

## 4.2: States of Matter

Describe the three main states of matter.

You have just learned about different properties of matter—mass, volume, density, and temperature. Now you need to know about the different states of matter. There are three main states, or phases, of matter—solid, liquid, and gas<sup>1</sup>. You are probably very familiar with solids and liquids. They are easy to see with your eyes and feel with your hands. Gases, on the other hand, are often not visible, making them more challenging to observe.

Solids are the most organized state of matter. The particles that make up solids are packed closely together. Solids maintain a constant shape and volume. The particles that make up liquids are also packed close, but not quite as close as in solids. Liquids maintain a constant volume but take the shape of the container that holds them. The particles in gases are very loosely held and are free to move around within a container. Gases take the shape and volume of the container that holds them.





Matter can change from one state to another. Look at what happens when you put liquid water in an ice tray and put it in the freezer. The liquid water turns into ice—solid water. It has changed state from liquid to solid. Leave that same ice out on the counter, and it will change back to liquid. Pour it into a pan and place it on a hot stove, and the liquid water will become steam—water as a gas, or water vapor.

Changes of state have specific names:

- melting—changing from solid to liquid
- freezing—changing from a liquid to a solid
- vaporization—changing from a liquid to a gas very quickly
- evaporation—changing from a liquid to a gas very slowly
- condensation—changing from a gas to a liquid
- sublimation—changing from a solid to a gas
- deposition—changing from a gas to a solid





You have probably heard of melting, freezing, evaporation, and condensation. The others might be new to you. Think back to the video introduction to this lesson where you saw dry ice change from a solid into a gas. Dry ice is made of solid carbon dioxide, not water. The carbon dioxide becomes a gas without becoming a liquid. This is sublimation. An example of deposition is frost that appears on car windshields and grass. Water vapor in the air becomes solid ice crystals without first becoming liquid water.

1. Read more about the other states of matter (https://www.livescience.com/46506-states-of-matter.html)