



SC.5.P.8.1 Compare and contrast the basic properties of solids, liquids, and gases, such as mass, volume, color, texture, and temperature.

Properties of Matter

What Is Matter?

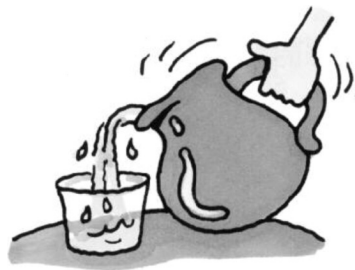
Anything that has mass and takes up space is **matter**. All physical objects are made of matter. Mass is the amount of matter in something. **Volume** is the amount of space something takes up. If you could view an object through the most powerful microscope, you would see that matter is made of tiny particles called atoms. Each of these particles has mass even though they are so small you cannot see them. Different types of matter are made of different arrangements of atoms. Each type of matter has physical properties that you can see, smell, touch, taste, measure, and study.

States of Matter

Aluminum, water, and helium are all examples of matter that are very easy to tell apart. Each one exists in a different state. One is a solid, one is a liquid, and one is a gas. Do you know which is which?

Gold is a solid at room temperature. A solid is the state of matter that holds its own shape and has a fixed volume. A nugget of gold will neither change its shape nor change volume at room temperature.

Water is a liquid at room temperature. A liquid is the state of matter that has a fixed volume but not a definite shape. A liquid takes the shape of its container. You can pour liquid water from a pitcher into a glass.



At room temperature, helium is a gas. A gas is the state of matter that expands to fill its container. A gas does not have a definite shape or volume. Helium gas is used to fill balloons.



Other Physical Properties

You can use your senses to observe some of the properties of solids, liquids, and gases. You can use your sense of sight to observe the color, shape, and general size of an object. You can use your sense of touch to observe a material's texture. Your sense of smell tells you what a substance smells like, and your sense of taste tells you what it tastes like. Even your sense of hearing can help you observe the properties of objects. Can you tell the difference between a tennis ball, a pin, and a rock, just by hearing each one drop to the floor? Can you tell if a substance is a liquid or a solid using your hearing? Of course!



Using Tools

Other properties can be measured using tools. You can also observe whether a substance is attracted to a magnet. If you bring a magnet near various objects, you will observe that objects containing the metals iron, nickel, and cobalt will be drawing toward the magnet. Objects made of glass or wood will not be attracted to the magnet.

You can measure the temperature of a substance using a thermometer. Temperature is a measure of how warm a substance is. A substance with a higher temperature is warmer. You can also find out how much matter is in an object by measuring its mass, and you can measure how much space an object takes up by measuring its volume.

Student-Response Activity

Use the data table below to answer the questions.

Substance	Mass	Volume	Magnetic	Color	State at Room Temperature
A	27 g	10 cm ³	No	metallic, silver	solid
B	50 g	6.36 cm ³	Yes	metallic, gray	solid
C	40 g	40 mL	No	clear	liquid

- 1** Which substance most likely contains iron? Use evidence to support your choice.

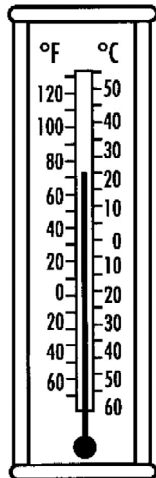
- 2** Which substance is most likely aluminum? Use evidence to support your choice.

- 3** Which substance is most likely water? Use evidence to support your choice.

Benchmark Assessment SC.5.P.8.1

Fill in the letter of the best choice.

- 1 Study this thermometer.



Which properties does water have at this temperature?

- (A) It would fill its container.
- (B) It would hold its own shape.
- (C) It would not have a shape.
- (D) It would take the shape of its container.

- 2 Which is a property of solids?

- (F) takes the shape of its container
- (G) keeps its shape
- (H) fills its container
- (I) can be poured

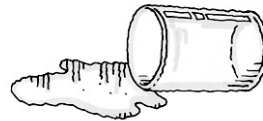
- 3 This chart shows the state of four substances.

Substance	State at Room Temperature
A	solid
B	gas
C	liquid
D	solid

Which substance is water?

- (A) A
- (B) B
- (C) C
- (D) D

- 4 Which characteristic of a liquid does the illustration show?



- (F) It is wet.
- (G) It has a fixed volume.
- (H) It does not have a definite shape.
- (I) It has a fixed volume and a fixed shape.