

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 11 curriculum revisits many of the core scientific concepts from earlier years, grouping them in similar fashion to how they are typically presented in exams (also reflected in the assessments) – this often include application of knowledge from the perspective of required practical's. Each terms learning culminates in students tackling pinnacle topics.

Bilton School Planning for Progress over Time Programme of Study 2024/25

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

IMPLEMENTATION

	Term 1 Energy, Electricity, Atomic Structure (P1), Infection and Response, Energy Changes, Quantitative Chemistry Review, PPE 1 Revision	Term 2 PPE 1 Revision/ Review, Chemical Analysis, Homeostasis and Response, Organic Chemistry, Forces and Motion	Term 3 Inheritance, Variation and Evolution, The Rate and Extent of Chemical Change, Forces and Motion, Ecology, Chemistry of the Atmosphere and Using Resources, Waves, PPE 2 Revision	Term 4 PPE 2 Revision/ Review, Revision	Term 5 Revision	Term 6
KS4	02/09/2024 09/09/2024 16/09/2024 23/09/2024 30/09/2024 07/10/2024 14/10/2024 21/10/2024 HOLIDAY: 1 WEEK	04/11/2024 11/11/2024 18/11/2024 25/11/2024 02/12/2024 09/12/2024 16/12/2024 HOLIDAY: 2 WEEKS	03/01/2025 06/01/2025 13/01/2025 20/01/2025 27/01/2025 03/02/2025 10/02/2025 HOLIDAY: 1 WEEK	24/02/2025 03/03/2025 10/03/2025 17/03/2025 24/03/2025 31/03/2025 07/04/2025 HOLIDAY: 2 WEEKS	28/04/2025 05/05/2025 12/05/2025 19/05/2025 HOLIDAY: 1 WEEK	02/06/2025 09/06/2025 16/06/2025 23/06/2025 30/06/2025 07/07/2025 14/07/2025
Year 11	(TTD x2) Energy L1, 2 Energy L3, 4, 5, 6, Energy Review Electricity L1,2,3,4 & 5 Electricity Review, Atomic structure L1,2,3,4 Particle Model Review, P1 Revision, P1 paper 2020 Infection and Response L1, 2, 3, 4, 5 Infection and response L6, Energy Changes L1, 2 RQP, 3 PPE Prep - B1, C1 & P1 Revision Key areas	PPE Prep - B1, C1 & P1 Revision Key areas PPEs – Biology Paper 1/ Chemistry Paper 1/ Physics Paper 1 PPEs – Biology Paper 1/ Chemistry Paper 1/ Physics Paper 1 PPEs – Biology Paper 1/ Chemistry Paper 1/ Physics Paper 1 Start Chemical Analysis L1&2 Human Nervous response L3 Reaction Time RQP L4 Homeostasis/ Diabetes/ Menstrual Cycle L5 Application Lesson L1 Fractional Distillation L2 Alkanes and properties L3 Cracking and alkenes L4 Combustion of Fuels L5 Application Lesson L1 Speed/ Distance-time graphs L2 Velocity-time graphs / Acceleration L3 Momentum / Acceleration RQP L4 Stopping Distances L5 Application Lesson	L1 Variation and Adaptation and classification L2 DNA Structure L3 & 4 Inheritance and Genetic crosses/ Inherited disease L5 Application Lesson L1 & 2 Rates of reaction and collision Theory L3 Equilibrium L4 Rates of Reaction RQP L5 Application Lesson L1 Scalars and vectors/ Weight equation/ work done L2 Terminal velocity L3 Resultant Force and Free body diagrams L4 Extension of a spring RQP L5 Application Lesson EOT L1 Food chains/ webs / Biomass L2 Decay L3 Human Impact L4 Sampling RQP L5 Application lesson L1 Types of Water / treatment L2 Gases of the atmosphere L3 Greenhouse effect/ Carbon footprint L4 Purification of water RQP L5 Application Lesson L1 Types of waves/ Waves RQP L2 EM spectrum / Leslie cube RQP L3 Magnetism L4 Magnetism and properties of light L5 Application Lesson PPEs – Biology paper 2/ Chemistry Paper 2/ Physics Paper 2	PPEs – Biology paper 2/ Chemistry Paper 2/ Physics Paper 2 PPEs – Review P2 Booklet C2 Booklet B2 Booklet P1 Booklet C1 Booklet HOLIDAY: 2 WEEKS B1 Booklet RQP Booklet		
Progress and assessment	P1 Paper (2020) Retrieval starters to test previous knowledge through the Unit.	PPE 1, Application Lessons	Application Lessons	PPE 2, Exam Qs		
Required Practical (RP)	<ul style="list-style-type: none"> Temperature change 	<ul style="list-style-type: none"> Reaction Time Acceleration Extension of a Spring 	<ul style="list-style-type: none"> Rates of Reaction Sampling Waves (Liquids and Solids) 	Revision of all RQP		
Homework <i>(ensure that this is NOT stand alone, but clearly advances or embeds knowledge and understanding)</i>	Use of Educake and BBC Bitesize Revision	Use of Educake and BBC Bitesize Revision	Use of Educake and BBC Bitesize Revision	Use of Educake and BBC Bitesize Revision	Use of Educake and BBC Bitesize Revision	

<p>Key Vocabulary/literacy opportunities</p>	<p><u>Energy</u> Specific heat capacity, gravitational potential energy, kinetic energy</p> <p><u>Electricity</u> Current, Potential Difference, Resistance, Ohmic conductor, Non-ohmic conductor, AC, DC</p> <p><u>Atomic Structure (P1)</u> Isotope, Alpha, Beta, Gamma, Contamination, Irradiation, Half-life</p> <p><u>Infection and Response</u> Pathogen, Antigen, Antibody, Vaccination</p> <p><u>Energy Changes</u> Exothermic, Endothermic, Bond energies</p> <p><u>Quantitative Chemistry</u> Relative Atomic Mass, Relative Formula Mass, Moles, Concentration, Empirical Formula, Conservation of mass</p>	<p><u>Chemical Analysis</u> Pure, Mixture, Formulation, Chromatography, Stationary phase, Mobile phase, Rf value</p> <p><u>Homeostasis and Response</u> Homeostasis, Reflex, Endocrine System, Hormone, Gland, Receptor, Neurone, Negative Feedback Loop (HT)</p> <p><u>Organic Chemistry</u> Crude Oil, Fractional Distillation, Cracking, Alkane, Alkene, Hydrocarbon, Combustion</p> <p><u>Forces and Motion</u> Speed, Velocity, Acceleration, Terminal Velocity, Momentum, Conservation of Momentum</p>	<p><u>Inheritance, Variation and Evolution</u> Asexual Reproduction, Selective Breeding, Meiosis, Genome, Alleles, DNA, Chromosomes, Gene, Phenotype, Genotype</p> <p><u>The Rate and Extent of Chemical Change</u> Activation Energy, Collision Theory, Catalyst, Closed System, Dynamic Equilibrium</p> <p><u>Forces and Motion</u> Scalar, Vector, Mass, Weight, Elastic Deformation, Inelastic Deformation, Limit of Proportionality</p> <p><u>Ecology</u> Abiotic, Biotic, Trophic level, Biodiversity, Adaptation</p> <p><u>Chemistry of the Atmosphere</u> Greenhouse Gas, Peer-Reviewed, Global Warming, Carbon Footprint, Carbon Neutral</p> <p><u>Using Resources</u> Finite Resource, Renewable Resource, Sustainable Development, Life Cycle Assessment, Potable Water, Desalination</p> <p><u>Waves</u> Transverse, Longitudinal, Electromagnetic Spectrum, Amplitude, Frequency, Wavelength</p> <p><u>Magnetism and Electromagnetism</u> North pole, South pole, Magnetic field, Solenoid, Electromagnet, Motor Effect, Fleming's Left-hand rule</p>				
<p>National Curriculum Links</p>	<p>Mini Test (MT), End of topic test (ETT)</p> <p>Retrieval starters to test previous knowledge through the Unit.</p>	<p>PPE 1, Application Lessons</p>	<p>Application Lessons</p>		<p>PPE 2, Exam Qs</p>		

<p>Connected knowledge</p>	<p><u>Energy –</u> KS3 – Energy.</p> <p>KS4 – Forces and Motion. Energy.</p> <p>Maths – Apply knowledge of substituting numbers into calculations and how to rearrange equations.</p> <p><u>Electricity -</u> KS3 – Electricity.</p> <p>KS4 – Energy</p> <p>KS5 – Electricity</p> <p>Maths – Apply knowledge of substituting numbers into calculations and how to rearrange equations.</p> <p><u>Atomic Structure –</u> KS3 – Particles, Atoms and Elements.</p> <p>KS4 – Atomic structure and the periodic table, Waves.</p> <p>KS5 – Particles and radiation,</p> <p>Maths – Apply knowledge of substituting numbers into calculations and how to rearrange equations. Apply graph skills to be able to plot energy changes graph for a neutralisation reaction.</p> <p><u>Infection and Response –</u> KS3 – Cells, Unicellular Organisms.</p> <p>KS4 – Cell Biology.</p> <p>KS5 – Cells</p> <p>Maths –</p>	<p><u>Chemical Analysis –</u> KS3 – Atoms and Elements, Compounds and Mixtures</p> <p>KS4 – Structure, bonding and the properties of matter.</p> <p>KS5 – Organic Chemistry, Organic Synthesis, Chromatography</p> <p><u>Homeostasis and Response -</u> KS3 – Cells, Reproduction, Movement.</p> <p>KS4 – Cells, Organisation.</p> <p>KS5 – Organisms respond to changes in their internal and external environments.</p> <p>Maths – See links with handling data in Maths and interpreting graphs.</p> <p><u>Organic Chemistry -</u> KS3 – Atoms and Elements, Compounds and Mixtures, Combustion, Energy Resources, Earth and Atmosphere.</p> <p>KS4 – Structure, bonding and the properties of matter, Chemistry of the Atmosphere, Using Resources.</p> <p>KS5 – Organic Chemistry, Organic Synthesis</p> <p><u>Forces and Motion –</u> KS3 – Forces, Motion, Acceleration Project.</p> <p>KS4 – Energy, Magnetism and Electromagnetism.</p> <p>KS5 – Mechanics and materials, Further mechanics and thermal physics.</p> <p>Maths –</p>	<p><u>Inheritance, Variation and Evolution –</u> KS3 – Cells, Reproduction, Genetics and Variation.</p> <p>KS4 – Cell Biology.</p> <p>KS5 – Cells, Biological Molecules, Genetic information, variation and relationships between organisms, Genetics, populations, evolution and ecosystems, The control of gene expression.</p> <p><u>The Rate and Extent of Chemical Change -</u> KS3 – Acids and Alkalis, Types of Reaction, Metals and Reactivity.</p> <p>KS4 – Atomic Structure and the Periodic Table, Chemical Change, Energy Changes.</p> <p>KS5 – Kinetics, Chemical equilibria, Le Chatelier’s principle and Kc, Rate equations, Equilibrium constant Kp for homogeneous systems.</p> <p>Maths – See links to interpreting and plotting graphs in Maths.</p> <p><u>Forces and Motion –</u> KS3 – Forces, Motion, Acceleration Project.</p> <p>KS4 – Energy, Magnetism and Electromagnetism.</p> <p>KS5 – Mechanics and materials, Further mechanics and thermal physics.</p> <p>Maths – See links to equations and graphs in maths.</p> <p><u>Ecology –</u> KS3 – Photosynthesis and Respiration, Ecosystems and Ecosystem Project.</p> <p>KS4 – Organisation, Bioenergetics.</p> <p>KS5 – Organisms exchange substances with their environment, Energy transfers in and between organisms, Genetics, populations, evolution and ecosystems.</p>				
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	<p>Apply knowledge of graphs from maths to be able to interpret data on infection and vaccination graphs.</p> <p><u>Energy Changes –</u> KS3 – Types of Reactions.</p> <p>KS4 – Chemical Changes, The Rate and Extent of Chemical Change.</p> <p>KS5 – Energetics, Thermodynamics</p> <p>Maths – Apply basic math skills to calculate the energy changes within a reaction. Apply graph skills to be able to plot energy changes graph for a neutralisation reaction.</p>	<p>See links to equations and graphs in maths.</p>	<p>Maths- See links to interpreting and plotting graphs in Maths.</p> <p>Geography – See links to climate change and human impact in Geography.</p> <p><u>Using Resources –</u> KS3 – Energy Resources, Earth and Atmosphere, Combustion.</p> <p>KS4 – Chemical Changes, Chemistry of the Atmosphere.</p> <p>Geography – See links to climate change in Geography.</p> <p><u>Chemistry of the Atmosphere –</u> KS3 – Energy Resources, Earth and Atmosphere, Combustion.</p> <p>KS4 – Chemical Changes, Using Resources.</p> <p>Maths- See links to interpreting and plotting graphs in Maths.</p> <p>Geography – See links to climate change in Geography.</p> <p><u>Magnetism and Electromagnetism –</u> KS3 – Magnetism and Electromagnetism.</p> <p>KS4 – Forces and Motion.</p> <p>KS5 – Fields and their consequences.</p> <p>Maths- See links to interpreting and plotting graphs in Maths.</p> <p><u>Waves –</u> KS3 – Light, Sound</p> <p>KS4 – Atomic Structure (P1)</p> <p>KS5 – Particles and Radiation, Waves, Nuclear Physics</p>						
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<p>Spiritual, Moral, Social and cultural.</p>	<p>Understand the collaboration between scientists when Drug trials are carried out.</p> <p>Understand the ethical and moral issues that arise from the process of trialling drugs before they go into circulation.</p> <p>Appreciate the influences of scientists in the development of vaccinations in the treatment of different types of infection.</p> <p>Understanding the collaboration between countries in the development of structure of the atom.</p> <p>Understand what Radiation is and the issues surrounding it.</p>		<p>Understand the impact that humans are having on the Earth's resources through the extraction and processing of crude oil.</p> <p>Understand Diabetes and Contraception methods and be able to link this to the choices that they make.</p> <p>Understanding the different methods of Contraception and the ethical and moral issues surrounding these.</p> <p>Building self-knowledge and self-confidence to be able to make choices in everyday life linked to lifestyle choices.</p>		<p>Appreciating the influence of famous scientists and the impact they have had on life, society and culture e.g Variation and Evolution - Darwin/ Lamark, Selective breeding and work of farmers and gardeners.</p> <p>Understanding the moral and ethical issues that can arise when considering variation and evolution and its potential impact on everyday life.</p> <p>Understand the impact that humans are having on the Earth's resources and the impact of the pollution that we create.</p> <p>Understand the importance of the different parts of the EM Spectrum in everyday life along with the ethical and moral issues of the Ionising nature of some of the parts.</p>						
<p>British Values</p>	<p>Respect and tolerance, collaboration during experiments and group work.</p> <p>Following the laboratory rules when conducting practical work.</p>		<p>Respect and tolerance, collaboration during experiments and group work.</p> <p>Following the laboratory rules when conducting practical work.</p>		<p>Respect and tolerance, collaboration during experiments and group work.</p> <p>Following the laboratory rules when conducting practical work.</p> <p>Appreciate individual liberty of own views, tolerance and mutual respect of others views throughout the variation and evolution topic.</p> <p>Recognise how their actions can have an impact on others and the wider world.</p>						

<p>Cultural Capital</p>	<p>Science - Careers display on W side corridor.</p> <p>Understanding how Scientists work to develop ideas and how they have contributed to the development of the structure of the atom throughout history.</p> <p>Appreciate the influences of scientists in the development of vaccinations in the treatment of different types of infection.</p>	<p>Science - Careers display on W side corridor.</p> <p>Understand the use of techniques to analyse substance by scientists in everyday life e.g airports</p> <p>Understand the impact that we are having on our planet through the extraction and use of crude of oil in everyday life.</p>	<p>Science - Careers display on W side corridor.</p> <p>Understand the impact that we are having on our planet.</p> <p>Appreciate the work of Darwin/ Lamark in the theory of evolution and appreciate the different viewpoints in everyday life.</p> <p>Understand the importance of Selective breeding and work of farmers and gardeners whilst also appreciating the impact this has in the world around us.</p> <p>Understand how scientists are involved in everyday processes such as how water is treated, extraction of metals, choice of materials to produce products.</p> <p>Understand the importance of the different parts of the EM Spectrum in everyday life along with the ethical and moral issues of the Ionising nature of some of the parts.</p>	<p>Science - Careers display on W side corridor.</p>	<p>Science - Careers display on W side corridor.</p>	<p>Science - Careers display on W side corridor.</p>
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