Ravens Wood School

KS3 Curriculum Plan

Subject: Year 8 Heating and cooling

KS2 Prior Learning			
States of Matter - compare and group materials together, according to whether they are solids, liquids or gases, observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)			
Overarching Topic: Heating and cooling			
Why is this topic being studied at this time? How does it fit into the wider subject curriculum?	• If you can harness heat energy transfer, it opens up possibilities like refrigerators. And internal combustion engines. And modern power plants. And understanding (and therefore predicting) the weather. And so many other things. The particle model is widely used to predict the behaviour of solids, liquids and gases and this has many applications in everyday life. It helps us to explain a wide range of observations and engineers use these principles when designing vessels to withstand high pressures and temperatures, such as submarines and spacecraft. It also explains why it is difficult to make a good cup of tea high up a mountain! • Students should be able to describe how substances react when they experience a change in the overall kinetic energy of the system (heating, cooling, radiation and insulation) and how this can be used in everyday life. This unit uses ideas developed in the Key Stage 2 programme of study, building on ideas introduced in unit 4C 'Keeping warm' and unit 5D 'Changing state'. Changes in state is also revisited in Key Stage 4.		
	Essential	**Core**	**Ambitious**
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	How do the particles in a liquid and a gas react when heat is applied to it? Can you using the particle model, draw the arrangement for a solid, liquid and gas? What is an insulator and a conductor? What is conduction? What is convection?	How is thermal energy transferred by conduction in solids and convection in liquids? Using the word radiation, can you describe how thermal energy is transferred from hotter objects to colder objects? Can you name at least 3 thermal insulators and describe how they are used? Can you describe the difference between thermal energy and temperature?	How can conduction be dangerous? How can it be a life saver? If light colored clothes keep you cool in the summer, why are marathon runners wrapped in foil at the end of the race? A flask is used to keep a liquid hot or cold. Can you explain how the vacuum seal within the flask works to support this? Why do people who live in desert climates wear black robes? Can I evaluate a claim about insulation in the home or for clothing technology? Design the best coat in the world! How do methods of heat insulation works in terms of conduction, convection and radiation.
The Key Skills/ Techniques	**The sophistication and application of skills will become more advanced as students' progress through the essential, core and ambitious knowledge**		
	Skill/Technique	**How will this skill be developed?**	
	1. Graphing & Drawing	Draw graphs with suitable scales, axes and units. Correct line of best fit. Appreciation of anomalies and processed data. Scientific drawing of cells, concepts and scientific equipment.	
	2. Variables	Identify independent, dependent and control variables and devise experiments to include these to ensure valid results. Appreciation of uncertainty.	
	3. Data Analysis	Describe, explain and predict trends. Graph and table data interpretation. Identify links and patters within and between topics. Statistical analysis of data to include mode/median/mean/range determination. Drawing justified conclusions from presented data.	

	4. Application	Apply known and taught theory in unfamiliar contexts. Making links to taught theory and extracting key ideas. Communicating using correct scientific terminology.
	5. Working Scientifically	Identify hazards and planning to limit risk. Describe how to improve accuracy/precision/repeatability/reproducibility/validity. Evaluate reliability of methods and investigations, taking in to account data analysis.