

SECTION 2-1

SECTION SUMMARY

Solids, Liquids, and Gases

Guide for Reading

- ◆ How are shape, volume, and particle motion useful in describing solids, liquids, and gases?

Substances 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 makes it hard to separate them. **Because the particles in a solid are packed tightly together and stay in fixed positions, a solid has a definite shape and volume.** The particles in a solid are not completely motionless. The particles vibrate, meaning they 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**. Salt, sugar, sand, and snow are all examples of crystalline solids. When a crystalline solid is heated, it melts at a distinct, characteristic melting point.

In other solids, including plastics, rubber, and glass, the particles are not arranged in a regular pattern. These solids are called **amorphous solids**. Unlike a crystalline solid, an amorphous solid does not have a distinct melting point. Instead, when it is heated it becomes softer and softer as its temperature rises.

Unlike a solid, a **liquid** has no shape of its own. A liquid takes on the shape of its container. Without a container, a liquid spreads 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 each other freely. **Because its particles are free to move, a liquid has no definite shape. However, it does have a definite volume.**

Because the particles in a liquid are free to move around each other, a liquid can flow from place to place. For this reason, a liquid is also called a **fluid**—meaning “a substance that flows.”

Some liquids flow more easily than others. The resistance of a liquid to flowing is called **viscosity**. 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. **Gas particles spread apart, filling all the space available to them. Thus, a gas has neither definite shape nor volume.**