

Edexcel IGCSE Chemistry

Topic 1: Principles of chemistry

States of matter

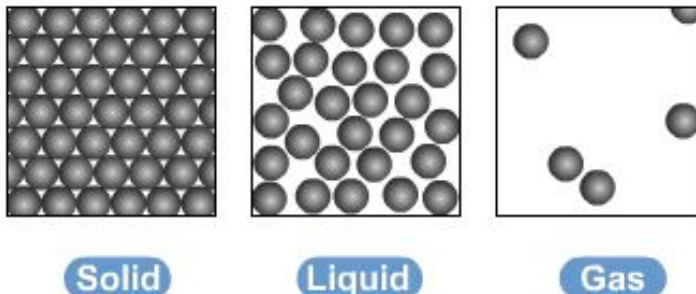
Notes





1.1 understand the three states of matter in terms of the arrangement, movement and energy of the particles

- The three states of matter are solid, liquid and gas



- They can be represented by the simple model above, particles are represented by small solid spheres
- Gas: particles have the most energy – shown by the diagram, as the particles are the most spread apart with a random arrangement
- Liquid: particles have more energy than those in a solid, but less than those in a gas and the particles are closer together but have a random arrangement
- solid has least energy – particles are not moving/are just vibrating and they are arranged regularly and very closely together

1.2 understand the interconversions between the three states of matter in terms of: the names of the interconversions, how they are achieved, the changes in arrangement, movement and energy of the particles

- Physical changes – therefore involves the forces between the particles of the substances, instead of these interconversions being chemical changes
- Melting and freezing take place at the melting point:
 - o solid → liquid: melting
 - o liquid → solid: freezing
- Boiling and condensing take place at the boiling point:
 - o liquid → gas: boiling
 - o gas → liquid: condensing
- when you change from solid to liquid to gas: the particles gain more kinetic energy, move around more and become more randomly arranged and further apart
- when you change from gas to liquid to solid: the particles lose kinetic energy, move less and become more regularly arranged and closer together



1.3 *understand how the results of experiments involving the dilution of coloured solutions and diffusion of gases can be explained*

- Diffusion
 - Movement of particles from an area of high concentration to an area of low concentration
 - For this to work, particles must be able to move
 - Therefore, diffusion does not occur in solids, since the particles cannot move from place to place (only vibrate)
 - Therefore, coloured solutions are diluted by adding water, because the particles of the colour diffuse to the area of low concentration, mixing with the water molecules, causing dilution to occur

1.4 *know what is meant by the terms: solvent, solute, solution and saturated solution*

- Solvent = liquid in which a solute dissolves
- Solute = substance that dissolves in a liquid to form a solution
- Solution = mixture formed when a solute has dissolved in a solvent
- Saturated solution = solution in which no more solute can be dissolved

1.5 *(chemistry only) know what is meant by the term solubility in the units g per 100 g of solvent*

- Solubility is shown as the grams of a solute that will dissolve in 100 g of water

1.6 *(chemistry only) understand how to plot and interpret solubility curves*

- generally:
 - solubility of solids increases when temperature increases
 - solubility of gases increases when pressure increases
 - any mass below the line for a solute at a specific temperature would mean the solution was unsaturated
 - any mass above the line for a solute at a specific temperature would mean the solution was supersaturated and unstable

1.7 *(chemistry only) practical: investigate the solubility of a solid in water at a specific temperature*

