Study Guide and Reinforcement
Student Edition
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Directions: Match the terms from the word bank with the phrases below.

<table>
<thead>
<tr>
<th>Earth science</th>
<th>health science</th>
<th>physical science</th>
<th>scientific theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>chemistry</td>
<td>life science</td>
<td>physics</td>
<td>technology</td>
</tr>
<tr>
<td>climate</td>
<td>mountain gorillas</td>
<td>science</td>
<td></td>
</tr>
</tbody>
</table>

1. the study of matter and energy
2. something a meteorologist might study
3. an explanation of a pattern in nature that is supported by observations and results from many investigations
4. an endangered species that was studied by Dian Fossey in Rwanda
5. study of living systems and their interactions
6. the study of energy and its ability to change matter
7. a field that is part of life science and includes careers such as dietitians, nurses, and physiotherapists
8. study of nonliving things and systems on Earth and in space
9. a way of learning more about the world, that starts with making observations and asking questions
10. applications of theoretical science. It’s what engineers develop.
11. the study of matter

Directions: Use Figure 2 to list four possible outcomes when new information is found about a scientific explanation.

12. ____________________________  13. ____________________________
14. ____________________________  15. ____________________________

Directions: Fill in the chart with the three interacting parts of a system, and two examples of each of these parts from your school.

<table>
<thead>
<tr>
<th>Three Parts of a System</th>
<th>First Example</th>
<th>Second Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Directions: Circle the term in the puzzle that fits each clue. Then write the term on the line. In the puzzle, terms read across or down.

1. Using your senses to gather information is called ____________________.
2. A reasonable and educated guess based on what you know and observe is called a(n) ____________________.
3. Making an educated guess on the results of an experiment based on observations and the hypothesis is called making a(n) ____________________.
4. In any good experiment, the scientist needs to ____________________ the hypothesis.
5. You can use a table or a graph to ____________________ your findings.
6. After your investigation, you can use the results of your experiments to draw ____________________.

Directions: Answer the following question on the lines provided.
7. What is a controlled experiment? Give an example.
Directions: Complete the following sentences using the correct terms.

1. A model built using software that you can see on a computer screen is a ____________________ model.

2. $E = mc^2$ is Einstein's ____________________ model of the theory of relativity.

3. A mobile that shows our solar system is a ____________________ model.

4. Some models are used to communicate ____________________ to other people.

5. Some models are used because testing with a model is ____________________ and less expensive than the real thing.

Directions: Answer the following questions on the lines provided.

6. List one example of a model used to test a prediction.

7. List one way a computer model could help a scientist studying plants.

8. What are the limitations of models?

9. Ancient scientists thought that Earth was the center of the universe, and imagined the sky as a blanket that covered the planet. Why did this early model change?
Evaluating Scientific Explanation

Directions: Fill in the blanks with the following terms.

repeatable explanations laboratory changing
evaluate inferences data critical thinking conclusions

Scientists often have to evaluate scientific explanations in two parts. Scientists evaluate the observations that are made, and evaluate the 1. ________________ made from those observations. To make a decision, scientists use their 2. ________________ skills to evaluate the evidence. Scientists have to be careful whenever they are collecting any type of 3. ________________. Measurements must be accurate and instruments must be properly calibrated, as scientists cannot afford to be careless in their data collection.

Valid scientific explanations must be 4. ________________ by other scientists. If a scientist’s experiment cannot be recreated accurately by other scientists, it might mean that the experiment is invalid. Once the experiments and evidence have been tested and examined, the scientist might draw 5. ________________ based on the observations. However, when drawing conclusions, scientists should ask themselves if they considered all of the possible 6. ________________. It is important to keep an open mind when drawing conclusions from scientific information. It is also important to remember that scientific information is constantly 7. ________________, and that all scientific models are subject to change.

It is important to know that scientific reasoning is used not only in the 8. ________________. Scientific reasoning and critical thinking skills are used every day. These skills will help you 9. ________________ claims and make good decisions about the world around you.

Directions: Answer the following questions on the lines provided.

10. Why is it important for a scientist to write down every observation, including unexpected observations?

________________________________________________________________________

11. How is evaluating an advertising claim a use of the scientific process?

________________________________________________________________________

12. Does an advertiser’s claim that its results have been verified by an independent laboratory impress you?

________________________________________________________________________
Directions: Use the word bank to fill in the blanks in the summary statements.

<table>
<thead>
<tr>
<th>accuracy</th>
<th>far</th>
<th>much</th>
</tr>
</thead>
<tbody>
<tr>
<td>decimal places</td>
<td>long</td>
<td>measurement</td>
</tr>
</tbody>
</table>

(1) ____________________ is a way to describe the world with numbers. It can tell you how
(2) ____________________, how (3) ____________________, or how
(4) ____________________, by measuring time, distance, and mass.

(5) ____________________ is a description of how close measurements are to each other. It can also be used to describe the number of (6) ____________________ a number has.

(7) ____________________ is a description of how close a measurement is to the true value.

Directions: Decide whether the number in column A or column B answers each question below and write the letter in the blank provided.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. the more accurate number, if the actual value is 10.21 g</td>
<td>10.201</td>
<td>10.19</td>
<td>A</td>
</tr>
<tr>
<td>9. the more precise number, if the actual value is 10.21 g</td>
<td>10.201</td>
<td>10.19</td>
<td>B</td>
</tr>
<tr>
<td>10. the more accurate number, if the actual value is 750 m</td>
<td>740.3</td>
<td>747</td>
<td>A</td>
</tr>
<tr>
<td>11. the more precise number, if the actual value is 750 m</td>
<td>740.3</td>
<td>747</td>
<td>B</td>
</tr>
<tr>
<td>12. the number 11.289, rounded to the tenths place</td>
<td>11.2</td>
<td>11.3</td>
<td>B</td>
</tr>
<tr>
<td>13. the number 12.4446, rounded to the hundredths place</td>
<td>12.45</td>
<td>12.44</td>
<td>A</td>
</tr>
<tr>
<td>14. the number 879,642 rounded to the hundreds place</td>
<td>879,600</td>
<td>879,000</td>
<td>B</td>
</tr>
<tr>
<td>15. the number of significant digits in 1280003</td>
<td>4</td>
<td>7</td>
<td>B</td>
</tr>
<tr>
<td>16. the number of significant digits in 454.00</td>
<td>5</td>
<td>3</td>
<td>B</td>
</tr>
<tr>
<td>17. the number of significant digits in 0.00002405</td>
<td>8</td>
<td>4</td>
<td>A</td>
</tr>
</tbody>
</table>
**SI Units**

**Directions:** Complete the chart by filling in the SI unit and the tool you would use for each measurement.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Unit</th>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. mass of rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. your body temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. volume of a plastic block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. length of your classroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. how much water a tablespoon holds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. how long between blinks of your eyes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** Convert each of the following SI measures.

7. 64 km = ____________________ m
8. 373 g = ____________________ kg
9. 897 mm = ____________________ cm
10. 0.25 L = ____________________ mL

**Directions:** Use the following information to answer the questions below.

A train travels at the rate of 120 km per hour.

11. What is its speed in meters per second?

12. What is its speed in meters per minute? Show your work in the space below.
Directions: Match the information in Column I with the best way to display it from Column II. Write the letter of the correct term in the blank at the left. A letter may be used more than once.

Column I

1. view of Earth from space
2. amount of rainfall in an area each month for a year
3. how the constellations change position over several hours
4. percents of the most abundant metals in Earth’s crust
5. percents of the different gases in the atmosphere on Mars
6. how far a hurricane moves each hour
7. structure of the human ear
8. daily high and low tide times for a week
9. how a sound wave travels through the air

Column II

a. bar graph
b. circle graph
c. drawing
d. line graph
e. movie
f. photograph
g. table

Directions: Use the paragraph below to complete question 10.

Some animals can live much longer than others. For example, both the golden eagle and the blue whale have a maximum life span of more than 80 years, while a guppy’s maximum life span is only 5 years. A giant spider may live 20 years, a lobster 50 years, and a crocodile may live 60 years.

10. Make a chart and draw a graph to display the data given in the paragraph.
### Directions:
List nine physical properties of matter, give an example of each one, and explain how each is measured or calculated. Include units if they apply.

<table>
<thead>
<tr>
<th>Property</th>
<th>Example with Units</th>
<th>How It Is Measured or Calculated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Directions:
List three physical properties of metals. Give the definition of each property and explain a use of a metal with each property.

<table>
<thead>
<tr>
<th>Property</th>
<th>Definition</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Directions:
Explain what a physical change is, and give an example.

13.  

---

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**Chemical Properties and Changes**

**Directions:** Answer the following question on the lines provided.

1. What are the differences between physical and chemical changes? Explain them, giving two examples of each.

**Directions:** Label the following changes as **C** for chemical or **P** for physical.

- ___ 2. forming a bar of copper into a wire
- ___ 3. frying an egg
- ___ 4. breaking a glass
- ___ 5. bleaching your hair
- ___ 6. transferring graphite from a pencil to paper when writing
- ___ 7. dissolving a drink mix in water
- ___ 8. shooting off fireworks
- ___ 9. a puddle drying up after a rain

**Directions:** In number 10 below, a code letter has been substituted for each letter in the alphabet. To find out what the sentence says, use the following key to decode it. In the key, the code letters are shown directly below the alphabet letters they stand for. Write the correct letter above each code letter, then read the sentence.

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| S | W | Q | G | L | V | A | X | C | R | Y | E | F | B | K | I | J | U | N | V | Z | P | O | H | D | M |

10. FSNN C N BKV QUL S VL G KU G L NV UK DL G

    G Z U C B A S BD Q X LF C Q SE Q X S B A L
Directions: List five things that are matter and five things that are not matter.

<table>
<thead>
<tr>
<th>Matter</th>
<th>Not Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

Directions: List the five main points of Democritus’ atom theory.

6. __________________________________________
7. __________________________________________
8. __________________________________________
9. __________________________________________
10. _________________________________________

Directions: Use the word bank to fill in the blanks to match the phrases below.

<table>
<thead>
<tr>
<th>atom</th>
<th>Chadwick</th>
<th>electron cloud</th>
<th>orbits</th>
<th>Rutherford</th>
<th>Thomson</th>
</tr>
</thead>
<tbody>
<tr>
<td>model</td>
<td>electron</td>
<td>neutron</td>
<td>proton</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. a neutral particle that is located in the nucleus
12. a negative particle that orbits the nucleus
13. a positive particle that is located in the nucleus
14. the area where modern scientists think electrons are likely to be found
15. scientist who discovered that atoms contained electric charge
16. a student of Niels Bohr who discovered neutrons in the nucleus
17. the place where Bohr thought electrons would be found
18. the smallest piece of matter that keeps the properties of the element to which it belongs
19. scientist who proposed the idea of a nucleus
20. a way of thinking about the structure of the atom
The Simplest Matter

Study Guide

Directions: Complete the table by writing in the appropriate characteristics for metals, metalloids, and nonmetals.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Metals</th>
<th>Metalloids</th>
<th>Nonmetals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. State of matter at room temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Shininess</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Conductor of heat or electricity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Malleability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Ductility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Location on periodic table</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Directions: The square below represents one element from the periodic table. Identify and describe the numbered items. Then answer the questions below.

7. ____________

8. ____________

9. ____________

10. What is the atom’s mass number?

11. What are isotopes?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
### Compounds and Mixtures

**Directions:** Select the term below that best describes each food listed.

<table>
<thead>
<tr>
<th>homogeneous mixture</th>
<th>compound</th>
<th>heterogeneous mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. milk</td>
<td>6. popsicle</td>
<td></td>
</tr>
<tr>
<td>2. salt</td>
<td>7. chili</td>
<td></td>
</tr>
<tr>
<td>3. sugar</td>
<td>8. taco</td>
<td></td>
</tr>
<tr>
<td>4. soda pop</td>
<td>9. pizza</td>
<td></td>
</tr>
<tr>
<td>5. ice cream</td>
<td>10. water</td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** Answer the following questions on the lines provided.

11. Describe what a compound’s formula tells us about the compound.

   [Blank]

12. Both compounds and mixtures contain more than one kind of atom. Explain how a compound is different from a mixture.

   [Blank]

**Directions:** Draw a line from the term on the right to its definition or description on the left.

13. a sample of matter that has the same composition and properties throughout  
   homogeneous mixture

14. a pure substance whose smallest unit is made up of atoms of more than one element  
   compound

15. two or more substances that are together but do not combine to form a new, pure substance  
   substance

16. a mixture that is the same throughout  
   mixture

17. a mixture with visible components  
   heterogeneous mixture
**Directions:** Fill in the chart with information from the chapter.

<table>
<thead>
<tr>
<th></th>
<th>Definition</th>
<th>Does it depend on direction?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>distance</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>average speed</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>instantaneous speed</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>velocity</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>acceleration</td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** A snowboarder is moving down a half-pipe. Describe what the acceleration would be in the following situations, and how this would affect the snowboarder’s velocity.

6. The snowboarder does a turn in midair while keeping a constant speed. (note: the acceleration is directed toward the center of the turn)

7. The snowboarder goes down a steep slope.

8. The snowboarder moves up the half-pipe.

9. The snowboarder moves down the half-pipe.

**Directions:** Explain how the velocity of an object could change while its speed stayed the same.

10. ...

**Directions:** Use Figure 5 to help you fill in the chart.

<table>
<thead>
<tr>
<th></th>
<th>Description of the Moving Figure</th>
<th>Description of Acceleration</th>
<th>What Happens to Speed</th>
<th>Description of Line on a Speed-Time Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>coasts down a hill</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>skates on a flat surface</td>
<td>speed stays the same</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>skates up a hill</td>
<td>acceleration is opposite to motion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Newton’s Laws of Motion

**Directions:** A yo-yo with a mass 0.25 kg is suspended from a hook on a ceiling. Use the diagram at the bottom of the page to answer the questions.

1. Identify which of Newton’s laws explains what happens in each of the following steps.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Earth pulls the yo-yo downward and the yo-yo pulls Earth upward.</td>
<td></td>
</tr>
<tr>
<td>b. The yo-yo doesn’t move.</td>
<td></td>
</tr>
<tr>
<td>c. Someone pushes on the yo-yo in the direction shown by the arrow, and the yo-yo moves.</td>
<td></td>
</tr>
<tr>
<td>d. The yo-yo keeps swinging back and forth.</td>
<td></td>
</tr>
<tr>
<td>e. The yo-yo slows down and eventually stops.</td>
<td></td>
</tr>
<tr>
<td>f. The yo-yo pulls on the hook and the hook pulls on the yo-yo.</td>
<td></td>
</tr>
</tbody>
</table>

2. What is the net force acting on the yo-yo in step b?

3. In step e, what force causes the yo-yo to slow down and stop?

4. If a net force of 0.2 N is applied in step c, use the space below to calculate how fast the yo-yo accelerates.

5. If the same net force is applied to a yo-yo with a mass of 0.5 kg, how will the rate of acceleration be affected? Why?

6. If the hook exerts a force of 0.001 N on the ceiling, how much force does the ceiling exert on the hook?
Directions: Describe what is happening in each situation as work or no work.

1. ____________________  
2. ____________________  
3. ____________________

Directions: Name two situations in which no work is done to an object.

4. ____________________
5. ____________________

Directions: Answer the following questions on the lines provided.

6. What two things must occur for effort to count as work?

7. How is work measured?

8. What is mechanical advantage?

9. How do the three classes of levers differ?

10. How does a pulley make work easier if it doesn’t multiply force?
Energy Changes

Directions: State the law of conservation of energy.

1. ________________________________________________________________________

Directions: Label each situation with the type of energy it describes. Some situations may have more than one answer.

<table>
<thead>
<tr>
<th>chemical</th>
<th>heat</th>
<th>kinetic</th>
<th>nuclear</th>
<th>potential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.</td>
<td>a rolling ball gains more of this kind of energy when it moves faster</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td>skiers gain this type of energy when they travel up the hill on a lift</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.</td>
<td>energy stored in the nuclei of atoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.</td>
<td>energy stored in chemical bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.</td>
<td>the energy of moving water</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.</td>
<td>energy of position</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.</td>
<td>as objects become hotter, they have more of this type of energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.</td>
<td>two kinds of energy produced by burning firewood</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.</td>
<td>energy of a moving soccer ball</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.</td>
<td>energy stored in gasoline</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Directions: List two factors that cause a large meteor crashing into Earth to have more kinetic energy than a batted baseball.

12. ________________________________________________________________________

13. ________________________________________________________________________

Directions: List three situations where energy is transformed from one form to another.

14. ________________________________________________________________________

15. ________________________________________________________________________

16. ________________________________________________________________________
Directions: Complete the following sentences using the correct terms.

1. The words ____________________ and ____________________ are commonly used to indicate temperature, but they are not scientific terms because they mean different things to different people.

2. Temperature really is a measure of the ____________________ of the particles in any material.

3. ____________________ is an energy transfer due to a difference in temperature.

Directions: Complete the chart.

<table>
<thead>
<tr>
<th>Name of Scale</th>
<th>Abbreviation</th>
<th>Temperature at which water freezes (degrees)</th>
<th>Temperature at which water boils (degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fahrenheit</td>
<td>4.</td>
<td>5.</td>
<td>6.</td>
</tr>
<tr>
<td>Celsius</td>
<td>7.</td>
<td>8.</td>
<td>9.</td>
</tr>
</tbody>
</table>

Directions: Read the following description. Then answer the questions.

Assume that you have just taken a pan of cookies out of the oven and set them on the counter to cool. In the space below, draw a picture of the cookies in the pan sitting on the counter. Add wavy lines to show the heat from the cooling cookies.

10. What term refers to the average kinetic energy of the particles of one of the cookies?

11. Imagine you put your hand next to one cookie without touching it. Your hand feels warm. By what method(s) has the thermal energy of the cookies transferred to your hand?

12. Imagine you move the pan and touch the spot where it had been sitting. The counter feels warm. How did the thermal energy of the cookies transfer to the counter?

13. The lines you drew above the cookies show that the air above the cookies is rising in a current.
   a. By what method is the thermal energy causing the air to move? ____________________
   b. What kind of current is this? ____________________
Directions: Complete the following sentences using the correct terms and phrases.

1. Chemical ________________ stored in oil, gas, and coal is used everyday.

2. Scientists refer to the potential energy within chemical bonds as ________________.

3. Energy is stored in the ________________ between the atoms in a compound.

4. Muscles in your body transform chemical energy into ________________ and heat when they move.

5. In chemical reactions, chemical bonds ________________ between some particles and ________________ between other particles.

6. Chemical reactions that absorb energy are called ________________.

7. A photosynthetic reaction in a plant cell transforming energy from sunlight into chemical energy is a(n) ________________ chemical reaction.

8. Living things depend on ________________ for food and oxygen.

9. Exothermic reactions are chemical reactions that ________________ energy.

10. Rates of chemical reactions can be changed by a substance called a(n) ________________, whose own structure is not changed by the reaction.

11. Greater amounts of sugar will dissolve in water if the water is ________________.

12. Your body relies on biological catalysts called ________________ to control cell processes.

Directions: For each of the following statements, write True or False on the line provided.

13. In a chemical reaction, the state of a substance changes, but the substance itself is not changed.

14. Rusting is a chemical reaction that occurs when a metal combines with oxygen.

15. All chemical reactions occur at the same rate.

16. Every chemical reaction includes some energy transformation.

17. Not every chemical reaction gives off energy.
Directions: Match the terms from the list with the correct phrase below.

- air currents
- attract
- charging by contact
- charging by induction
- conductors
- electric force
- grounding
- insulators
- negatively charged
- neutral
- positively charged
- repel

1. cause the bottom of a storm cloud to become negatively charged
2. how the ground beneath a storm cloud becomes positively charged
3. how a lightning rod protects a building
4. what a positive and a negative charge will do
5. what two positive charges will do
6. describes an atom with equal numbers of protons and electrons
7. depends on the amount of charge on two objects and the distance between them
8. describes an atom when the number of electrons is greater than the number of protons
9. gold, silver, and copper
10. materials with electrons that can not move easily through the material
11. describes an atom when the number of electrons is less than the number of protons
12. how a balloon becomes charged when you rub it on a cat

Directions: Order the following steps in the production of lightning. The first step has been numbered for you.

13. The electric field surrounding the excess electrons in the bottom of the storm cloud repels electrons in the ground.

14. Charges move quickly from the cloud to the ground, causing a flash of lightning.

15. During a storm, air currents in storm clouds cause electrons to be transferred from the top of the cloud to the bottom.

16. The ground beneath the storm cloud becomes positively charged.

Directions: Explain how a lightning flash can occur within a storm cloud.

14.
Electric Current

Directions: Circle the answer that correctly completes the sentence.

1. The closed path in which electric charges can flow is an electric circuit / current.

2. Electrons flow from the positive / negative terminal of a battery.

3. Collisions of electrons with other particles in a circuit convert electrical energy / charge into heat or light.

4. V = IR is the equation that expresses the relationship known as Ohm’s / Ampere’s Law.

5. In the formula, V = IR, current is represented by the letter I / R.

6. The light switch in your classroom is part of a series / parallel circuit if it controls all of the lights at once.

7. A simple electric circuit includes a switch / crank battery, lightbulb, and wires.

8. One source of energy / heat for a circuit is a battery.

9. The unit for voltage is the volt / hertz.

Directions: Answer the following questions.

10. What happens to the total charge on a wire when a current flows through the wire?

11. In a light circuit with a constant voltage, what is the effect on current if the number of light-bulbs is doubled?

12. How can a broken wire affect a series circuit differently than a parallel circuit?
Directions: Complete this paragraph using the terms on the list.

electric current  generators  magnetic
magnetic domain  magnetic field  magnetic materials
permanent magnets  poles  power plants

The atoms of 1. ____________________, such as iron and nickel are 2. _____________________.

Many of these atoms can line up in a group, called a 3. ____________________ with their

4. ____________________ all pointed in the same direction. When all of the domains in a piece

of iron are oriented in the same direction, they form a 5. _____________________. The movement

of a wire loop in the 6. ____________________ that surrounds the magnet creates an

7. ____________________. 8. ____________________ use this interaction in

9. ____________________ to produce the electrical energy that you use in your home.

Directions: Place a check mark next to each statement that is true. If the statement is false, write the true state-
ment on the line provided.

10. Every magnet has a north pole and a south pole.

11. If the north pole of a magnet is brought toward the north pole of another magnet, the
magnets attract each other.

12. In a permanent magnet the magnetic domains are oriented in random directions.

13. A current-carrying wire wrapped around an iron core is an electromagnet.

14. The production of an electric current by moving a magnet and a loop relative to each
other is called a magnetic domain.
What are waves?

Directions: Use the words from the word bank to fill in the blanks in front of the correct phrases below.

- compression
- compressional
- crest
- electromagnetic
- mechanical
- medium
- radiant
- rarefraction
- sound
- transverse
- trough
- vibrating
- water
- waves
- X-ray

1. a type of wave that requires matter to transmit energy
2. part of a compressional wave where molecules are farthest apart
3. all waves are produced by something that is doing this
4. a type of wave that can carry energy without matter
5. rhythmic disturbances that carry energy without carrying matter
6. a type of compressional wave made by a guitar
7. a material in which a mechanical wave is traveling
8. a type of transverse wave
9. a type of wave in which matter moves at right angles to the direction the wave travels
10. high point of a transverse wave
11. the type of energy emitted by the Sun
12. part of a compressional wave where molecules are closest together
13. a type of wave where the matter moves back and forth along the same direction that the wave travels
14. low point of a transverse wave
15. a type of electromagnetic wave

Directions: Explain how ocean water moves within a wave, and how a wave can carry energy without moving matter.

16. 

_________________________________________________________________________________

_________________________________________________________________________________
Directions: Circle the term that correctly completes each sentence.

1. The wavelength of a transverse wave is often measured from (crest to crest, crest to trough).
2. Waves with greater amplitudes carry (more, less) energy than waves with smaller amplitudes.
3. The amplitude of a wave can be measured from the (medium, crest) or the (trough, wavelength) to the rest position of the wave’s medium.
4. The number of waves that pass a point in one (second, minute) is the wave’s (amplitude, frequency).
5. Waves with longer wavelengths have a (lower, higher) frequency and waves with shorter wavelengths have a (lower, higher) frequency.
6. A group of molecules that are squeezed together is called a (rarefaction, compression).
7. Electromagnetic waves travel faster in (gases, solids).

Directions: Use the words below to label the diagram. You will use each term more than once. Then answer the questions.

1. The wavelength of the wave shown in the diagram?
2. What is the amplitude of the wave shown in the diagram?
Directions: Study the following picture. Think about light waves and sound waves. Then answer each question.

1. The woman in the building watches the worker through a window. What happens to the light waves as they pass though the window? 

2. Why is the worker wearing ear protectors? How do ear protectors work to block harmful sound waves?

3. The man down the street hears the jackhammer around the corner, although he cannot see it. What behavior of waves is responsible for this?

4. The man down the street can see an image of himself in the window. What behavior of waves is responsible for this?

5. The man down the street can NOT see an image of himself in the wall of the building. What behavior of waves is responsible for this?
**Rocks and Minerals**

**SECTION 1** Study Guide  
**Minerals—Earth’s Jewels**

**Chapter 9**

**Directions:** Use the words from the word bank to fill in the blanks in front of the correct phrases below.

<table>
<thead>
<tr>
<th>apatite</th>
<th>graphite</th>
<th>precipitation</th>
<th>calcite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kimberlite magma</td>
<td>Quartz</td>
<td>Fracture</td>
<td>Mica</td>
</tr>
<tr>
<td>Rocks</td>
<td>Gems</td>
<td>Minerals</td>
<td>Smelting</td>
</tr>
</tbody>
</table>

1. a mineral that is used to make glass
2. something that must form and be brought to Earth's surface by through a special type of volcanic explosion for miners to be able to get diamonds
3. solids made of two or more minerals
4. a process to melt and separate unwanted materials from a metal
5. minerals that break into jagged or rough pieces have this
6. the mineral used in pencil lead
7. one of the minerals found in bones
8. rare minerals that can be cut and polished
9. more than 4,000 of these solid inorganic materials with unique identifying characteristics have been identified
10. the way that 25-cm manganese nodules form on the ocean floor
11. a mineral that has cleavage lines that cause it to form thin flakes when broken
12. a mineral that can form clear crystals that cause double images

**Directions:** List four characteristics of gems.

13. ...

**Directions:** List seven identifying properties of minerals.

14. ...
Directions: Complete the following sentences using the correct terms.

1. When melted rock cools or hardens on or under Earth’s surface, it forms __________________ rock.

2. Igneous rock that forms on Earth’s surface is called ____________________.

3. Igneous rock that forms beneath Earth’s surface is called ____________________.

4. Rocks that are formed of pieces of other rocks, plant and animal matter, or dissolved minerals are called ____________________ rocks.

5. Magma that flows onto Earth’s surface is called ____________________.

6. Chalk and coal are examples of a kind of sedimentary rock called ____________________ rock.

7. Melted rock can ooze out from below Earth’s surface through a crack in the crust called a(n) ____________________.

8. Rocks called ____________________ are made up of pebbles cemented together with other sediments.

Directions: Classify the terms you used above so that the terms in each group are related.

9. Group 1

   ____________________

   ____________________

   ____________________

   ____________________

10. Group 2

    ____________________

    ____________________

    ____________________

    ____________________
Metamorphic Rocks and the Rock Cycle

Directions: Match the term in the first column with its description in the second column by writing the correct letter in the space provided.

1. marble   a. nonfoliated metamorphic rock
2. metamorphic   b. consisting of layers of different minerals
3. foliated   c. a model of the way rocks change form
4. nonfoliated   d. pieces of rock deposited by wind, ice, gravity, or water
5. rock cycle   e. metamorphic rock having a uniform consistency
6. sediment   f. having a changed or different form
7. gneiss   g. foliated metamorphic rock

Directions: Answer the following questions on the lines provided.

8. What is the rock cycle?

9. What is the difference between foliated and nonfoliated metamorphic rocks?

10. How are metamorphic rocks formed?

11. What are three examples of foliated metamorphic rocks?

12. What are three examples of nonfoliated metamorphic rocks?
Directions: Match the terms from the word bank with the phrases below.

<table>
<thead>
<tr>
<th>Term</th>
<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabian plate</td>
<td>the part of Earth that makes up two thirds of its mass and flows slowly</td>
</tr>
<tr>
<td>asthenosphere</td>
<td>like putty</td>
</tr>
<tr>
<td>colliding plates</td>
<td>a layer of Earth that is like plastic. It rests under the lithosphere</td>
</tr>
<tr>
<td>convection</td>
<td>and the plates move on it.</td>
</tr>
<tr>
<td>crust</td>
<td>the kind of plates that cause mountains to form</td>
</tr>
<tr>
<td>erupting lava</td>
<td>these are formed when oceanic plates slide under continental plates</td>
</tr>
<tr>
<td>inner core</td>
<td>what occurs when two plates of different densities are colliding</td>
</tr>
<tr>
<td>lithosphere</td>
<td>the area where two plates slide past each other</td>
</tr>
<tr>
<td>mantle</td>
<td>the plate that the Nazca plate is moving toward</td>
</tr>
<tr>
<td>outer core</td>
<td>plates may move because of this type of movement in the mantle</td>
</tr>
<tr>
<td>seismic waves</td>
<td>the highest-pressure, hottest part of Earth that is mostly solid iron</td>
</tr>
<tr>
<td>separating plates</td>
<td>these can form when plates of similar density are colliding</td>
</tr>
<tr>
<td>transform boundary</td>
<td>the part of Earth that is made of the crust and upper mantle and rests</td>
</tr>
<tr>
<td>volcanoes</td>
<td>on the asthenosphere.</td>
</tr>
<tr>
<td>crust</td>
<td>islands can be formed near ocean trenches by this</td>
</tr>
<tr>
<td>lithosphere</td>
<td>the kind of plates that cause rift zones or high ridges to form under</td>
</tr>
<tr>
<td>mantle</td>
<td>the part of Earth that contains the mountains and the valleys. It is</td>
</tr>
<tr>
<td>outer core</td>
<td>the least dense and thinnest layer and is thicker on the continents</td>
</tr>
<tr>
<td>asthenosphere</td>
<td>than under the oceans.</td>
</tr>
<tr>
<td>subduction</td>
<td>the part of the Earth that stops or slows down seismic waves because it</td>
</tr>
<tr>
<td>transform boundary</td>
<td>is made of liquid metal</td>
</tr>
<tr>
<td>volcanoes</td>
<td>a plate that the African plate is moving toward</td>
</tr>
<tr>
<td>crust</td>
<td>energy disturbances that travel through rock, and can speed up, slow</td>
</tr>
<tr>
<td>outer core</td>
<td>down, and be bent or stopped</td>
</tr>
</tbody>
</table>

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Directions: Complete the table by describing the type of mountain and giving an example of that type of mountain.

<table>
<thead>
<tr>
<th>Type of mountain</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fault–block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Folded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Upwarped</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Volcanic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Directions: Complete the following sentences using the correct terms.

5. The principle of isostasy states that Earth’s crust and ________________ float on the upper part of the mantle.

6. Mountains grow ________________ and sink farther down into the mantle.

7. Icebergs are largest when they break off of a ________________.

8. The Hawaiian Islands are volcanic mountains that formed from lava eruptions on the ________________.
**Weathering and Soil Formation**

**Directions:** Explain how each of the following factors cause weathering of rock.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mechanical or Chemical</th>
<th>Explanation of Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>ice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>running water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>plants</td>
<td>mechanical</td>
<td></td>
</tr>
<tr>
<td>plants</td>
<td>chemical</td>
<td></td>
</tr>
<tr>
<td>natural rock acids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>animals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lichens</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** Unscramble the words to fill in the summary statements about soil formation.

Sandy soil forms when (8)__________________ (dastnesno) is weathered. Soil with clay in it forms from (9)__________________ (milenotes). (10)__________________ (shumu), organic matter, is added to soil when plants and animals die. Thick soils are more likely to form in (11)__________________ (tlaf) areas and in (12)__________________ (mraw) climates where many plants grow. (13)__________________ (streeds) do not have enough plants to form humus. (14)__________________ (dloc) and dry climates may be slow to form soil because of the slow growth of plant life and the slow rate of (15)__________________ (greatwheni).
**SECTION 2**  

**Study Guide**  

**Erosion of Earth’s Surface**

**Chapter 11**

**Directions:** *Answer the following questions on the lines provided.*

1. What is the difference between weathering and erosion?

2. Name four agents of erosion.

**Directions:** *Identify each statement as true or false. If the statement is true, write T in the blank at the left. If the statement is false, change the underlined term to make the statement true.*

3. Mass movement is caused by **ice**.

4. Creep is a flow of rock or sediment along a curved surface, often down an eroded cliff.

5. Continental glaciers are located near the north and south poles.

6. The most important agent of erosion is **wind**.

7. If you see long striations on the surface of a rock, you would suspect **mass movement**.

8. Water that flows over Earth’s surface is called **sheet flow**.

**Directions:** *Circle the term in parentheses that correctly completes the sentence.*

9. Creep is caused by (glacial erosion, wind, gravity).

10. Sediment left behind when a glacier melts is called (till, loess, silt).

11. (Slump, Mudflow, Creep) is a mass of wet sediment that flows downhill as a result of heavy rain, melting snow and ice, or a volcano.

12. The wearing down of rocks by blowing sand is called (deflation, grinding, abrasion).

13. Where the Mississippi River enters the Gulf of Mexico, there is a large accumulation of sediment called a (cirque, gully, delta).

14. When wind lifts and carries off small particles of weathered rock, it is called (deflation, deposition, abrasion).
The Atmosphere in Motion

The Atmosphere Study Guide

Chapter 12

Directions: Use Figure 6 and the chart below to make notes on the water cycle.

Directions: Fill in the chart with the names of the gases found in the atmosphere.

1. Clouds
2. Precipitation
3. Runoff
4. Evaporation

Directions: Name seven trace gases in the atmosphere.


Directions: Name four aerosols in the atmosphere and explain how each gets into the air.

11. ____________________________ 12. ____________________________ 13. ____________________________ 14. ____________________________
Directions: Write the correct term in the spaces beside each definition. Unscramble the boxed letters to find the answer to question 11.

1. current conditions of the atmosphere __________

2. air has weight due to ______

3. the circular movement of warm air rising and cool air sinking __________

4. varying ______ causes wind __________

5. measure of water vapor in the air compared to the amount that could be held at a specific temperature __________

6. low clouds form at less than 2,000 ______

7. ______ form when air rises, cools to a dew point, and condenses into small particles __________

8. air deflection caused by Earth’s rotation __________

9. giant rivers of air that develop at high altitudes __________

10. rain, sleet, snow, or hail __________

11. a measure of how fast air molecules are moving __________

Directions: Circle the term in parentheses that makes each statement correct.

12. When the Sun’s rays strike Earth’s surface, energy is (reflected/absorbed).

13. The process of warm rising and cool air sinking is called (pressure/convection).
**Air Masses and Fronts**

**Directions:** Select the term from Column II that matches the weather conditions described in Column I.

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. a warm air mass advancing under a cold air mass</td>
<td>a. cold front</td>
</tr>
<tr>
<td>2. a cold air mass advancing under a warm air mass</td>
<td>b. warm front</td>
</tr>
<tr>
<td>3. sinking air, dry weather, few clouds</td>
<td>c. stationary front</td>
</tr>
<tr>
<td>4. sound produced due to rapid expansion and contraction of heated air</td>
<td>d. air mass</td>
</tr>
<tr>
<td>5. a storm that can last weeks and has winds of at least 120 km/h</td>
<td>e. high pressure</td>
</tr>
<tr>
<td>6. a large body of air that develops over a particular region</td>
<td>f. low pressure</td>
</tr>
<tr>
<td>7. a fast-moving cold front overtakes a slower warmer front</td>
<td>g. thunderstorms</td>
</tr>
<tr>
<td>8. air uplifts rapidly, causing electrical charges to form</td>
<td>h. tornadoes</td>
</tr>
<tr>
<td>9. rising air that cools, forming clouds and precipitation</td>
<td>i. hurricane</td>
</tr>
<tr>
<td>10. funnel clouds that last about 15 minutes</td>
<td>j. occluded front</td>
</tr>
<tr>
<td>11. lightning and thunder</td>
<td>k. thunder</td>
</tr>
<tr>
<td>12. a warm air mass and cold air mass meet but neither advances</td>
<td>l. lightning</td>
</tr>
</tbody>
</table>

**Directions:** Answer the following questions on the lines provided.

13. What instruments are used for monitoring weather?

14. In what types of weather should you be cautious?

15. How does the National Weather Service alert the public to dangerous weather?
**Directions:** List three resources from the ocean and explain their uses.

1. 
2. 
3. 

**Directions:** Use Figure 3 to list the six most common dissolved solids in the ocean from greatest to least and write their percent.

<table>
<thead>
<tr>
<th>Greatest</th>
<th>Least</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** List three dissolved gases in the ocean and make notes about the interactions of these gases with the atmosphere and/or ocean organisms. Give at least two points for each gas.

<table>
<thead>
<tr>
<th>Name of Gas</th>
<th>Notes on Gas Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** Explain why water is cooler near Earth’s poles.

13. 

**Directions:** Explain why water temperature drops in the thermocline layer.

14. 

**Directions:** Explain why pressure increases with depth.

15.
Ocean Currents and Climate

Directions: Identify each statement as true or false. If the statement is true, write true on the line. If the statement is false, rewrite it to make it correct.

1. Surface currents are caused by the wind.

2. The Gulf Stream cools the climate of the states on the east coast of the United States.

3. The California Current warms the climate of the west coast of the United States.

4. Because of the rotation of Earth, surface currents in the northern hemisphere bend to the right.

5. Sailors depended on surface currents to transport them.

6. Surface currents usually move in a few thousand meters of ocean.

7. If the Iceland density current stopped flowing, the east coast of the United States might be warmer.

8. The density of warm water is less than that of cold water.

9. Where cool dense water sinks, it becomes more dense.

10. Density currents flow faster than surface currents.

Directions: Complete the following sentences using the correct terms.

11. The curving of winds and currents caused by Earth’s rotation is called the _________________.

12. Evaporation of water at the ocean’s surface makes the water ________________ dense.

13. Currents deep in the ocean are caused by differences in water _________________.

Directions: Answer the following question on the lines provided.

14. Describe the two steps of upwelling.
**Directions:** Complete the following sentences using the correct terms.

1. The particles in a water wave move ________________.
2. When a wave approaches the shore, its ________________ moves ahead of its ________________.
3. Surface waves are caused by ________________.
4. When Earth, the Moon, and the Sun line up together, they create ________________ tides with high tidal ranges.
5. When cliffs are pounded by wind and water, ________________ takes place.

**Directions:** Select the term from the following list that matches each description.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>the highest part of a wave</td>
</tr>
<tr>
<td>7</td>
<td>a large ocean wave caused by the gravitational pull of the Moon</td>
</tr>
<tr>
<td>8</td>
<td>a collapsed wave on the beach</td>
</tr>
<tr>
<td>9</td>
<td>the distance between two wave crests</td>
</tr>
<tr>
<td>10</td>
<td>the distance between high and low tides</td>
</tr>
<tr>
<td>11</td>
<td>the lowest point of a wave</td>
</tr>
<tr>
<td>12</td>
<td>water that runs parallel to the shore</td>
</tr>
</tbody>
</table>

**Directions:** Use the diagram to answer questions 13 and 14.

13. In which position(s) of the Moon will the high tide be the highest? Why?

14. In which position(s) of the Moon will the low tide be the highest? Why?
Directions: Answer the following questions on the lines provided.

1. List three factors that could be considered part of an ecosystem.

2. Organisms in the ocean are divided loosely into three large groups. What are they?

3. Producers are usually the most plentiful organisms in an ecosystem. Describe how producers that live above the thermocline make food.

4. What is chemosynthesis?

5. What would happen if there were no decomposers?

6. Describe one path a nitrogen molecule might follow through the ocean ecosystem.

7. What is transferred from producers to consumers and decomposers through food chains?

8. Why isn’t all the energy from one level of a food chain passed on to the next level?

9. Which kind of ocean life do humans most often use for food? Give three examples.
**Radiation from Space**

**Directions:** Write the correct term on the line in front of its definition.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>active and adaptive observatory refracting telescope</td>
<td>an instrument with small mirrors pieced together to create a larger, clearer image</td>
</tr>
<tr>
<td>electromagnetic radiation</td>
<td>carry energy through empty space and through matter</td>
</tr>
<tr>
<td>electromagnetic waves</td>
<td>300,000 km/s</td>
</tr>
<tr>
<td>Hubble space telescope</td>
<td>a device placed outside Earth's atmosphere to minimize absorption and distortion of energy from space</td>
</tr>
<tr>
<td>optics</td>
<td>energy that is transmitted from one place to another by electromagnetic waves</td>
</tr>
<tr>
<td>radio telescope</td>
<td>an instrument with a concave mirror that focuses an image on a second mirror for viewing through the eyepiece</td>
</tr>
<tr>
<td>reflecting telescope</td>
<td>telescopes with computer enhanced and corrected images</td>
</tr>
<tr>
<td></td>
<td>detects radio waves as they travel freely through Earth's atmosphere</td>
</tr>
<tr>
<td></td>
<td>an instrument for distance viewing through a convex lens that focuses the image to be viewed through an eyepiece</td>
</tr>
<tr>
<td></td>
<td>a building with an open roof used to house a telescope</td>
</tr>
</tbody>
</table>

**Directions:** Arrange the seven types of electromagnetic radiation from longest to shortest wavelength on the spectrum. (Hint: Refer to Figure 1 in the text for additional help.)

<table>
<thead>
<tr>
<th>Type of Radiation</th>
<th>Longest Wavelength</th>
<th>Shortest Wavelength</th>
</tr>
</thead>
</table>
Directions: Circle the term in the puzzle that fits each clue. Then write the term on the line. The terms read across or down.

S A T E L L I T E  E A R T H A
P R O J E C T  G E M I N I T
A R M A R M S T R O N G I M
C T N E G E S A J L S G A O
E O T E L R D I U N T A E S
P R O J E C T  A P O L L O P
R B S A N U Y S I J P I M H
O I A C N R O C K E T L A E
B T B V O Y A G E R D E R R
E S P U T N I K R R M O S E

1. The Moon is a natural ____________________ of Earth.
2. The first human to set foot on the Moon was Neil ____________________.
3. The path of one object circling another is an ____________________.
4. ____________________ was the program that first sent people to the Moon.
5. The ____________________ probes flew past Jupiter and other planets before heading outward toward deep space.
6. The first citizen of the United States to orbit Earth was John ____________________.
7. In ____________________, a team of American astronauts first met and connected with a spacecraft in orbit.
8. A ____________________ travels far into the solar system, collecting information and returning it to Earth.
9. Galileo dropped a smaller probe into Jupiter’s ____________________.
10. Cooperative missions between countries are being planned to send spacecraft to ____________________ and elsewhere.
11. Launched in 1989, ____________________ provided information about Jupiter.
12. Space exploration began when the Soviets launched ____________________, the first artificial satellite.
13. The simplest ____________________ engine is made of a burning chamber and a nozzle.
14. Weather satellites provide information about the global weather systems on__________________.
15. Project ____________________ began the United States’ effort to reach the Moon.
**Current and Future Space Missions**

**Directions:** Identify Figure A and Figure B as a **space station** or a **space shuttle**. Before each statement at the bottom of the page, write the name of the spacecraft that the item describes. If an item describes both types of spacecraft, write both.

A. ______________________________

B. ______________________________

1. This spacecraft orbits Earth.

2. Astronauts were able to conduct experiments when working in this.

3. This glides back to Earth and lands like an airplane.


5. This reusable spacecraft transports astronauts and other materials.

6. A former Soviet cosmonaut spent a record 438 days aboard one of these.

7. The *Hubble Space Telescope* was launched in 1990 by one of these.

8. This spacecraft provides living quarters and working space for people living and working in space.

9. Several countries may cooperatively build one of these in the future.

10. Its astronauts move mechanical arms to launch and recover satellites.

11. The Soviet craft is named *Mir*.

12. Its solid-fuel booster rockets are reused.

13. American astronauts spent up to 84 days working in this.
**Earth’s Place in Space**

**Directions:** Put the eight phases of the moon in order in the chart below, starting with the full moon. Then sketch each phase of the moon in its box.

<table>
<thead>
<tr>
<th>first quarter</th>
<th>new moon</th>
<th>waning crescent</th>
<th>waxing crescent</th>
</tr>
</thead>
<tbody>
<tr>
<td>full moon</td>
<td>third quarter</td>
<td>waning gibbous</td>
<td>waxing gibbous</td>
</tr>
</tbody>
</table>

1. Full Moon

2. ______

3. ______

4. ______

5. ______

6. ______

7. ______

8. ______

**Directions:** Use Figure 8 to help you decide if each phase of the moon given happens at the same time as a neap tide or a spring tide.

9. new moon happens at the same time as a ____________________ tide

10. first quarter happens at the same time as a ____________________ tide

11. full moon happens at the same time as a ____________________ tide

12. third quarter happens at the same time as a ____________________ tide

**Directions:** Unscramble the words to fill in the blanks below.

13. ____________________ (antpaper) motion is the movement of the Sun, stars, Moon, and planets across the sky, caused by Earth’s (14) ____________________ (rintatoo) on its (15) ____________________ (sixa). (16) ____________________ (aenosss) are caused by Earth’s revolution and the (17) ____________________ (litt) of Earth’s axis at an angle of (18) ____________________ (532.) degrees. The Earth (19) ____________________ (slervveo) around the Sun once each (20) ____________________ (raye). In June, North America gets more (21) ____________________ (nitseen) sunlight as the Earth tilts toward the Sun.

(22) ____________________ (washesod) are longer in the winter months because North America is tilted (23) ____________________ (yaaw) from the Sun and (24) ____________________ (thilg) strikes the Earth at a lower angle. In (25) ____________________ (munuta) and (26) ____________________ (irnpsg) the Earth is neither tilted toward nor away from the (27) ____________________ (uns).
Directions: Use the clues below to complete the crossword puzzle.

Across
3. These pieces of rock form a belt that separates the inner planets from the outer planets.
4. Pluto is the ________ planet in size.
6. Saturn is known for its dazzling __________.
8. Jupiter, Saturn, Uranus, Neptune, and Pluto make up the ________ planets.
9. This force holds the objects in the solar system in place.
10. This is the number of planets that are in our solar system.
11. Earth is the ________ planet from the Sun.
13. A piece of rock or metal that plunges through the atmosphere and falls to Earth is called a(n) __________.

Down
1. This is made up of the nine planets and numerous other objects that orbit the Sun.
2. This large body of frozen ice and rock sometimes forms what appears to be a bright, glowing tail when it gets near the Sun.
5. Jupiter is the ________ planet in size.
7. This is what we call the star in the center of our solar system.
12. Mars looks ________________ because the rocks on its surface contain iron oxide.
Directions: Explain the relationship among the following groups of words. Use complete sentences.

1. star’s color, temperature, cool, medium, hot

2. supergiant, supernova, neutron star, black hole

3. giant, white dwarf, black dwarf

4. elliptical, spiral, irregular, Milky Way

5. astronomical units, light-years

6. huge clouds of gas and dust, gravity, fusion

7. Milky Way, galaxies, universe
Directions: Write the correct term from the word bank on the line before each phrase below.

1. device that Robert Hooke used in 1665 to see cork cells
2. the part of the cell where food, water, minerals, and wastes may be stored
3. the part of the nucleus that contains DNA
4. the “manager” of cell operations
5. a gelatinlike substance that fills the cell
6. a green organelle that captures energy from sunlight
7. the organelle that converts energy and produces carbon dioxide and water
8. the smallest living things on Earth, which are made of just one cell
9. controls what enters and exits the cell
10. using light energy to make food and oxygen
11. the part of a plant cell that provides support and protection
12. the general name for the specialized parts of the cell

Directions: List the three main ideas of the cell theory.

13. 

Directions: List two things that plant cells have that animal cells do not, and explain the function of each part.

14. 

Directions: Explain how to find the magnification of the microscope.

15. 

Cells—The Units of Life  55
Match the description in the first column with the item in the second column by writing the correct letter in the space.

1. a group of organs working together
2. what a cell’s shape and size is related to
3. group of similar cells that all do the same work
4. two or more types of tissue working together

Complete the following sentences using the correct terms.

5. Cells are __________________ into systems that work together to keep an organism alive.
6. The tongue, stomach, and intestines make up part of an organ __________________.
7. An organism that contains more than one cell is called a(n) __________________ organism.
8. Plant cells help move __________________, __________________, and other materials throughout a plant.

Unscramble the terms in italics to complete the sentences below. Write the terms on the lines provided.

9. Cells in a tissue or organ work tergheto to keep an organism alive.
10. The yiretpsorsra system is one of several organ systems in your body.
11. Your bones move from contracting lecsmu tissue.
12. Groups of similar cells that do the same sort of work are sesitus.
13. Different tissues working together form a(n) rango.

Answer the following questions on the lines provided.

14. Describe the various tissues in the stomach and what they do.

15. How many muscles make up the muscular system, and what do they do?
What is an animal?

Directions: Use the terms from the list below to fill in the summary of the five characteristics of animals.

<table>
<thead>
<tr>
<th>cells</th>
<th>escape</th>
<th>move</th>
<th>reproduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>digested</td>
<td>eukaryotic</td>
<td>nucleus</td>
<td>shelter</td>
</tr>
<tr>
<td>energy</td>
<td>membrane</td>
<td>plants</td>
<td>wastes</td>
</tr>
</tbody>
</table>

Most animals can (1) ______________________ to find food, (2) ______________________, and mates, and to (3) ______________________ from predators. Animals have many (4) ______________________ in their bodies, some of which digest food, get rid of (5) ______________________, and help in (6) ______________________. To get (7) ______________________, animals eat (8) ______________________ or other animals. Their food is (9) ______________________ into smaller substances that their cells can use. Animal cells have a (10) ______________________ and organelles. They are surrounded by a (11) ______________________ and are (12) ______________________.

Directions: Classify each animal according to the headings in the chart.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Symmetry (Radial, Bilateral, or Asymmetrical)</th>
<th>Vertebrate/Invertebrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Grasshopper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Lobster</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Human</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Jellyfish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Sea urchin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Horse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Sponge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Sea anemone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Butterfly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Platypus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Directions: Define the underlined term on the lines provided.

1. Sponges are **sessile** animals.

2. Sponges are **filter feeders**.

3. Spicules support and protect a sponge’s body.

Directions: Study the following diagram. Fill in the blanks with the correct terms.

- **Male**
- **Female**
- **Medusae**
- **reproduction**

Directions: Answer the following questions on the lines provided.

10. The word *cnidarian* means “stinging cells.” Why is this a good name for this group?

11. Explain the difference between a free-living and a parasitic flatworm.

12. Describe a roundworm.
1. Define the following groups of animals and give an example of each.
   a. mollusks
   b. gastropods
   c. bivalves
   d. cephalopods

2. What is the difference between an open and a closed circulatory system?
   a. open circulatory system
   b. closed circulatory system

3. Many mollusks gather food with a radula, but bivalves are filter-feeders. Explain the difference between the two types of feeding.

4. Describe the way in which squids and octopuses move through the water.

5. Why is the segmented structure of segmented worms important?

6. Describe the following structures in earthworms.
   a. coelom
   b. setae

7. What is unique about the earthworm’s diet and skin?

8. Leeches are parasites. How do they eat?

9. How are marine worms different from earthworms?
Directions: Answer the following questions on the lines provided.

1. Arthropods have appendages instead of setae. What different kinds of appendages do they have?

2. What is the main difference between centipedes and millipedes?

3. What is attached to an insect’s thorax?

4. In insects, what does the blood transport? What is not transported by the blood?

5. What are the four stages of complete metamorphosis?

6. If spiders cannot chew, how can they eat?

7. Why is a large heavy exoskeleton less limiting for arthropods that live in water?

8. Describe how a sea star feeds on a clam.

9. What happens if a sea star loses an arm?

10. Why are echinoderms important to the marine environment?

11. What functions do tube feet serve in an echinoderm such as a sea star?
### Chordate Animals

**Directions:** Fill in the chart with the three characteristics of chordates and the definition of each part.

<table>
<thead>
<tr>
<th>Three Characteristic Parts of Chordates</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** Match the terms from the word bank with the phrases below.

- **bony**
- **cartilaginous**
- **ectotherms**
- **endo**
- **endotherms**
- **gill slits**
- **jawless**
- **muscles**
- **swim bladder**
- **vertebrates**

1. structures that attach to the skeleton and make movement possible
2. trout and goldfish are this type of fish
3. structures in lancelets that developed from pharyngeal pouches
4. this substance helps bony fish move through the water
5. sharks are this type of fish
6. warm-blooded animals such as humans
7. a prefix that means “within”
8. hagfish and lampreys are this type of fish
9. cold-blooded animals such as fish
10. the largest group of chordates
11. an adaptation of bony fish to control their depth in the water
12. the largest group of vertebrates

**Directions:** Name three parts common to most fish and describe the structure and function of each part.

<table>
<thead>
<tr>
<th>Name of Part</th>
<th>Description of Structure</th>
<th>Description of Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Directions: Answer the following questions using complete sentences.

1. What is the definition of a reptile?

2. How are reptiles related to amphibians?

3. Compare the skin of amphibians and reptiles.

4. What role does an amphibian’s skin play in breathing?

5. Compare and contrast hibernation and estivation.

6. What is metamorphosis?

7. What amphibian activities occur on land? In water?

8. Explain the function of each of these structures in reptile eggs.
   a. amniotic egg
   b. a leathery shell
   c. a yolk
1. Describe the four characteristics of birds.
   a. 
   b. 
   c. 
   d. 

2. Label the drawing of a contour feather with the names of its parts.
   a. 
   b. 
   d. 
   c. 

3. How do the air sacs of birds help make the body lighter?

4. What is the purpose of preening?

5. Compare and contrast contour feathers and down feathers.
Directions: Answer the following questions on the lines provided.

1. What are some characteristics of mammals?

2. What are some problems facing mammals today?

3. What are the functions of these mammal characteristics?
   a. hair or fur
   b. mammary glands
   c. complex nervous system
   d. well-developed lungs

4. Define these types of mammals.
   a. Carnivores
   b. Herbivores
   c. Omnivores

Directions: Fill in the table by describing two characteristics of each group of mammals and giving an example.

<table>
<thead>
<tr>
<th>Group</th>
<th>Characteristic A</th>
<th>Characteristic B</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Monotremes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Marsupials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Placentals</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Directions:** Match the terms from the word bank with the phrases below.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>bones</td>
<td>the type of immunity where your body makes antibodies</td>
</tr>
<tr>
<td>capillaries</td>
<td>the smallest blood vessels</td>
</tr>
<tr>
<td>joints</td>
<td>place where two or more bones come together</td>
</tr>
<tr>
<td>kidneys</td>
<td>salt and other wastes can exit the body through this protective organ</td>
</tr>
<tr>
<td>proteins</td>
<td>vitamins, like B and C, that you need to eat every day</td>
</tr>
<tr>
<td>skin</td>
<td>calcium and phosphorus make these cells hard</td>
</tr>
<tr>
<td>fat-soluble</td>
<td>organs that remove extra water, salts, and wastes from the blood</td>
</tr>
<tr>
<td>fat-soluble</td>
<td>muscle types in most organs</td>
</tr>
<tr>
<td>specific</td>
<td>these move your joints by relaxing and contracting</td>
</tr>
<tr>
<td>sun</td>
<td>vitamin D can be made by exposure to this</td>
</tr>
<tr>
<td>vitamins</td>
<td>vitamins E, A, K, and D are this type of vitamin</td>
</tr>
<tr>
<td>water-soluble</td>
<td>vital nutrients for cell growth and repair</td>
</tr>
</tbody>
</table>

**Directions:** Write the body system that corresponds with each function below.

<table>
<thead>
<tr>
<th>Function</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. absorption of nutrient molecules</td>
<td></td>
</tr>
<tr>
<td>14. movement of nutrients and gases to cells</td>
<td></td>
</tr>
<tr>
<td>15. movement of bones</td>
<td></td>
</tr>
<tr>
<td>16. a fluid system that requires skeletal and vessel muscle contractions</td>
<td></td>
</tr>
<tr>
<td>17. removes wastes from the blood that are produced by cells</td>
<td></td>
</tr>
<tr>
<td>18. shape, support, protection</td>
<td></td>
</tr>
<tr>
<td>19. senses and reflexes</td>
<td></td>
</tr>
<tr>
<td>20. entry and exit for most gases used and made by the body</td>
<td></td>
</tr>
<tr>
<td>21. body regulation and hormones</td>
<td></td>
</tr>
</tbody>
</table>
Directions: Label the diagrams of the male and female reproductive systems below. Write the function of each part in the space provided.

Male Reproductive System

Female Reproductive System
Directions: Write the correct term from the word bank next to its definition.

asexual reproduction  DNA  mitosis

cigarette smoking  fertilization  sexual reproduction

cloning  meiosis  tadpole

1. division of the nucleus into two identical nuclei
2. a new organism is produced from the DNA of two cells
3. life stage will grow into an adult frog
4. hereditary material that controls how offspring will look and function
5. reproduction by one organism
6. growing a plant from a cutting of a leaf to make an identical plant
7. nucleus divides twice to form four sex cells
8. a factor that may deform and decrease the number of sperm made by a male
9. the joining of an egg and sperm to form a new organism

Directions: Number the following steps of cell division in the order they happen. The first step in the sequence has been numbered for you.

10. duplicated chromosomes become visible through a microscope
    the cell divides into two new cells
    each duplicated chromosome pair separates
    chromosomes in the nucleus are duplicated
    duplicated chromosome pairs line up along the middle of the cell
    individual chromosomes are pulled to opposite ends of the cell

Directions: List two similarities and three differences between meiosis and mitosis in human cells. Use the information in Table 1 to help you.

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Study Guide  

**Genetics—The Study of Inheritance**

**Directions:** *Answer the following questions on the lines provided.*

1. What is the passing of traits from parents to offspring?

2. Why is it likely that you look like your parents?

3. What is each gene of a gene pair called?

4. What are the differences between pure and hybrid genes?

5. Why are two recessive alleles needed for a recessive trait to be shown?

6. Give an example of a trait that is determined by multiple alleles.

7. To produce a beneficial version of a trait in an animal, what type of process is used?

8. What is the name of the science that studies which traits are passed from parents to offspring?

9. In human reproduction, at which point are traits passed from parent to offspring?

10. What functions of cells can be affected by a mutation?
Directions: Write a term from the word bank on each blank in front of the correct definition.

<table>
<thead>
<tr>
<th>abiotic factors</th>
<th>burrowing</th>
<th>large leaves</th>
<th>soil</th>
<th>tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>biosphere</td>
<td>ecology</td>
<td>organism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>biotic factors</td>
<td>ecosystem</td>
<td>short stature</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. nonliving parts of the ecosystem such as soil, sunlight, and water
2. a way that desert creatures might get out of the heat
3. an animal or plant
4. an adaptation that gathers more light
5. an abiotic factor that limits the number of organisms that can live in an ecosystem
6. organisms interacting with each other and abiotic factors in an area
7. a factor that determines what kind of plants can live in an ecosystem
8. an adaptation that allows organisms to live where there are strong winds
9. living parts of the ecosystem
10. an organism that might provide food and shelter for birds
11. the part of Earth that contains life
12. the study of interactions in ecosystems

Directions: List three examples of organisms interacting with other organisms in an ecosystem.

13. ______________________________________________________________________
    ______________________________________________________________________
    ______________________________________________________________________

Directions: List four abiotic factors and explain how they affect organisms’ lives.

14. ______________________________________________________________________
    ______________________________________________________________________
    ______________________________________________________________________
    ______________________________________________________________________
Directions: Determine whether the italicized term makes each statement true or false. If the statement is true, write true in the line provided. If the statement is false, write the term that makes the statement true.

1. Ecologists find it helpful to organize living things by how they interact with each other and their environments.

2. A biosphere is a group of the same type of organisms living in the same place at the same time.

3. Algae, sharks, and coral are all examples of communities.

4. There are 100 trees growing on a lot that is 10 square km in size. The population density is 100 trees per square km.

5. The amount of rainfall an ecosystem receives is a limiting factor.

6. A predator captures and eats other animals.

7. The role of an organism in an ecosystem is called the organism’s habitat.

Directions: Answer the following questions on the lines provided. Use complete sentences.

8. What is the relationship between a population and a community?

9. How do members of a community interact with each other?

10. What are two examples of limiting factors.

11. How might a falcon (predator) and a field mouse (prey) interact in a community?

12. In what type of habitat might you find birch trees, mushrooms, and deer?
1. Which are the producers in this food web? Which are the decomposers?

2. List three consumers of barnacle larvae in this food web.

3. Provide the missing consumer in the food chain: algae → mollusk larvae → jellyfish → ___?___ → adult herring

4. What “energy relationship” exists between the immature herring, arrow worms, and adult herring?

5. How might the energy of this ecosystem get passed on to an organism on land?
Directions: Complete the right and left columns with the words from the word bank, and the middle column with renewable or not renewable.

- coal
- cotton
- crude oil
- electricity
- gold
- lumber
- metal
- mud
- paper

<table>
<thead>
<tr>
<th>Natural Resource</th>
<th>Renewable or Not?</th>
<th>Product Made from the Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rain forest trees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Other trees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Minerals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>not renewable</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Wind</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Wind</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Water</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Directions: List at least four steps in the production of screws for a CD player. Use Figure 4 to help you.

11. ___________________________________________________________________________
    ___________________________________________________________________________
    ___________________________________________________________________________
    ___________________________________________________________________________

Directions: Explain why some renewable resources should be conserved.

12. ___________________________________________________________________________
    ___________________________________________________________________________
    ___________________________________________________________________________
    ___________________________________________________________________________
### Directions: Fill in the causes and effects in the following table. Some have been filled in for you.

<table>
<thead>
<tr>
<th>Human Actions</th>
<th>How does the action cause pollution?</th>
<th>What effect does the pollution have on the environment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using landfills</td>
<td></td>
<td>If the chemicals get into our food or water, they can interfere with life processes such as growth and development.</td>
</tr>
<tr>
<td>Running vehicles and factories</td>
<td>Vehicles release pollutants into the air when they burn gasoline or diesel fuel. Factories release pollutants when they burn coal or oil.</td>
<td></td>
</tr>
</tbody>
</table>

### Directions: Use the information in the table above to answer the following questions.

1. Which two types of pollution are caused by vehicles and factories?

2. Which actions cause water pollution?

3. Which actions cause land pollution?

### Directions: Name two other human actions not included in the table that affect the environment. Describe the impact of each action.

4. ____________________________________________________________________________

   ____________________________________________________________________________
Directions: Circle the process in parentheses that is described in each situation.

1. The checkout clerk at the bookstore asked Jorge if he wanted a bag for the book he had just bought. “No thanks,” said Jorge. “I brought my own bag.”
   (reduce waste    reuse things    recycle things)

2. Claire outgrew her favorite sweater, so she gave it to her little sister.
   (reduce waste    reuse things    recycle things)

Directions: Read each of the following paragraphs. Then answer the question following each paragraph on the lines provided.

Claudia and Jeff cleaned out the garage. They found lots of things that they did not want to keep. For example, they found three boxes of old clothes, a stack of newspapers, last year’s telephone books, a bag full of old jars, and some old toys and games. How can Claudia and Jeff practice the three Rs to get rid of the items they found?

3. ____________________________
   ____________________________
   ____________________________

Nick and his friends are going on a picnic. Their sandwiches are individually wrapped in aluminum foil. They brought macaroni salad in a disposable container, paper napkins, plastic forks, cans of soft drinks, and paper cups. How can Nick and his friends use the three Rs to reduce the amount of waste they produce on their next picnic?

4. ____________________________
   ____________________________
   ____________________________
   ____________________________

Directions: Answer the question on the line provided.

5. What are three examples of solid waste?
   ____________________________