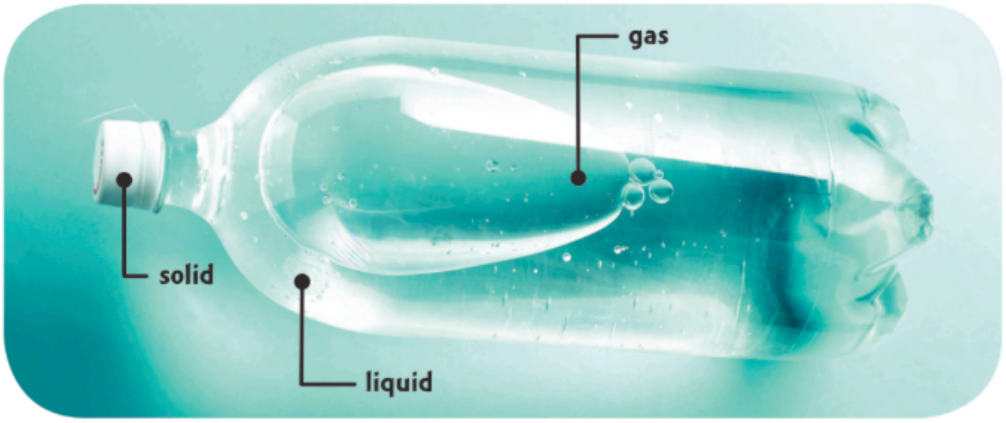
Solids, Liquids and Gases

Matter exists in different forms. The air around us is a gas. The water we drink is a liquid. Your book is a solid.

Active Reading As you read these two pages, underline the contrasting characteristics of each state of matter.



Solids, liquids and gases are three **states of matter**. Most matter on Earth is classified as one of these forms.

A **solid** has a definite volume and shape. Your desk, book, pencil and chair are all solids. Solids stay solid unless something, such as heat, changes them.

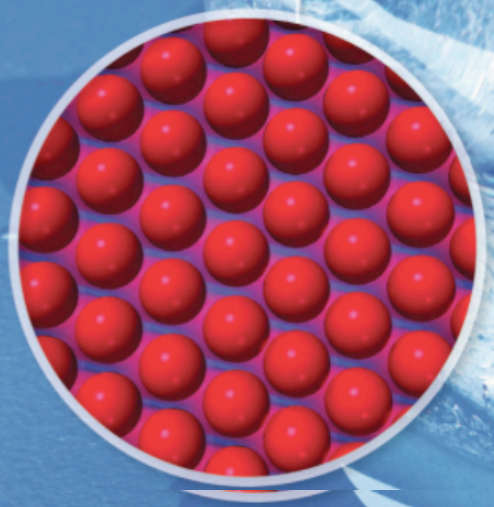
A **liquid** has a definite volume but not a definite shape. A liquid takes the shape of whatever container holds it. Water, shampoo and fruit juice are liquids.

A **gas** doesn't have a definite volume or shape. It expands to take up all the space in a container. If you blow up a balloon, you can see that air spreads out to fill the space. The air we breathe is a mixture of gases.

Water's Forms

Water can be a solid, a liquid or a gas. This ice cube is solid water. It melts into a liquid. When water is a gas, it is called water vapour.

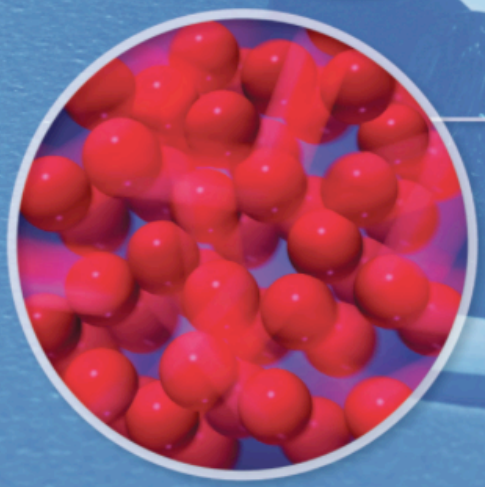
Water is made of tiny particles. We can learn what state water is in by knowing how fast the particles in it move.



Solid

Water in the solid state has a definite volume and shape. You can make square or round ice cubes. You can make big ones or little ones.

The particles in solids are close together. They are moving, but stay in the same spot, much like the strings of a guitar vibrating back and forth.



Liquid

Liquid water has a definite volume but not a definite shape. Pouring water from a glass into a bowl changes its shape, but not its volume.

Generally, particles are a bit farther apart in a liquid than in a solid. They move around more, too. The particles slide past each other.

Gas

The air around the ice cube has water vapour in it. We can't see the water vapour, but it's there. A gas doesn't have a definite volume or shape.

Particles in a gas are far apart. They are much farther apart than the particles in a liquid. They move very quickly in all directions.

Water Changes Form

Anything made out of snow will melt if it gains enough heat energy. Energy from the sun causes the snow to change to a liquid.

Active Reading As you read these two pages, compare changes of state. Draw a circle around changes that happen when heat is added.

Freezing

At a certain temperature, water can freeze as heat energy is removed. Particles slow down and get closer together. They begin to lock into place. Water changes from a liquid to a solid. A **change of state** occurs when matter changes from one state to another.

Melting

Adding heat energy causes ice to melt. Particles speed up until they overcome the attractions that hold them in place. Water melts when it changes from a solid to a liquid.

Evaporation

When heat energy is added to water, its particles speed up. Particles that gain enough energy enter the air as water vapour. **Evaporation** is the process by which a liquid changes into a gas. Water evaporates from oceans, lakes and rivers every day.

Condensation

When heat energy is removed from a gas, its particles slow down and clump together. **Condensation** is the process by which a gas changes into a liquid. Clouds form when water vapour condenses on particles of dust in the air.