

Learning Objectives

- 1) Matter is all of the “stuff” in our world.
- 2) Matter has mass and takes up space.
- 3) Matter has different properties. You can use your five senses to discover the properties of different matter.
- 4) All matter is made up of very tiny particles.
 - a) Particles are the building blocks of matter.
 - b) Scientists can view these particles using high-powered microscopes.
- 5) Matter can also come in different forms: solid, liquid, or gas.
- 6) **Solids**
 - a) Every solid has a shape that stays the same.
 - b) Every solid has its own size.
 - c) Solids maintain their shape and size. Even if you break or cut a solid, it is still a solid.
 - d) Solids can be bendable, rigid, hard, soft, rough, smooth, pointed, round, colorful, or clear.
 - e) Some solids are more packed with particles than others—they have more mass.
- 7) **Liquids**
 - a) The particles in liquids are farther apart than in solids.
 - b) Liquids have no shape of their own; they take the shape of the container they are in.
- 8) **Gases**
 - a) Gases do not keep the same shape or size—they take the shape of whatever they fill.
 - b) Gas fills all of the space inside a container.
 - c) Gas particles are very spread out.
- 9) Matter can change from one form to another.
 - a) When a liquid is cooled, it can change into a solid.
 - b) When a solid is heated, it can change into a liquid.

- c) When a liquid is heated, it can change into a gas.
 - i) When you heat water, a gas called water vapor is produced. Water vapor is invisible.
 - ii) When you cool water vapor, it turns back into a liquid.
- 10) The water cycle is an example of the changes in properties of matter.

When the sun heats natural sources of water, vapor rises into the air. As the vapor rises, it gets cooler and turns back into a liquid. Those tiny drops of water form clouds. When the air is very cold, the water in the cloud freezes and falls to the earth in the form of hail or snow—both solids. If the air is warmer, the water in the clouds can fall as rain—a liquid. The water returns to the natural sources of water, and the cycle begins again.

Suggested Activities

- 1) **Mystery Box.** Have students use their five senses to describe the different properties of matter. Fill several shoeboxes with various items (thimble, cotton ball, orange slice, etc.) Have students work in pairs. One student should close his eyes while the other student hands him objects from the mystery box. The student should use his senses to guess the identity of each mystery object (use the sense of taste to your discretion—toxic substances should not be used). Encourage students to describe the properties of each object. Students should take turns identifying objects.
- 2) **Active play extension.** During the video, students learn that particles in solid objects are packed closely together, particles in liquids are more spread out, and particles in gases are spread even farther. When a solid is heated, it changes to a liquid as the particles bump into each other and spread apart. When a liquid is heated, the particles continue to bump into each other and spread even farther apart. The reverse happens when a gas is cooled into a liquid, and when a liquid is cooled to become a solid. Make a tape of music with three types of music—slow tempo, medium tempo, and

fast tempo. Using an open area or the playground, tell students that they are going to act like particles in matter. When the slow tempo music is playing, they will act like a solid—they will huddle together, holding hands—tightly packed. As the tempo increases, they will stay connected, but space themselves farther apart, moving around. When the fast tempo music plays, they will become a gas—disconnecting from each other and moving farther apart. Have the music vary in tempo so that students get the experience of changing from one property to another. This is a great way to reinforce how matter changes property while helping students work off some energy!

Vocabulary

Properties — The qualities or parts of an object.

Mass — How much matter something has in it.

Matter — All of the “stuff” in our world.

Solid— The type of matter that consists of tightly packed particles; has a constant size and shape.

Liquid — The type of matter that consists of loose particles—has a definite size, but takes the shape of the container it is in.

Gas — The type of matter that consists of particles that are very spread out. Gases fill the container they are in and take its shape.

