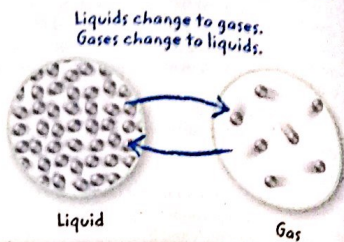


# Dropping in on Liquids

## How do liquids and gases change state?

The particles in a liquid have less kinetic energy than those in a gas. They can only slide around each other. The particles in a gas have a great deal of kinetic energy. Therefore, they move very quickly. Adding energy can cause a liquid to change into a gas, while removing energy can cause a gas to change to a liquid.



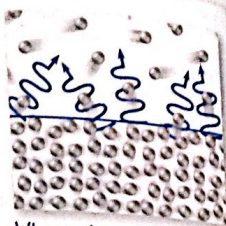
## Evaporation and Boiling

Once again, temperature is crucial. When the temperature of a liquid is increased, the particles that make it up gain kinetic energy. Some particles may gain enough kinetic energy to become gaseous and escape from the surface of the liquid. This process is called **evaporation**. Evaporation happens at a range of temperatures, but it occurs more rapidly at higher temperatures.

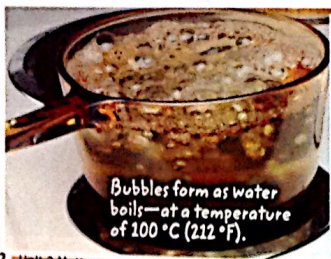
**Boiling** is a rapid change from the liquid to gaseous state. It is so rapid that bubbles of gas form in the liquid. The temperature at which this occurs is the **boiling point**.

The boiling point of water is 100 °C (212 °F). The boiling point of aluminum is 2,467 °C (4,473 °F). Yes, it's true. At very high temperatures, aluminum metal boils and becomes a gas.

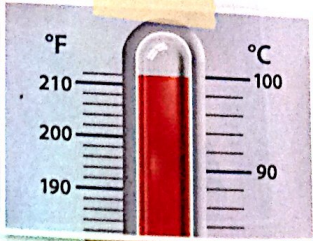
**Active Reading 10 Compare** How are evaporation and boiling alike? How are they different?



When water particles gain enough energy, they change from a liquid to a gas and escape through the surface of the liquid.



Bubbles form as water boils—at a temperature of 100 °C (212 °F).



## Condensation

Temperature changes can also cause a gas to become a liquid. As the temperature of a gas is lowered, the movement of the particles is slowed. The attraction between the particles overcomes their motion, and a liquid is formed. This process is **condensation**.

You can easily see condensed water on the side of a cold glass or pitcher, especially on a hot day. The gaseous water vapor in the air quickly changes to liquid water when its particles come in contact with the cold glass surface.

**Active Reading 11 Explain** What happens to the particles in a gas during condensation?

**12 Graph** Make a graph that shows the boiling point in degrees Celsius of the three liquids listed.

Liquid	Boiling Point (°C)
Water	100
Rubbing Alcohol	82
Acetic Acid	118

