

Combined Science Long Term Programme of Study Year 10

Temperance Term

W/C	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	HALF TERM	
Area of Study	B3 Infection and Response and P4 Atomic Structure				C3 Quantitative Chemistry and P5 Forces				
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. -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. <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 -Use nuclear equations to represent radioactive decay -Calculate half life -Describe the sources of radiation and their dangers and uses 				<p>C3 – Use chemical equations as a way to communicate chemical ideas.</p> <ul style="list-style-type: none"> -Define ‘conservation of mass’ -Calculate relative formula mass and percentage mass. -Investigate mass changes -Make estimations of uncertainty -Understand the term ‘moles’ and calculate moles in a given mass of a substance. -MS1b express data in standard form -MS 3b Change the subject of an equation -MS1c Use ratios, fractions and percentages -Calculate percentage yield <p>P5 -Identify and measure forces acting on objects</p> <ul style="list-style-type: none"> -Describe the differences between contact and non-contact forces. -MS 3b,c Calculate weight and work done -MS1c, WS 4.5 Convert between newton-meters and joules 				
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>				<p>C3 – Demonstrate how to calculate moles and rearrange the mole equation.</p> <p>P5 - Determine speed, acceleration and distance from multiple graphs using mathematical tools such as area under line and gradient.</p>				
Assessment	End of Topic Tests				End of Topic Tests				

W/C	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	CHRISTMAS
Area of Study	P5 Forces and C4 Chemical Changes						

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Core Learning	<p>P5 - Identify and measure forces acting on objects</p> <ul style="list-style-type: none"> -Describe the differences between contact and non-contact forces. -MS 3b,c Calculate weight and work done -MS1c, WS 4.5 Convert between newton-meters and joules -RP6 Investigate the link between force and extension with springs. -MS 3c Describe a moment as a turning force and be able to calculate moment using force and distance. -Express a displacement in terms of magnitude and direction -MS 3b, c Calculate speed using distance travelled and time -Draw and interpret velocity time graphs -Apply Newton's Laws <p>C4 – Investigate and predict chemical changes in substances</p> <ul style="list-style-type: none"> -Explain oxidation and reduction in terms of loss or gain of oxygen -Experiment and describe reactions of metals with water and dilute acids -Interpret and evaluate metal extraction processes -Explain oxidation and reduction in terms of loss and gain of electrons. -Write ionic equations for displacement reactions. -Explain reactions of acids with metals -Predict products from given reactants -Use the pH scale to identify acidic or alkaline solutions -Describe and explain the process of electrolysis -RP Investigate the electrolysis of aqueous solutions -Write half equations 	
Opportunities for Challenge	<p>P5 - Determine speed, acceleration and distance from multiple graphs using mathematical tools such as area under line and gradient.</p> <p>C4 - Explain any observed changes in mass in non-enclosed systems during a chemical reaction given the balanced symbol equation for the reaction and explain these changes in terms of the particle model.</p>	
Assessment	<p>End of Topic Tests and Temperance Term Assessment</p>	

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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	B4 Bioenergetics and C5 Energy Changes				C6 The Rate and Extent of Chemical Change and B5 Homeostasis and Response		
Core Learning	<p>B4 - Describe and explain the processes of respiration and photosynthesis</p> <ul style="list-style-type: none"> -State the word and symbol equations for photosynthesis. -MS Measure and calculate the rate of photosynthesis as well as extract and interpret graphs. -RP Investigate the effect of light intensity on the rate of photosynthesis -Describe the uses of glucose from photosynthesis. -Explain the processes of aerobic and anaerobic respiration, stating the equations. -Explain how the body responds to exercise. <p>C5- Explain how the interaction of particles often involves transfers of energy.</p> <ul style="list-style-type: none"> -Describe the differences between exothermic and endothermic reactions -RP Investigate the variables that affect temperature changes -Draw and analyse simple reaction profiles -Calculate the energy transferred in chemical reactions -Describe the effects of changing conditions on a system at equilibrium can be predicted using Le Chatelier's Principle 				<p>C6 - Understand energy changes that accompany chemical reactions.</p> <ul style="list-style-type: none"> -MS 1a Recognise and use expressions in decimal form. -MS4a Translate information between graphical and numerical form -Calculate mean rate of reaction. -Describe and explain factors which effect the rate of reaction, including concentration and surface area. <p>B5 – Describe the structure and function of the nervous system and the hormonal system.</p> <ul style="list-style-type: none"> -Define 'homeostasis' -Explain the role of homeostasis in the control of blood glucose, body temperature and water levels. -Describe the structure and function of the nervous system 		
Opportunities for Challenge	<p>B4 - Explain the importance of sugars, amino acids, fatty acids and glycerol in the synthesis and breakdown of carbohydrates, proteins and lipids.</p> <p>C5 - Interpret appropriate given data to predict the effect of a change in temperature on given reactions at equilibrium</p>				<p>C6 - Explain why catalysts increase the rate of reaction by providing a different pathway for the reaction that has a lower activation energy</p> <p>B5 - Explain the role of the reflex arc in reflex actions.</p>		
Assessment	End of Topic Tests				End of Topic Tests		

W/C	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	EASTER
Area of Study	C6 The Rate and Extent of Chemical Change and B5 Homeostasis and Response				C7 Organic Chemistry and B6 Inheritance, Variation and Evolution		

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Core Learning	<p>C6 - Understand energy changes that accompany chemical reactions.</p> <ul style="list-style-type: none"> -MS 1a Recognise and use expressions in decimal form. -MS4a Translate information between graphical and numerical form -Calculate mean rate of reaction. -Describe and explain factors which effect the rate of reaction, including concentration and surface area. -RP5 Investigate how changes in concentration affect the rates of reaction. -Predict and explain changes in rate of reaction by using the collision theory. -Explain the effects of a catalyst -Define endothermic and exothermic reactions and describe the term 'equilibrium' <p>B5 – Describe the structure and function of the nervous system and the hormonal system.</p> <ul style="list-style-type: none"> -Define 'homeostasis' -Explain the role of homeostasis in the control of blood glucose, body temperature and water levels. -Describe the structure and function of the nervous system -MS Extract and interpret data from graphs -RP 7 Investigate the effect of a factor on human reaction time. -Explain how the human endocrine system is controlled. -WS 1.3 Evaluate information around the relationship between obesity and diabetes. -Describe the role of hormones in human reproduction, including the menstrual cycle. -WS 1.3 Discuss why the issues regarding contraception cannot be answered by science alone. 	<p>C7-Explain the importance of carbon compounds as organic compounds, in terms of structure and properties.</p> <ul style="list-style-type: none"> -Recognise substances as alkanes given their formulae in these forms. -Recognise substances as alkenes given their formulae in these forms -Describe the process of fractional distillation <p>B6 Compare asexual and sexual reproduction, with relation to number of chromosomes and explain how favoured characteristics can be selectively bred.</p> <ul style="list-style-type: none"> -Understand the differences between mitosis and meiosis. -WS 1.2 Model behaviour of chromosomes during meiosis. -Describe the structure of DNA 	
Opportunities for Challenge	<p>C6 - Explain why catalysts increase the rate of reaction by providing a different pathway for the reaction that has a lower activation energy.</p> <p>B5 - Explain the role of the reflex arc in reflex actions.</p>	<p>C7 - Determine name and therefore properties from chemical formula.</p> <p>B6 Consider and debate the ethical considerations of cloning</p>	
Assessment	<p>End of Topic Tests</p>	<p>End of Topic Tests and Justice Term Assessment</p>	

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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	B6 Inheritance, Variation and Evolution and Revision						
Core Learning	B6 Compare asexual and sexual reproduction, with relation to number of chromosomes and explain how favoured characteristics can be selectively bred. -Understand the differences between mitosis and meiosis. -WS 1.2 Model behaviour of chromosomes during meiosis. -Describe the structure of DNA -Describe the importance of the human genome -Draw genetic diagrams to show the possible genotype and phenotype of offspring -MS 1c, 3a use direct proportion and simple ratios to express outcomes of genetic crosses.						
Opportunities for Challenge	B6 Consider and debate the ethical considerations of cloning						
Assessment	End of Topic Tests						

W/C	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	SUMMER
Area of Study	Year 10 Mock Exams		C8 – Chemical Analysis and P7 Magnetism and Electromagnetism				
Core Learning			C8 Explain a variety of instrumental methods can be used to analyse substances -Use melting point and boiling point data to distinguish pure from impure substances. -Explain how paper chromatography separates mixtures and calculate retention factor -RP 6 Investigate how paper chromatography can be used to separate and tell the difference between coloured substances - Explain the tests for a variety of gases, including oxygen and chlorine P7-Explain how electromagnetic effects are used in a variety of devices -Describe the differences between permanent and induced magnetism Draw the magnetic field pattern of a bar magnet -Describe how the magnetic effect of a current can be demonstrated				
Opportunities for Challenge			C8 – Use chromatography to calculate Rf values. P7 - Show that Fleming’s left-hand rule represents the relative orientation of the force, the current in the conductor and the magnetic field				

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Assessment		End of Topic Tests	
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