

St Michael's Church of England High School – Scheme of Learning Overview

Subject: Science		Year group: 7	
Unit: The Particle model			
Overview (including links to Big Ideas)			
<p>This unit is designed to develop student ideas and understanding of what substances are made of and how those particles will move when in the states solid, liquid and gas. They will then apply this knowledge to how smells other chemicals can be transported through various media. This unit links directly to 3 of our big ideas in science</p> <ul style="list-style-type: none">• Matter is made up of small particles and it's the movement of these particles that allow particles to spread out from areas of high concentration to areas of low concentration.• Changing the movement of an object requires a net force to be acting on it- particles such as air particles exert a force on their containers due to collisions.• the total amount of energy in the Universe is the same but energy can be transformed when things change or are made to happen <p>Through this unit a variety of misconceptions students may have about the particle model will be addressed this will include why the particles are moving when looking at Brownian motion.</p>			
Links to Prior and Future learning (Why this? Why now?)			
<p>This unit links to students' prior KS2 learning on states of matter (materials are made of small particles), how to classify solids, liquids and gases. As well as how solutions are made and how mixtures can be separated.</p> <p>From KS2 most students will be able to:</p> <ul style="list-style-type: none">• compare and group materials together, according to whether they are solids, liquids or gases (Year 4)• understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (Year 5)• use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (Year 5). <p>This links with the fluids and energy transfers in year 8. As well as transporting substances in KS4 Biology, States of Matter in KS4 Chemistry and insulation in conservation of energy in KS4 Physics.</p>			
Knowledge Goals		Lesson sequence	
<p>By the end of this unit all students should be able to</p> <ul style="list-style-type: none">• To describe the difference between physical and chemical properties• To recall the physical properties of solids, liquids and gases• To construct particle diagrams for a solid, liquid and a gas• To define the key words boiling point and melting point		<div><div>1</div><div>States of matter</div></div> <div><div>2</div><div>Diffusion</div></div> <div><div>3</div><div>Brownian motion and gas pressure</div></div> <div><div>4</div><div>Topic review</div></div>	

<ul style="list-style-type: none"> To name the processes that take place to change the state of matter To describe what happens in diffusion of fluids To use particle theory to explain how heating can affect the rate of diffusion To explain how Brownian motion supports particle theory To convert between nanometres and metres 	
Key vocabulary (Tier 2 and 3)	Reading/Writing/Numeracy development
Tier 2 Volume, compressed, pressure, particle, forces, theory, model, vibrate, Tier 3 Corrosive, flammable, states of matter, particle theory, Brownian motion, molecules, diffusion, small intestine, cells, air pressure, flammable, vacuum	Reading – Students read a variety of different information presented in different formats throughout the topic. Opportunities to read aloud in each lesson. Writing – Students complete application questions and complete a literacy task as their assessment for this unit. Numeracy – students carry out conversions between nanometres and metres. Appreciation and checking of scale of phenomena.
Teaching strategies	
Quality First Teaching strategies (QFT) Use of red and green cards for quizzing and identification of confidence levels, use of task organisers, use of modelling with slow practicals, modelling a deliberate practice for numeracy and literacy skills, use of scaffolding to achieve the same outcomes across every class (structure strips, word wheels etc.) Stretch and Challenge Opportunities for challenge through progressively more challenging calculations, presenting information to the class, carrying out independent research and applying knowledge to complex scenarios.	
Assessment	
Complete the literacy task on states of matter.	
Homework	
Students complete a 25-question quiz each week during this unit, which focuses on retrieval of key knowledge.	
Cultural/Social/Economic Development	Subject specific information (eg scientific enquiry/historical enquiry/key practical's)
Students learn about how knowledge of particles is vital to understanding how materials will behave in extreme environments. Linking this	<ul style="list-style-type: none"> Identifying melting and boiling points for different substances Diffusion of simple substances

<p>understanding to the development of the craft needed for deep sea and space exploration. As well the development of materials to enable us to live comfortably in extreme environments such as Antarctica.</p> <p>Understanding how knowledge of states of matter can enable us to better manage resources. Such as the delivering of fuels like natural gases to remote communities as a compressed liquid in a bottle rather than as a gas.</p>	<ul style="list-style-type: none"> • Investigating the effect of temperature on diffusion • Investigating the effect of surface area on diffusion
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