

Solids, Liquids, and Gases • Section Summary

States of Matter**Key Concepts**

- What are the characteristics of a solid?
- What are the characteristics of a liquid?
- What are the characteristics of a gas?

Matter can be classified as solids, liquids, or gases. These three states of matter are defined mainly by the way they hold their volume and shape.

A **solid** has a definite volume and a definite shape. The particles that make up a solid are packed very closely together. Each particle is tightly fixed in one position. **This fixed, closely packed arrangement of particles causes a solid to have a definite shape and volume.** The particles in a solid are not completely motionless. They vibrate, or move back and forth slightly.

In many solids, the particles form a regular, repeating pattern. These patterns create crystals. Solids that are made up of crystals are called **crystalline solids**. Table salt, table sugar, and snow are examples of crystalline solids. When a crystalline solid is heated, it melts at a specific temperature.

In other solids, called **amorphous solids**, the particles are not arranged in a regular pattern. Amorphous solids include plastics, rubber, and glass. Unlike a crystalline solid, an amorphous solid does not melt at a distinct temperature. Instead, when it is heated it may become softer and softer or change into other substances.

A **liquid** has a definite volume but no shape of its own. A liquid takes on the shape of its container. Without a container, a liquid can spread into a wide, shallow puddle. The particles in a liquid are packed almost as closely as in a solid. However, the particles in a liquid move around one another freely. **Because its particles are free to move, a liquid has no definite shape. However, it does have a definite volume.**

A liquid can flow from place to place. For this reason, a liquid is also called a **fluid**, meaning "a substance that flows."

One property of liquids, **surface tension**, is caused by the inward pull of the molecules making up a liquid. This pull brings the molecules on the surface closer together. This property explains why water forms droplets and supports the weight of certain insects on its surface.

Another property of water, **viscosity**, is a liquid's resistance to flowing. Viscosity depends on the size and shape of the particles of a liquid. It also depends on the attractions between particles. Liquids with high viscosity flow slowly. Liquids with low viscosity flow quickly.

Unlike solids and liquids, a **gas** can change volume very easily. The particles of a gas move at high speeds in all directions. **As they move, gas particles spread apart, filling all the space available. Thus, a gas has neither definite shape nor definite volume.**

States of Matter (pp. 70-75)

This section explains how shape, volume, and the motion of particles are useful in describing solids, liquids, and gases.

Use Target Reading Skills

A definition states the meaning of a word or phrase by telling about its most important feature or function. After you read the section, reread the paragraphs that contain definitions of Key Terms. Use all the information you have learned to write a definition of each Key Term in your own words.

solid _____

crystalline solid _____

amorphous solid _____

liquid _____

fluid _____

surface tension _____

viscosity _____

gas _____

Solids (pp. 71-72)

1. Which state of matter has a definite volume and a definite shape?

2. Is the following sentence true or false? A solid will keep its volume and its shape in any position and in any container.



Solids, Liquids, and Gases ▪ *Guided Reading and Study*

States of Matter (continued)

3. Why do solids have a definite shape and a definite volume?

4. Complete the table about types of solids.

Solids			
Type of Solid	Description	Examples	Melting Temperature
a.	Made up of crystals	b.	Specific
c.	Particles not arranged in a regular pattern	d.	Not distinct

5. Circle the letter of each sentence that is true about particles in a solid.

- a. They are completely motionless.
- b. They stay in about the same position.
- c. They vibrate back and forth.
- d. They move around one another freely.

Liquids (pp. 73–74)

6. Which state of matter has no definite shape but does have a definite volume? _____

7. Is the following sentence true or false? A liquid's volume does not change no matter what shape its container has.

8. A substance that flows is called a(n) _____.