

When you choose your clothes, your lunch, and even your toothpaste, you are making choices based on the properties of matter. A **property** is a characteristic that may help to identify a substance. You can observe properties using your five senses, or you can determine properties using simple tests and measurements.

## LEARNING TIP

Before reading this section, “walk” through it and make a note of the headings and subheadings. Use these to take point form notes as you read.

## Properties You Can Observe with Your Senses

You can use your five senses—sight, touch, hearing, smell, and taste—to observe matter (**Figure 1**).



**Figure 1**

Which senses would you use to describe the properties of an ice-cream sundae?

Some of the properties you can observe with your senses are summarized in **Table 1**.

**Table 1** Properties Observed with the Senses

Property	Describing the property
colour	Is it black, white, colourless, red, blue, greenish-yellow ...?
taste	Is it sweet, sour, salty, bitter ...?
texture	Is it fine, coarse, smooth, gritty ...?
odour	Is it odourless, spicy, sharp, burnt ...?
lustre	Is it shiny, dull ...?
clarity	Is it clear, cloudy, opaque, translucent ...?



## States of Matter

You can also use your five senses to observe whether a substance is a solid, a liquid, or a gas. These are called the **states** of matter. A substance may be found in all three states. For example, water can be found as a solid (ice), a liquid (water), or a gas (water vapour in the air), depending on the temperature. You can easily observe the state of a substance at room temperature.

### TRY THIS: OBSERVE PROPERTIES

**Skills Focus:** observing, communicating

Play “I spy” with a partner using the observable properties of matter. Use the format, “I spy something that is (pick a state) and is (pick one or more properties from **Table 1**) ...” For example, “I spy something that is a solid, and is blue and shiny. What is it?”



**Check with your teacher before you taste anything other than your own lunch.**

## Properties You Can Measure

Some properties can be determined using simple tests and measurements. For example, you could put a substance in water to see if it dissolves. You could also put a variety of substances in water to see which ones float and which ones sink. Later in this unit, you will measure properties of matter using both of these tests.

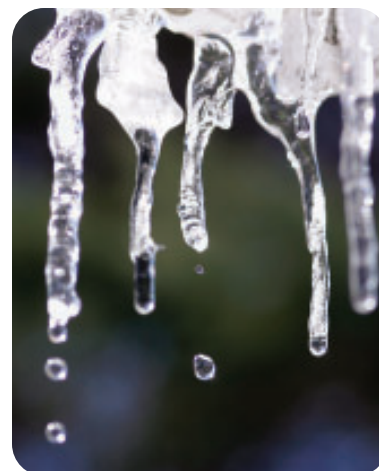
### ▶ LEARNING TIP

The key vocabulary words in this section are illustrated with photographs.

## Melting and Boiling Points

One of the properties of matter that can be measured is the temperature at which a substance changes state. Most substances have two temperatures at which they change state.

The **melting point** of a substance is the temperature at which the solid form of the substance changes to a liquid (**Figure 2**). For example, water changes from solid ice to liquid water at  $0^{\circ}\text{C}$ . Thus, the melting point of solid water (ice) is  $0^{\circ}\text{C}$ .



**Figure 2**

The melting point of ice is  $0^{\circ}\text{C}$ .

The **freezing point** of a substance is the temperature at which the liquid form changes to a solid. If water is cooled, it will freeze at  $0^{\circ}\text{C}$ . The freezing point of a substance is the same as its melting point.

The **boiling point** of a substance is the temperature at which the liquid form of the substance changes to a gas. For example, at the boiling point of water,  $100^{\circ}\text{C}$ , liquid water changes to water vapour, a gas (**Figure 3**).



**Figure 3**

The boiling point of water is  $100^{\circ}\text{C}$ .

Melting point and boiling point are properties that can be used to help identify a substance.

**CHECK YOUR UNDERSTANDING**

1. Make a chart, like the one below, that lists properties you can observe using your senses and properties you can observe using simple measurements.  

1. Using your senses	Using simple measurements
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2. Describe what happens to the state of a substance when it reaches
  - a) its melting point
  - b) its freezing point
  - c) its boiling point