Chapter 3  States of Matter

Section 3.1 Solids, Liquids, and Gases  (pages 68–73)

This section explains how materials are classified as solids, liquids, or gases. It also describes the behavior of these three states of matter.

Reading Strategy (page 68)
Comparing and Contrasting  As you read about the states of matter, replace each letter in the diagram below with one of these phrases: definite volume, definite shape, variable volume, or variable shape. For more information on this Reading Strategy, see the Reading and Study Skills in the Skills and Reference Handbook at the end of your textbook.

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Describing the States of Matter  (pages 68–70)

1. What are three common states of matter?
   a. _______Solids_______  b. _______Liquids_______  c. _______Gases_______

2. Is the following sentence true or false? The fact that a copper wire can be bent shows that some solids do not have a definite shape.
   _______false_______

3. Circle the letter of each phrase that describes how particles at the atomic level are arranged within most solids.
   a. randomly arranged  b. packed close together  
   c. arranged in a regular pattern  d. spaced far apart

4. Is the following sentence true or false? A liquid takes the shape of its container.
   _______true_______

5. What is the state of matter in which a material has neither a definite shape nor a definite volume?
   _______gas_______

6. Compare and contrast the arrangement of particles at the atomic level for a liquid and a solid.
   Particles in a solid are packed close together in an orderly arrangement. The arrangement of particles in a liquid is more random.

7. What determines the shape and volume of a gas?
   A gas takes the shape and volume of its container.

8. On the sun, where temperatures are extremely high, matter exists in a state known as _______plasma_______.
9. The state of matter that can exist at extremely low temperatures is called a Bose-Einstein condensate.

10. Complete the table about states of matter.

<table>
<thead>
<tr>
<th>States of Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
</tr>
<tr>
<td>Solid</td>
</tr>
<tr>
<td>Liquid</td>
</tr>
<tr>
<td>Gas</td>
</tr>
</tbody>
</table>

**Kinetic Theory** *(page 71)*

11. Describe kinetic energy. *Kinetic energy is the energy an object has due to its motion.*

12. Circle the letter of the phrase that describes all particles of matter in the kinetic theory of matter.
   - a. randomly arranged
   - b. constant temperature
   - c. in constant motion
   - d. orderly arrangement

**Explaining the Behavior of Gases** *(pages 72–73)*

13. Is the following sentence true or false? There are forces of attraction among the particles in all matter. **true**

14. Why can scientists ignore the forces of attraction among particles in a gas under ordinary conditions? *The particles in a gas are apart and moving fast, so the forces of attraction are too weak to have a noticeable effect.*

15. Is the following sentence true or false? Because of the constant motion of the particles in a gas, the gas has a definite shape and volume. **false**

**Explaining the Behavior of Liquids** *(page 73)*

16. Do forces of attraction have a stronger effect on the behavior of the particles in a gas or in a liquid? **liquid**

17. Circle the letter of each factor that affects the behavior of liquids.
   - a. fixed location of particles
   - b. constant motion of particles
   - c. orderly arrangement of particles
   - d. forces of attraction among particles

**Explaining the Behavior of Solids** *(page 74)*

18. Solids have a(n) **definite** volume and shape because particles in a solid vibrate in **fixed** locations.