



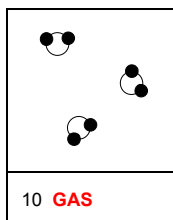
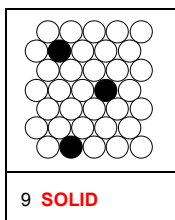
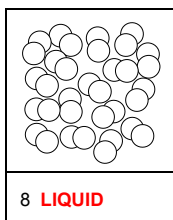
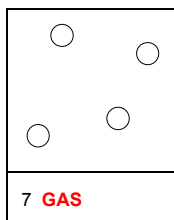
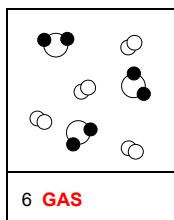
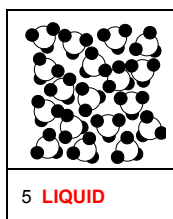
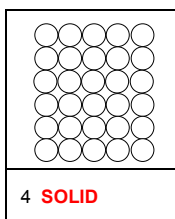
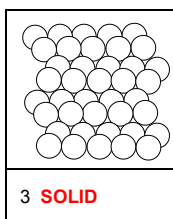
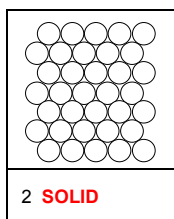
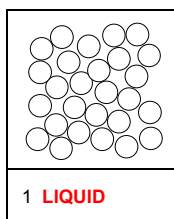
# PARTICLE THEORY CIRCUS 1

The instructions for most of these 7 activities are on the Particle Theory 1 instruction cards.

**Activity 1** Write your explanation about ice melting and water boiling.

**Energy is used to overcome forces between particles instead of heating the substance up.**

**Activity 2** Follow the instructions on the card.



**Activity 3** Match the explanations on the cards to the observations below. Once you have matched them up, write the correct explanations in the spaces below. Note that there are more explanations than observations.

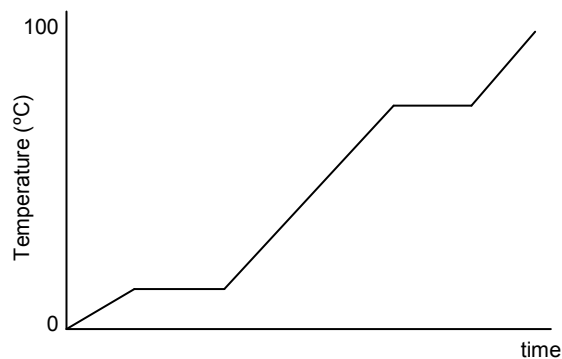
- a) Gas and liquids take the shape of the container they are put in. **The particles can move around**
- b) Solids have a fixed shape. **The particles cannot move around**
- c) Gases can be squashed easily. **The particles are a long way apart**
- d) Liquids and solids cannot be squashed easily. **The particles are close together**
- e) If a perfume is sprayed in one corner of the room, it takes a few minutes for the smell to reach the other side of the room. **The particles are slowed down by collisions with air particles.**

**Activity 4** Use the melting and boiling point data on the cards to help you sketch how the temperature changes as the following substances are heated or cooled.

**cyclohexane** (chewing gum remover)  
heated from 0°C to 100°C

melting point = 6°C

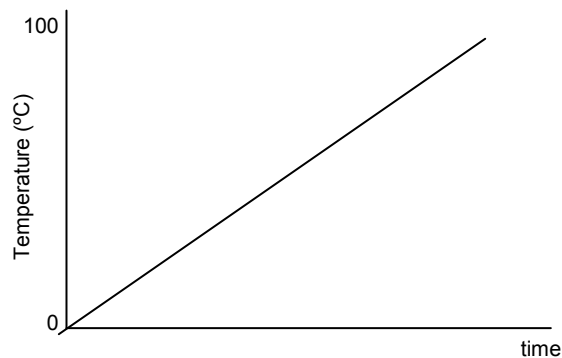
boiling point = 81°C



**toluene** (a solvent for glues)  
heated from 0°C to 100°C

melting point = -95°C

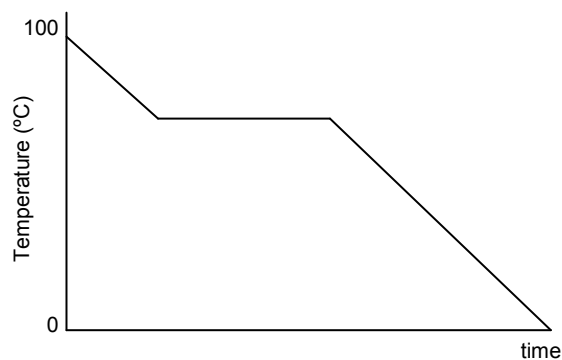
boiling point = 110°C



**alcohol**  
cooled from 100°C to 0°C

melting point = -117°C

boiling point = 79°C



**Activity 5** Use the melting and boiling point data on the cards to work out the state of each substance at the temperatures shown. Write S for solid, L for liquid or G for gas.

substance	melting point (°C)	boiling point (°C)	state at -50°C	state at 20°C	state at 100°C
toluene	-95	110	L	L	L
hydrogen chloride	-115	-85	G	G	G
gallium	30	2403	S	S	S
magnesium oxide	2852	3600	S	S	S
methylamine	-93	-6	L	G	G

**Activity 6** Write your explanation about air reaching the heart here.

When blood is in the heart, as the heart contracts the blood is pushed out of the heart as it cannot be squashed. Air can be squashed and so is squashed and stays in the heart preventing blood being pumped around – the air just expands and contracts with the heart instead.

**Activity 7** Write your explanations about hydraulic brakes here.

The brake fluid is pushed through the tube by the pedal as it cannot be squashed but can change shape. This in turn pushes the brakes against the wheel.