

The Particle Model

1) What is density?

2) In each box draw how the particles are arranged in solids, liquids and gases:



solids



liquids



gases

3) Explain each property in terms of how the particles are arranged:

a) Gases and liquids can flow and be poured because...

b) Solids and liquids cannot be squashed (compressed) because...

c) Solids cannot flow because...

d) Gases can be squashed (compressed) because...

4) Phoebe leaves a can of hairspray on the windowsill on a sunny day. Describe what is happening inside the can in terms of the particles:

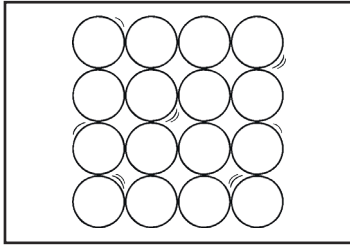
Challenge: Why are drivers encouraged to check their car tyre pressures before completing a long journey?

Learning Objectives:

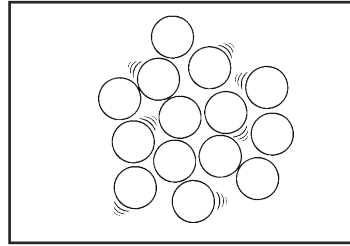
- I can define density.
- I can draw the arrangement of particles in solids, liquids and gases.
- I can link the properties of solids, liquids and gases to the arrangement of their particles.
- I can describe the effects of gas pressure.

The Particle Model Answers

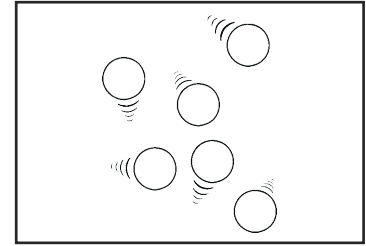
1) The mass of a substance per unit of volume.



solids



liquids



gases

3) a) Gases and liquids can flow and be poured because...

The particles can move around one another and are not fixed. This is because the forces between particles in a liquid are weaker than a solid and weakest in gases.

b) Solids and liquids cannot be squashed (compressed) because...

The particles are tightly packed in a solid and have no spaces in between them, they are very dense. In a liquid, the particles are still closely packed together and are quite dense.

c) Solids cannot flow because...

The particles are fixed and cannot move. But they can vibrate / move around a fixed spot. They have a fixed shape and volume.

d) Gases can be squashed (compressed) because...

The particles are far apart and have spaces between them. The forces between particles in a gas are very weak.

4) Phoebe leaves a can of hairspray on the windowsill on a sunny day. Describe what is happening inside the container in terms of the particles:

Gas particles are always moving and colliding with the walls of the container. As the temperature is increased due to the sunshine, more energy is transferred to the gas particles. This means they collide more frequently and harder with the walls of the container. This causes the gas pressure to increase which could lead to the container exploding.

Challenge:

The tyres will warm up with increased contact (friction) with the roads. This means more energy is transferred to the gas particles inside the tyre, causing them to collide with the inside of the tyre more frequently and harder. The pressure inside the tyres will increase and could cause the tyre to burst or explode.