

## The Curriculum Journey – Key stage 3 YEAR 9 2024- 2025

Year 9	Ht1	Ht2	Ht3	Ht4	Ht5	Ht6
<b>Topic</b>	DNA, Chromosomes and inherited variation	Energy and energy calculations- Energy in fuels	<b>Preparation for KaST 1</b>  Revision  Preparation  Marking  Feedback and reporting.	Photosynthesis	Cells and the movement of substances	Particles at work -Atoms and matter
<b>Learning question</b>	Why are we all unique?	How can we calculate energy?		How do organisms obtain energy to live?	How do organisms gain the substances they need?	How is energy stored and transferred? Why is the atom a fundamental chemical building block?
<b>Key schema- What is delivered?</b>	-Inheritance -Chromosomes, DNA and genes -The work of Franklin, Watson and Crick -Modelling DNA and the development of the DNA model -Difference between organisms -Natural selection -Evolution and extinction -Biodiversity	-Renewable and non-renewable energy -Calculating the cost of energy -Comparing energy values -Comparing power ratings -Calculating work done		-Transects -Calculate means and identify the range in data collected -Describe and explain the effects of exercise on the respiratory system -Compare aerobic and anaerobic respiration -Describe the function of the root and root hair cells	-Prokaryotic -Eukaryotic -SA:V ratio --Use a light microscope and calculate magnification. -State the similarities and differences between prokaryotic and eukaryotic cells and orders of magnitude	- Atoms -Development of atomic models -Electron structure -Ions -Isotopes -Atoms and radiation - Density

	<p>-Interleaving SK4 Punnet squares and monohybrid diagrams</p>			<p>and compare to 'typical' plant cells -Explain how the adaptations of the root are related to its function - Identify the reactants and products of photosynthesis and describe using a word equation -Identify hazards and risks and suggest appropriate ways to reduce the risks -Describe how leaves are adapted for their function -Use a microscope correctly to observe stomata - Explain how features enable the leaf to do its job -Label the xylem and phloem and describe their role in transporting water and sugars -Explain how plants have affected the levels of oxygen and</p>	<p>-describe the roles of osmosis, active transport, and diffusion in the movement of materials in and between cells. - Describe and explain different types of cell division that form gametes and body cells, and the division of cells in plants.</p>	
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				<p>carbon dioxide in the atmosphere</p> <ul style="list-style-type: none"><li>-Identify the reactants and products of photosynthesis</li><li>- Identify factors to change, measure and control to test a hypothesis</li><li>- Collect and display data appropriately - Draw conclusions from data collected</li><li>- Describe photosynthesis using a word equation</li><li>-Describe and explain factors which affect the rate of photosynthesis - Describe how leaves are adapted for their function</li><li>-Label the xylem and phloem and describe their role in transporting water and sugars</li></ul>		
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<p><b>Where Programme of study is met</b></p>	<p><b>National curriculum coverage:</b></p> <ul style="list-style-type: none"> <li>-Heredity as the process by which genetic information is transmitted from one generation to the next - a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model</li> <li>- differences between species</li> <li>- the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation</li> <li>-the variation between species and between individuals of the same species means some organisms compete more successfully,</li> </ul>	<p><b>National curriculum coverage:</b></p> <ul style="list-style-type: none"> <li>-comparing energy values of different foods (from labels) (kJ)</li> <li>-Comparing power ratings of appliances in watts (W, kW) - comparing amounts of energy transferred (J, kJ, kW hour)</li> <li>-domestic fuel bills, fuel use and costs</li> <li>-fuels and energy resources.</li> </ul>		<p><b>National curriculum coverage:</b></p> <ul style="list-style-type: none"> <li>-plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.</li> <li>- the role of leaf stomata in gas exchange in plants</li> <li>-the reactants in, and products of, photosynthesis, and a word summary for photosynthesis</li> <li>-the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to</li> </ul>	<p><b>National curriculum coverage:</b></p> <p>cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope</p> <ul style="list-style-type: none"> <li>-the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts</li> <li>-the similarities and differences between plant and animal cells</li> <li>-the role of diffusion in the movement of materials in and between cells</li> <li>-the structural adaptations of some unicellular organisms</li> <li>-the hierarchical organisation of multicellular organisms: from cells to tissues to organs</li> </ul>	<p><b>National curriculum coverage:</b></p> <ul style="list-style-type: none"> <li>-differences between atoms, elements and compounds</li> <li>-chemical symbols and formulae for elements and compounds</li> <li>-the principles underpinning the Mendeleev periodic table</li> <li>-the periodic table: periods and groups; metals and non-metals</li> <li>-how patterns in reactions can be predicted with reference to the periodic table</li> <li>-the properties of metals and non-metals</li> <li>-the chemical properties of metal and non-metal oxides with respect to acidity</li> </ul>
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	<p>which can drive natural selection -changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction</p>			<p>maintain levels of oxygen and carbon dioxide in the atmosphere -the adaptations of leaves for photosynthesis</p>	<p>to systems to organisms</p>	
<p><b>Building schema. Why is this important?</b></p>	<p>In Year 7 students were introduced to Darwin and evolution. This unit will provide an opportunity to develop their understanding of how organisms have evolved due to their DNA.</p> <p>This is a fundamental principle for students in KS4 biology and prepare them well for their GCSE content.</p>	<p>This unit builds upon energy transfers in year 7, thermal transfers in year 8 and prepares students for Physics at KS4.</p>		<p>Students have studied cells, plants, biodiversity, food webs and chains and understand the importance of plants on sustaining life. In this unit students will begin to understand the process of photosynthesis and how plants are adapted to carry out this very important process in bioenergetics. This topic has many</p>	<p>Cells are the basic unit of all forms of life. In this unit students will explore how a cell's structure helps with its function within the organism. They will move on to look at the ways in which cells divide and multiply. They will look at specialised and non-specialised cells and link these to stem cells. Student's will continue to look at stem cells and study their possible uses in medicine.</p>	<p>Bridging between disciplines to show how they interact is important. This unit demonstrates to students that disciplines often interact. These are key principles for understanding physics and chemistry at KS4.</p>

				cross-discipline links to biology and chemistry at KS4.	This unit will be a bridging unit of the fundamental principles of cell organisation in Biology and will lay firm foundations for B1, B2, B3, B4 and preparation for September.	
<b>Assessment</b>	<b>Zip grade</b>	<b>Zip grade</b>	<b>Prior learning test</b>	<b>Prior learning test</b>	<b>Prior learning test</b>	<b>Prior learning test</b>
<b>Second part of term</b>	<b>Second part of term</b>	<b>Second half of term</b>	<b>Second half of term</b>		<b>Second half of term</b> KaST	
<b>Topic</b>	<b>The reactivity series</b>	<b>Health and disease</b>	<b>Respiration</b>		Revision	
<b>Learning question</b>	<b>How can we extract materials from the ground?</b>	<b>What can cause ill health?</b>	<b>How do organisms obtain energy to live</b>		Preparation	
<b>Key schema</b> <b>What is delivered?</b>	-Reactivity series -Displacement reactions -Uses of carbon to obtain metals - Thermal decomposition -Energetics- endothermic and exothermic reactions -Catalysts	- Mental health -Physical health -Vaccines -Diet -Deficiency diseases -Drugs -Smoking (vaping) -Alcohol -Exercise and fitness	Calculate means and identify the range in data collected -Describe and explain the effects of exercise on the respiratory system -Compare aerobic and anaerobic respiration		Marking	
					Feedback and reporting.	

			- Effects of exercise on the body		KaST 2	
<b>Where Programme of study is met</b>	<p><b>National curriculum coverage:</b></p> <ul style="list-style-type: none"> <li>-the order of metals and carbon in the reactivity series</li> <li>-the use of carbon in obtaining metals from metal oxides</li> <li>-properties of ceramics, polymers and composites (qualitative).</li> </ul>	<p><b>National curriculum coverage:</b></p> <ul style="list-style-type: none"> <li>-Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed</li> <li>-Calculations of energy requirements in a healthy daily diet</li> <li>-The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</li> <li>- the importance of bacteria in the human digestive system</li> <li>-as exchange systems</li> <li>- the structure and functions of the gas exchange system in humans, including adaptations to function</li> <li>-the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the</li> </ul>	<p><b>National curriculum links:</b></p> <ul style="list-style-type: none"> <li>-aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life</li> <li>-a word summary for aerobic respiration</li> <li>-the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration</li> <li>- the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.</li> </ul>			

		<p>movement of gases, including simple measurements of lung volume</p> <p>-the impact of exercise, asthma and smoking on the human gas exchange system</p> <p>.</p>				
<p><b>Building schema. Why is this important?</b></p>	<p>This unit explains how reactivity of metals is important in extracting materials from the ground. Students will investigate how carbon is used to displacement oxygen from it's compounds and build on learning during Yr8 when they studies chemical reactions and neutralisation reactions.</p>	<p>In this unit students will be able to understand the terms mental health and physical health. They will discover how diet, substance abuse, lack of sleep and deficiency in food groups can have a negative impact on both mental and physical health both in the long and short term.</p> <p>In non-communicable diseases students can make links to the real world and illness and the spread of disease. Students will be able to evaluate how pathogens can be</p>	<p>Bioenergetics is taught beyond Ks4 and links into many professional beyond education. It builds upon cells and tissues of year 7, Energy in yr 7, chemical reactions in year 7. It demonstrates that knowledge acquired prior is still applied. It builds upon energy transfer in food chains and how producers gain energy through endothermic reactions.</p>	<p>In the bioenergetic unit's students will build upon knowledge pf photosynthesis and respiration and apply it to real-life scenarios. They will learn about limiting factors and how farmers use this knowledge to their advantage to produce a high yield of crops. It prepares students for KS4 and begin scientific study such as field studies and transects</p>		



		spread and how to stop and prevent transmission in animals.				
<b>Assessment</b>	<b>Zipgrade</b>	<b>KaST assessment and completion of RAP sheet</b>	<b>RaP assessment and completion of RAP sheet</b>	<b>RaP assessment and completion of RAP sheet</b>	<b>KaST</b>	<b>RaP assessment and completion of RAP sheet</b>