Ravens Wood School
KS4 Curriculum Plan

Subject: Year 9 P.1 Energy

Overarching Topic: Energy			
Why is this topic being studied at this time? How does it fit into the wider subject curriculum?	The concept of energy emerged in the 19th century. The idea was used to explain the work output of steam engines and then generalised to understand other heat engines. It also became a key tool for understanding chemical reactions and biological systems. Limits to the use of fossil fuels and global warming are critical problems for this century. Physicists and engineers are working hard to identify ways to reduce our energy usage. Having studied energy at KS3, students will be able to analyse today's energy resources and how they impact our lives. In doing so, they should be able to identify the types and uses of energy and why we need energy resources.		
	Essential	**Core**	**Ambitious**
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	What are the changes involved in the way energy is stored, for common situations? When a system changes, can you describe those changes? Can you calculate the kinetic energy of a moving object, energy stored by a stretched spring and an object raised above ground level? Can you calculate changes in the way energy is stored when a system is changed by heating? Can energy be created or destroyed? Which type of power station is the most efficient? What are the main energy resources available for use on Earth?	Can you calculate how energy is redistributed in a system when it changes? When an object falls, is the decrease in the gravitational potential energy store equal to the increase in the kinetic energy store? What is happening at an atomic level when a substance is heated? What is meant when people say, 'energy is lost'? Which type of light bulb would cost the least amount of money to use? Can you explain the patterns and trends in the use of energy resources?	Why does a current along a wire allow bulbs to light and motors to spin? Can you calculate the changes in energy store between GPE and KE in a multi-step process? Working critically with primary and secondary evidence, how much energy is stored in a crisp? How can we reduce the amount of energy being wasted by a machine? Will energy-saving light bulbs save money compared to incandescent light bulbs? Can you evaluate the use of different energy resources for a given situation?
	TRIPLE ONLY QUESTIONS What are the ways we can insulate an object?	**TRIPLE ONLY QUESTIONS** What factors affect insulation?	**TRIPLE ONLY QUESTIONS** Given any situations, can you identify main sources of heat lost and give a solution to improve loss?

The Key Skills/ Techniques	**The sophistication and application of skills will become more advanced as students' progress through the critical, core and pinnacle 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.