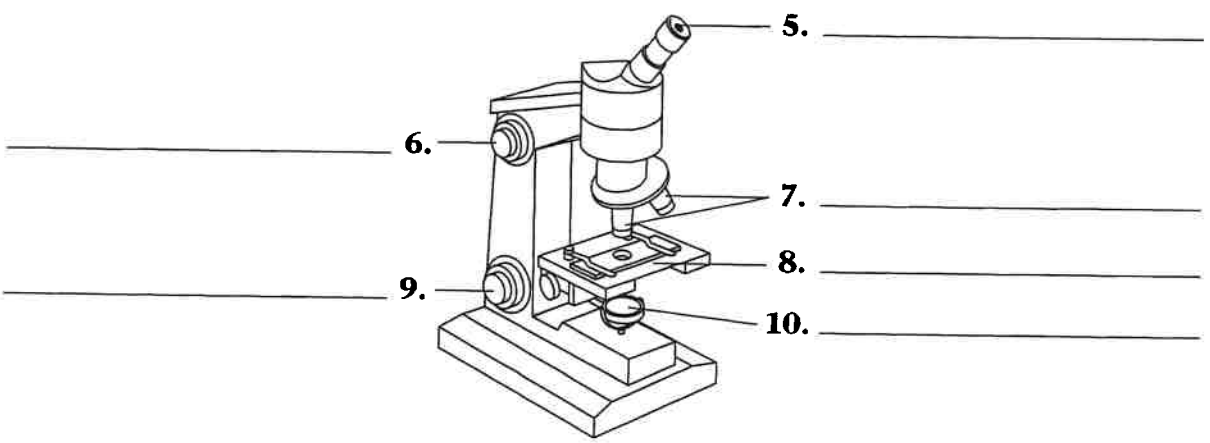
b. matter that is made of only one kind of atom

c. a force that holds atoms together

d. two or more atoms that are joined by chemical bonds

B. Label the parts of the microscope using the terms from the box.

eyepiece	stage	coarse adjustment knob
objectives	mirror	fine adjustment knob



CRITICAL THINKING

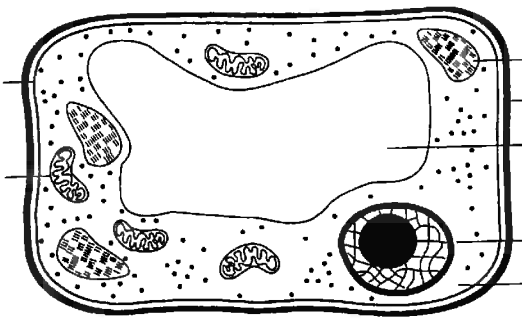
If you were looking for signs of life on another planet, what elements would you look for? Explain your answer on a separate sheet of paper.

Name _____ Date _____

4.2 Understanding Cells: Parts of Cells — Exercise 14

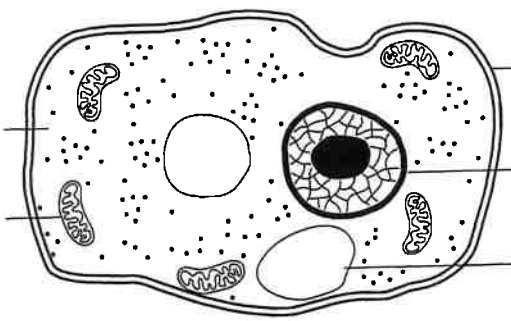
Label the cells using the terms from the box. Some terms can be used more than once.

vacuole	cell membrane	cytoplasm	chloroplast
mitochondrion	cell wall	nucleus	



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

Plant Cell



8. _____
9. _____
10. _____
11. _____
12. _____

Animal Cell

13. What is one activity plants do that animals do not? What cell part do they use to do that?

_____

CRITICAL THINKING

What might cause a cell to become larger or smaller in size? Write your answer on a separate sheet of paper.

Name _____ Date _____

4.2 Understanding Cells: Comparing Plant and Animal Cells

Exercise 15

Write check marks in the correct box in the chart below to show whether the cell part is found in an animal cell, a plant cell, or both. Then describe the job each part does.

Cell part	Animal cell	Plant cell	Job
1. Cell membrane			
2. Nucleus			
3. Chlorophyll			
4. Cytoplasm			
5. Mitochondria			
6. Vacuoles			
7. Chloroplasts			
8. Cell wall			

CRITICAL THINKING

On a separate sheet of paper, explain what the following equation means.

FOOD MOLECULE + OXYGEN = ENERGY + WATER + CARBON DIOXIDE

Name _____ Date _____

4.2 Understanding Cells: DNA — Exercise 16

Write *true* or *false* on the lines below each sentence. If the sentence is false, rewrite it to make it true.

1. DNA molecules are smaller than most other molecules found in cells.

_____

_____

2. Watson and Crick described the structure of a DNA molecule.

_____

_____

3. A DNA molecule contains a code that controls the activities of a cell.

_____

_____

4. The vacuole in a cell contains DNA.

_____

_____

5. Thousands of cells make up a DNA molecule.

_____

_____

6. A DNA molecule has the shape of a ball.

_____

_____

CRITICAL THINKING

Make a list of at least ten human characteristics that you think are controlled completely or partly by a person's DNA. Name two characteristics that you think are not controlled by DNA. Write your lists on a separate sheet of paper.

Name _____ Date _____

5.1 Classifying Organisms: Species — Exercise 17

You have been sent to another planet to explore. You find a living creature. You must send a message back to Earth describing what you have found. After studying the creature, you find the following to be true:

> **It is many-celled. It has chloroplasts in its cells. Its cells do not have walls. It can move around on its own. It has no true nuclei in its cells.**

1. Write a message to send back to Earth saying what kingdom of life, if any, the creature belongs to. If you need help, look at the chart on page 65 of your textbook. Explain your answer.

2. You are asked to send a drawing of the creature back to Earth. Draw a picture of the creature below. Label its body parts.

3. Since you discovered the new creature, you get to name it. Create a name for the new creature. Explain why you chose this name.

CRITICAL THINKING

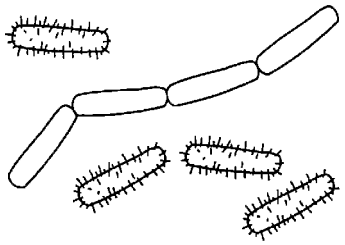
Pet dogs come in a wide range of sizes and shapes. They are all able to reproduce with each other. Do they all belong to the same species? Explain why or why not. Write your answer on a separate sheet of paper.

Name _____ Date _____

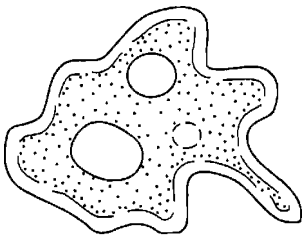
5.1 Classifying Organisms: The Kingdoms of Life

Exercise 18

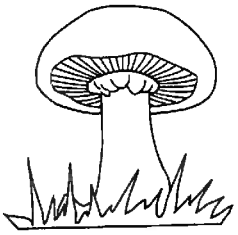
A. Look at the pictures below. Write the name of the kingdom in which each organism belongs.



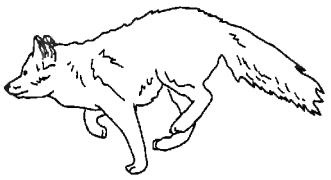
1. _____



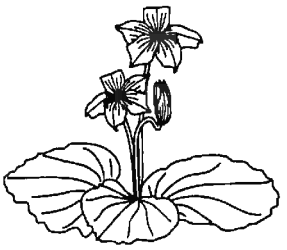
2. _____



3. _____



4. _____



5. _____

B. Answer the following questions on the lines below. If you need help, look at the chart on page 65 of your textbook.

6. Why is a mushroom not considered a plant?

_____

7. How are bacteria different from protozoa?

_____

8. Why can human bodies not make their own food using sunlight?

_____

CRITICAL THINKING

Why would grouping organisms into kingdoms based on size not be a good idea? Write your answer on a separate sheet of paper.

Name _____ Date _____

5.2 Earth's Simplest Organisms: Identifying Simple Organisms — Exercise 19

A. Decide what type of organism each set of statements describes. Write *bacterium, alga, protozoan,* or *fungus* on the line. Some terms can be used more than once.

1. I am a one-celled organism with a nucleus. I can make my own food. _____
2. I break down dead matter to get my food. My cells have nuclei and cell walls. _____
3. I am a one-celled organism. I do not have a nucleus. _____
4. I am a one-celled organism with a nucleus. I am animal-like. _____
5. I am a one-celled organism and absorb my food. I have a nucleus. _____
6. I am a plantlike organism and live in the ocean. I can make my own food. _____

B. Replace the underlined term to make the sentence true. Write the correct term on the line.

7. The DNA of bacteria is found in the nucleus. _____
8. Algae and protozoa are two types of fungi. _____
9. Molds belong in the Plant Kingdom. _____
10. Mushrooms cannot make their own food because they do not have cell walls. _____

CRITICAL THINKING

Suppose you discovered a one-celled organism. How would you decide if it was a bacterium, a protist, or a fungus? Write your answer on a separate sheet of paper.

Name _____ Date _____

5.2 Earth's Simplest Organisms: Friends or Enemies? Exercise 20

A. Describe one way that each of these organisms can help people.

1. bacteria _____

_____

2. protists _____

_____

3. fungi _____

_____

B. Describe one way that each of these organisms can harm people.

4. bacteria _____

_____

5. protists _____

_____

6. fungi _____

_____

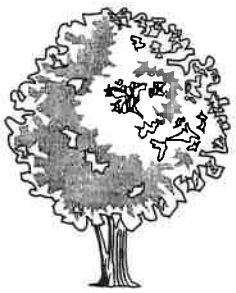
CRITICAL THINKING

A friend tells you that she once got very sick from an infection. The infection was caused by bacteria. She says she wishes she could destroy all bacteria. Do you think that would be a good thing to wish for? Explain why or why not on a separate sheet of paper.

Name _____ Date _____

6.1 From Simple to Complex — Exercise 21

Read the list of "Characteristics of Living Things" below. Decide which organisms shown in the pictures have each characteristic. Write the letter below each organism on the correct lines. There can be more than one answer for each characteristic. The first one is done for you.



a.

b.

c.

Characteristics of Living Things

a, b, c **1.** It can grow.

_____ **2.** It is made of specialized cells.

_____ **3.** It does not have specialized cells.

_____ **4.** It can reproduce.

_____ **5.** It can move from place to place.

_____ **6.** It cannot move from place to place.

_____ **7.** It gets food from other organisms.

_____ **8.** It can make its own food.

_____ **9.** It can respond to the environment.

CRITICAL THINKING

Sea squirts are organisms that live in the ocean. They move around when they are young, but they grow in one place when they are adults. They filter small bits of food out of the water. Their bodies are made of specialized cells. Are sea squirts plants, protists, monera, animals, or fungi? Write your answer on a separate sheet of paper. Explain your reasoning.

Name _____ Date _____

6.2 Invertebrates: Grouping by Type — Exercise 22

Complete the chart below. Place each of these animals in the correct column.

ant	crab	lobster	roundworm	snail
bee	crayfish	mite	sand dollar	spider
butterfly	earthworm	mosquito	scorpion	squid
clam	flea	octopus	sea star	tapeworm
cockroach	grasshopper	oyster	slug	tick

1. Worms	2. Mollusks	3. Spiny-Skinned Invertebrates	4. Arthropods

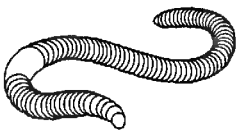
CRITICAL THINKING

If you found an animal with a hard outer covering, how would you decide if it was a mollusk or an arthropod? On a separate sheet of paper, write a paragraph to explain your answer.

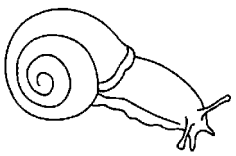
Name _____ Date _____

6.2 Invertebrates: Sponges, Worms, Mollusks, and Spiny-Skinned Animals — Exercise 23

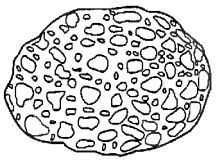
A. Label each invertebrate below with one of these terms: *sponge, worm, mollusk,* or *spiny-skinned*. You will need to use some labels twice.



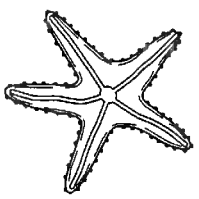
1. _____



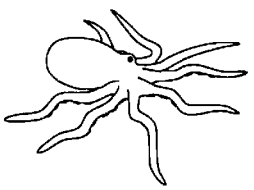
2. _____



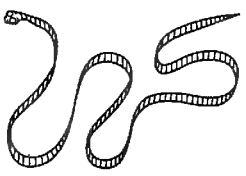
3. _____



4. _____



5. _____



6. _____

B. Match each invertebrate below with its habitat. Write the correct letter on the line. Some items may have more than one answer. Some answers will be used more than once.

Invertebrate	Habitat
_____ **7.** earthworm	**a.** water
_____ **8.** sand dollar	**b.** land
_____ **9.** slug	**c.** inside a host
_____ **10.** snail	
_____ **11.** sponge	
_____ **12.** tapeworm	

CRITICAL THINKING

Think of a kitchen item that has the same function as the crop of an earthworm. Think of another item that has the same function as the gizzard of an earthworm. On a separate sheet of paper, write the names of the kitchen items. Describe their functions.

Name _____ Date _____

6.2 Invertebrates: Arthropods — Exercise 24

A. Each sentence below is false. Replace the underlined term and rewrite the sentence to make it true.

1. An arthropod is an animal with an <u>inner</u> skeleton.

_____

2. Arthropods have jointed <u>heads</u>.

_____

3. <u>Spiders</u> are the largest group of arthropods.

_____

4. An insect's body has <u>two</u> main parts.

_____

5. Insects have feelers, which are called <u>parasites</u>.

_____

6. A crustacean's front pair of legs are called <u>walking legs</u>.

_____

B. Complete the chart below with the correct numbers. The first one is done for you.

	Insects	Spiders	Crustaceans
Number of body segments	7. 3	9.	11.
Number of pairs of legs	8.	10.	12.

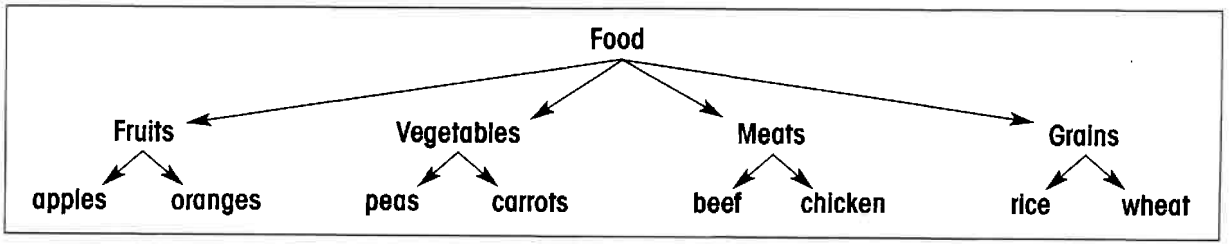
CRITICAL THINKING

On a separate sheet of paper, name three ways you can tell insects, spiders, and crustaceans apart.

Name _____ Date _____

6.3 Vertebrates: Organizing Major Groups — Exercise 25

A. Here is a branching diagram that organizes foods into different groups. It shows foods found in each group.



Make a branching diagram of the animal kingdom. Show *vertebrates, invertebrates,* and the kinds of animals that go into those two major groups.

The Animal Kingdom

B. Make a branching diagram of vertebrates. Show *cold-blooded* and *warm-blooded* vertebrates and the kinds of animals that go into those two major groups.

Vertebrates

CRITICAL THINKING

Which type of animal would find it easier to live in extreme kinds of weather—a cold-blooded animal or a warm-blooded animal? Explain your answer on a separate sheet of paper.

Name _____ Date _____

6.3 Vertebrates: Characteristics — Exercise 26

A. Match each vertebrate group below with its characteristics. Write the correct letter on the line.

_____ **1.** fish

_____ **2.** amphibian

_____ **3.** reptile

_____ **4.** bird

_____ **5.** mammal

a. covered with feathers; has hollow bones

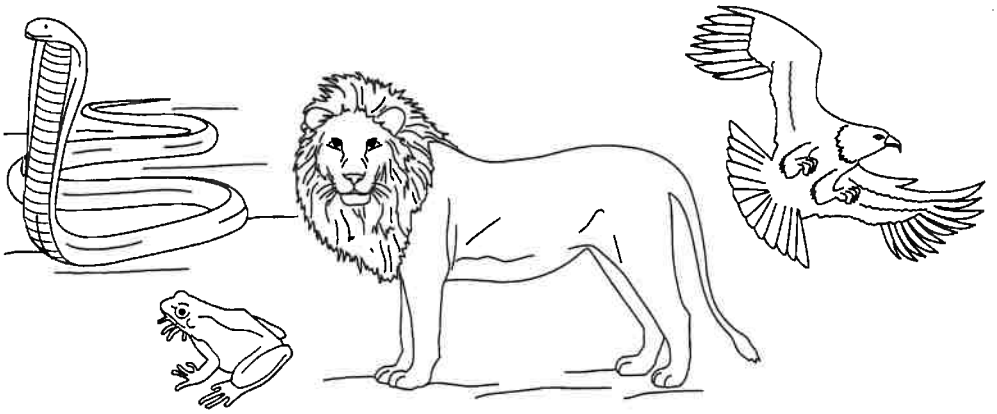
b. covered with scales; has lungs

c. covered with scales; has fins and gills

d. covered with hair; feeds young with mother's milk

e. has wet, slippery skin and two pairs of legs

B. Choose one of the vertebrates pictured below. Then answer the questions that follow.



6. Which vertebrate did you choose? _____

7. What group of vertebrates does it belong to? _____

8. Is it cold-blooded or warm-blooded? _____

9. What is its body covered with? _____

CRITICAL THINKING

Crocodiles were once endangered. With the help of new laws and environmental groups, the number of crocodiles has increased again. Do you think it was right to help them? Why or why not? Explain your answer on a separate sheet of paper.

Name _____ Date _____

7.1 Plants as Food Makers: Food From Plants — Exercise 27

A. Here is a recipe for carrot cake. Write *P* next to the six ingredients that come from plants. Write *A* next to the one ingredient that comes from an animal. Write *N* next to the three ingredients that do not come from living things.

Carrot Cake
Mix together:

_____ **1.** 1 cup whole wheat flour

_____ **2.** 1 teaspoon baking soda

_____ **3.** 1 teaspoon baking powder

_____ **4.** 1 teaspoon salt

Mix and add:

_____ **5.** $\frac{2}{3}$ cup vegetable oil

_____ **6.** 2 beaten eggs

_____ **7.** 1 cup sugar

Add and blend in well:

_____ **8.** 1 cup chopped walnuts

_____ **9.** $1\frac{1}{2}$ cups grated carrots

_____ **10.** 1 teaspoon grated lemon rind

Bake in a greased and floured pan about 30 minutes at 325°F.

B. List four ingredients you found that come from plants. Next to each one, write what part of the plant it comes from. Use reference books or the Internet if you need help. The first one is done for you.

11. *wheat flour (seed)* **12.** _____

13. _____ **14.** _____

CRITICAL THINKING

On a separate sheet of paper, explain the following statement: "All animals depend on plants."

Name _____ Date _____

7.1 Plants as Food Makers: Plant Parts — Exercise 28

A. Each sentence below is false. Replace the underlined term and rewrite the sentence to make it true.

1. The <u>leaf</u> is the part of a seed plant from which a new plant can grow.

_____

_____

2. Most of a plant's chlorophyll is found in its <u>seeds</u>.

_____

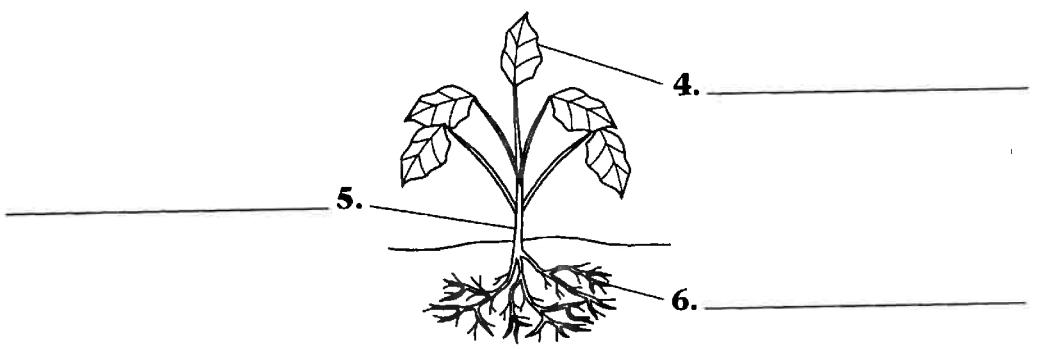
_____

3. Plants make sugar using sunlight, water, chlorophyll, and <u>oxygen</u>.

_____

_____

B. Label the parts of the plant below using these words: *root*, *leaf*, and *stem*. Then, on the lines below, write what job or jobs each part does.



7. root: _____

8. leaf: _____

9. stem: _____

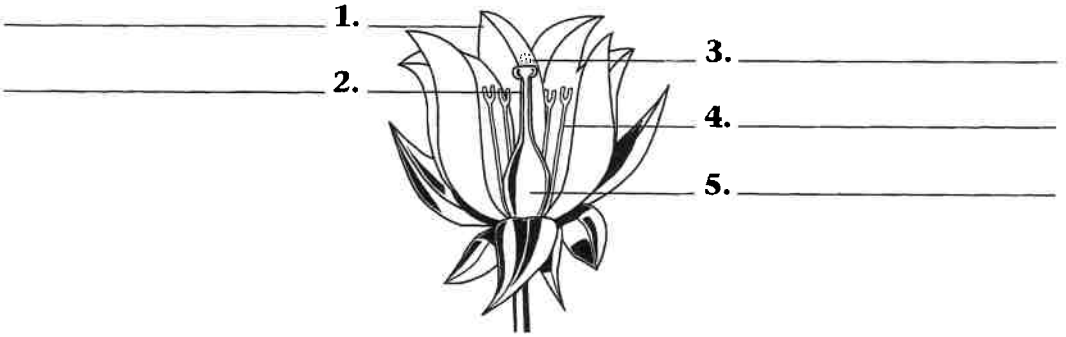
CRITICAL THINKING

How do you think life on Earth would be different without chlorophyll? Write your answer on a separate sheet of paper.

Name _____ Date _____

7.2 Plant Reproduction: Pollination — Exercise 29

A. Label the parts of the flower below using these words: *petal, pistil, stamen, pollen,* and *ovary*.



B. For each "if" below, circle the letter of the best ending for each sentence. Then, on the line, write why you chose your answer.

6. If the pistil of a flower were not sticky, then
- **(a)** pollination would not occur as easily.
- **(b)** sperm cells would travel down the pistil more slowly.
- **(c)** the plant would produce more nectar.

This is because _____

7. If all the flowers were picked off an apple tree in the spring, then
- **(a)** the tree could not carry on photosynthesis.
- **(b)** the tree might not bear fruit.
- **(c)** the tree could not get oxygen.

This is because _____

8. If the pollen from one flower lands only on the stamen of another flower, then
- **(a)** fertilization occurs.
- **(b)** pollination occurs.
- **(c)** pollination does not occur.

This is because _____

CRITICAL THINKING

How do you think flower petals attract insects? Write your answer on a separate sheet of paper.

Name _____ Date _____

7.2 Plant Reproduction: Producing Seeds and Fruit

Exercise 30

A. The names of the three processes involved in plant reproduction and growth are in the box. Write the processes in the order in which they occur in a plant. Then, next to each process, describe what happens during that process.

fertilization	germination	pollination

1. _____ _____

_____

2. _____ _____

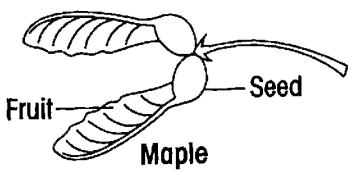
_____

3. _____ _____

_____

B. Study the shape of each fruit below. Then, on the lines, write a sentence explaining how the fruit and seed is most likely carried away from the parent plant.

4.



_____

_____

5.

_____

_____

CRITICAL THINKING

Design a fruit that would help the seeds be carried away easily by the wind, water, an animal, or some other way. Draw your fruit and seeds on a separate sheet of paper. Describe how the design helps carry the fruit and seeds away to a place where the seeds can grow best.

Name _____ Date _____

8.1 The Same But Different — Exercise 31

A. The steps below describe Gregor Mendel's research with breeding pea plants. Number the steps in their correct order. Write the numbers on the lines.

_____ **1.** Hybrid offspring were produced.

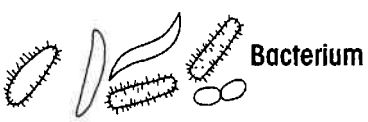
_____ **2.** Mendel took the pollen from a tall pea plant.

_____ **3.** Mendel concluded that tallness in pea plants is a dominant trait.

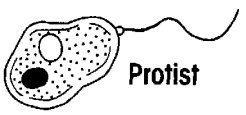
_____ **4.** Mendel used the pollen to pollinate a short pea plant.

_____ **5.** The hybrids were all tall.

B. On the line below each organism shown, describe one of the organism's traits.



6. _____



7. _____

8. _____

9. _____

C. Match each term below with its definition. Write the correct letter on the line.

_____ **10.** dominant

_____ **11.** crossbreeding

_____ **12.** offspring

a. a new organism that results from reproduction

b. a trait in an organism that shows no matter the effect of its partner trait

c. the matching of parents with different traits to produce offspring with new traits

CRITICAL THINKING

Mendel crossbred the hybrid tall plants described in Part A above. Some of the offspring were short. On a separate sheet of paper, explain why this happened.

Name _____ Date _____

8.2 The Building Blocks of Heredity: Genes — Exercise 32

A. Write the following words on the lines below, in order, from the largest to the smallest thing: *gene, nucleus, chromosome, cell.*

1. _____ **2.** _____

3. _____ **4.** _____

B. Draw and label illustrations showing two of the things listed above. You can create your own idea of what a chromosome or gene looks like.

5.

6.

C. Answer the following questions on the lines below.

7. What is a change in an organism's genetic code called?

_____

8. What is an example of a harmful mutation?

_____

9. What is an example of a helpful mutation?

_____

10. What makes egg cells and sperm cells different from other body cells?

_____

CRITICAL THINKING

How do organisms pass down mutations to their offspring? Write your answer on a separate sheet of paper.

Name _____ Date _____

8.2 The Building Blocks of Heredity: Producing Offspring — Exercise 33

A. Complete the chart below. Write the correct number of chromosomes in each blank box.

Animal	Number of chromosomes in body cells	Number of chromosomes in sex cells
1. horse	64	
2. frog		13
3. grasshopper	24	
4. alligator		16
5. dog	78	

B. Each sentence below is false. Replace the underlined term and rewrite the sentence to make it true.

6. During fertilization, a <u>body cell</u> joins with an egg cell.

_____

7. A <u>number</u> code is found in an organism's genes.

_____

8. An animal gets <u>all</u> of its chromosomes from its mother.

_____

9. A sperm cell is a <u>body</u> cell.

_____

10. Sex cells reproduce by dividing <u>once</u>.

_____

CRITICAL THINKING

Why is it important that the sex cells of an organism have half the number of chromosomes that are found in the organism's body cells? Write your answer on a separate sheet of paper.

Name _____ Date _____

8.3 Controlling Heredity — Exercise 34

Read each story below. Think about whether the environment or genetics caused the ending in the story. Then circle the word *environment* or *genetics*. Explain your choice.

1. Christina brought home a strong, healthy tomato-plant seedling. She placed the plant in a shady part of the garden. She only remembered to water it about once a week. The plant lived, but it did not produce any tomatoes.

Environment / Genetics

Why? _____

_____

2. Annie's parents met in high school on the track team. Her father was the city's fastest long-distance runner. Her mother was the city's champion high jumper. Annie hated sports, though. The only exercise she got was in gym class. Even so, she was one of the fastest runners and best jumpers in gym class.

Environment / Genetics

Why? _____

_____

3. Bob and Hiroko both entered a garden club contest for growing roses. Bob worked just as hard as Hiroko did. He used the same soil and fertilizer. He watered his roses just the right amount. However, Hiroko got some special seeds from her grandmother to grow her roses. They turned out to be the most beautiful roses in the contest.

Environment / Genetics

Why? _____

_____

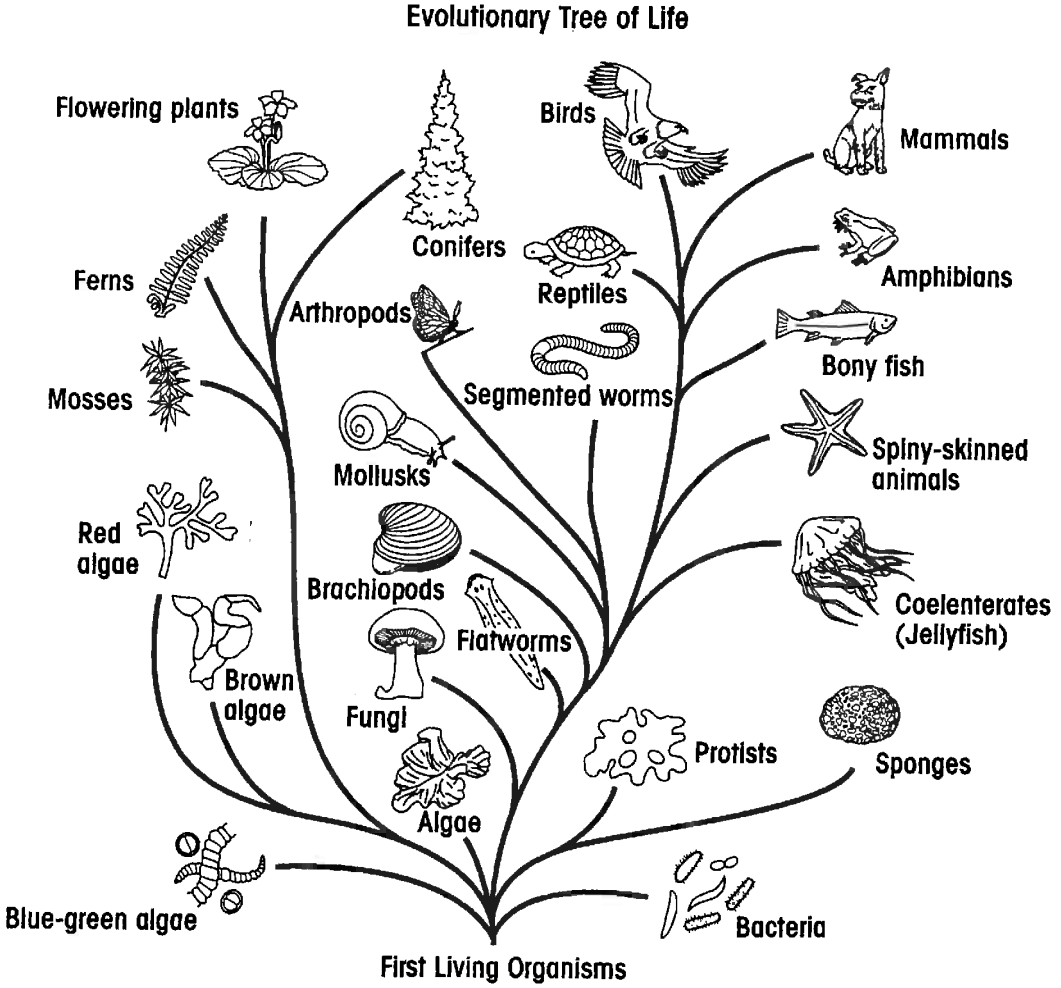
CRITICAL THINKING

On a separate sheet of paper, list three human traits that are affected by both genetics and the environment. Explain how both can affect these traits.

Name _____ Date _____

9.1 Time and Change: Paths of Evolution — Exercise 35

This is the evolutionary tree of life. It shows how different kinds of organisms may have evolved from the very first organisms.



1. Use a pencil to trace the path of evolution from the first living organism to bony fish.
2. In another color pencil, trace the path of evolution from the first living organism to arthropods.
3. Circle the part of the path that fish and arthropods have in common.

CRITICAL THINKING

Notice that algae and plants are both on the left side of this tree. Also notice that the algae branch off just below the branch that leads to plants. What do these facts tell you about the evolution of these organisms? Write your answer on a separate sheet of paper.

Name _____ Date _____

9.1 Time and Change: Relationships Among Organisms

Exercise 36

Use the evolutionary tree of life on page 35 to answer the questions below.

1. What were the two earliest organisms? _____

2. What were the earliest plants? _____

3. Which five animals on this tree are vertebrates? _____

4. Where on the tree would vertebrates appear? _____
   Write *vertebrates* on the branch that shows where these organisms first evolved.

5. Which two plants on this tree are seed plants? _____

6. Where on the tree would seed plants appear? _____
   Write *seed plants* on the branch that shows where these organisms first evolved.

7. Find the fungi on this tree. Which kinds of organisms, if any, evolved from fungi?

8. Which evolved first, sponges or segmented worms? _____

9. Which evolved first, mollusks or reptiles? _____

10. Which evolved first, conifers or mosses? _____

CRITICAL THINKING

According to the evolutionary tree of life, which of today's organisms did the first living organisms most look like? How do you know this? Write your answer on a separate sheet of paper.

Name _____ Date _____

9.2 Theories of Evolution: Darwin's Theory — Exercise 37

A. What are the four main ideas that make up Charles Darwin's theory of natural selection? Write the ideas on the lines below.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

B. Read each sentence. Decide which of Darwin's main ideas above it describes. Write *1*, *2*, *3*, or *4* on the line.

_____ **5.** Two tiger kittens had strong running muscles, just like their mother.

_____ **6.** A pine tree dropped thousands of pine cones full of seeds.

_____ **7.** Hawks fought over places in the field to hunt.

_____ **8.** Insects that lived on the forest floor looked a lot like twigs.

_____ **9.** A plum tree seedling was as healthy as its parent tree.

_____ **10.** The garden was crowded with weeds and tomato plants.

_____ **11.** A salmon laid hundreds of eggs.

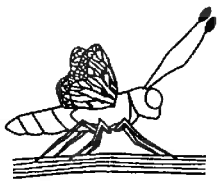
CRITICAL THINKING

According to Jean Baptiste Lamarck's theory of evolution, what should parents do if they want their children to be born with musical talent? Why? Write your answer on a separate sheet of paper.

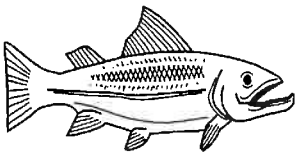
Name _____ Date _____

9.2 Theories of Evolution: Mutations — Exercise 38

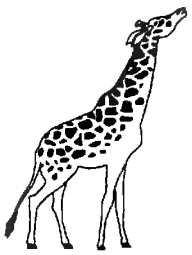
Each drawing below shows an organism with a mutation. Its label describes the mutation. Explain how each mutation would be helpful or harmful to the organism. Write your answers on the lines below.



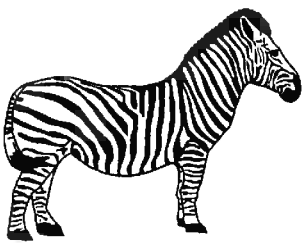
1. small wings



2. large mouth



3. short neck



4. short legs

5. deep roots

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

CRITICAL THINKING

If a male animal had a mutation that kept it from making any sperm cells, would you expect the animal to pass on this trait to offspring? Explain why or why not on a separate sheet of paper.

Name _____ Date _____

10.1 From Cells to Systems: The Basic Plan — Exercise 39

A. Match each term with its definition. Write the correct letter on the line.

_____ **1.** organ

_____ **2.** system

_____ **3.** cell

_____ **4.** tissue

a. a group of similar cells that work together to do a job

b. a building block of life

c. a body part made up of one or more kinds of tissue

d. a group of organs working together

B. Circle any four parts of the body listed in the box. Write each one on a line below and the body system it belongs to. Describe the function of each system. One word is already done for you.

heart	brain	lungs	ovaries
skin	stomach	backbone	(biceps)

5. *biceps/muscular system. The muscular system allows movement.*

6. _____

7. _____

8. _____

9. _____

CRITICAL THINKING

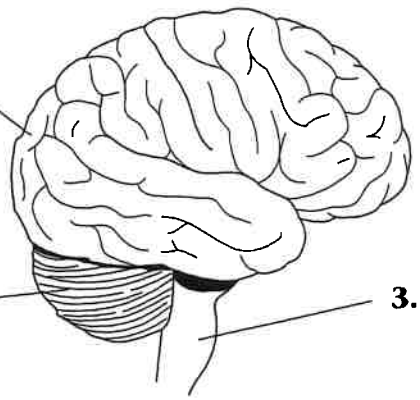
Organs work together to perform a task. Organs working together form a system. What other examples of different things working together as a system can you think of? Write your answer on a separate sheet of paper.

Name _____ Date _____

10.1 From Cells to Systems: Nerves and Senses

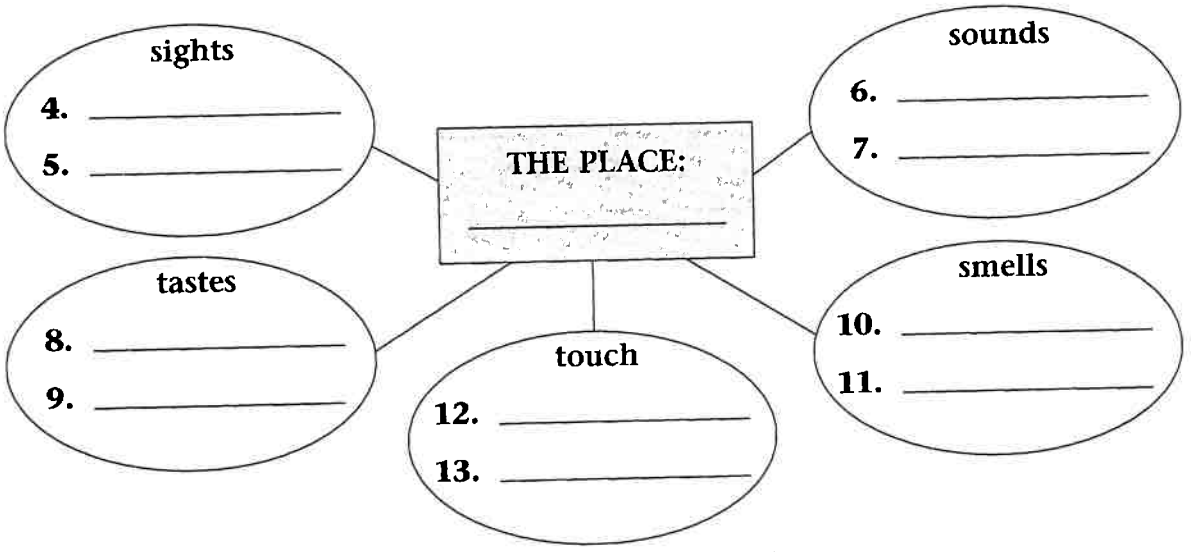
Exercise 40

A. Label the parts of the brain, using these terms: *cerebrum*, *cerebellum*, and *brain stem*.



1. _____
2. _____
3. _____

B. Think of a place you would like to visit. It could be a beach, a forest, or a mountaintop. Write the name of the place in the center of the topic web below. Then fill in the topic web, using sense words that describe this place. Write two terms under each of the sense words.



CRITICAL THINKING

Pick one of the five senses. Now think about how life would be if that sense were much stronger than normal. If you could see great distances or hear things from far away, how would your life be different? Write your answer on a separate sheet of paper.

Name _____ Date _____

10.2 Your Body at Work — Exercise 41

A. Read the list below of parts of the body. Decide which ones belong to the skeletal system and which belong to the muscular system. Write *skeletal* or *muscular* next to each one.

1. voluntary muscle _____
2. biceps _____
3. skeleton _____
4. joints _____
5. skull _____
6. leg bone _____
7. tendon _____
8. rib cage _____

B. Each body system does one or more jobs. Write *skeletal* or *muscular* next to each job below.

9. This system makes the heart beat involuntarily. _____
10. This system holds the body up. _____
11. This system allows your arm to bend. _____
12. This system helps you swallow food. _____
13. This system moves your legs, arms, and other body parts. _____
14. This system protects important organs such as the brain and heart. _____

CRITICAL THINKING

Choose one of the following bones: the skull, the backbone, or the hip bone. Describe how you think its shape is related to what it does. Write your answer on a separate sheet of paper.

Name _____ Date _____

10.3 Reproduction — Exercise 42

Write *true* or *false* next to each sentence below. If the sentence is false, replace the underlined term and rewrite the sentence to make it true.

1. During <u>adulthood</u>, the reproductive system develops. _____

2. <u>Hormones</u> cause physical changes in the body. _____

3. Females release one egg each month from their <u>uterus</u>. _____

4. <u>An ovary</u> will begin to develop when an egg cell is fertilized by a sperm cell. _____

5. A fetus develops inside the mother's <u>uterus</u>. _____

6. A human fetus usually takes <u>48</u> weeks to fully develop. _____

7. The <u>support</u> system controls the release of sperm cells and egg cells. _____

8. A young mammal in between fertilization and birth is called a <u>fetus</u>. _____

9. Menstruation stops in women at about the age of <u>30</u>. _____

CRITICAL THINKING

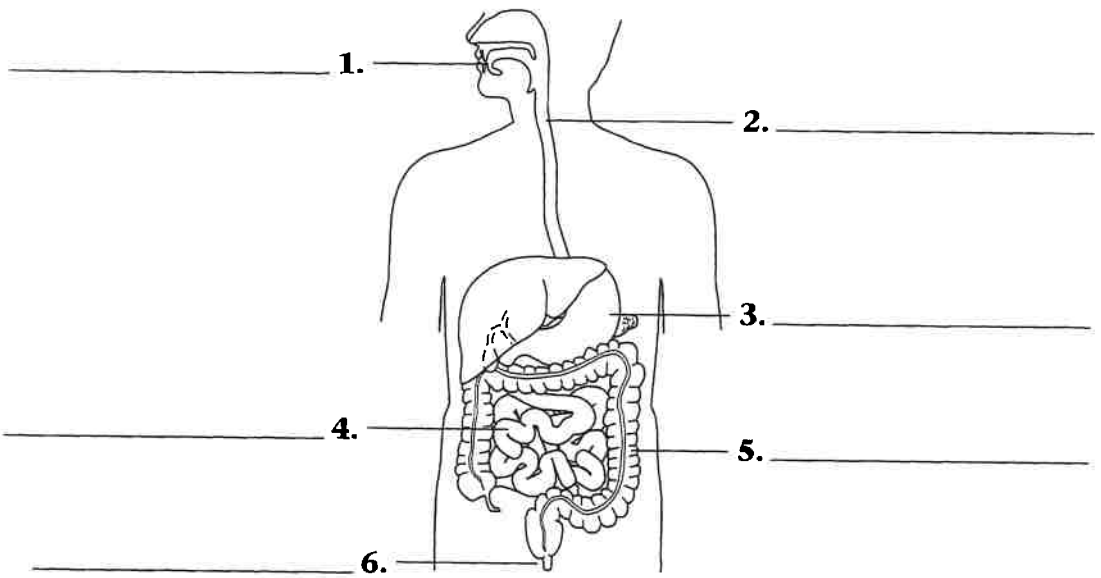
Why do you think women's ovaries stop releasing egg cells later in life? Write your answer on a separate sheet of paper.

Name _____ Date _____

11.1 Digestion: The Digestive System — Exercise 43

A. Label each part of the digestive system on the diagram below. Use terms from the box.

large intestine	small intestine	mouth
stomach	anus	esophagus



B. Describe the function of each labeled part on the lines below.

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

CRITICAL THINKING

What might happen if your digestive system worked faster? How would your life change? For example, how would your eating habits be different? Write your answer on a separate sheet of paper.

Name _____ Date _____

11.1 Digestion: Breaking Down Food — Exercise 44

Describe what happens to a piece of food as it passes through each of the organs listed below. Include as much detail as possible.

1. mouth _____

_____

_____

2. esophagus _____

_____

_____

_____

3. stomach _____

_____

_____

_____

4. small intestine _____

_____

_____

_____

5. large intestine _____

_____

_____

_____

CRITICAL THINKING

How is the digestive system like an assembly line in reverse? Write your answer on a separate sheet of paper.

Name _____ Date _____

11.2 Respiration: The Respiratory System — Exercise 45

A. Match each organ below with its function. Write the correct letter on the line.

_____ **1.** larynx

_____ **2.** trachea

_____ **3.** bronchi

_____ **4.** air sacs

a. carries air to the bronchi; also called the windpipe

b. passes air from the throat to the windpipe

c. tiny pockets that fill with air from the bronchi and pass it to the lungs

d. two tubes that carry air into the lungs

B. Write *true* or *false* next to each sentence below. If the sentence is false, rewrite the sentence to make it true by replacing the underlined term.

5. Digestion gets oxygen to the cells. _____

_____

6. When you breathe in, you take in air through your mouth or nose. _____

_____

7. Carbon dioxide in the air passes through the air sacs into your blood. _____

_____

8. The oxygen in the air comes from animals. _____

_____

CRITICAL THINKING

How is respiration in animals similar to respiration in plants? Do a comparison chart on a separate sheet of paper.

Name _____ Date _____

11.2 Respiration: Exchanging Oxygen and Carbon Dioxide

Exercise 46

A. Fill in each sentence below with a term from the box.

air sacs	oxygen	carbon dioxide	cells

1. Blood from the body contains _____ when it enters the lungs.
2. Blood contains _____ when it leaves the lungs.
3. The exchange of carbon dioxide and oxygen happens in the _____.
4. Carbon dioxide is produced in the body's _____.

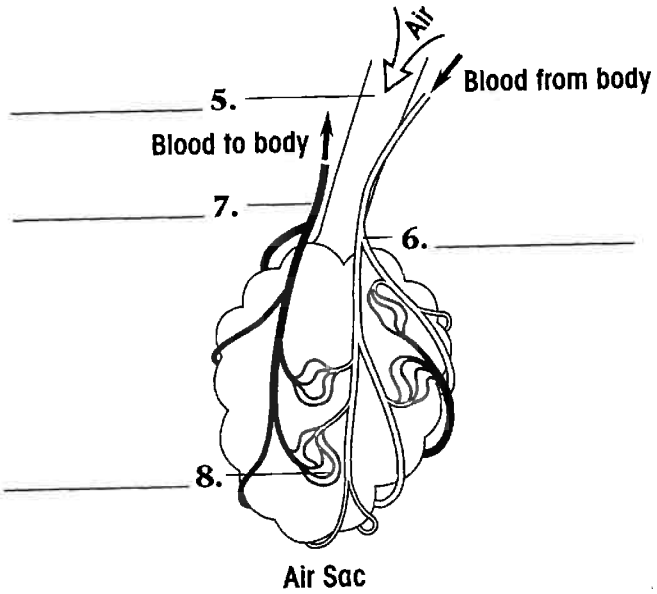
B. The diagram below shows how oxygen and carbon dioxide are exchanged in the air sacs of the lungs. The sentences below describe what happens in the air sacs. Read the sentences. Then write the letter of the sentence that best describes what happens at that place. Write your answers on the lines.

a. Blood leaves the air sac and goes to the body.

b. Oxygen passes into the blood, and carbon dioxide passes out of the blood.

c. Blood from the body enters the air sac.

d. Air containing oxygen enters the air sac.



CRITICAL THINKING

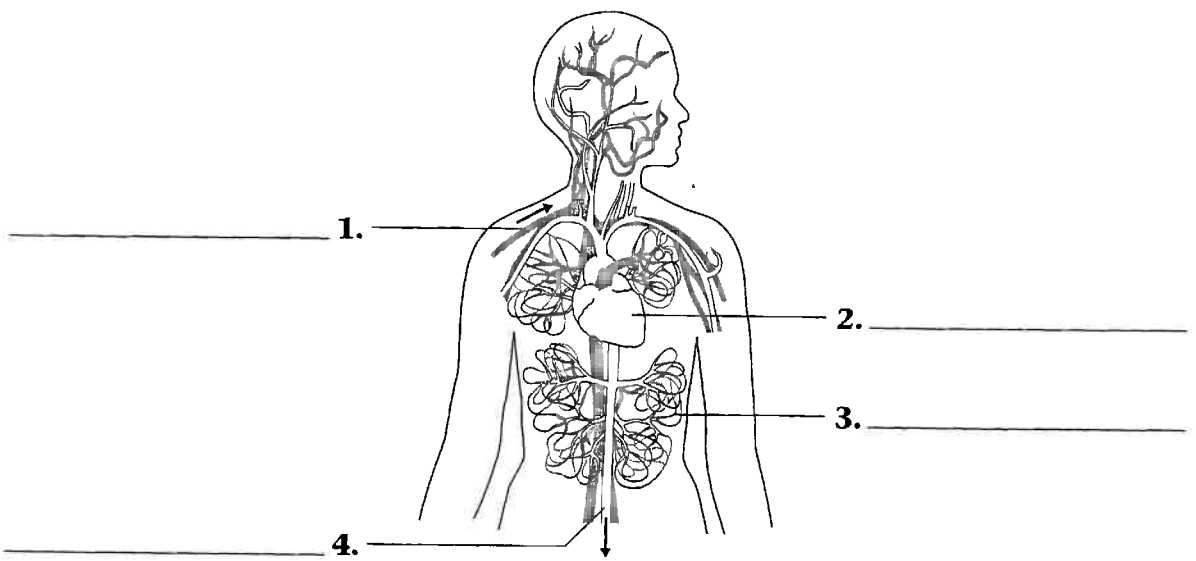
Why is it good that air can enter your body through either your nose or your mouth? Write your answer on a separate sheet of paper.

Name _____ Date _____

11.3 Circulation: The Circulatory System — Exercise 47

A. Label each part of the circulatory system shown on the diagram below. Use terms from the box.

capillaries	heart	vein	artery



B. Use the diagram to answer the questions below.

5. What organ pumps blood through the body?

_____

6. Which type of blood vessel carries blood to the heart?

_____

7. Which type of blood vessel carries blood away from the heart?

_____

8. What do capillaries do?

_____

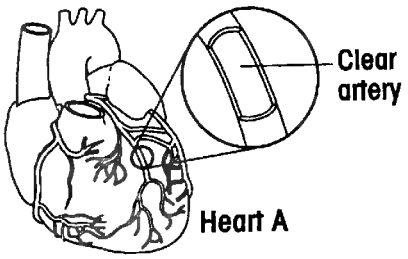
CRITICAL THINKING

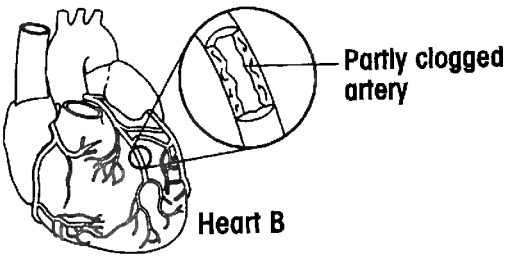
On a separate sheet of paper, list and describe the four parts of blood.

Name _____ Date _____

11.3 Circulation: Heart Disease — Exercise 48

A. Use the drawings of the heart and artery to answer the questions below.





1. In which heart would the artery have higher blood pressure? Why?

_____

_____

2. Change the drawing of Heart A to show what might happen to give this person a heart attack. How would this change give the person a heart attack?

_____

_____

B. Draw a circle around each healthy practice below. Put an X through each unhealthy practice. Tell why each practice is healthy or unhealthy. Write your answers on the lines below.

3.

_____

_____

_____

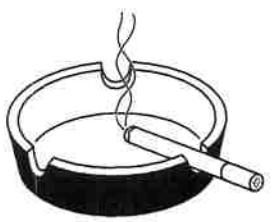
4.

_____

_____

_____

5.



_____

_____

_____

CRITICAL THINKING

List five "heart-healthy" foods. Tell why each one is "heart-healthy." Write your answer on a separate sheet of paper.

Name _____ Date _____

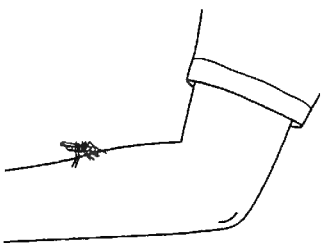
12.1 Fighting Disease — Exercise 49

A. On the lines below each picture, describe what is happening. Tell which picture or pictures show a way disease is spread. Which show a way to prevent the spread of disease?

1.

_____
_____
_____
_____

2.



_____
_____
_____
_____

3.

_____
_____
_____
_____

B. Complete each sentence with a term from the box.

diseases	bacteria	DNA
white blood cells	viruses	

4. The Plague of the 1300s was caused by _____.

5. The common cold, AIDS, and the Plague are examples of _____.

6. If harmful organisms get into your body, _____ try to destroy them.

7. Polio, chicken pox, colds, and the measles are caused by _____.

8. Viruses are often made mostly of _____.

CRITICAL THINKING

Why do you think it is easier to get the flu when your body is already fighting off a cold? Write your answer on a separate sheet of paper.

Name _____ Date _____

12.2 Nutrition — Exercise 50

A. Match each section of the Food Guide Pyramid with its food group. Write the correct letter on the line.

_____ **1.** vegetable group

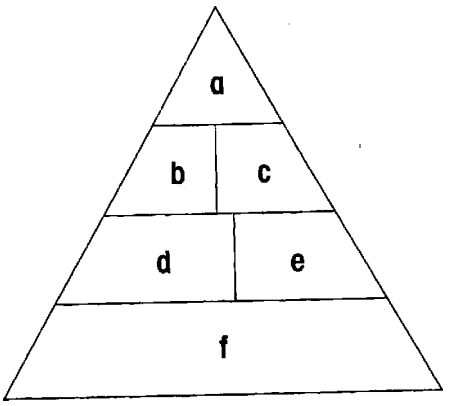
_____ **2.** fats, oils, and sweets group

_____ **3.** bread, cereal, rice, and pasta group

_____ **4.** fruit group

_____ **5.** meat, poultry, fish, dry beans, eggs, and nuts group

_____ **6.** milk, yogurt, and cheese group



B. Use the foods in the box below to create a balanced meal for each day on the menu chart. Look at the Food Guide Pyramid on page 177 of your textbook if you need help.

macaroni and cheese	carrot cake	rice
hot turkey sandwich	milk	collard greens

Monday	Tuesday	Wednesday
fish sticks	**7.**	beef tacos
8.	mashed potatoes	green salad
oatmeal cookies	milk	custard with apples
9.	carrot, raisin, and pineapple salad	milk
10.	**11.**	**12.**

CRITICAL THINKING

The school cook asks you to plan the meals for Thursday and Friday. You can choose anything you want, as long as you balance the meals. Use the Food Guide Pyramid as a guide. Write your plan on a separate sheet of paper.

Name _____ Date _____

12.3 Guarding Your Health — Exercise 51

A. Make a list of what you consider to be the top three health problems facing the United States today. Explain why each is a big problem.

1. _____

_____

2. _____

_____

3. _____

_____

B. Suggest one way each problem you chose can be fought.

4. _____

_____

_____

5. _____

_____

_____

6. _____

_____

_____

CRITICAL THINKING

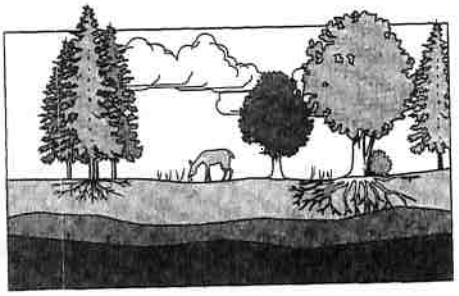
If you were asked to speak on national television about health care, what would you say? Write a speech telling what you think are the nation's three biggest health problems and how these problems can be fought. Write your speech on a separate sheet of paper.

Name _____ Date _____

13.1 Living Together — Exercise 52

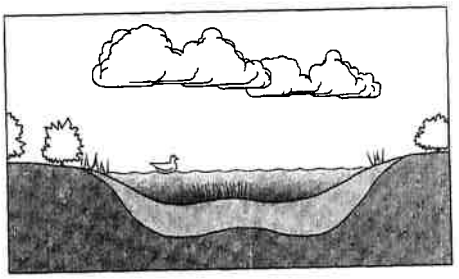
A. The drawings below show the steps in which a pond changes into a forest. Number the steps on the lines in the order in which they occur.

1.



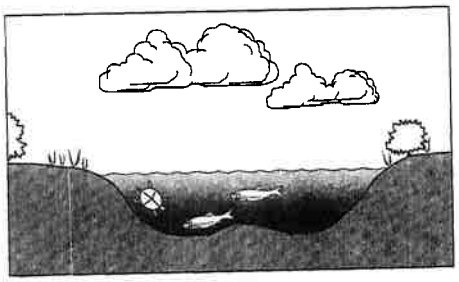
_____

2.



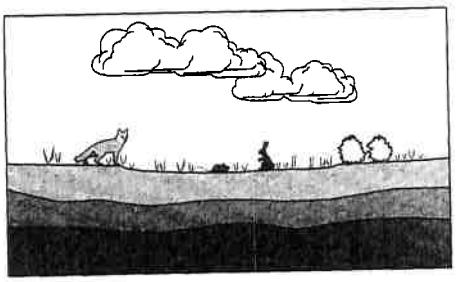
_____

3.



_____

4.



_____

B. Match each term below with its example. Write the correct letter on the line.

_____	**5.** resource	**a.**	all the gorillas in a rain forest
_____	**6.** ecosystem	**b.**	water
_____	**7.** population	**c.**	all the organisms in a desert
_____	**8.** recycling	**d.**	a bird's nest in a tree
_____	**9.** community	**e.**	all the organisms, water, soil, and air in a desert
_____	**10.** habitat	**f.**	breathing air in and out

CRITICAL THINKING

What organisms and other things might you find in an ocean ecosystem, such as a coral reef or the shallow water near the shore? Write your answer on a separate sheet of paper.

Name _____ Date _____

13.2 Using Nature's Resources: Food Chains and Webs

Exercise 53

A. Study the picture below. Read what the people are saying. Then complete the chart with the names of three producers, consumers, and decomposers that are found in this part of the forest. Some of the organisms may be too small to see.

Producers	Consumers	Decomposers
1.	4.	7.
2.	5.	8.
3.	6.	9.

B. Fill in the food chain below. Use terms from the box.

snake	grass	hawk	mouse

10. _____ ⇨ 11. _____ ⇨ 12. _____ ⇨ 13. _____

gets eaten by gets eaten by gets eaten by

CRITICAL THINKING

A freshwater food web may be made up of water plants, frogs, minnows, bass, insects, and turtles. The minnows eat the water plants and insects. The bass eat the frogs and minnows. The frogs eat the insects. The insects eat the water plants. The turtles eat the frogs. What might happen to the community if the frogs suddenly disappeared? Write your answer on a separate sheet of paper.

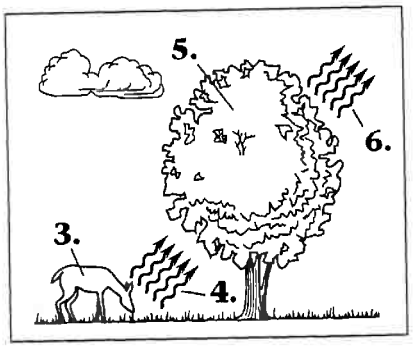
Name _____ Date _____

13.2 Using Nature's Resources: Water and Air — Exercise 54

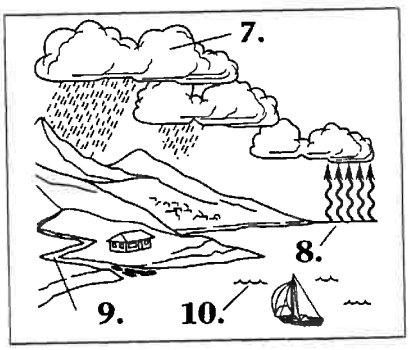
A. Look at the drawings of two different kinds of cycles. Choose the correct title for each one from the box. Write the titles above the drawings. Then draw arrows to show the flow of each cycle.

Water Cycle	Oxygen and Carbon Dioxide Cycle

1. _____



2. _____



B. Choose the term from the box that matches each step in the cycles above. Write the term on the line.

photosynthesis	oxygen	evaporation
cellular respiration	ocean	condensation
river	carbon dioxide	

3. _____ **7.** _____

4. _____ **8.** _____

5. _____ **9.** _____

6. _____ **10.** _____

CRITICAL THINKING

Both processes on the drawings you labeled use the sun's energy. Explain how. Write your answer on a separate sheet of paper.

Name _____ Date _____

13.2 Using Nature's Resources: Natural Resources and Conservation — Exercise 55

A. Match each natural resource below with the way people use it. Write the correct letter on the line.

_____	**1.** wood	**a.**	growing crops
_____	**2.** fossil fuel	**b.**	making paper
_____	**3.** plants	**c.**	eating food
_____	**4.** air	**d.**	driving cars
_____	**5.** soil	**e.**	inflating tires

B. For each item listed below, decide how it could be reused. Write your idea on the line.

6. lumber from old buildings that have been torn down

_____

7. chunks of concrete from torn-up roads and sidewalks

_____

8. steel from old cars

_____

9. grass clippings, leaves, and other lawn wastes

_____

10. old tires

_____

11. plastic from bottles and other containers

_____

CRITICAL THINKING

What are four things you can do to conserve natural resources? Write your answer on a separate sheet of paper.

Name _____ Date _____

14.1 From Molecules to Matter: Elements and Physical Science — Exercise 56

A. Complete the table below with the names and symbols of elements. You may use the Periodic Table of Elements in the Appendix of your textbook.

Name of Element	Symbol of Element	Name of Element	Symbol of Element
1. aluminum		**5.**	H
2. carbon		**6.**	Hg
3.	Cl	**7.** sulfur	
4. copper		**8.**	Sn

B. Read each job description below. Decide the branch of physical science in which each job would be done. Write *physics* or *chemistry* on the line.

9. Doing research in nuclear energy _____

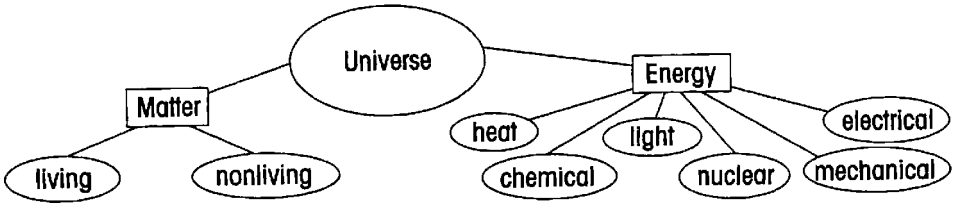
10. Gathering water samples from the deep ocean to find out what elements they contain _____

11. Carrying out experiments to find out how electrical energy is changed into mechanical energy _____

12. Finding out how different household chemicals affect a new material used for kitchen counters _____

CRITICAL THINKING

Study the diagram below. On a separate sheet of paper, write two sentences that describe what the diagram shows about the study of physical science.

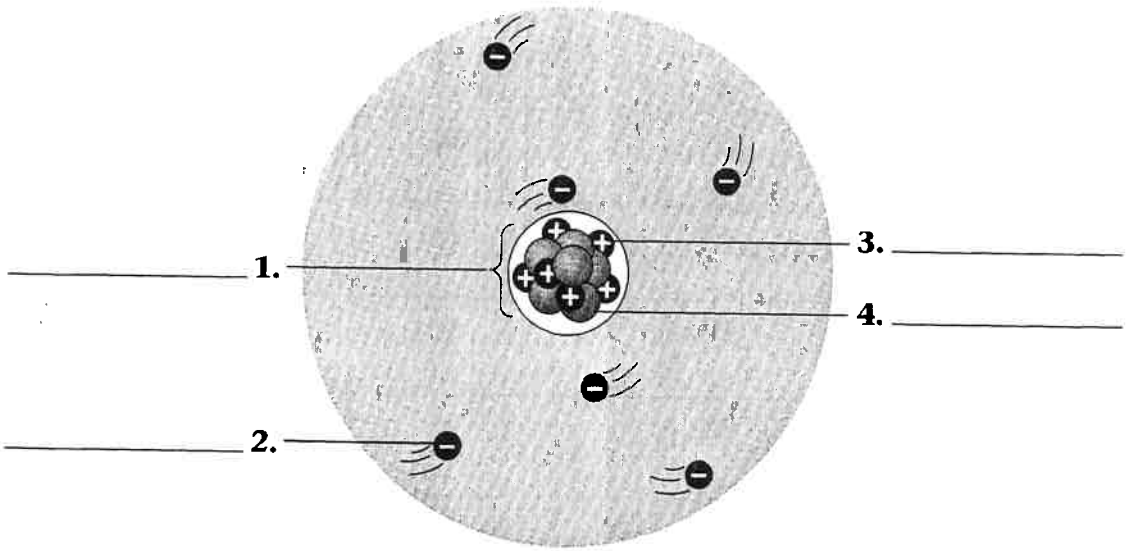


Name _____ Date _____

14.1 From Molecules to Matter: The Atom — Exercise 57

A. Label the parts of the atom with the terms from the box.

electron	neutron	nucleus	proton



B. Use the diagram above and the Periodic Table of Elements in the Appendix of your textbook to answer these questions.

5. How many electrons are in the atom? _____

6. Which element is the atom? _____

C. Match each particle with its charge. Write the correct letter on the line.

_____ **7.** proton

_____ **8.** neutron

_____ **9.** electron

a. no charge

b. negative charge

c. positive charge

CRITICAL THINKING

How can you remember the parts of the atom and what their charges are? List your ideas on a separate sheet of paper.

Name _____ Date _____

14.2 More About Matter: Properties — Exercise 58

A. Find an example of each item in the chart below. Then complete the chart. Be as descriptive as you can.

Item	Color	State	Odor	Shape
metal wire	**1.**	**2.**	**3.**	**4.**
milk	**5.**	**6.**	**7.**	**8.**
air	**9.**	**10.**	**11.**	**12.**
paper	**13.**	**14.**	**15.**	**16.**
perfume	**17.**	**18.**	**19.**	**20.**
pencil	**21.**	**22.**	**23.**	**24.**

B. Tell something you could do to change the properties of each item. Then describe the properties of the item after the change.

Item	How to change properties	Properties after the change
metal wire	**25.**	**26.**
milk	**27.**	**28.**
air	**29.**	**30.**
paper	**31.**	**32.**
perfume	**33.**	**34.**
pencil	**35.**	**36.**

CRITICAL THINKING

Not all solutions are liquids. For example, bronze is a solid solution made up of copper and tin. Give an example of another solution that is not a liquid. Write your answer on a separate sheet of paper.

Name _____ Date _____

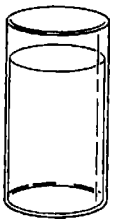
14.2 More About Matter: Vocabulary Practice — Exercise 59

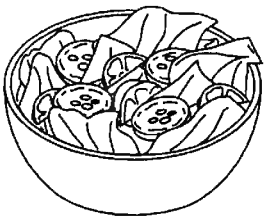
A. Read each sentence below. If the underlined term is used correctly, write *correct* on the line. If the term is used incorrectly, choose the correct term from the box, and write that term on the line.

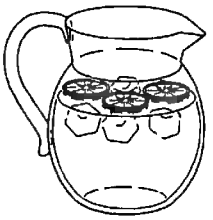
compound	density	solution
protons	solid	

1. A substance that is formed when the atoms of two or more elements join together chemically is called a <u>solution</u>. _____
2. A <u>mixture</u> is two or more elements or compounds that are mixed together but not chemically joined. _____
3. The three states of matter are <u>density</u>, liquid, and gas. _____
4. A chemical connection between elements in a compound is called a <u>bond</u>. _____
5. A bowling ball has a greater <u>compound</u> than a volleyball. _____

B. Identify each picture below, using these terms: *compound*, *mixture*, or *solution*. You can use more than one term for an answer. Write the term or terms on the line.

6. 
water
_____

7. 
salad
_____

8. 
lemonade
_____

CRITICAL THINKING

On a separate sheet of paper, draw a water balloon that is only half-filled with water. Label the solid, liquid, and gas parts of the water balloon.

Name _____ Date _____

15.1 Energy in All Things — Exercise 60

A. Complete each sentence with a term from the box.

energy	kinetic	matter	mass	potential	work

1. Energy is the ability to do _____ or make heat.
2. Energy powers all _____ in the world.
3. Without _____, nothing would move.
4. Energy has no _____.
5. Stored energy is _____ energy.
6. Energy of movement is _____ energy.

B. Write *kinetic* or *potential* to identify the kind of energy in each item listed below. Write your answer on the line.

_____ 7. a book lying on your desk

_____ 8. a coat falling from your locker

_____ 9. food stored in the root of a plant

_____ 10. a bus turning a corner

_____ 11. a waterfall

_____ 12. water behind a dam

_____ 13. a cat chasing a toy

_____ 14. a batter swinging a bat

CRITICAL THINKING

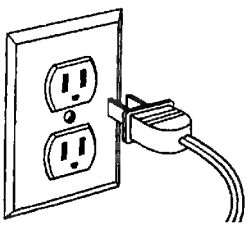
A car is driving slowly down the street. Does the car have kinetic energy, potential energy, or both? Explain your answer on a separate sheet of paper.

Name _____ Date _____

15.2 The Different Forms of Energy: Identifying Them — Exercise 61

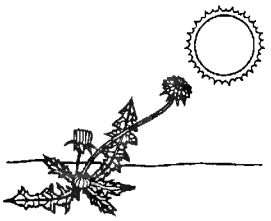
A. Look at each picture. Decide whether it represents *light, electrical, chemical, mechanical, heat,* or *nuclear energy.* Write the form of energy on the line below the picture.

1.



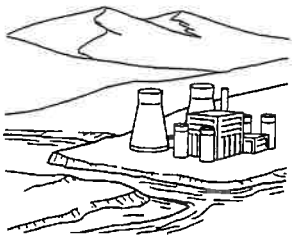
_____

2.



_____

3.

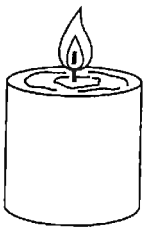


_____

4.

_____

5.



_____

6.

_____

B. Think of one way you have used each of the following forms of energy this week. Write your answers in complete sentences on the lines.

7. heat _____

8. mechanical _____

9. light _____

10. chemical _____

11. electrical _____

CRITICAL THINKING

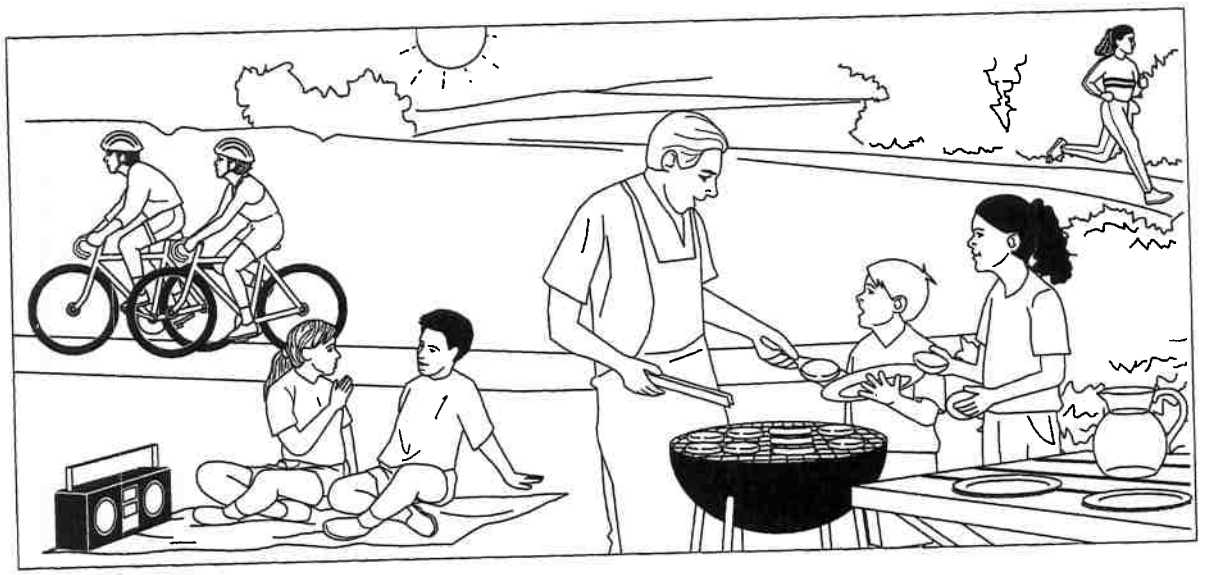
Typing on a computer keyboard involves mechanical energy. Does it involve chemical energy also? Explain your answer on a separate sheet of paper.

Name _____ Date _____

15.2 The Different Forms of Energy: How They Are Used

Exercise 62

A. Look for all the forms of energy being used in the picture. List them on the lines below.



_____

_____

_____

B. Write a paragraph that describes the scene above. Include all the ways energy is being used.

_____

_____

_____

_____

_____

_____

CRITICAL THINKING

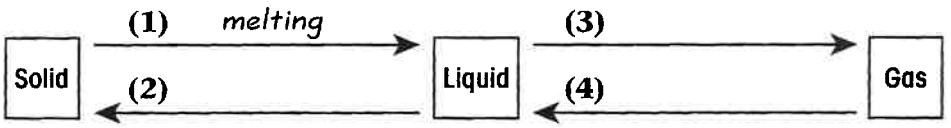
How does energy change form in your everyday life? Give an example of this and the forms of energy involved. Write your answer on a separate sheet of paper.

Name _____ Date _____

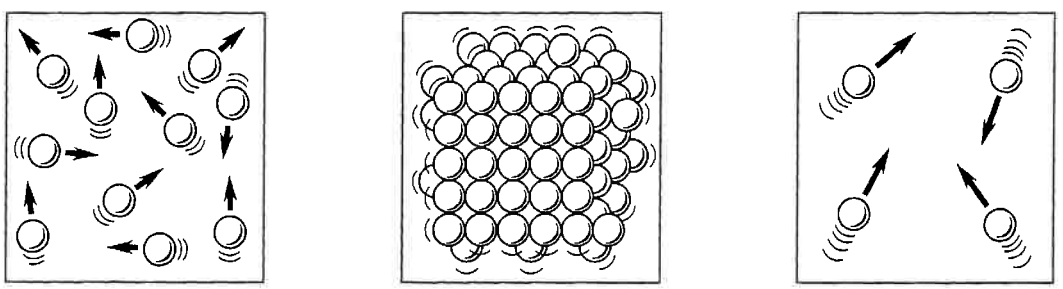
15.3 Changing Matter Using Energy: Matter and Heat Energy

Exercise 63

A. Label the arrows in the diagram below to show what process is taking place. Use the words *condensation*, *evaporation*, *freezing*, and *melting*. The first arrow is labeled for you.



B. The drawings below show H_2O molecules as they change from a *solid* to a *liquid* to a *gas*. Number the drawings in their correct order from 5 to 7, beginning with the solid.



_____ _____ _____

C. Answer these questions.

8. Why does dew form on the grass in the morning?

_____

_____

9. What happens to dew as the weather warms up? Why?

_____

_____

CRITICAL THINKING

Why do beads of water often form on the outside of a glass of ice-cold lemonade on a warm day? Write your answer on a separate sheet of paper.

Name _____ Date _____

15.3 Changing Matter Using Energy — Exercise 64

A. Write *physical change* or *chemical change* on the line to describe what is happening to each item on the list.

_____ **1.** A piece of paper is being cut.

_____ **2.** A candle is burning.

_____ **3.** Food is being digested.

_____ **4.** A piece of stale bread is crumbling.

_____ **5.** A shirt is being folded.

_____ **6.** Cookies are baking.

_____ **7.** Iron is rusting.

_____ **8.** Tree roots are breaking concrete.

_____ **9.** Acid rain is dissolving statues.

_____ **10.** A peach is rotting.

B. Answer these questions.

11. When a car burns gasoline in order to run, which change takes place, a physical change or a chemical change?

_____

12. Matter cannot be destroyed. It just changes form. When gasoline is burned to run a car, what sign of that change can you see?

_____

13. What physical change happens to a car if it crashes into a tree?

_____

CRITICAL THINKING

What is one physical change and one chemical change that has affected your life in some way in the past 24 hours? Write your answer on a separate sheet of paper.

Name _____ Date _____

16.1 What Is Force? Mass and Weight — Exercise 65

Weight **is the measure of the force of gravity on an object. The stronger the force, the greater the weight. The closer something is to the center of the Earth, the greater its weight will be.**

Mass **is the amount of matter in an object. An object's mass will stay the same wherever that object is. Use this information to write answers to the following problems.**

1. You have two golf balls that are exactly the same mass. You take one to the top of a mountain and weigh it. You weigh the other at sea level. Will they weigh the same?

_____

2. If yes, why? If no, which one will weigh more? Explain your answer.

_____

_____

3. You and your friend have the same mass on Earth. Would you both have the same mass on the moon? Explain your answer.

_____

_____

_____

4. An American quarter weighs more in the United States than it does at the equator. What does this tell you about the shape of the Earth?

_____

_____

_____

CRITICAL THINKING

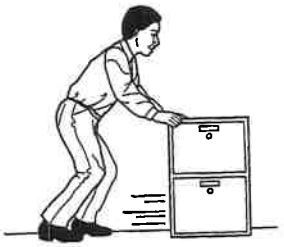
How was it possible for astronauts on the moon to pick up rocks that were too heavy to be picked up by people on Earth? Write your answer on a separate sheet of paper.

Name _____ Date _____

16.1 What Is Force?
Friction and Centripetal Force

Exercise 66

A. Identify the kind of friction shown in each picture below. Choose from *rolling friction*, *sliding friction*, and *fluid friction*.



1. _____

2. _____

3. _____

B. Circle the word or phrase that best completes each sentence.

4. Two rough surfaces rubbing against each other produce _____ two smooth surfaces do.
   (a) less friction than (b) more friction than
   (c) the same amount of friction as

5. A bird flying through the air has to overcome _____ friction.
   (a) rolling (b) sliding (c) fluid

6. Grease and graphite are two kinds of _____.
   (a) forces (b) masses (c) lubricants

7. Oil is added to a car to reduce the _____ of its moving parts.
   (a) friction (b) centripetal force (c) weight

8. Centripetal force causes moving objects to go in a _____ path.
   (a) straight (b) curved (c) short

9. Light objects fall at the same speed as heavy objects unless _____ causes one to fall more slowly.
   (a) gravity (b) centripetal force (c) friction in the air

CRITICAL THINKING

Why do you think tires have treads? Think of a "new and improved" tire tread. Draw a sketch of it on a separate sheet of paper. Explain why you think it is a good design.

Name _____ Date _____

16.2 Inertia and Motion: Forces in Sports — Exercise 67

Gravity, friction, inertia, centripetal force, and motion all play a big part in our lives. How do these forces affect playing sports? Answer these questions.

1. How does gravity affect a baseball that is hit into the air?

_____

2. What would happen to a fly ball if there were no gravity?

_____

3. Why does a ball that is hit on the ground eventually come to a stop?

_____

4. When you swing a baseball bat, what force makes the bat move in a curved path?

_____

5. What makes a skier go downhill?

_____

6. Why do skiers often put a lubricant on the bottom of their skis?

_____

7. What makes a boat come to a stop after the motor has been shut off?

_____

8. What force makes big football players harder to stop than small ones?

_____

CRITICAL THINKING

You are being sent on a mission to the moon. You are in charge of physical fitness for a team of astronauts. You have been asked to create a sport that can be played on the moon, where there is much less gravity than on Earth. Describe your sport on a separate sheet of paper.

Name _____ Date _____

17.1 All Kinds of Work — Exercise 68

A. Match each term below with its definition. Write the correct letter on the line.

_____ **1.** effort force

_____ **2.** work

_____ **3.** mechanical advantage

_____ **4.** resistance force

_____ **5.** load

a. a measure of how helpful a machine is

b. an object to be moved

c. what happens when a force moves something through a distance

d. a force applied when doing work

e. a force that must be overcome when doing work

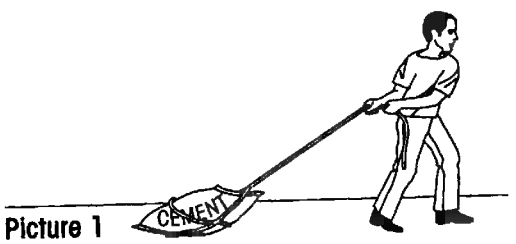
B. For each picture below, identify the effort force, resistance force, and load. The effort force and load are shown in the picture. The resistance force is either *gravity* or *friction*. Write your answers on the lines. The first one is partly done for you.

Picture 1

6. Effort force: pulling

7. Resistance force: _____

8. Load: sack of cement



Picture 1

Picture 2

9. Effort force: _____

10. Resistance force: _____

11. Load: _____

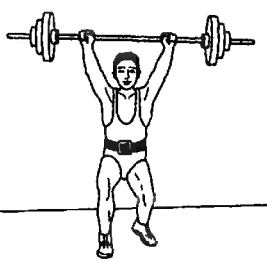

Picture 2

Picture 3

12. Effort force: _____

13. Resistance force: _____

14. Load: _____


Picture 3

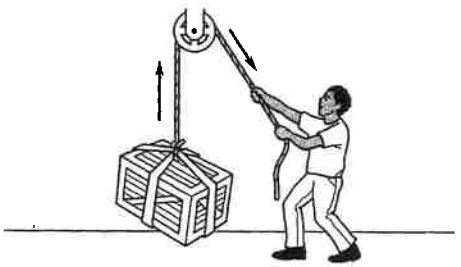
CRITICAL THINKING

Describe work you did recently, and draw a picture of it on a separate sheet of paper. Identify the effort force, resistance force, and load.

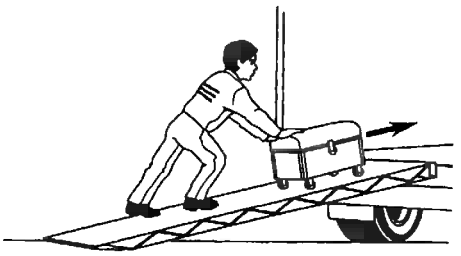
Name _____ Date _____

17.2 Simple and Compound Machines: Identifying Simple Machines — Exercise 69

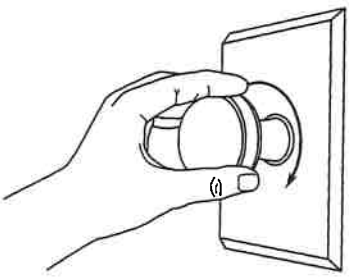
Label each picture below with the name of a simple machine. Choose one of these terms: *inclined plane, lever, pulley, screw, wedge, wheel and axle.*



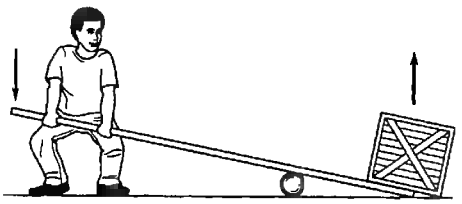
1. _____



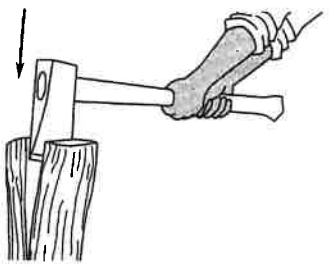
2. _____



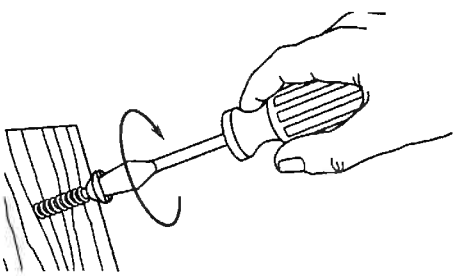
3. _____



4. _____



5. _____



6. _____

CRITICAL THINKING

Which picture above shows a wheel and axle as well as an inclined plane? How do the wheel and axle help make the work easier? Write your answer on a separate sheet of paper.

Name _____ Date _____

17.2 Simple and Compound Machines: Designing Machines to Solve Problems

Exercise 70

For each problem below, design a machine to do the work. It can be a simple machine or two or more simple machines that work together to make a compound machine. Either draw and label the machine or describe it in words. Identify each simple machine used.

1. Tracey is supposed to clean her room every Saturday morning. She wants to find a way to do this without getting out of bed.

2. Carlos is supposed to help his father work on the roof. Carlos's job is to get things his father needs up to the roof. Carlos does not want to keep going up and down the ladder.

3. Florence's family is moving. She is supposed to move all the small boxes to the truck. From her window, she sees a set of stairs leading to the truck.

CRITICAL THINKING

What are some large, worldwide problems that can be solved by using machines? How could machines help? Write your answer on a separate sheet of paper.

Name _____ Date _____

18.1 Heat and Matter: Heat Energy — Exercise 71

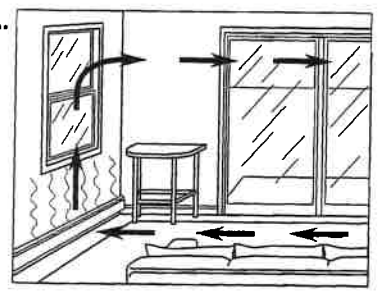
A. Complete each sentence with a term from the box.

temperature
particles
average
total

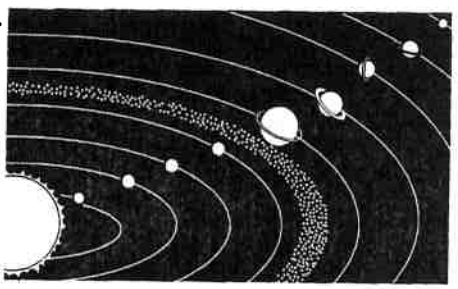
1. Heat is the _____ kinetic energy of a substance.
2. Temperature is the measure of the _____ kinetic energy of the atoms and molecules in a substance.
3. As a substance's temperature increases, the speed of its _____ increases.
4. A cup of hot cocoa has a higher _____ than the Pacific Ocean.

B. Study the pictures below. Then answer the questions.

A.



B.



C.

5. In Picture A, why is the air rising to the ceiling?

_____

6. In Picture B, in what form does the energy from the sun travel to the planets?

_____

7. In Picture C, why is the metal handle on the pan hot?

_____

CRITICAL THINKING

Why does the Earth's surface get warmer when sunlight strikes it? Write your answer on a separate sheet of paper.

Name _____ Date _____

18.1 Heat and Matter: Heat on the Move — Exercise 72

A. Below are descriptions of things people do to get warm. On the first line below each description, write whether heat moved through a *solid*, *liquid*, or *gas* to reach the person. Then, on the second line, write the word *conduction*, *convection*, or *radiation* to describe how the heat was passed along.

1. Randy held a warm towel to his face.

_____ _____

2. Ali added some hot water to his bath.

_____ _____

3. Judith stood in the rays of the sun.

_____ _____

4. Alicia hugged her dog.

_____ _____

5. Sue turned on the heater in her car.

_____ _____

B. In the picture below, the arrows show convection currents in the water. Write the labels *warm water* and *cool water* to describe the currents.

6. _____ **7.** _____

CRITICAL THINKING

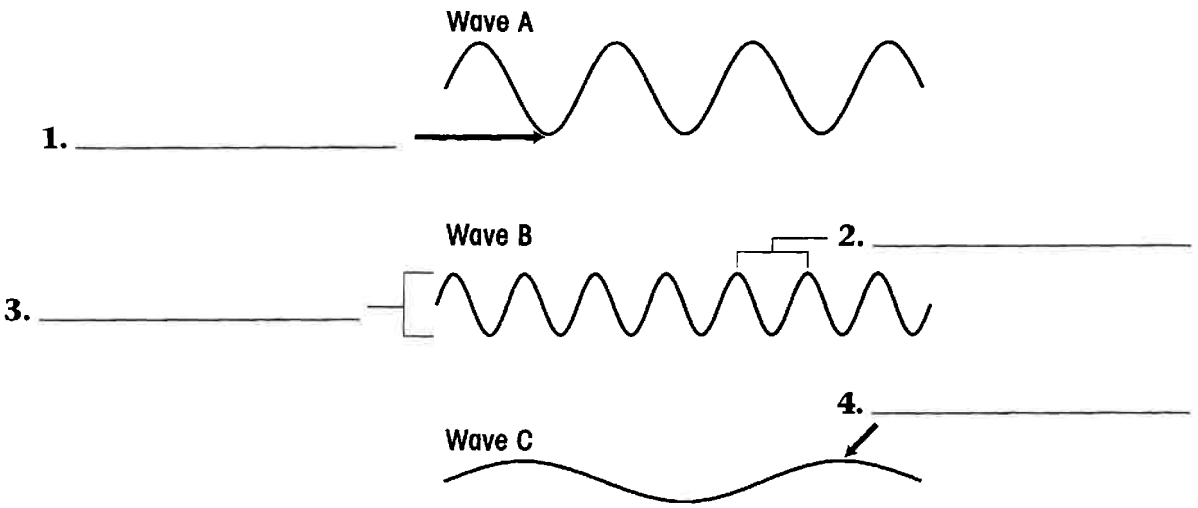
How does warming a bottle of milk in a pot on a stove involve both convection and conduction? Write your answer on a separate sheet of paper.

Name _____ Date _____

18.2 Light: Understanding Waves — Exercise 73

A. Label the parts of the three waves below. Use the terms in the box.

crest	amplitude	wavelength	trough



B. Use the diagrams of the waves above to answer these questions.

5. Which of the waves has the most energy? _____
6. Which of the waves would produce the least light? _____
7. Which of the waves has the highest frequency? _____
8. Which of the waves would make the loudest sound? _____
9. If Waves B and C were light waves, which one could be ultraviolet light? _____
10. If Waves B and C were light waves, which one could be infrared light? _____

CRITICAL THINKING

You can make small waves in water by dropping a marble into a pan of water. How can you increase the amplitude of the waves that are produced? Write your answer on a separate sheet of paper.

Name _____ Date _____

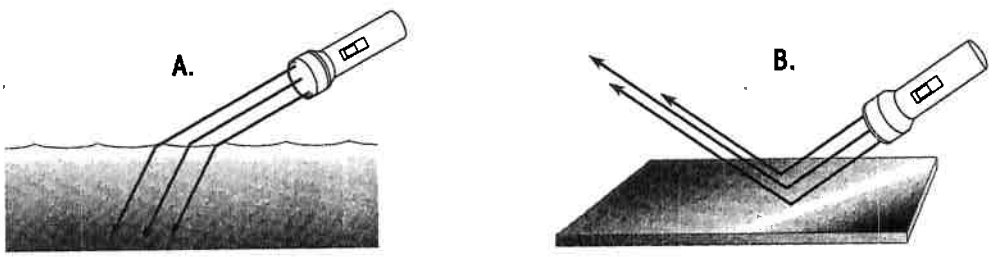
18.2 Light: What Are Its Properties? Exercise 74

A. Complete each sentence with a term from the box.

refraction	spectrum	amplitude
reflection	wavelength	

1. When white light passes through a prism, it separates into a _____.
2. The bending of light as it passes from air to water is an example of _____.
3. Increasing the energy of a wave will increase its _____.
4. The bouncing of light off an object is _____.
5. The _____ of visible light determines its color.

B. Study the diagrams below. Then answer these questions.



6. Which diagram shows the reflection of light, A or B? _____
7. Which diagram shows the refraction of light, A or B? _____
8. What kind of surface are the light rays striking in Diagram B?

_____

9. What causes light to refract?

_____

CRITICAL THINKING

What would happen to the light rays in Diagram B if the surface they were hitting was black? Write your answer on a separate sheet of paper.

Name _____ Date _____

18.3 Sound: Comparing Sound and Light — Exercise 75

A. On the line next to each phrase below, write *light*, *sound*, or *light or sound* to tell which form(s) of energy are described.

1. a form of energy _____
2. travels through a vacuum _____
3. travels in waves _____
4. travels slowest through a gas _____
5. caused by matter that vibrates _____
6. travels faster through a liquid than through a solid _____
7. has amplitude, wavelength, and frequency _____
8. determines the color of an object _____
9. has amplitude that can vary _____
10. causes tiny bones in the ear to vibrate _____

B. Match the first part of the sentence on the left with the part of the sentence on the right that best completes it. Write the correct letter on the line.

_____ **11.** Looking at your reflection in a mirror is similar to

_____ **12.** Putting more logs on a fire to make it brighter is similar to

_____ **13.** Drawing the blinds to block out the sunlight is similar to

a. wearing earplugs to protect your ears from loud sounds.

b. hearing an echo.

c. banging a drum harder to make it louder.

CRITICAL THINKING

Why can sound waves travel faster through a liquid than through a gas? Write your answer on a separate sheet of paper.

Name _____ Date _____

18.3 Sound: How Sound Travels — Exercise 76

A. The steps below describe how you can hear your friend's voice. Number the steps in the order in which they occur. Write the numbers 1 to 6 on the lines.

_____ Air molecules next to your friend's throat vibrate.

_____ You can hear your friend's voice.

_____ Your friend's vocal cords vibrate.

_____ Sound waves enter your ear.

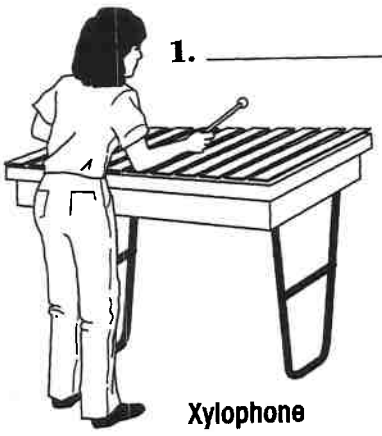
_____ Tiny bones in your ear vibrate.

_____ Sound waves move through the air.

B. Study the pictures below. On each picture, draw an arrow pointing to the part of the instrument that is vibrating. Then write its name. Use a term from the box.

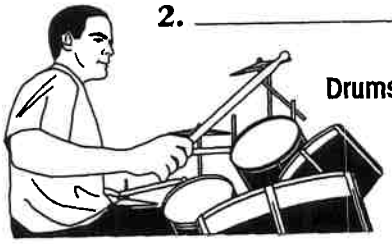
bar	string	drumhead

1. _____



Xylophone

2. _____



Drums

3. _____

Violin

CRITICAL THINKING

In the past, people who could not hear well sometimes used a funnel to hear better. They held the narrow end of the funnel against the opening of their ear. How do you think the funnel helped them to hear better? Write your answer on a separate sheet of paper.

Name _____ Date _____

19.1 All Charged Up: Static Electricity — Exercise 77

A. Match each term below with its definition. Write the correct letter on the line.

_____	**1.** electricity	**a.** having too few electrons
_____	**2.** neutral	**b.** having extra electrons
_____	**3.** discharge	**c.** having no charge
_____	**4.** repel	**d.** push away or push apart
_____	**5.** static electricity	**e.** a form of energy caused by the movement of electrons
_____	**6.** negatively charged	**f.** caused when objects with opposite charges are attracted to each other
_____	**7.** positively charged	**g.** the throwing off of static electricity

B. Draw a sketch that shows how lightning occurs. Draw plus signs (+) on the parts of your sketch that have a positive charge. Draw minus signs (−) on the parts that have a negative charge.

CRITICAL THINKING

Should people try to use lightning as a source of energy? Explain why or why not. Write your answer on a separate sheet of paper.

Name _____ Date _____

19.1 All Charged Up: Comparing Present and Past

Exercise 78

A. What are six things you use electricity for each week? Write these on the lines below.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

B. Look at your list of six things. Choose three of them. What job does each of these things do? How did people do these jobs before they had electricity to use? Write your answers on the lines.

7. _____

_____

_____

_____

8. _____

_____

_____

_____

9. _____

_____

_____

_____

CRITICAL THINKING

Electricity has always existed in nature. However, people have only learned how to control it in the last hundred years. On a separate sheet of paper, list two ways that people would have known of electricity 150 years ago.

Name _____ Date _____

19.2 Electrical Currents

Exercise 79

A. Rewrite each sentence, using the correct term for the underlined term. Choose a term from the box.

insulator	metals	electrons	electrical

1. All <u>plastics</u> are excellent electrical conductors.

_____

2. Electricity does not travel easily through an electrical <u>conductor</u>.

_____

3. A battery changes chemical energy into <u>mechanical</u> energy.

_____

4. A generator can be used to start the flow of <u>protons</u>.

_____

B. List three household items that would be good conductors.

5. _____ 7. _____

6. _____

C. List three household items that would be good insulators.

8. _____ 10. _____

9. _____

CRITICAL THINKING

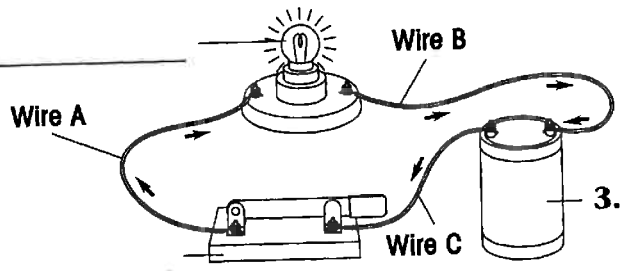
Electrical currents are sometimes used in medical devices. For example, pacemakers are used to regulate heartbeat. The pacemaker is implanted under the skin. A battery inside the pacemaker produces a small electrical current. The current flows through wires to the heart muscle. How do you think the electrical current is prevented from affecting the other parts of the body that the wires touch? Write your answer on a separate sheet of paper.

Name _____ Date _____

19.3 Electrical Circuits — Exercise 80

A. Use the terms from the box to label the diagram of the circuit below.

battery	light bulb	switch



1. _____
2. _____
3. _____

B. Use the diagram above to answer the questions below.

4. What do the arrows show? _____

_____

5. What do you think would happen to this circuit if you cut one of the wires? Why?

_____

_____

6. What do you think would happen if you removed the battery and connected Wire B to Wire C? Why?

_____

_____

7. Where in this circuit is energy lost? How is it lost? _____

_____

CRITICAL THINKING

Some fires start when electrical circuits become overloaded. How do you think a circuit could become overloaded at home? Write your answer on a separate sheet of paper.

Name _____ Date _____

19.4 Magnetism — Exercise 81

Write *true* or *false* on the line below each sentence. If the sentence is false, rewrite it to make it true.

1. If you smash a magnet with a hammer, it will still keep its magnetism.

_____

_____

2. When a piece of metal becomes magnetized, the electrons line up.

_____

_____

3. A magnet is any solid substance that attracts wood or plastic.

_____

_____

4. If you let a magnet swing freely on a string, one end will always point toward the north.

_____

_____

5. The like poles of magnets attract each other, and the opposite poles repel each other.

_____

_____

CRITICAL THINKING

If you were lost, how could a compass help you find your way? Write your answer on a separate sheet of paper.

Name _____ Date _____

20.1 Fossil Fuels: How Are They Used? Exercise 82

A. In the chart below, list ten activities that you did within a 24-hour period. Next to each activity, identify the source of the fuel that was used to do the activity.

Activity	Fuel
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

B. Answer these questions.

11. How many of the activities that you listed above used fossil fuels as their fuel source?

_____

12. Name one activity that used fossil fuels that could be done using solar energy instead.

_____

13. Name one activity that used fossil fuels that could have been done using only the energy your body produces from food.

_____

CRITICAL THINKING

How do you think people's activities will be affected if the world runs out of fossil fuels? Write your answer on a separate sheet of paper.

Name _____ Date _____

20.1 Fossil Fuels: Saving or Wasting? Exercise 83

A. Write *save* next to each practice that would help save fossil fuels. Write *waste* next to each practice that would waste fossil fuels.

1. insulating homes _____
2. riding in a bus instead of driving a car _____
3. buying products packaged in cardboard _____
4. packing groceries in reusable cloth bags _____
5. joining a car pool _____
6. driving a bigger car _____
7. recycling motor oil _____
8. leaving the heat on when you are not home _____
9. wearing a sweater instead of turning up the heat _____
10. using throwaway plastic cups for drinking _____

B. Look over the practices that you have marked *save*. Then answer these questions.

11. Which practice do you think is the best way to save fossil fuel?

_____

12. How does this practice save fossil fuel?

_____

_____

CRITICAL THINKING

Many modern cooking devices, such as microwave ovens, cook food fast. How does this help save fossil fuels and also improve our lives? Write your answer on a separate sheet of paper.

Name _____ Date _____

20.2 Other Energy Resources: Producing Energy — Exercise 84

Write *true* or *false* on the line below each sentence. If the sentence is false, rewrite it to make it true.

1. A nuclear reactor is a device that splits atoms to produce energy.

_____

_____

2. A dam traps moving water to produce nuclear energy.

_____

_____

3. A machine with blades that can be turned is a geyser.

_____

_____

4. A solar collector changes sunlight into heat energy.

_____

_____

5. The source of geothermal energy is heat contained in rocks deep inside the Earth.

_____

_____

6. The fuel used in nuclear fission is seawater.

_____

_____

CRITICAL THINKING

People around the world get energy from different sources. Why do you think this is so?

Name _____ Date _____

20.2 Other Energy Sources: Advantages and Disadvantages — Exercise 85

A. On the chart below, write one advantage and one disadvantage of each energy source.

Energy Source	Advantage	Disadvantage
dams	**1.**	**2.**
nuclear fission	**3.**	**4.**
tides	**5.**	**6.**
wind	**7.**	**8.**
sunlight	**9.**	**10.**
hot rocks inside the Earth	**11.**	**12.**
nuclear fusion	**13.**	**14.**

B. Answer these questions.

15. Which energy source do you think would be best to use where you live?

_____

16. Why do you think this is a good energy source in your area?

_____

17. What is one energy source that you think would not work where you live?

_____

18. Why do you think it would not work?

_____

CRITICAL THINKING

Which energy source listed in the chart do you think will be the most important energy source in the future? Why? Write your answer on a separate sheet of paper.

Name _____ Date _____

21.1 Spaceship Earth — Exercise 86

A. Match each term below with its definition. Write the correct letter on the line.

_____ **1.** orbit

_____ **2.** gravity

_____ **3.** Earth

_____ **4.** solar system

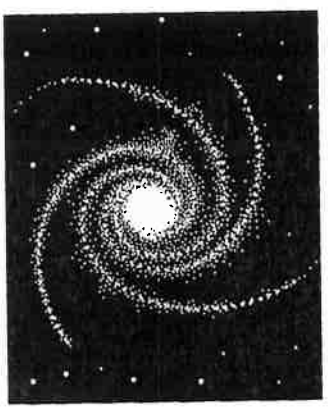
a. the sun and all the planets and other objects that circle around it

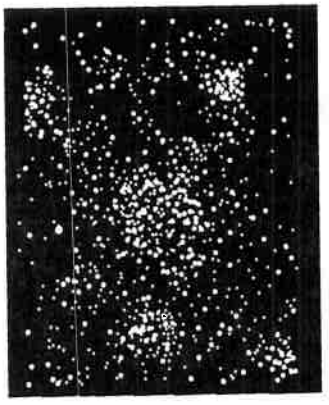
b. a closed, curved path

c. the third planet from the sun

d. a strong pull that keeps planets and other objects in orbit around the sun

B. The illustrations below show how scientists think the Earth and the rest of the Milky Way galaxy were formed. Put the illustrations in the order from earliest to latest formation. Write the correct number (1, 2, or 3) on the line.





5. _____ **6.** _____ **7.** _____

CRITICAL THINKING

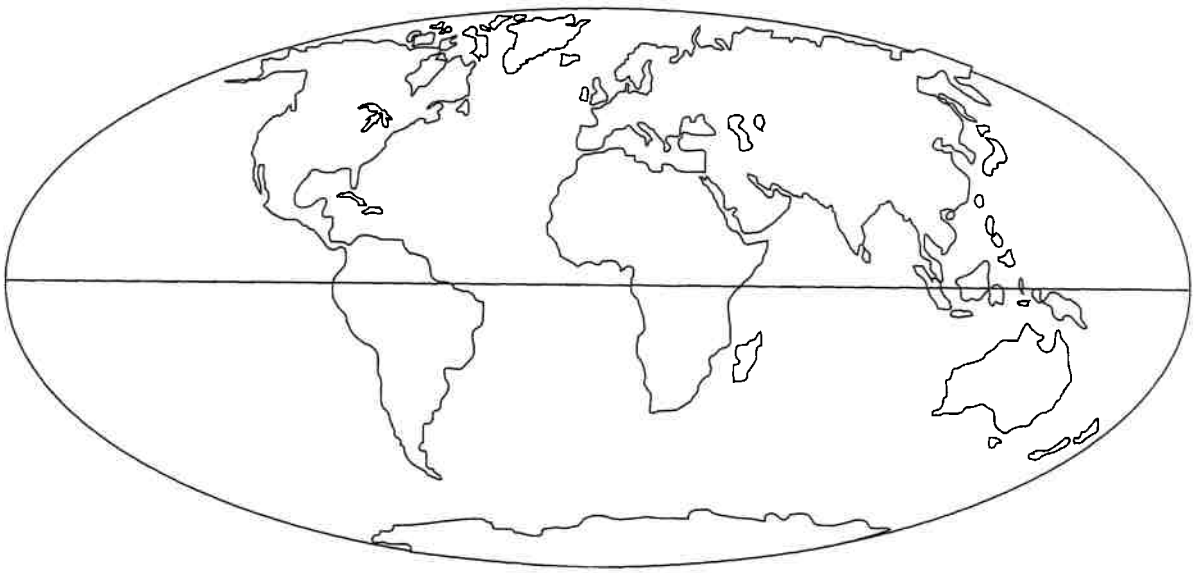
The sun's gravity holds the Earth in orbit around the sun. The Earth's gravity holds the moon in orbit around the Earth. The sun's gravity cannot pull the moon away from the Earth. The Earth and the moon are closer to each other than are the moon and the sun. What can you infer from these facts about gravity? Write your answer on a separate sheet of paper.

Name _____ Date _____

21.2 Features of the Earth: The Earth's Surface

Exercise 87

Use a set of colored pens or pencils. Follow the directions below.



1. The Earth is called the "water planet." From space, it is a blue-green color. Color the water on the map blue.

2. Use the key to color in each of the seven continents.

dark green	= Africa	orange	= South America
yellow	= Antarctica	purple	= North America
gray	= Asia	pink	= Europe
red	= Australia		

3. Label the Indian, Arctic, Atlantic, and Pacific oceans.

4. Label the poles and the equator.

CRITICAL THINKING

A traveler is taking a trip around the world. He can go by land or by sea or by a combination of both. Use the map above and mark the route you think he would take. Why did you choose that route? Write your answer on a separate sheet of paper.

Name _____ Date _____

21.2 Features of the Earth: Land, Layers, and Seasons

Exercise 88

A. Write *true* or *false* on the line below each sentence. If the sentence is false, replace the underlined term with a term from the box to make it true.

core
mantle
continent
equator

1. Each of the Earth's seven large landmasses is called a sphere.

_____

_____

2. An imaginary line called the axis circles the Earth halfway between the North and South poles.

_____

3. The center of the Earth is called the mantle.

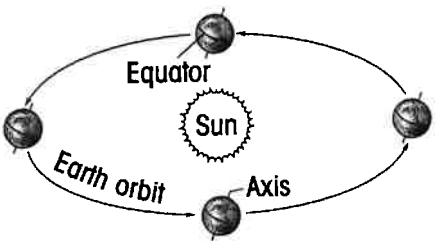
_____

4. The continents and ocean floor are part of the Earth's crust.

_____

B. The diagram below shows the Earth as it orbits the sun. Decide which season it is in the Northern Hemisphere when the Earth reaches each of the four positions. Write the correct answers on the lines.

6. _____



5. _____ 7. _____

8. _____

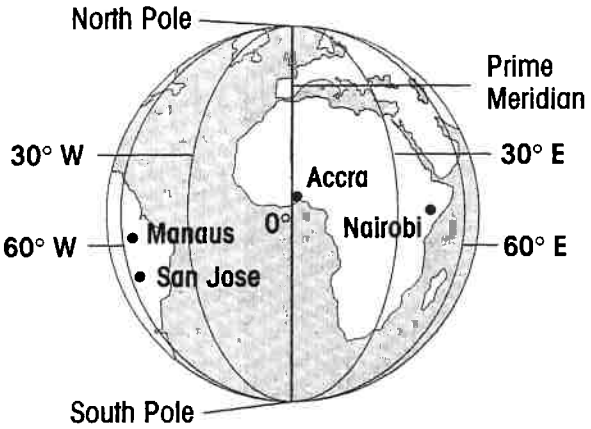
CRITICAL THINKING

How would the lengths of day and night change where you live if the Earth were not tilted on its axis? Write your answer on a separate sheet of paper.

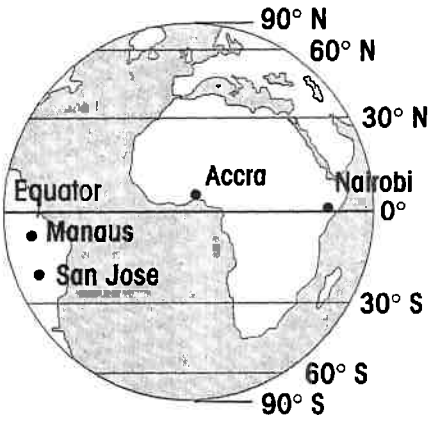
Name _____ Date _____

21.3 Dividing Up the Earth: Lines of Latitude and Longitude — Exercise 89

Study the maps below. Then answer the questions.



Lines of Longitude



Lines of Latitude

1. Which lines are continuously the same distance apart, lines of latitude or lines of longitude? _____

2. What city in the map is closest to the equator? _____

3. At what degree of latitude is the North Pole? _____

4. Which two cities on the map lie on the same line of longitude?

_____

5. Which city on the map is closest to the prime meridian? _____

6. Which line of longitude passes through the smallest amount of land?

_____

7. At what two points do all the lines of longitude meet? _____

CRITICAL THINKING

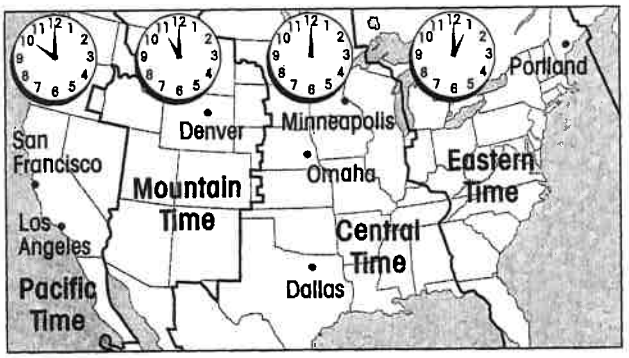
If you travel eastward along a line of latitude, you can circle the Earth completely and always be traveling eastward. However, if you travel northward along a line of longitude, you will begin to travel southward as soon as you cross the North Pole. Why do you think this is so? Write your answer on a separate sheet of paper.

Name _____ Date _____

21.3 Dividing Up the Earth: Time Zones Around the World

Exercise 90

A. You live in Los Angeles and work as a telephone sales person. You sell your products to offices all over the United States. Use the time zone map to answer the questions below.



1. During what hours in *your* time zone should you not call the East Coast because offices will be on their noon lunch hour?

_____

2. The switchboard of your customer in Omaha closes at 5:30 P.M. What is the latest time in *your* time zone that you can get a call through?

_____

B. Your company transfers you to Dallas. You are still selling your products to offices all over the United States. Use the map to answer these questions.

3. You are supposed to return a call to Minneapolis at exactly 3:00 P.M. Minneapolis time. At what time in *your* time zone should you call?

_____

4. You want a fax to arrive in Portland, Maine, at 1:00 P.M. What time in *your* time zone should you send it?

_____

CRITICAL THINKING

Time zones have only been in use since the late 1800s. Why are time zones more important now than they would have been many years ago?

Name _____ Date _____

22.1 Plate Tectonics: Breaks in the Earth's Crust — Exercise 91

A. Complete each sentence with a term from the box.

geologists	magma	volcanoes
lava	earthquake	

1. Magma that has reached the Earth's surface is _____.
2. Melted rock formed in the Earth's mantle is _____.
3. Scientists who study rocks to learn about the history and structure of the Earth are _____.
4. Openings in the Earth's surface that release magma from the mantle are _____.
5. A sudden violent shaking of the Earth is called an _____.

B. Rewrite each sentence to make it true. Replace the underlined term with the correct term.

6. The Earth's crust is made up of several <u>mantles</u>.

_____

7. Plates drift because they float on the hot, soft rock of the <u>crust</u>.

_____

8. Most geologists think that all of the Earth's <u>seas</u> were once part of Pangaea.

_____

CRITICAL THINKING

Will a physical map of the world look the same 5 million years from now as it does today? Why or why not? Write your answer on a separate sheet of paper.

Name _____ Date _____

22.1 Plate Tectonics: Shifting Plates — Exercise 92

A. Several things can happen as the Earth's plates move. Read the descriptions below. Decide what will happen and write it on the line. Choose from the statements in the box.

A trench will form.	An earthquake will occur.
A volcano may erupt.	A mountain range will form.

1. Two plates move toward each other and begin to pile up.

_____

2. Two plates move toward each other, and one gets pushed down under the other.

_____

3. Two plates suddenly slip as they rub past each other.

_____

4. Two plates move, and an opening is formed in the crust.

_____

B. A newspaper reporter is on the scene of either a volcanic eruption or an earthquake. Write a brief news report describing what the reporter sees and hears. Use a separate sheet of paper if you need more space.

_____

_____

_____

_____

CRITICAL THINKING

Why do volcanic eruptions and earthquakes often occur in the same areas? Write your answer on a separate sheet of paper.

Name _____ Date _____

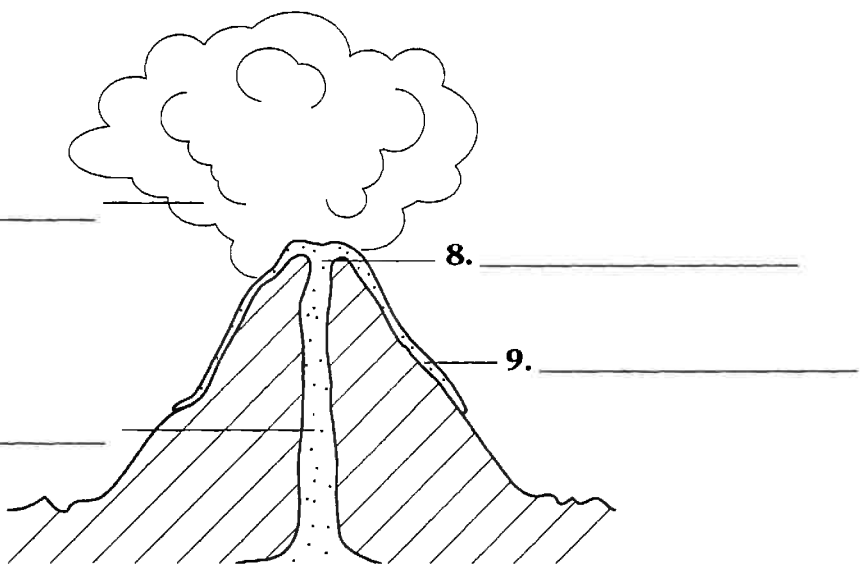
22.1 Plate Tectonics: Earthquakes and Volcanoes — Exercise 93

A. Read the list of events below. Write *volcano* or *earthquake* next to each one, whichever describes the event best.

1. Plates slide past each other. _____
2. Shock waves travel through the Earth's crust. _____
3. Magma rises in a vent. _____
4. A fault forms. _____
5. Lava flows out and becomes rock. _____

B. Label the parts of the volcano, using the terms in the box.

lava	magma	vent	gas and ash



CRITICAL THINKING

Geologists are trying to find a way to predict earthquakes. What might be some signs that they would look for? Write your answer on a separate sheet of paper.

Name _____ Date _____

22.2 Rocks and Minerals: Kinds of Rock — Exercise 94

A. Match each term with its definition. Write the correct letter on the line.

_____ **1.** igneous rock

_____ **2.** sedimentary rock

_____ **3.** metamorphic rock

_____ **4.** weathering

_____ **5.** soil

_____ **6.** erosion

_____ **7.** glacier

a. a type of rock formed by the pressing together of smaller particles of rock or the remains of living things

b. a large, slow-moving field of ice

c. a type of rock formed when igneous or sedimentary rock changes under very high temperatures or pressure

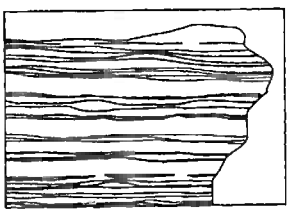
d. a type of rock formed from magma

e. the wearing away of rock or soil

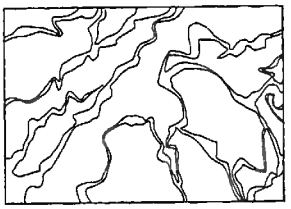
f. a process that breaks down rocks and minerals

g. rocks on Earth's surface broken down by weathering into very tiny pieces that mix with the nutrients from living and once-living things

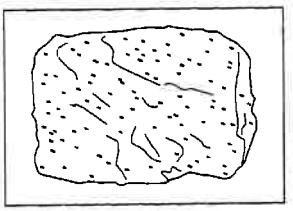
B. Look at the three rocks below. Use the pictures and the labels under them to decide whether each one is *igneous*, *sedimentary*, or *metamorphic*. Write the correct rock type under each picture.



formed in layers



was once another type of rock called limestone



formed from lava

8. _____ **9.** _____ **10.** _____

CRITICAL THINKING

How can an igneous rock become a sedimentary rock? Write your answer on a separate sheet of paper.

Name _____ Date _____

22.2 Rocks and Minerals: Weathering and Erosion — Exercise 95

A. Put a check next to each statement below that describes a cause of either weathering or erosion.

_____ **1.** ice freezing in the cracks of rocks

_____ **2.** people sitting on a sandy beach

_____ **3.** a glacier moving down a mountainside

_____ **4.** a river flowing over boulders

_____ **5.** energy from the sun heating the ground and making air rise

_____ **6.** magma rising in volcanic vents

B. Write *true* or *false* on the line after each sentence. If the sentence is false, rewrite it to make it true.

7. Running water, rain, ice, and chemicals can weather rocks and minerals. _____

_____

8. When water freezes, it contracts and acts like a wedge to break rock. _____

_____

9. Weathering breaks rocks down into tiny pieces of soil. _____

_____

10. Glaciers create mountains as they flow downhill. _____

_____

CRITICAL THINKING

A geologist has two rocks. One has sharp edges, and the other has rounded edges. Which one has been weathered by flowing water? Explain your answer on a separate sheet of paper.

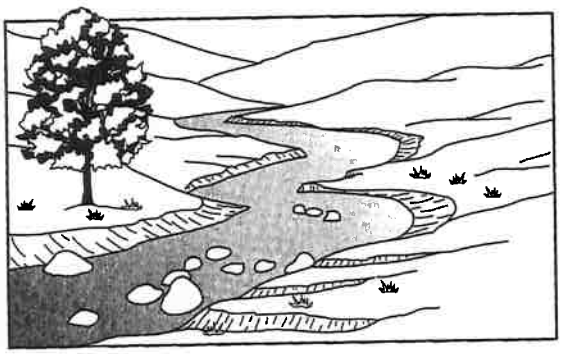
Name _____ Date _____

22.2 Rocks and Minerals: Predicting the Effects of Erosion

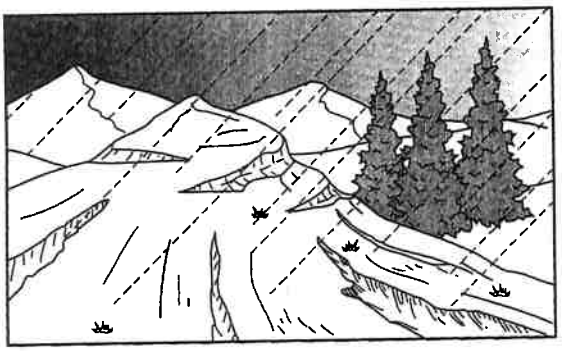
Exercise 96

Study the following pictures. To the right of each picture, draw a second picture showing what the scene might look like in 1,000 years.

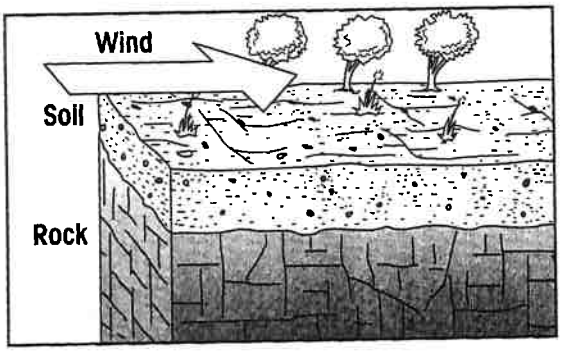
1.



2.



3.



CRITICAL THINKING

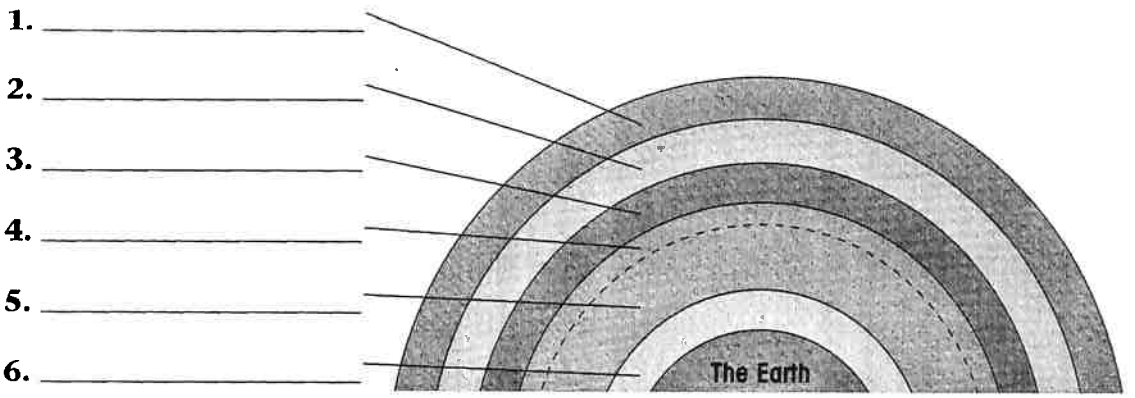
Because of weathering and erosion, landforms change over time. List three other things in nature that change in appearance over time. Explain why each changes. Write your answers on a separate sheet of paper.

Name _____ Date _____

23.1 Air All Around Us — Exercise 97

A. Use the terms in the box to label the layers of the atmosphere on the drawing below. Write the correct terms on lines 1 to 6.

ionosphere	mesosphere	stratosphere
thermosphere	troposphere	ozone



B. Match each description below with its correct layer in the atmosphere. Write the correct letters on lines 6 to 10.

_____ **7.** reflects radio signals	**a.** troposphere
_____ **8.** has thin air	**b.** stratosphere
_____ **9.** is the third layer	**c.** mesosphere
_____ **10.** has clouds	**d.** ionosphere
_____ **11.** has the ozone layer	**e.** thermosphere

CRITICAL THINKING

Mount McKinley is the highest mountain in North America. The top of it is more than 20,000 feet (6,000 meters) above sea level. What advice would you give people who want to climb this mountain? Write your answer on a separate sheet of paper.

Name _____ Date _____

23.2 Properties of Air: Pressure and Temperature Exercise 98

Rewrite each sentence to make it true. Use the correct term from the box to replace the underlined term.

warmer	pressure	uneven	radiation
Earth	gases	faster and spread out	

1. Air pressure is the weight of <u>clouds</u> pressing down on the Earth.

_____

2. A barometer is an instrument that measures air <u>temperature</u>.

_____

3. Energy from the sun reaches the Earth as <u>gravity</u>.

_____

4. The <u>even</u> heating of the atmosphere causes convection currents to form.

_____

5. Heat causes molecules in matter to move <u>slower and come together</u>.

_____

6. At night, clouds act as a blanket and make the land <u>cooler</u>.

_____

7. Heat energy radiating from the <u>sun</u> warms the atmosphere.

_____

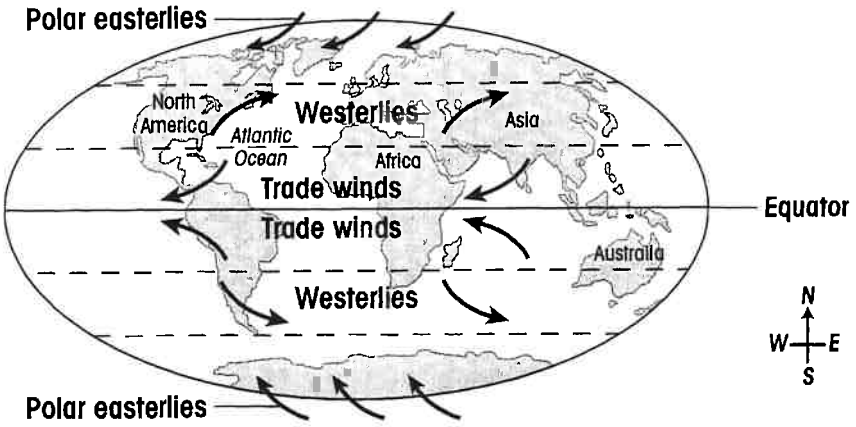
CRITICAL THINKING

Where would you expect to find a greater difference between daytime and nighttime temperatures, at the seashore or in the desert? Explain your answer on a separate sheet of paper.

Name _____ Date _____

23.2 Properties of Air: Wind — Exercise 99

A sailor is planning a trip around the world. Help him plan his trip. Use the map and your knowledge of wind to answer the questions below.



1. After the sailor crosses the Atlantic Ocean, he sails down the coast of Africa. There, near the equator, it is very warm. Heat makes air molecules rise. Do you think this will make the equator a windy place or a calm place? Explain your answer.

_____

_____

2. After passing between Australia and Asia, the sailor is headed across the Pacific Ocean. He is just north of the equator. What winds is he fighting against?

_____

3. As the sailor heads north, aimed at the West Coast of the United States, he finally gets into a wind system that helps him. What is it?

_____

CRITICAL THINKING

The Midwestern states, such as Iowa, Nebraska, and South Dakota, are known for their very hot summers and very cold winters. Washington is farther north, but its west coast has milder weather all year round. It does not get as cold, but it does not get as hot, either. Why is this so? Write your answer on a separate sheet of paper.

Name _____ Date _____

23.3 Water and Air: Precipitation — Exercise 100

A. The terms in the box refer to different forms of water in the atmosphere. Match each term with its definition. Write the term on the line.

water vapor	fog	rain	snow	hail	sleet

_____ **1.** low-lying clouds

_____ **2.** water in the form of a gas

_____ **3.** rain that freezes as it falls through a layer of cold air near the ground

_____ **4.** lumps of ice that form as water freezes around ice crystals that are moving up through rain clouds

_____ **5.** water droplets that fall to the Earth

_____ **6.** water vapor that crystallizes because the temperature in a cloud is below freezing

B. The following statements describe how rain occurs. Place the statements in the order in which they occur. Write the correct numbers (1 to 6) on the lines.

_____ **7.** Droplets collect to form clouds.

_____ **8.** Water vapor in the air forms tiny droplets of liquid water.

_____ **9.** Water enters the air by evaporation.

_____ **10.** Droplets become larger and heavier.

_____ **11.** Droplets fall to the ground as rain.

_____ **12.** Air is cooled below the dew point.

CRITICAL THINKING

It is morning. You want to plan a picnic for the afternoon, but no weather forecast is available. All you know is that right now it is sunny, the humidity is high, and the temperature is dropping. Do you think that today would be a good day for a picnic? Why or why not? Write your answers on a separate sheet of paper.

Name _____ Date _____

23.3 Water and Air: Clouds — Exercise 101

A. Match each term with its definition. Write the correct letter on the line.

_____ **1.** cirrus cloud

_____ **2.** cumulus cloud

_____ **3.** dew point

_____ **4.** humidity

_____ **5.** fog

_____ **6.** stratus cloud

a. a low-lying gray cloud that covers a wide area

b. the amount of water in the air at any given time

c. a high-altitude cloud made of ice crystals

d. a low-lying layer of cloud

e. the temperature at which water vapor turns into liquid water

f. a big, puffy, low-altitude cloud that usually signals good weather

B. Use the descriptions in the box below to fill in the cloud chart. You may use some descriptions twice.

made of ice crystals	made of water droplets	thin and feathery
broad, flat layers	unbroken cloud cover	big, puffy
low in sky	often sign of stormy weather	gray colored
usually bright white	sign of fair weather	seen in mountains

cirrus clouds	stratus clouds	cumulus clouds

CRITICAL THINKING

On a cold day outside, you can "see your breath." How is this like a cloud? Write your answer on a separate sheet of paper.

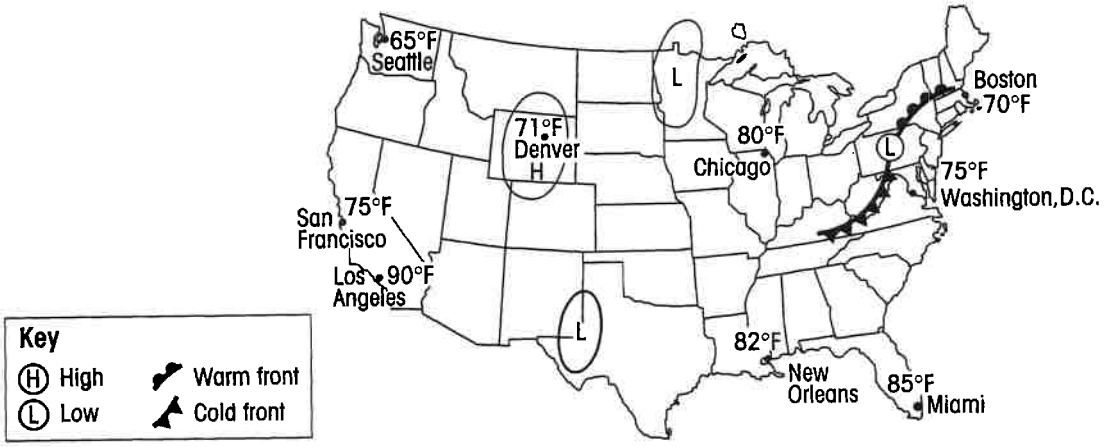
Name _____ Date _____

24.1 Air on the Move — Exercise 102

A. Complete each sentence with one of these terms: *front, climate, weather, air mass, occluded front.*

1. A huge body of air that moves from place to place is an _____.
2. The place where two air masses of different temperatures meet is a _____.
3. The average weather in a region over many years is _____.
4. The condition of the atmosphere at a certain time and place is _____.
5. An _____ forms when a cold front overtakes a warm front.

B. Look at the weather map below. Use the information on it to answer the questions.



6. Is the temperature higher in Los Angeles or Chicago? _____
7. What will the weather be like during the next day or so in Washington, D.C.? _____

CRITICAL THINKING

You are sitting outside in shorts and a short-sleeved shirt. Suddenly the wind picks up. There is a brief but heavy shower that forces you to go inside. When the rain ends, you have to put on a heavy sweater to sit outside. What type of weather system has passed? On a separate sheet of paper, explain how you can tell.

Name _____ Date _____

24.2 Storms — Exercise 103

A. Complete each sentence with a term from the box.

wind	tornado	thunderhead	hurricane

1. A tall, thick cloud that produces lightning and thunder is a _____.
2. Air moving from high to low pressure areas is _____.
3. A stormy cyclone with high winds is a _____.
4. A swirling column of air that extends down from a cumulonimbus cloud is a _____.

B. Complete each sentence with a term from the box.

funnel-shaped	low air
cumulus clouds	lightning

The Earth's surface heats moist air. The air rises and cools, which causes **(5)** _____ to form. An updraft blows up through the clouds. Then cumulonimbus clouds form. A thunderstorm begins. Electric charges build up and then are discharged. Heat from **(6)** _____ expands the air and we hear thunder.

A cyclone is a storm with circling winds in an area of **(7)** _____ pressure. A cyclone extends down from a cumulonimbus cloud and forms a **(8)** _____ cloud. The formed cloud begins to spin rapidly. It can cause a great deal of damage.

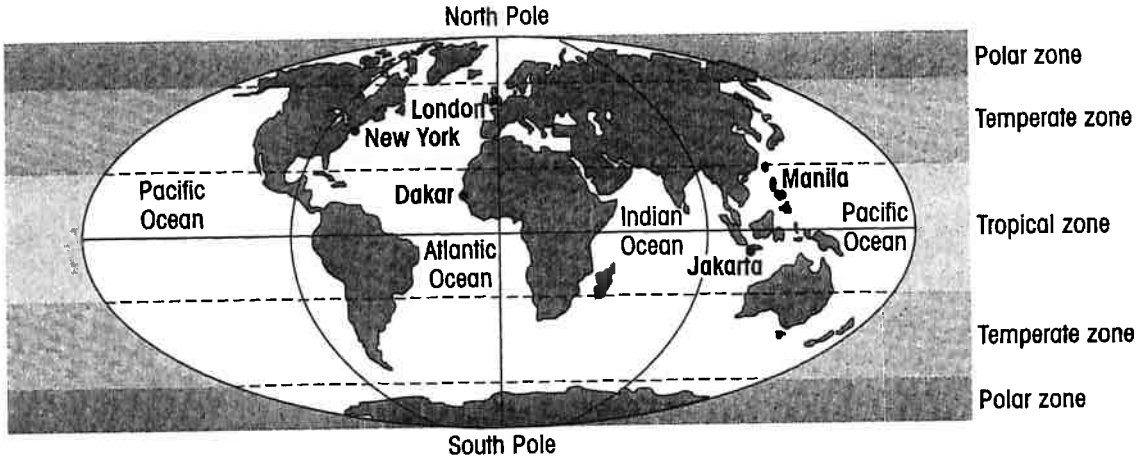
CRITICAL THINKING

The TV weather forecaster says that a high pressure system will arrive tomorrow. Should you plan on taking your umbrella to school? Explain your answer on a separate sheet of paper.

Name _____ Date _____

24.3 The Earth's Climate Zones — Exercise 104

A. Use the climate zone map below to answer the questions.



1. Is Manila or London more likely to have no real winter season? _____

2. Which city, New York or Jakarta, has warm summers and cold winters? _____

3. What type of clothing would you wear to spend Thanksgiving in Dakar? _____

B. Answer the questions below.

4. What is one good thing and one bad thing about living in a tropical climate?

_____

5. What is one good thing and one bad thing about living in a temperate climate?

_____

6. What is one good thing and one bad thing about living in a polar climate?

_____

CRITICAL THINKING

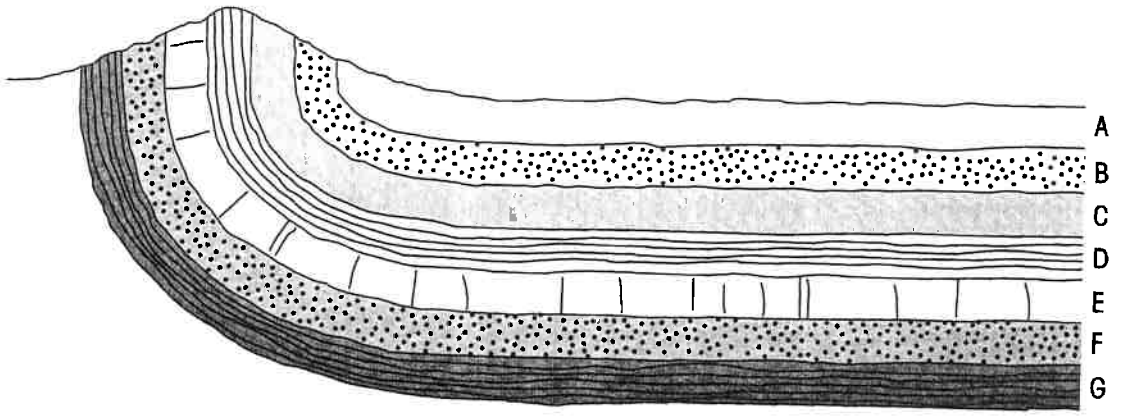
Choose a climate zone other than the one in which you live. How would your life be different if you lived in that climate zone? Write your answer on a separate sheet of paper.

Name _____ Date _____

25.1 The Story in the Rocks

Exercise 105

A. Use the diagram of rock layers below to answer the questions.



1. Which layer is the oldest? _____

2. Which layer is the youngest? _____

3. Why are the layers on the left side of the diagram curving up rather than lying flat?

_____

_____

B. What methods or processes do geologists use to learn about the Earth's history? Name two and describe them.

_____

_____

_____

_____

_____

CRITICAL THINKING

Fossils tell only part of the story of what life was like millions of years ago. How else can we learn about the history of the Earth? Write your answer on a separate sheet of paper.

Name _____ Date _____

25.2 Geological Time: Eras — Exercise 106

A. Finding the age of fossils is not always easy. Sometimes scientists start by ruling out certain time periods. For each fossil described below, cross out the eras the fossil could *not* be from. If you think you know the era the fossil came from, circle your guess.

1. Large dinosaur leg bone

Precambrian Paleozoic Mesozoic Cenozoic

2. A human skull

Precambrian Paleozoic Mesozoic Cenozoic

3. A mud tunnel made by worms

Precambrian Paleozoic Mesozoic Cenozoic

4. A large deposit of coal

Precambrian Paleozoic Mesozoic Cenozoic

B. Geologists find three rock layers on top of one another. In the bottom layer, there are small skeletons of sea animals. In the middle layer, there are skeletons of land animals. In the top layer, there are skeletons of sea animals. Explain the geological events that occurred in the area.

_____

_____

_____

_____

_____

_____

CRITICAL THINKING

The Cenozoic era is the present geological era. However, it may not be the last era. Why? Write your answer on a separate sheet of paper.

Name _____ Date _____

25.2 Geological Time: Past Life — Exercise 107

A. List the organisms in the two groups from simplest (lowest number) to most complex (highest number) below. Then, next to each organism's name, write the name of the era in which it first appeared.

humans, bacteria, birds, dinosaurs

1. _____ **2.** _____

3. _____ **4.** _____

algae, flowering plants, ferns

5. _____ **6.** _____

7. _____

B. Answer the questions below.

8. What group of animals listed above became extinct?

_____

9. Which kingdom, plant or animal, developed more new species between the Mesozoic and Cenozoic eras? Explain.

_____

_____

10. Of all the organisms listed above, which are ancient and which are new in the Cenozoic era?

_____

_____

CRITICAL THINKING

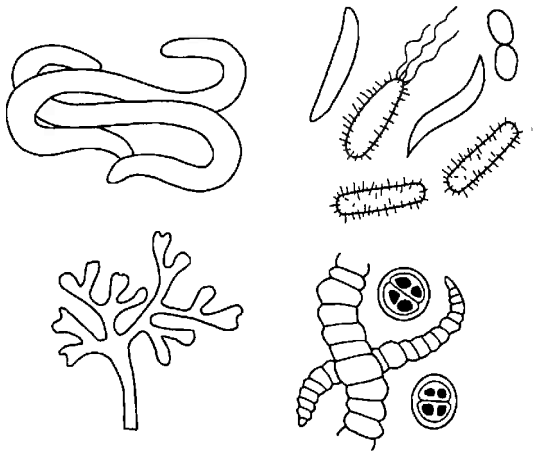
Do you think fossils provide a record of every kind of organism that lived in the past? Explain your answer on a separate sheet of paper.

Name _____ Date _____

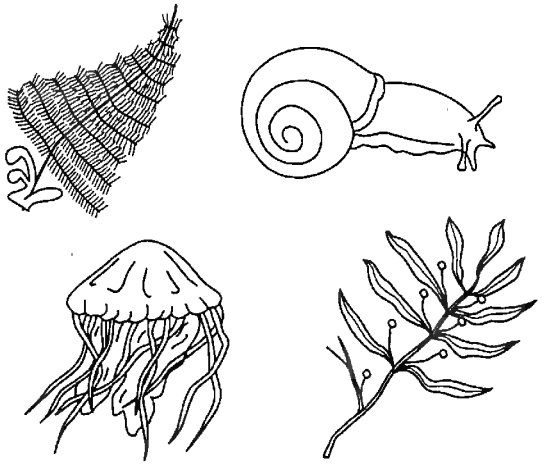
25.2 Geological Time: Ordering Eras — Exercise 108

Label each picture below with an era from the box.

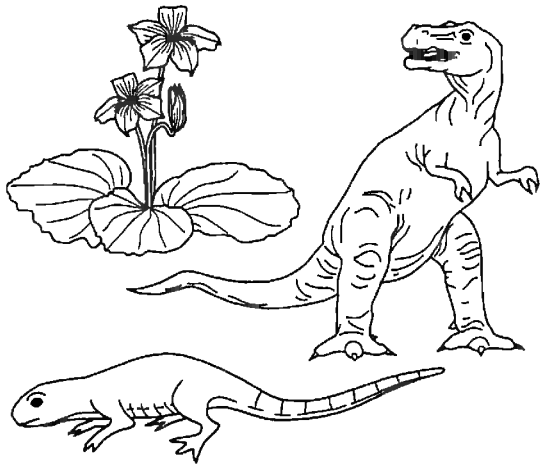
Mesozoic era	Precambrian era	Cenozoic era	Paleozoic era



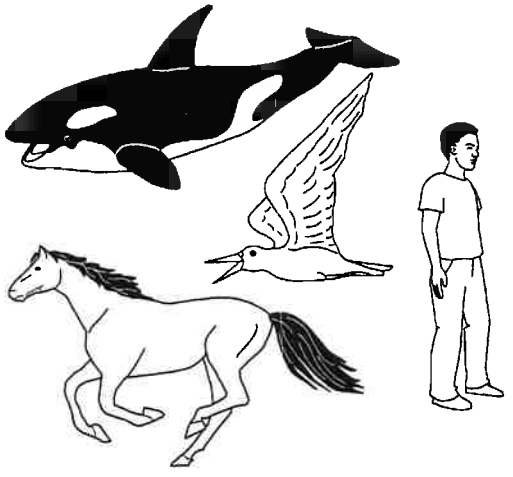
a. _____



b. _____



c. _____



d. _____

CRITICAL THINKING

Name five different kinds of animals. Put them in the order in which their group first appeared on Earth. Explain why you chose that order. Write your answer on a separate sheet of paper.

Name _____ Date _____

26.1 Features of the Oceans: Water — Exercise 109

A. Write *true* or *false* on the lines below each sentence. If the sentence is false, rewrite it to make it true.

1. The oceans cover 70 percent of the Earth's surface.

_____

_____

2. The study of the ocean is called paleontology.

_____

_____

3. The ocean's salinity is the measure of how much water is in it.

_____

_____

4. An ocean current is a mass of water that flows like a river through an ocean.

_____

_____

B. Match each current below with its description. Write the correct letter on the line.

_____ **5.** Gulf Stream system

_____ **6.** density current

_____ **7.** North Atlantic current

a. any current caused by cold, salty water sinking below warmer water

b. a river of water that flows through the Atlantic Ocean

c. the current that moves from Newfoundland toward Europe

CRITICAL THINKING

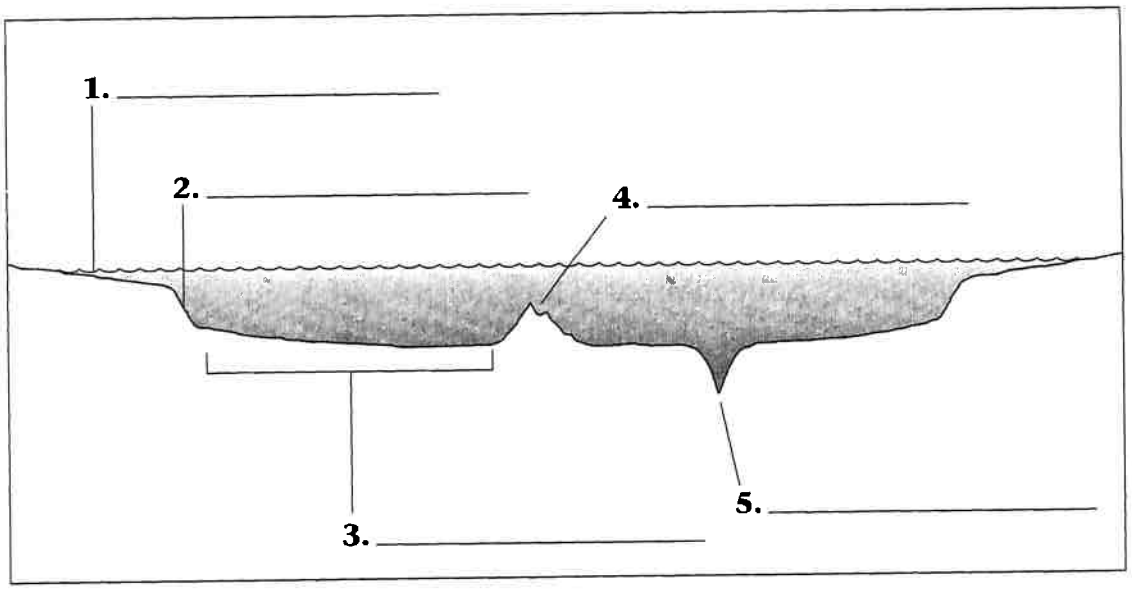
How would life on Earth be different if all of the world's water were as salty as the ocean? Write your answer on a separate sheet of paper.

Name _____ Date _____

26.1 Features of the Oceans: The Ocean Floor Exercise 110

A. Label the parts of the ocean floor, using the terms in the box.

mid-ocean ridge	ocean trench	continental shelf
ocean basin	continental slope	



B. Use the diagram above to answer the questions.

6. You walk into the ocean from the beach. Which part of the ocean floor are you standing on?

_____

7. Which part of the ocean floor looks like a cliff?

_____

8. What is the largest part of the ocean floor?

_____

CRITICAL THINKING

Much of the deep ocean is still unexplored. Why is the study of the deepest parts of the ocean so difficult? Write your answer on a separate sheet of paper.

Name _____ Date _____

26.1 Features of the Oceans: Comparing the Ocean Floor to the Land

Exercise 111

A. Answer these questions.

1. Name four formations that occur on both the ocean floor and on land.

_____ _____

_____ _____

2. Which one of these ocean floor features do you think oceanographers know the least about? Explain your answer.

_____

_____

3. Which part of the ocean floor do you think oceanographers know the most about? Explain your answer.

_____

_____

4. Where do most underwater earthquakes occur?

_____

_____

B. Match each ocean feature with the landform that is most similar. Write the correct letter on the line.

_____	**5.** mid-ocean ridge	**a.**	valley
_____	**6.** trench	**b.**	plain
_____	**7.** continental slope	**c.**	mountain range
_____	**8.** basin	**d.**	cliff

CRITICAL THINKING

Some mountains under the ocean are bigger than those on land. Why might this be the case? Write your answer on a separate sheet of paper.

Name _____ Date _____

26.2 Waves and Tides: Understanding Waves — Exercise 112

A. Match each word with its definition. Write the correct letter on the line.

_____ **1.** undertow

_____ **2.** seismic sea wave

_____ **3.** tide

a. a giant wave caused by an earthquake on the ocean floor

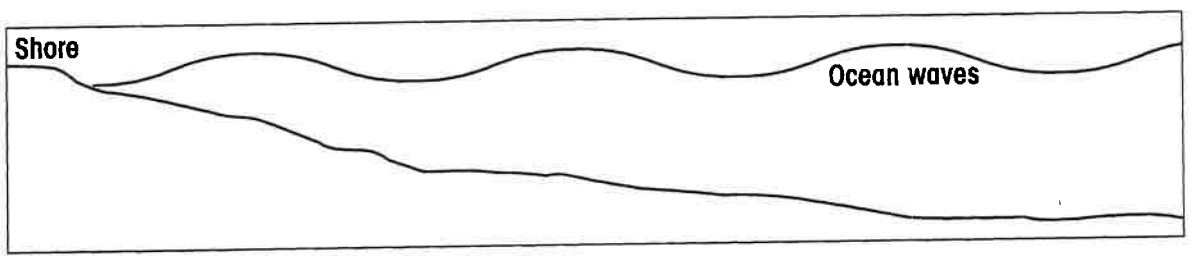
b. the rise and fall of the oceans, caused by the sun's and moon's pull of gravity

c. the backward movement of ocean water near the shore

B. Use the diagram to answer the questions.

4. Draw an arrow on the diagram that shows the direction in which the energy of the waves is moving.

5. Draw another arrow under one of the waves in the diagram to show the direction in which the water is moving.



C. Rewrite each sentence to make it true. Replace the underlined term with one of the following terms: *winds, breakers.*

6. Local <u>tides</u> cause most ocean waves.

_____

7. <u>Rivers</u> form as the tops and bottoms of waves move at different speeds near shore.

_____

_____

CRITICAL THINKING

What do you think would happen if the water in ocean waves moved forward toward shore instead of the way it really moves? Write your answer on a separate sheet of paper.

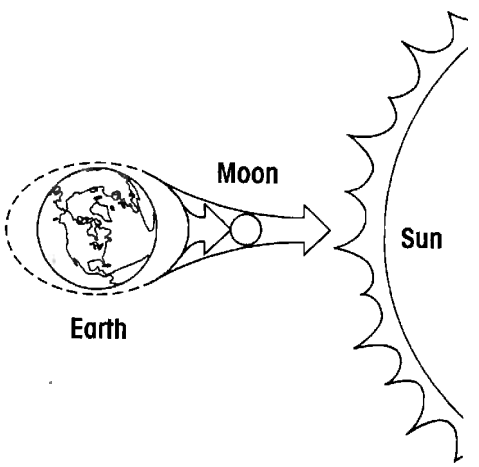
Name _____ Date _____

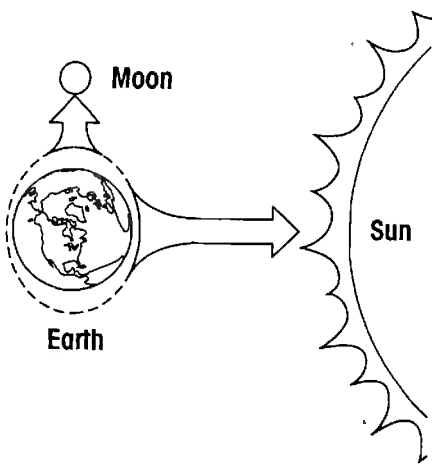
26.2 Waves and Tides: Looking at Tides — Exercise 113

A. Use the following terms to complete the sentences below: ***low tide, moon, neap, coast, gravity, spring.***

1. A tide is the up and down movement of water on the _____.
2. The pull of the _____ and the sun causes tides.
3. Tides that vary greatly in height are _____ tides.
4. During _____, the tide pulls away from the shore.
5. Tides that are neither very high nor very low are _____ tides.
6. Wind causes most waves, but _____ causes tides.

B. Look at the diagrams below. One shows the positions of the Earth, sun, and moon during a neap tide. The other shows their positions during a spring tide. Label the diagrams *neap tide* or *spring tide*.





7. _____ 8. _____

CRITICAL THINKING

Would it be better to explore the coast at high tide or at low tide? Explain your answer on a separate sheet of paper.

Name _____ Date _____

26.3 Ocean Resources: Ocean Life — Exercise 114

Read the following paragraphs about whales. Then answer the questions below.

Many whales migrate between polar and tropical regions. They spend the summer months in Arctic and Antarctic waters. The cold water has a large supply of plankton, which whales eat. The whales build up thick layers of fat in these feeding areas. The whales then migrate south in the fall before the polar waters freeze.

The water is much warmer in the tropical oceans near the equator. The whales give birth to their young there. The babies would not survive if they were born in the cold polar oceans. But food is scarce in the tropical oceans. So adults live off their fat in the warm waters. Babies live off their mother's milk. In late spring the whales migrate north again.

1. Where do whales feed in summer?

_____

2. Where do whales give birth?

_____

3. According to the paragraphs, what would happen to a whale that stayed north all winter?

_____

_____

4. According to the paragraphs, what would happen to a whale that stayed south all summer?

_____

_____

CRITICAL THINKING

Do you think whales are an ocean resource? Why or why not? Write your answer on a separate sheet of paper.

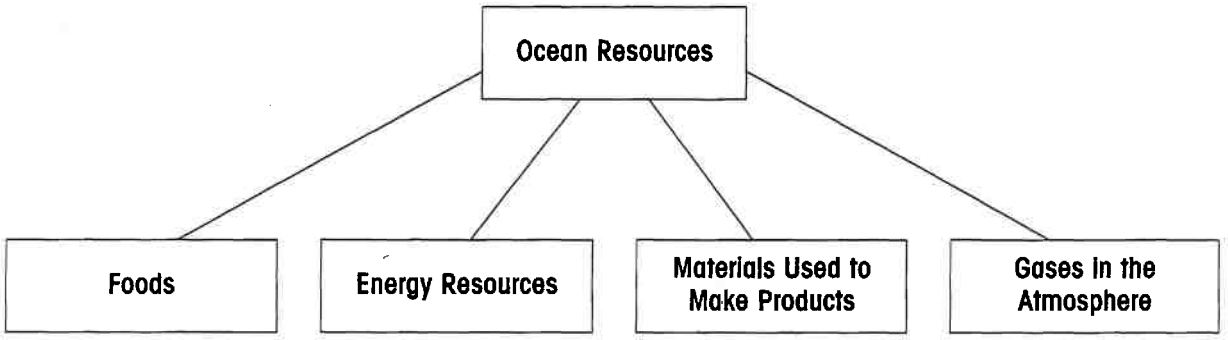
Name _____ Date _____

26.3 Ocean Resources: How We Use Them — Exercise 115

A. Put a check next to each resource that people get from the ocean.

_____ fish	_____ coral
_____ oil	_____ vegetables
_____ fruit	_____ salt
_____ oxygen from algae	_____ wood
_____ tides (as an energy source)	_____ natural gas
_____ coal	_____ metals

B. Use the ocean resources you chose above to fill in the lines below.



1. _____	**3.** _____	**6.** _____	**8.** _____
2. _____	**4.** _____	**7.** _____	
	5. _____		

CRITICAL THINKING

Which ocean resource above do you think is the most important to people? Why? Write your answer on a separate sheet of paper.

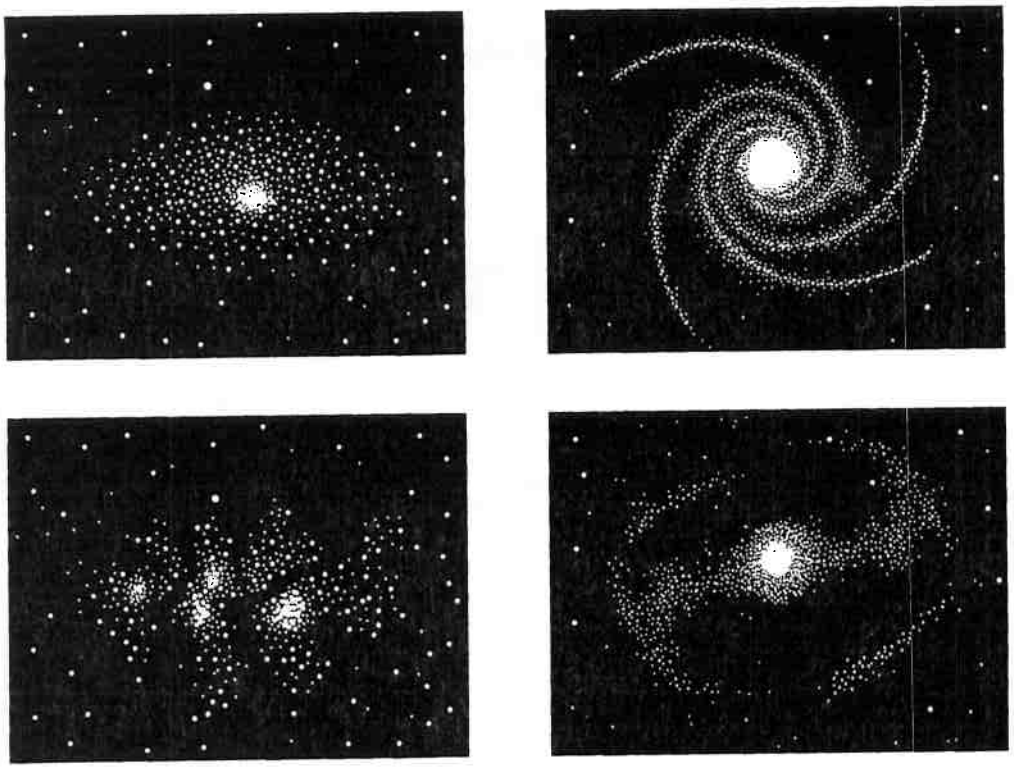
Name _____ Date _____

27.1 The Last Frontier — Exercise 116

A. Complete the sentences below with these terms: *astronomy, universe, galaxy, stars.*

1. The _____ is all the matter, energy, and space that exists.
2. The Milky Way is a _____ that contains the Earth and the rest of the solar system.
3. The study of the stars, planets, and all of space is _____.
4. The Milky Way contains billions of _____.

B. There are four types of galaxies below. Each one has a different shape. Circle the galaxy that has the same shape as the Milky Way.



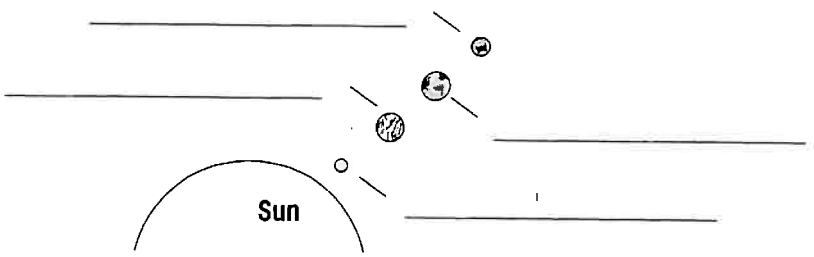
CRITICAL THINKING

Astronomers group galaxies by their shape. What is another property of galaxies that astronomers might use to group them? Write your answer on a separate sheet of paper.

Name _____ Date _____

27.2 The Solar System: The Inner Planets — Exercise 117

The inner planets are Earth, Mars, Mercury, and Venus. On the diagram, label them. Then, on the lines below that, write their names in order from closest to the sun to farthest from the sun. Write two facts about each planet.



1. Planet _____

Facts _____

_____

2. Planet _____

Facts _____

_____

3. Planet _____

Facts _____

_____

4. Planet _____

Facts _____

_____

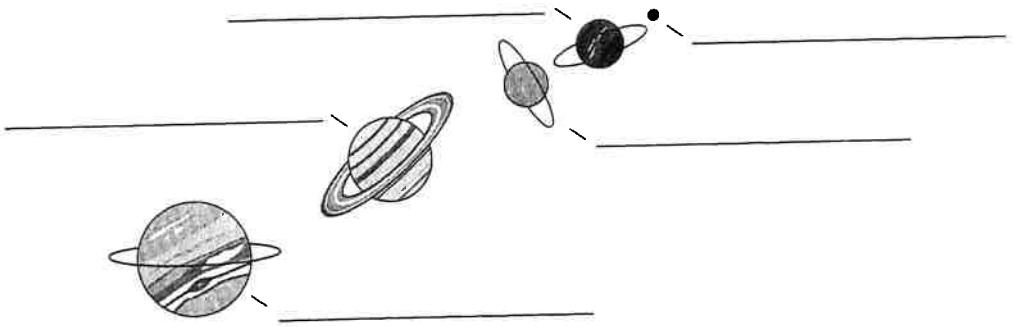
CRITICAL THINKING

The fuel that powers the sun is hydrogen and helium. What is the process the sun uses to produce its light and heat? Name and explain that process on a separate sheet of paper. (Hint: Look at Chapter 15 in your textbook if you need help.)

Name _____ Date _____

27.2 The Solar System: The Outer Planets — Exercise 118

The outer planets are Jupiter, Neptune, Pluto, Saturn, and Uranus. On the diagram, label them. On the lines below, write their names in order from closest to the sun to farthest from the sun. Then write one fact about each planet.



1. Planet _____

Fact _____

2. Planet _____

Fact _____

3. Planet _____

Fact _____

4. Planet _____

Fact _____

5. Planet _____

Fact _____

CRITICAL THINKING

The large outer planets all have many moons and rings. Do you think the moons and rings are related to each other? Explain your answer on a separate sheet of paper.

Name _____ Date _____

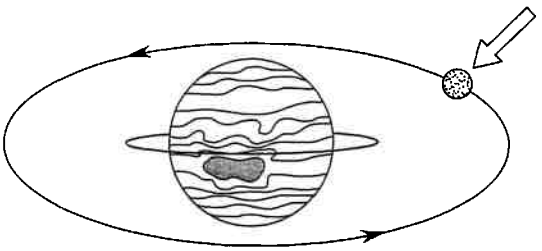
27.2 The Solar System: Asteroids, Comets, and Meteors

Exercise 119

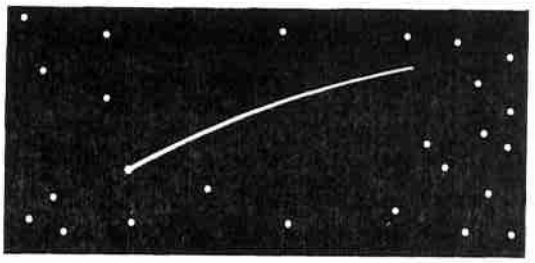
A. Match each word with its definition. Write the correct letter on the line.

_____	**1.** satellite	**a.** a ball of ice and dust that orbits the sun
_____	**2.** asteroid	**b.** an object that orbits a planet
_____	**3.** comet	**c.** a meteoroid that falls to the Earth
_____	**4.** meteor	**d.** a small, rocky object that orbits the sun
_____	**5.** meteorite	**e.** a bright streak of light caused by a meteoroid burning up in the Earth's atmosphere

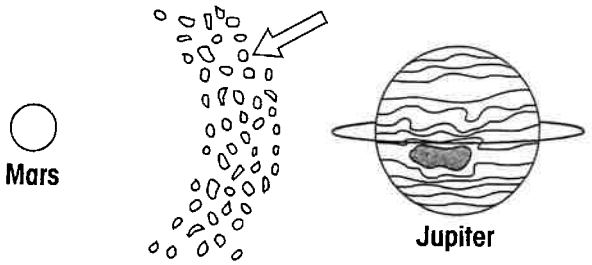
B. Label the drawings below with these terms: *asteroid, satellite, comet, meteor.*



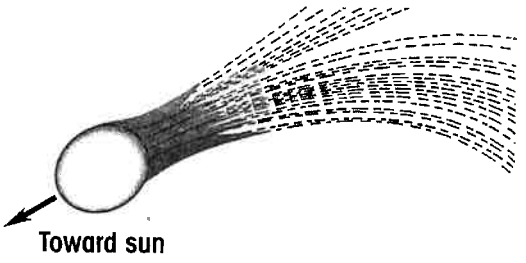
6. _____



7. _____



8. _____



9. _____

CRITICAL THINKING

Objects from space enter the Earth's atmosphere constantly. Why don't we see pieces of rock falling to the ground around us all the time? Write your answer on a separate sheet of paper.

Name _____ Date _____

27.3 Space Exploration — Exercise 120

A. Match each event with the year it happened. Write the correct letter on the line.

_____ **1.** *Viking* sends photos from Mars.

_____ **2.** *Explorer 1*, the first U.S. satellite, is launched.

_____ **3.** First American woman goes into space.

_____ **4.** Space exploration begins.

a. 1983

b. 1957

c. 1958

d. 1976

B. Think about what it would be like to take part in a space shuttle mission. Then answer the questions below.

5. Choose something that you would like to do experiments on in space. Draw a line under one of the choices below. Or think of something different, and write it on the lines.

How does appetite change in space?

What effects does space travel have on the growth of plants?

Does space travel have an effect on the behavior of insects?

Does friction change when there is less gravity?

_____

_____

6. Now think of an experiment that would help you answer the question. Describe how you would set up and carry out your experiment.

_____

_____

_____

_____

CRITICAL THINKING

In the future, astronauts may travel to other planets in the solar system. What planet do you think would be best for space exploration? Why? Write your answer on a separate sheet of paper.