Checkpoint support and extension

Aim

The aim of the Revision activity is to provide support for students who need to progress from *Know* to *Apply* for the AQA syllabus goals.

The aim of the extension activity is to provide extension for students who have already achieved *Apply*. The activity is also suitable for higher ability or older students in need of further *extension* work.

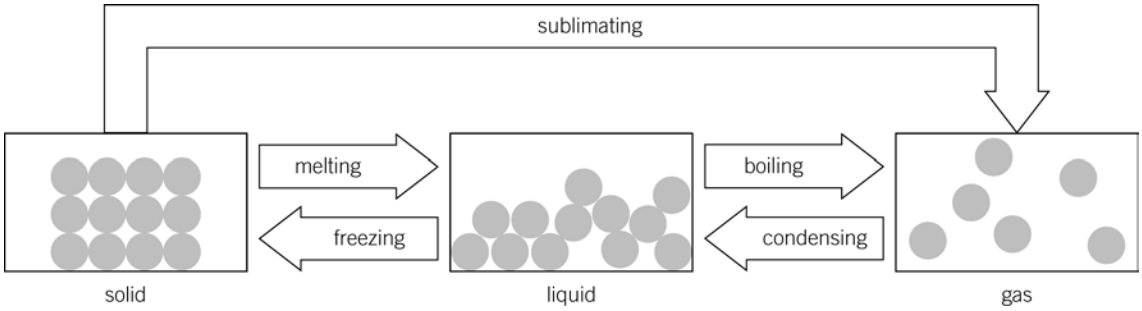
Revision activity notes

It is recommended that students achieving less than 63% complete the revision activity.

The Revision activity is a guided worksheet where students draw diagrams and add descriptions to demonstrate that they can securely use the particle model to describe state change, diffusion, and gas pressure.

Revision activity answers

1



2 Solid – fixed pattern, vibrating, cannot flow over each other

Liquid – touching neighbours, can flow over each other

Gas – separate, spread out and fill the whole container

3

Change of state	**The particles…**
melting	increase in energy, break free from fixed positions, flow over each other
boiling	increase in energy, move away from neighbours, fill container
condensing	decrease in energy, move towards each other, can still flow
freezing	decrease in energy, particles fix in position next to each other
sublimation	increase in energy, break free from fixed positions, fill the container

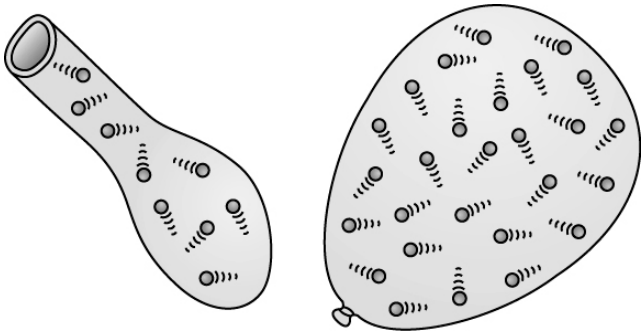
Part 1 Checkpoint Teacher notes

4 Boiling happens at boiling point to the whole liquid. Bubbles of gas are formed throughout which then rise to the surface and escape. Particle diagram should clearly show gas bubbles forming throughout with correct particle arrangement.

Evaporation happens over a range of temperatures just at the liquid surface. Only high energy particles escape. Particle diagram should correctly represent liquids and gases shown within the explanation.

5 (The pictures of the other people is not essential.)

6



7

Separation method	Used for…
chromatography	separating mixtures of liquids (often coloured) that are soluble in the same solvent
filtration	separating insoluble solid particles from a liquid
evaporation	removing liquid (solvent) from a solution to leave behind the dissolved solid (solute)
distillation	removing a solvent from a solution by evaporation followed by condensation

Extension activity overview

The Extension activity contains a series of independent tasks that are designed to improve and extend students' scientific literacy and understanding of Big Idea 5 Matter.

Extension activity answers or marking guidance

Task 1

Answers will depend on students selection of temperature, general rule is a substance is:

Solid – at temperatures lower than the substance's melting point

Liquid – at temperature between the substance's melting and boiling point

Gas – at temperatures greater than the substance's boiling point.

Task 2

1 Sand is a solid as the particles are fixed, the reason it can pour and fills the shape of its container is because the sand itself is in very small pieces – it is the collection of individual pieces of sand that flow, not the individual particles that make up these pieces.

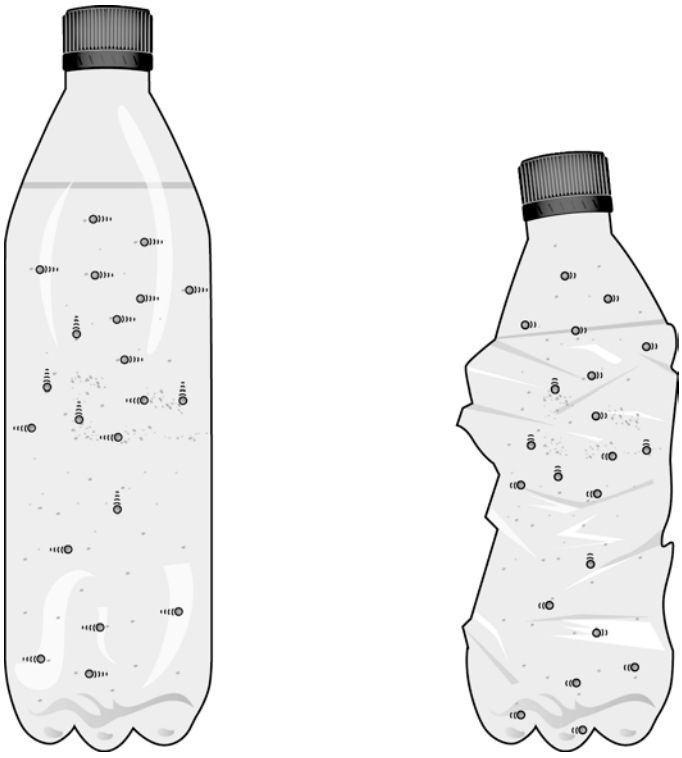
2

Process	How particles leave the liquid	Temperature	Does the mass change?
evaporation	Particles escape from the liquid surface.	happens at any temperature	no
boiling	Bubbles of the substance in the gas state form throughout the liquid. They rise to the surface and escape.	happens only at the boiling point	no

Part 1 Checkpoint
Teacher notes

Task 3

Particles move more slowly, they get closer together colliding with the wall of the bottle less often. This reduces the pressure so the bottle will get smaller and collapse.



Task 4

Answer will depend on student selection, however general guidance is as follows: The higher the position of the line on the *y*-axis, the greater the solubility value for the substance. Positive gradients represent increasing solubility, zero gradients represent static solubility, negative gradients represent decreasing solubility. The steepness of each gradient represents the rate of change in solubility values with the temperature change.

Task 5

1 **Filter** the solution to remove the sand.

Carry out **distillation** to separate the ink from the water.

Measure the boiling point of the water – if it is pure it will have a sharp boiling point of 100°C.

2 Chromatography could be used. Spots of the ink from the mixture will reach the same position on the chromatogram as the ink that was used to make the mixture. A labelled diagram showing such a situation should be included.