

IMPLEMENTATION

**INTENT-**

- To develop knowledge and understanding of key scientific principles within Biology, Chemistry and Physics.
- Students to apply this knowledge and explain key ideas within Science, applying them to a range of typical and frequent assessment points.

Students will be able to analyse scientific data and will be able to evaluate scientific discoveries in order to approach enquiry questions based on

**The bigger picture:**

The year 10 curriculum continues to build on core scientific concepts and introduce more challenging ideas and concepts. It continues to develop both practical skills and application of knowledge and again allows misconceptions to be revisited before moving forward.

Bilton School Planning for Progress over Time  
Programme of Study 2020/21

**WS1** – Development of Scientific Thinking  
**WS2** – Experimental skills and strategies  
**WS3** – Analysis and evaluation  
**WS4** – Scientific vocabulary, quantities, units, symbols and nomenclature

		Term 1 Energy Changes, Atomic structure (P1), Quantitative Chemistry Infection & Response,	Term 2 Infection & Response C&C Vaccinations and Antibiotics, Homeostasis & Response, The rate and extent of chemical change,	Term 3 The rate and extent of chemical change, Organic Chemistry, Forces and Motion,	Term 4 Magnetism and Electromagnetism, Using Resources, Chemical Analysis *Topic moved to end of term 4	Term 5 Inheritance, Variation and Evolution	Term 6 Revision, End of Year Assessment, Ecology (C&C link Society) and Trip to Brandon Marsh RQP Link to Geography *revisit key practical's
KS4		31/8/20	2/11/20	4/1/21	22/2/21	19/4/21	7/06/21
Year 10		7/9/20	9/11/20	11/1/21	1/3/21	26/4/21	14/06/21
		14/9/20	16/11/20	18/1/21	8/3/21	3/5/21	21/06/21
		21/9/20	23/11/20	25/1/21	15/3/21	10/5/21	28/06/21
		28/9/20	30/11/20	1/2/21	22/3/21	17/5/21	5/07/21
		5/10/20	7/12/20	8/2/21	29/3/21	24/5/21	12/07/21
		12/10/20	14/12/20				12/07/21
		19/10/20					19/07/21
Progress and assessment	FAR tasks based on GCSE questions & FAR of EOT assessment  GCSE questions throughout topics  Focus on Skills for RQP and application of knowledge to exam questions	FAR tasks based on GCSE questions & FAR of EOT assessment  GCSE questions throughout topics  Focus on Skills for RQP and application of knowledge to exam questions	FAR tasks based on GCSE questions & FAR of EOT assessment  GCSE questions throughout topics  Focus on Skills for RQP and application of knowledge to exam questions	FAR tasks based on GCSE questions & FAR of EOT assessment  GCSE questions throughout topics  Focus on Skills for RQP and application of knowledge to exam questions	FAR tasks based on GCSE questions & FAR of EOT assessment  GCSE questions throughout topics  Focus on Skills for RQP and application of knowledge to exam questions	FAR tasks based on GCSE questions & FAR of EOT assessment  GCSE questions throughout topics  Focus on Skills for RQP and application of knowledge to exam questions	FAR tasks based on GCSE questions & FAR of EOT assessment  GCSE questions throughout topics  Focus on Skills for RQP and application of knowledge to exam questions
Required Practical (RP)	• Temperature Change	• Reaction Time • Rates of Reaction	• Extension of a Spring • Acceleration	• Water Purification	• Chromatography	• Sampling	

Working Scientifically	<p><b>Atomic Structure (P1):</b></p> <p><b>WS1:</b> Describe how the model of the atom has changed overtime and how scientific developments have supported this change eg Scattering experiment and describe why the results led to a change in the model of the atom. Compare the plum pudding model to the nuclear model of the atom. Describe and explain the properties of alpha, beta and gamma linking to uses and hazards in everyday life. Use nuclear equations to represent radioactive decay and use the correct names and symbols. Explain the concept of half-life and how it relates to the random nature of decay. State the hazards of radioactive contamination and irradiation and compare t hazards of contamination and irradiation and state precautions that should be taken. Understand that peer review of any studies on the effects of radiation on humans is important.</p> <p><b>WS4:</b> Recognise expressions given in standard form when looking at atoms. Relate differences between isotopes to differences in conventional representations of their identities, charges and masses.</p> <p><b>Quantitative Chemistry:</b></p> <p><b>WS1:</b> State the law of conservation of mass states that no atoms are lost or made during a chemical reaction so the mass of the products equals the mass of the reactants and use balanced symbol equations to prove this. <b>WS3:</b> Identify that whenever a measurement is made there is always some uncertainty about the result obtained and represent the distribution of results and make estimations of uncertainty using calculations and use the range of a set of measurements about the mean as a measure of uncertainty. <b>WS4:</b> HT – Define what a mole is and be able to recognise its importance of it for calculations Carry out calculations to work out the number of moles using the correct units. State Avogadro's constant and be able to relate this to moles Use the correct number of significant figures Define limiting reactant and know its effects on the amount of product.</p> <p><b>Infection and Response:</b></p> <p><b>WS1:</b> Describe and explain how the spread of diseases in animals and plants can be reduced or prevented. Evaluate the global use of vaccinations in the prevention of diseases. Explain the use of antibiotics and other medicines in the treatment of diseases in everyday life. Understand that the results of testing and trials are published only after scrutiny by peer review.</p>	<p><b>Infection and Response:</b></p> <p><b>WS1:</b> Describe and explain how the spread of diseases in animals and plants can be reduced or prevented. Evaluate the global use of vaccinations in the prevention of diseases. Explain the use of antibiotics and other medicines in the treatment of diseases in everyday life. Understand that the results of testing and trials are published only after scrutiny by peer review.</p> <p><b>Homeostasis and Response:</b></p> <p><b>WS1:</b> Evaluate information around the relationship between obesity and diabetes, and make recommendations taking into account social and ethical issues. Evaluate the use of different contraception methods when given data about each and understand that Science alone can not answer the issues around contraception. HT - State that developments in microscopy techniques have enabled the developments in IVF treatment. Describe and explain the ethical issues linked with IVF treatment and give the pros and the cons. Evaluate the methods of treating infertility. HT – Interpret and explain negative feedback loops for control.</p> <p><b>The Rate and Extent of Chemical Change:</b></p> <p><b>WS1:</b> predict and explain using collision theory the effects of changing conditions of concentration, pressure and temperature on the rate of a reaction. State and identify that when a reversible reaction occurs in apparatus which prevents the escape of reactants and products, equilibrium is reached when the forward and reverse reactions occur at exactly the same rate.</p> <p><b>Organic Chemistry:</b></p> <p><b>WS1:</b> Use model kits to represent alkanes. Describe and explain how fractional distillation works based on evaporation and condensation of the hydrocarbons in the mixture of crude oil. Recall how boiling point, viscosity and flammability changes with increasing molecular size. Describe and explain how cracking can be sued to break down large chain hydrocarbons into short chain hydrocarbons giving the conditions necessary. <b>WS4:</b> Write balanced equations for the complete combustion of hydrocarbons given formula.</p> <p><b>Forces and Motion:</b></p> <p><b>WS1:</b> HT - use free body diagrams to describe qualitatively examples where several forces lead to a resultant force on an object, including balanced forces when the resultant force is zero. Know whenever two objects interact, the forces they exert on each other are equal and opposite. Evaluate the effect of various factors on thinking distance based on given data. Explain the dangers caused by large accelerations. Recall and apply the momentum calculation.</p> <p><b>WS2:</b> Investigate factors that can affect thinking distance (reaction time).</p> <p><b>WS3:</b> Interpret data collected from an investigation of the relationship between force and extension. draw distance–time graphs from measurements and extract and interpret lines and slopes of distance–time graphs, translating information between graphical and numerical form. Determine speed from a distance–time graph. Draw velocity–time graphs from measurements and interpret lines and slopes to determine acceleration HT - interpret enclosed areas in velocity–time graphs to determine distance travelled (or displacement HT- measure, when appropriate, the area under a velocity–time graph by counting squares.</p> <p><b>WS4:</b> Interconvert units when looking at work done and energy transfer calculation.</p> <p><b>Magnetism and Electromagnetism:</b></p> <p><b>WS2:</b> Plan investigations to observe the magnetic field around a magnet Describe how the magnetic effect of a current can be demonstrated Draw the magnetic field pattern for a straight wire carrying a current and for a solenoid (showing the direction of the field Explain how a solenoid arrangement can increase the magnetic effect of the current.</p>	<p><b>The Rate and Extent of Chemical Change:</b></p> <p><b>WS1:</b> predict and explain using collision theory the effects of changing conditions of concentration, pressure and temperature on the rate of a reaction. 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Identify formulations given appropriate information. Describe and explain the method for chromatography and how it can be sued to separate mixtures. <b>WS3:</b> Interpret chromatograms by comparing to known samples and calculate and use Rf values to analyse a sample. <b>WS4:</b> Use correct terminology when discussing pure and</p>	<p><b>Inheritance, Evolution and Evolution:</b></p> <p><b>WS1:</b> Modelling behaviour of chromosomes during meiosis. Discuss the importance of understanding the human genome. This is limited to the:</p> <ul style="list-style-type: none"><li>• search for genes linked to different types of disease</li><li>• understanding and treatment of inherited disorders</li><li>• use in tracing human migration patterns from the past.</li></ul> <p>Appreciate that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise. Use the theory of evolution by natural selection in an explanation to show how horses have evolved over time. Explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues. Explain the potential benefits and risks of genetic engineering in agriculture and in medicine and that some people have objections. HT - Interpret information about genetic engineering techniques and to make informed judgements about issues concerning cloning and genetic engineering, including GM crops. Describe the evidence (data) for evolution including fossils and antibiotic resistance in bacteria. Describe and explain how theories have changed overtime and describe and explain why the fossil record is incomplete. Describe and explain how classification has changed overtime. Interpret evolutionary trees</p>	<p><b>Ecology:</b></p> <p><b>WS1:</b> Explain how a change in an abiotic factor would affect a given community given appropriate data or context. Explain how a change in a biotic factor might affect a given community given appropriate data or context. Interpret graphs used to represent predator-prey cycles. Interpret and explain the processes in diagrams of the carbon cycle, the water cycle. Explain how waste, deforestation and global warming have an impact on biodiversity. Evaluate the conflict between the need for cheap available compost to increase food production and the need to conserve peat bogs and peatlands as habitats for biodiversity and to reduce carbon dioxide emissions. Evaluate the environmental implications of deforestation. Recognise that the scientific consensus about global warming and climate change is based on systematic reviews of thousands of peer reviewed publications and explain why evidence is uncertain or incomplete in a complex context. Evaluate given information about methods that can be used to tackle problems caused by human impacts on the environment and explain and evaluate the conflicting pressures on maintaining biodiversity given appropriate information.</p> <p><b>WS2:</b> Record first hand observation on organisms using sampling techniques.</p>

<b>Homework</b> <i>(ensure that this is NOT stand alone, but clearly advances or embeds knowledge and understanding )</i>	<b>Use of SENeca – Activity and Exam Question based</b>  <b>Baseline Assessment Revision</b> <b>Energy Changes – 5</b> Wk 1 – 5.1.1 Wk2 – 5.1.2 & 5.1.4 <b>Atomic Structure (P1) – 4</b> Wk3 – 4.1 Wk4 – 4.2 Wk 5 – Revision 5.1.3 <b>Quantitative Chemistry – 3</b> Wk 6 – 3.1.1, 3.1.2 Wk 7 – 3.1.3, 3.1.4	<b>Use of SENeca – Activity and Exam Question based</b>  <b>Infection and Response – 3</b> Wk 1 – 3.1.1, 3.1.2, 3.1.3 Wk 2 – 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.1.8 Wk 3 – 3.1.9, 3.1.10 <b>Homeostasis and Response – 5</b> Wk 4 – 5.1, 5.2 Wk 5 – 5.3 <b>The Rate and Extent of Chemical Change – 6</b> Wk 6 – 6.1.1 Wk 7 – 6.1.2	<b>Use of SENeca – Activity and Exam Question based</b>  <b>The Rate and Extent of Chemical Change – 6</b> Wk 1 – 6.2 <b>Organic Chemistry – 7</b> Wk 2 – 7.1 <b>Forces and Motion - 5</b> Wk 3 – 5.1.1, 5.1.3, 5.2.1, 5.2.2 Wk 4 – 5.2.3, 5.2.4, 5.2.5 Wk 5 – 5.3.1, 5.3.2, 5.3.3, 5.3.5 <b>Magnetism and Electromagnetism - 7</b> Wk 6 – 7.1, 7.2, 5.3.4	<b>Use of SENeca – Activity and Exam Question based</b>  <b>Using Resources – 10</b> Wk 5 – 10.1 Wk 6 – 10.2 (not 10.2.3)	<b>Use of SENeca – Activity and Exam Question based</b>  <b>Chemical Analysis – 8</b> Wk 1 – 8.1, 8.2 (not 8.2.4) Wk 2 – Revision 8.2.4, 10.2.3 <b>Inheritance, Variation and Evolution – 6</b> Wk 3 – 6.1.1, 6.1.2, 6.1.3, 6.1.4, 6.1.5, 6.1.6 Wk 4 – 6.1.7, 6.1.8, 6.1.10, 6.2.1, 6.2.2, 6.2.3, 6.2.4, 6.2.5 Wk 5 – 6.2.6, 6.2.7, 6.2.8 Wk 6 – 6.3	<b>Use of SENeca – Activity and Exam Question based</b>  <b>End of Year Assessment Revision</b> <b>Ecology – 7</b> Wk 4 – 7.1 Wk 5 – 7.2 Wk 6 – 7.3
<b>Key Vocabulary /literacy opportunities</b>	In the Homework menu and science skills and required practical's	In the Homework menu and science skills and required practical's	In the Homework menu and science skills and required practical's	In the Homework menu and science skills and required practical's	In the Homework menu and science skills and required practical's	In the Homework menu and science skills and required practical's
<b>Connected knowledge</b>  <i>Connectives to ???? theme/topic /year group?</i>  <i>Advancement/repetition/'stickability' of these theme by/through ???? , because ?????</i>						
<b>IMPACT:</b>	Students will be able to measure progress using tracking sheets in exercise books. As all assessments will use generic criteria, will be moderated through dept meetings it will be possible to measure progress over time within and across year groups.					