

Science Long Term Programme of Study Year 9 2021-2022

Temperance Term

W/C	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	HALF TERM
Area of Study	B1 - Cell Biology and P1 – Energy							
Core Learning	<p>B1 -Students should be able to, explain how the structure of different types of cell relate to their function in a tissue, an organ or organ system, or the whole organism.</p> <p>-Describe the structure of eukaryotic and prokaryotic cells, including the structure and function of specialised cells. -WS 4.4 Use prefixes centi, milli, micro ad nano. -WS 1.2 Recognise, draw and interpret images of cells. -RP 1 – Use microscopes to observe and draw animal and plant cells. -Explain the process of cell division and the cell cycle. -WS 1.2 Use models and analogies to develop explanations of how cells divide. -WS 1.3 Evaluate the practical risks and benefits of the use of stem cells. -WS 1.2 Draw and interpret diagrams that model diffusion and osmosis -RP3 Investigate the effect of concentration on the mass of plant tissue. -MS Confidently plot, draw and interpret graphs</p> <p>P1 - There are changes in the way energy is stored when a system changes. Students should be able to describe all the changes involved in the way energy is stored when a system changes, for common situations. For example:</p> <ul style="list-style-type: none"> • an object projected upwards • a moving object hitting an obstacle • an object accelerated by a constant force • a vehicle slowing down • bringing water to a boil in an electric kettle. <p>-WS1.2, 4.3 Calculate the amount of energy associated with a moving object or a stretched spring -MS 3b,c Calculate kinetic energy, elastic potential energy and gravitational potential energy -RP1 Investigate the specific heat capacity of one or more materials -MS 3b, c Calculate power -Investigate thermal conductivity using rods of different materials -MS 1a,c, 3b,c Calculate and use efficiency values as a decimal or as a percentage</p>							
Opportunities for Challenge	<p>B1 - Use estimations and explain when they should be used to judge the relative size or area of sub-cellular structures. P1 - Experimentally compare and contrast two electric motors that both lift the same weight through the same height but one does it faster than the other.</p>							
Assessment	End of Topic Tests							

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W/C	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	CHRISTMAS
Area of Study	C1 – Atomic Structure and the Periodic Table and B2 - Organisation						
Core Learning	<p>C1 – Describe the development and structure of the atom and periodic table.</p> <ul style="list-style-type: none"> -Represent chemical reactions as word and symbol equations. -AT4 Safe use of a range of equipment to separate chemical mixtures -WS 1.1,1.6 Describe how scientific methods and theories develop over time <p>B2 - Students should know the structure and functioning of the human digestive system and the respiratory system. Students should be able to describe the relationship between health and disease and the interactions between different types of disease.</p> <ul style="list-style-type: none"> -MS Develop an understanding of size and scale in relation to cells, tissues, organs and systems -Describe and explain the role of the digestive system -WS 1.2 Use models, such as the lock and key theory to explain enzyme action. -RP 4 Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. -RP 5 Investigate the effect of pH on the rate of reaction of amylase. -Describe and explain the structure and function of the heart and lungs -WS 1.3 and 1.4 Evaluate the methods of treating cardiovascular disease. -Describe the relationship between health and disease -MS Construct and interpret frequency tables and graphs. -Describe the effect of lifestyle on some non-communicable diseases -Explain how the structures of plant tissues are related to their functions 						
Opportunities for Challenge	<p>C1 - Experimentally determine the empirical formula of an ionic compound from a given model or diagram that shows the ions in the structure</p> <p>B2 - Students should be able to evaluate the advantages and disadvantages of treating cardiovascular diseases by drugs, mechanical devices or transplant.</p>						
Assessment	End of Topic Tests						

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Justice Term

W/C	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	HALF TERM
Area of Study	C1 – Atomic structure and the Periodic Table and C2 - Bonding, Structure, and the Properties of Matter						
Core Learning	<p>C1 – Describe the development and structure of the atom and periodic table.</p> <ul style="list-style-type: none"> -Describe the differences between the plum pudding model of the atom and the nuclear model. -MS 1b Recognise expressions in standard form. -Calculate relative atomic mass. -WS Represent the electronic structures of the first twenty elements of the periodic table. -Identify patterns in properties in the periodic table. - Nanoparticles have many applications in medicine, in electronics, in cosmetics and sun creams, as deodorants, and as catalysts. New applications for nanoparticulate materials are an important area of research. <p>C2 – Explain how atoms are held together in structures and describe their properties.</p> <ul style="list-style-type: none"> - Describe and draw ionic, covalent and metallic bonding. - MS 5b Represent 2D and 3D forms of bonding - Draw dot and cross diagrams for ionic and covalent bonds. - Describe the structures of covalent and ionic bonds, including giant structures. - . 						
Opportunities for Challenge	<p>C1 - Explain the influence of how the side of cube decreases by a factor of 10 the surface area to volume ratio increases by a factor of 10.</p> <p>C2 - Students should consider advantages and disadvantages of the applications of these nanoparticulate materials, but do not need to know specific examples or properties other than those specified.</p>						
Assessment	End of Topic Tests						

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W/C	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	EASTER
Area of Study	P3 – Particle Model of Matter and C2 - Bonding, Structure, and the Properties of Matter						
Core Learning	<p>P3 – Use the particle model to predict the behaviour in solids, liquids and gases.</p> <p>-Students should be able to explain the differences in density between the different states of matter in terms of the arrangement of atoms or molecules.</p> <p>-RP5 Determine the densities of regular and irregular objects and liquids.</p> <p>-MS 1a, 3b,c,d, Calculate change in thermal energy using specific heat capacity</p> <p>C2 – Explain how atoms are held together in structures and describe their properties.</p> <ul style="list-style-type: none"> - Predict the states of substances and given temperatures. - Describe the structure and bonding of carbon - MS2h Make order of magnitude calculations - Consider the advantages and disadvantages of nanoparticles 						
Opportunities for Challenge	<p>P3 - Explain the differences in density between the different states of matter in terms of the arrangement of atoms or molecules.</p> <p>C2 - Students should be able to use the idea that intermolecular forces are weak compared with covalent bonds to explain the bulk properties of molecular substances.</p>						
Assessment	End of Topic Tests						

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Courage Term

W/C	Week 26	Week 27	Week 28	Week 29	Week 30	Week 31	HALF TERM
Area of Study	B3 – Infection and Response and P4 - Atomic Structure						
Core Learning	<p>B3 - Students should be able to explain how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants.</p> <ul style="list-style-type: none"> -Explain how diseases caused by pathogens are spread in animals and plants. -Describe diseases caused by viruses, bacteria, fungi and protists. -Describe the defence systems of the human body and explain the role of the immune system. <p>P4 – Describe the structure of the atom, the nuclear forces and atom stability.</p> <ul style="list-style-type: none"> -Describe the structure of the atom, with reference to atomic number and mass number -Describe the discovery of the electron led to the plum pudding model of the atom. The plum pudding model suggested that the atom is a ball of positive charge with negative electrons embedded in it. -Describe the properties of alpha, beta and gamma radiation 						
Opportunities for Challenge	<p>B3 - Justify how the immune system fights against disease successfully.</p> <p>P4 - Justify the significance of the Rutherford experiment for the development of the atom model.</p>						
Assessment	End of Topic Tests						

W/C	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	SUMMER
Area of Study	KS3 Exams		B3 – Infection and Response and P4 - Atomic Structure				
Core Learning			<p>B3 - Students should be able to explain how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants.</p> <ul style="list-style-type: none"> -WS 1.4 Evaluate the global use of vaccination in the prevention of disease. -Describe the development of new medicines. -WS 1.6 Understand the role of peer review before publishing results of trials. 				



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		<p>P4 – Describe the structure of the atom, the nuclear forces and atom stability.</p> <p>-Use nuclear equations to represent radioactive decay</p> <p>-Calculate half life</p> <p>-Describe the sources of radiation and their dangers and uses</p>	
Opportunities for Challenge		<p>B3 - Justify how the immune system fights against disease successfully.</p> <p>P4 - Compare and contrast isotopes using the correct nomenclature.</p>	
Assessment		<p>End of Topic Tests</p>	