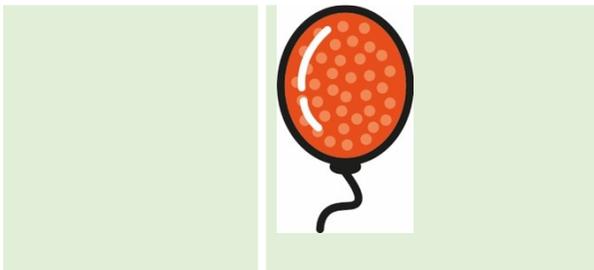


KS3: C1.1 Particles



Big Picture Link: Structures determines properties



Matter is composed of atoms; atoms can link together and arrange in a variety of ways leading to the formation of different structures. This behavior and arrangement of atoms explain the properties of different materials.

	Year 7: Building	Yr 7: Developing	Yr 7 Securing	Yr 7 : Mastering
Progress Objectives	Students should be able to:		By the end of Yr 7 students should be able to:	By the end of Yr 7 students may also be able to:
Factual and Conceptual Understanding	<p>The three states of matter are solid, liquid and gas. Temperature is measured in degrees Celsius All matter is made of particles. The three states of matter can be represented by a simple model. In this model, the particles are represented by small, solid spheres. Gas pressure occurs because of particles colliding with the walls of a container. Particles in gases are constantly colliding.</p>	<p>Solids, liquids and gases have different properties. Solids have a fixed shape and cannot be compressed. Liquids are able to flow, take the shape of their containers and cannot be compressed. The particles in a solid are close together, vibrate on the spot and are arranged in a regular pattern. They have the least energy. The particles in a liquid are close together, move freely and move in a random way. The particles in a gas are far apart, they move freely and are arranged in a random way. There is nothing but space between the particles and they have the most energy. Boiling and condensing take place at the boiling point.</p>	<p>More collisions result in greater pressure and fewer collisions result in less pressure Pressure in liquids increases with depth</p>	<p>Explain that atmospheric pressure decreases with increasing height as the weight of air above decreases with height.</p>
Application of Knowledge	<p>The particles in a solid can vibrate in a fixed position and cannot move from place to place because there are strong forces which attract the</p>	<p>Explain why a given substance is described as a solid, liquid or gas. Freezing is the change of state from a liquid to a solid. A substance changes from a liquid to a solid at the freezing</p>	<p>Describe how heating or cooling can cause a substance to change state. Compare the structure and properties of a solid, liquid and gas. The particles in a liquid are able to</p>	<p><u>The amount of energy needed to change state from solid to liquid and from liquid to gas depends on the strength of the forces between the particles of the substance.</u></p>

<p>and Skills</p>	<p>particles towards each other. The particles in a gas are free to move in any direction as there are weak forces between the particles Particle theory can help to explain melting, boiling, freezing and condensing. Diffusion is the movement of particles from a high concentration to a low concentration</p>	<p>point</p> <p>A substance changes from a solid to a liquid at the melting point</p> <p>Boiling is the change of state from a liquid to a gas. A substance changes from a liquid to gas at the boiling point.</p> <p>Explain that condensation is the change of state from a gas to a liquid. A substance changes from a gas to a liquid at the condensing point.</p> <p>Diffusion cannot happen in solids because particles in a solid are not free to move</p> <p>Diffusion happens faster when the particles in a gas or liquid are moving faster after heating</p>	<p>move around each other because the forces are strong enough to keep the particles close together, but weak enough to let them move around each other</p> <p>Compare the motion of particles in different states of matter in terms of forces of attraction.</p> <p>Describe how when the forces of attraction in a solid object are weakened, the distance between the particles increases and the object expands</p> <p>The stronger the forces between the particles the higher the melting point and boiling point of the substance.</p> <p>Particle theory can help to explain melting, boiling, freezing and condensing Explain that boiling occurs in a liquid when particles have sufficient energy to overcome the forces between them and move apart randomly. Explain that evaporation happens at the surface of a liquid as it boils. Evaporation can occur over a large range of temperatures</p>	
<p>Maths, Practical and Enquiry Skills</p>	<p>Substances can be heated using a Bunsen burner, water bath or electric heater</p> <p>A Bunsen burner consists of a base, a chimney, an air hole and rubber tubing.</p> <p>Variables are factors that can change or be changed in an investigation</p> <p>Measure volumes of liquids accurately.</p>	<p>To be able substitute values into a simple equation.</p> <p>To be able to select the correct equation from the equation sheet.</p> <p>Demonstrate safe use of a Bunsen burner.</p> <p>An independent variable is one that the scientist changes The dependent variable is one that</p>	<p>The melting point and freezing point of a substance are the same</p> <p>Explain the effect of temperature of the rate of diffusion</p> <p>Volumes of liquids can be measured precisely using graduated cylinders, plastic pipettes and glass pipettes When reading the volume of a liquid, this should be done at eye level from the bottom of the meniscus</p>	<p>Explain the effect of temperature on the rate of diffusion of potassium permanganate crystals in water Explain the importance of control variables in scientific investigations. Rearrange an equation for an unknown. Measure the volume of an irregularly shaped object using a displacement can, water and a graduated cylinder.</p>

	<p>The mass of an object can be measured using a balance.</p>	<p>the scientist measures Control variables are those that are kept the same, to ensure that the dependent variable is only influenced by the independent variable The volume of a regular shaped object can be measured by multiplying the length by width by height</p>	<p>Investigate the effect of temperature of the rate of diffusion</p>	
<p>Language and Communication</p>	<p>Write some facts about solids, liquids & gases</p>	<p>Explain why a given substance is described as a solid, liquid or gas.</p>	<p>Explain the effect of temperature of the rate of diffusion</p>	<p>Explain what is meant by the term 'melting point'.</p>