KS3 CURRICULUM: SCIENCE - YEAR 9 2024-2025

Curriculum Aim: In science we aim to develop a deeper understanding of a range of scientific ideas in biology, chemistry and physics. Pupils will be able to connect the three disciplines and scaffold on KS3 content learned in year 7 and 8 in order to excel going forward into their GCSEs.
Link to prior learning: The subject builds on key skills and knowledge learned in year 7 across biology, chemistry and physics with some topics revisited in more detail, building on foundations learned at KS3.
Rationale of sequencing: The course begins with biology, chemistry and physics in the autumn term and this theme continues in the spring and summer terms. By grouping the topics together as such, it allows students to develop their use of scientific vocabulary throughout, building on knowledge acquired in all three disciplines.

	Focus / Topic	Knowledge	Skills	Assessment
Autumn 1	**B1 - Cell structure and transport** **C1 - Atomic structure**	**B1** - Name and describe the function of cell features. Describe how specialised cells are adapted to their function. Explain how substances move into and out of cells. Be able to use a microscope correctly including how to calculate the size of cells. **C1** - Define element and compound and be able to distinguish between them. Explain why mass is conserved in a chemical reaction. Identify appropriate separation techniques to separate a range of different substances. Recognise the different models proposed for the structure of an atom including the difference between the plum pudding model and the nuclear model. Describe what an ion and an isotope is. Be able to write the electronic configuration of the first 20 elements.	Make predictions using scientific knowledge and understanding. Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas. Make predictions using scientific knowledge and understanding.	Question-led lessons to develop skills to answer 6 mark questions in science.
Autumn 2	**P1 - Conservation and dissipation of energy**	**P1** - Name different types of energy store and be able to do calculations involving gravitational potential energy, kinetic energy, elastic potential energy, work, power and efficiency. Be able to rearrange an equation to find different unknown quantities.	Interpret observations and data, identifying patterns and using observations to draw conclusions. Identify further questions arising from your results. Make and record observations and measurements using a range of methods for different investigations and evaluate the reliability of methods suggesting possible improvements.	Autumn term assessment on B1, C1 and P1. Question-led lessons to develop skills to answer 6 mark questions in science.

Spring 1	**B2 - Cell division** **C2 - The periodic table**	**B2** - Describe cell division by mitosis. Compare the differences between differentiation in animal and plant cells. State what a stem cell is and discuss arguments for and against stem cell research. **C2 -** Describe how elements are arranged in groups and periods in the periodic table. Link the electronic structure of metals and non-metals to the periodic table and be able to explain why noble gases are unreactive. Describe and explain the trend in reactivity going down group 1 and group 7.		Question-led lessons to develop skills to answer 6 mark questions in science.
Spring 2	**P2 - Energy transfer by heating** **B3 - Organisation and the digestive system**	**P2** -Be able to calculate change in thermal energy. Describe what thermal conductivity depends on. Calculate specific heat capacity and apply knowledge of specific heat capacity to make predictions. Describe the greenhouse effect. **B3 -** Define the terms cell, tissue, organ and organ system. Name the organs of the digestive system summarising the process of digestion. Describe the structure of sigards, starch, lipids and proteins. Use the lock and key model to describe the action of enzymes. Identify the factors that affect enzyme activity. Explain the role of enzymes in efficient digestion. Explain how stomach acid and bile increase the efficiency of digestion.	Evaluate risks. Make and record observations and measurements using a range of methods. Make and record observations and measurements using a range of methods. Use and derive simple equations and carry out appropriate calculations.	Spring term assessment on B2, C2 and P2. Question-led lessons to develop skills to answer 6 mark questions in science.
Summer 1	**C3 - Structure and bonding**	**C3** - Identify the three states of matter and their state symbols including the processes of changing state. Explain how electron transfer allows ionic bonding to occur when group 1 metals react with group 7 non-metals. Explain in terms of electronic structure how elements become ions. Describe and explain why ionic compounds have a high melting point and how they conduct electricity when in solutions or molten. Draw dot and cross diagrams for simple covalent molecules such as H_2, Cl_2, O_2, N_2, HCl, H_2O, NH_3 and CH_4 and link their structure to melting and boiling point. Explain the difference in structure and bonding of diamond and graphite. Recognise the structure of fullerenes and nanotubes. Describe metallic bonding and explain why metals conduct electricity.	Present observations and data using appropriate methods, including tables and graphs. Evaluate risks. Make and record observations and measurements using a range of methods. Make predictions using scientific knowledge and understanding. Evaluate data, showing awareness of potential sources of random and systematic error.	Question-led lessons to develop skills to answer 6 mark questions in science.

Summer 2	**P3 - Energy resources**	**P3** - Describe how current energy demands are met, Describe how to generate electricity with renewable sources. Suggest factors that influence decisions about meeting future energy needs.	Ask questions and develop a line of enquiry based on observations of the real world alongside prior knowledge and experience.	**End of year assessment on all topics learned this year:** **B1 - Cell structure and transport** **B2 - Cell division** **B3 - Organisation and the digestive system** **C1 - Atomic structure** **C2 - The periodic table** **C3 - Structure and bonding** **P1 - Conservation and dissipation of energy** **P2 - Energy transfer by heating** Douglas's Den - BBF link

<u>Further Information</u>

Seneca: https://www.senecalearning.com/
BBC Bitesize: https://www.bbc.com/bitesize/subjects/zng4d2p
Kerboodle: https://www.kerboodle.com/
Chace GCSE Science website: https://sites.google.com/s/1BtvyrZrxIRC1edvS2polc56NnbGMsMfh/p/1Q_QYKtQJGkB2vAWUIxIJQyHyyE7Ce_L7/edit?safe=vss