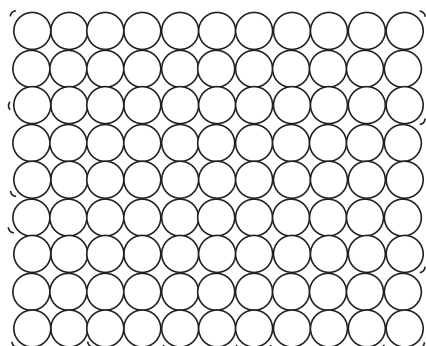


The three states of matter

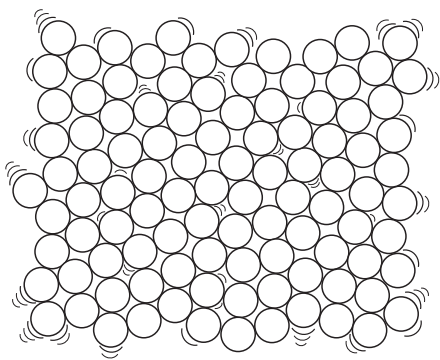
A **theory** is used to explain **observations (data)**. Scientists also use theories to make **predictions**, and test the predictions to find out if they are correct. If the predictions are not correct, then the theory may have to be changed to explain the new **evidence**.

The different **properties** of solids, liquids and gases can be explained by the **particle theory** (or **particle model**). Solids, liquids and gases (the three **states of matter**) need to be handled and stored differently because of these different properties. For instance, solid materials can be taken to a **landfill site**.



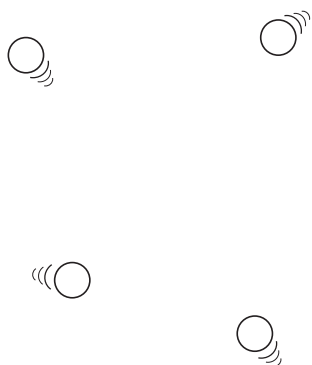
SOLID

- Solids are made up of particles that are very close together and are held tightly together by strong **bonds**.
- Solids cannot be squashed, do not flow, have a fixed shape and **volume**, and are **dense** (are heavy for their size). (Volume is the amount of space something takes up. It is measured in units such as **cubic centimetres (cm³)**.)



LIQUID

- Liquids are made up of particles that are fairly close together; the bonds between the particles are weaker than the bonds in solids. This allows the particles to move past each other.
- Liquids cannot be squashed, flow quite easily and have a fixed volume but no fixed shape.
- Although they are dense, liquids are usually less dense than solids.



GAS

- Gases are made up of particles that are well spread out, with no bonds between them.
- Gases are quite easy to squash, flow easily, have no fixed volume and no fixed shape.
- Gases are not dense.

Diffusion

The natural mixing of substances is called **diffusion**. Diffusion occurs because particles in a substance are always moving around. Diffusion is fastest in gases, and slower in liquids.

Dilution

When you add water to orange squash you **dilute** it. The colour becomes paler because the orange coloured squash particles are spread out more by the water particles.

Pressure in gases

Pressure is caused by particles hitting the walls of the container they are in. The pressure may increase because:

- the container has been squashed, making the volume smaller; this means that the particles will be hitting the walls more often.
- the number of particles has been increased, which means there are more particles moving around to hit the walls.
- the temperature of the particles has increased, so they will move around faster and hit the walls harder and more often.

If the particles are in a flexible container, like a balloon, an increase in pressure will make the volume increase. If the pressure becomes too great the balloon will burst.

Air pressure is the pressure caused by air particles around us. Air pressure lets us suck things up using a straw and also causes a container to collapse if the air is sucked out. If all the air is sucked out of a container, you get a **vacuum** – nothingness.

