

**INTENT-**

- To develop knowledge and understanding of key Biology, Chemistry and Physics topics
- Students to apply this knowledge and explain key ideas within Science, applying them to a range of typical and frequent assessment points.
- To develop basic practical skills and data analysis.

**The bigger picture:**

The year 9 curriculum continues to develop an understanding of key scientific concepts needed throughout the curriculum and creating a building block for later years. The curriculum is also designed to start developing an enquiring mind through key practical's that will allow for skills needed for Required practical's at GCSE to be built on.

**Bilton School Planning for Progress over Time Programme of Study**

**IMPLEMENTATION**

	Term 1 Genetics & Variation, Metals & Reactivity, Electrolysis Project								Term 2 Electrolysis Project, Sound, Unicellular Organisms							Term 3 Unicellular Organisms, Enzymes Project, Types of Reaction						Term 4 Types of Reaction, Pressure					Term 5 Acceleration Project, Magnetism						Term 6 Light, GCSE Transition Lessons						
KS3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 9	TTD x 2, Genetic & Variation L1, 2	Genetics & Variation L3, 4, 4.5 (Mid Review)	Genetics & Variation L5, 6, 7RP.	Gen & Var L8RP, 9 (Revision), Metals & Reactivity L1	Metals & Reactivity L2, 3	Metals & Reactivity L4, 4.5 (Mid Review), 5	Metals & Reactivity L6, 7RP, 8RP, 9 (Revision)	Metals & Reactivity L9 (Revision), ETT Electrolysis Project L1.2	Electrolysis Project L3, 4, 5	Electrolysis Project L6 (Review),	Sound L1,2, 3	Sound L4, 4.5 (Mid review), 5	Sound L6, 7RP, 8RP, 9 (Review)	Sound L9 (Review), ETT Unicellular Organisms	Unicellular Organisms L3, 4, 4.5 (Mid Review)	Unicellular Organisms L5, 6, 7+8RP	Uni Organisms, 9 (Revision), Enzymes Project L1, 2	Enzymes Project L3, 4, 5	Enzymes project L6, 7 (revision), ETT	Types of Reaction L1, L2, L3	Types of Reaction L4, L4.5 (mid-review), L5	Types of reaction L6, L7RP, Science Week Lesson	Types of Reaction L8RP, 9 (Revision), Pressure L1	Pressure L2, 3, 4	Pressure L4.5 (Mid review), 5, 6	Pressure L7+8RP, 9 (Revision), ETT Acceleration Project L1	Acceleration Project L2, 3, 4	Acceleration Project L5, 6 (Review),	Magnetism L1, 2, 3	Magnetism L4, 4.5 (mid Review), 5	Magnetism L6, 7+8RP, 9 (Revision)	EOY Assessment Revision x 3	EOY Assessment Revision x 3	EOY Assessment, Light L1, 2	Light L3, 4, EOY Assessment Review	Light L4.5, 5, 6	Light L7RP, 8RP, 9 (Revision)	GCSE Transition Lessons	GCSE Transition Lessons
Progress and assessment	End of topic test (ETT) Follow on questions to test previous knowledge through the Unit. FAR completed approximately every 6 lessons.								End of topic test (ETT) Follow on questions to test previous knowledge through the Unit. FAR completed approximately every 6 lessons.							End of topic test (ETT) Follow on questions to test previous knowledge through the Unit. FAR completed approximately every 6 lessons.						Follow on questions to test previous knowledge through the Unit. FAR completed approximately every 6 lessons.					End of topic test (ETT) Follow on questions to test previous knowledge through the Unit. FAR completed approximately every 6 lessons.												
Required Practical (RP)	Genetics and Variation: Variation in Seedlings Analysing Data  Metals and Reactivity: Extracting Copper Writing a risk assessment.								Electrolysis Investigation Making observations  Sound: Investigating Waves Making Observations							Unicellular Organisms: Skills Accuracy, Precision and Resolution.  Enzyme Investigation Use of control variables						Types of Reaction: Rate of Reaction Comparing to Secondary Data  Pressure: Investigating Pressure Calculations					Acceleration Investigation  Magnetism: Making Electromagnets Graph/Method Writing						Light: Skills Variables						
Numeracy Skills	<ul style="list-style-type: none"> <li>- Calculating the mean, mode and median and range of data.</li> <li>- Using scientific equipment and reading from scales</li> <li>- Interpreting data from graphs and drawing lines of best fit</li> </ul>								<ul style="list-style-type: none"> <li>- Using ideas of reflection in waves</li> <li>- Calculating and rearranging formulae for magnification and the speed of sound</li> <li>- Comparing and judging size of cells</li> <li>- Calculating averages</li> </ul>							<ul style="list-style-type: none"> <li>- Calculating averages</li> <li>- Converting between units of time, mass and length</li> <li>- Observing uncertainty of equipment</li> <li>- Plotting graphs accurately</li> </ul>						<ul style="list-style-type: none"> <li>- Calculating averages</li> <li>- Interpreting data from tables and graphs</li> <li>- Calculating and Rearranging the pressure formula</li> <li>- Converting between units of volume</li> </ul>					<ul style="list-style-type: none"> <li>- Plotting suitable line of best fits</li> <li>- Drawing graphs accurately</li> <li>- Calculating and rearranging formulae for speed and acceleration</li> <li>- Calculating averages</li> <li>- Practicing inputting sums into a calculator</li> <li>- Using metric and imperial units of speed and distance</li> </ul>						<ul style="list-style-type: none"> <li>- Using a protractor to measure angles of reflection and refraction</li> <li>- Drawing and labelling diagrams accurately</li> <li>- Using ideas of reflection with mirrors to predict incidence and reflection angles</li> </ul>						
Homework (ensure that this is NOT stand alone, but clearly advances or embeds knowledge and understanding)	Educake Homework								Educake Homework							Educake Homework						Educake Homework					Educake Homework												
Key Vocabulary/literacy opportunities	<b>Genetics and Variation:</b> Variation, Inherited Variation, Environmental Variation, Continuous Variation, Discontinuous Variation, Genes, Adaptation, Competition, Natural Selection, Evolution, Extinction, Inherited Disorders, Cloning  <b>Metals and Reactivity:</b> Chemical change, Physical Change, Word Equation, Reactants, Products, Endothermic, Exothermic, Displacement, Ceramic, Polymer.  <b>Guided Reading Activity:</b> Exploration of what it means for a species to be endangered and how this can happen.								<b>Electrolysis:</b> Electrolysis, Electrode, Electrolyte, Anode, Cathode, Ions.  <b>Sound:</b> Sound, Vibration, Waves, Longitudinal, Transverse, Amplitude, Pitch, Frequency, Ear, Echo, Ultrasound  <b>Unicellular Organisms:</b> Organism, Unicellular, Multicellular, Antibiotic, Budding.  <b>Guided Reading Activity:</b> Exploration of the work of Edward Jenner and how his work contributed to the development of vaccinations still in use today.							<b>Unicellular Organisms:</b> Organism, Unicellular, Multicellular, Antibiotic, Budding.  <b>Enzymes:</b> Digestion, Digestive System, Enzyme, Protein, Active Site, Substrate, Product, Denature.  <b>Types of Reaction:</b> Chemical change, Physical Change, Word Equation, Reactants, Products, Fuel, Combustion, Conservation of Mass, Rate of Reaction, Thermal Decomposition.						<b>Types of Reaction:</b> Chemical change, Physical Change, Word Equation, Reactants, Products, Fuel, Combustion, Conservation of Mass, Rate of Reaction, Thermal Decomposition.  <b>Pressure:</b> Pressure, Particle, Solid, Liquid, Gas, Fluid, Atmosphere, Surface Area, Floating, Sinking.					<b>Magnets and Electromagnets:</b> Magnet, Electromagnet, Magnetic Field, Coil, Current, Static Electricity  <b>Light:</b> Light, Wave, Reflection, Refraction, Spectrum, Convex, Concave, Eye.  <b>Guided Reading Activity:</b> Exploration of what an electromagnet and how much of the modern technology we use depends on electromagnets.						<b>Light:</b> Light, Wave, Reflection, Refraction, Spectrum, Convex, Concave, Eye.						

<p><b>Connected knowledge</b></p>	<p><b>Genetics and Variation:</b></p> <ul style="list-style-type: none"> <li>heredity as the process by which genetic information is transmitted from one generation to the next</li> <li>a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model</li> <li>differences between species</li> <li>the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation</li> <li>the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection</li> <li>changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction</li> <li>the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.</li> </ul> <p><b>Metals and Reactivity</b></p> <ul style="list-style-type: none"> <li>chemical reactions as the rearrangement of atoms</li> <li>representing chemical reactions using formulae and using equations</li> <li>the order of metals and carbon in the reactivity series</li> <li>the use of carbon in obtaining metals from metal oxides</li> <li>properties of ceramics, polymers and composites (qualitative).</li> <li>the chemical properties of metal and non-metal oxides with respect to acidity.</li> <li>exothermic and endothermic chemical reactions (qualitative).</li> <li>reactions of acids with metals to produce a salt plus hydrogen</li> </ul>	<p><b>Sound:</b></p> <ul style="list-style-type: none"> <li>frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound</li> <li>sound needs a medium to travel, the speed of sound in air, in water, in solids</li> <li>sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal</li> <li>auditory range of humans and animals.</li> </ul> <p><b>Unicellular Organisms:</b></p> <ul style="list-style-type: none"> <li>the structural adaptations of some unicellular organisms</li> </ul>	<p><b>Unicellular Organisms:</b></p> <ul style="list-style-type: none"> <li>the structural adaptations of some unicellular organisms</li> </ul> <p><b>Types of Reaction:</b></p> <ul style="list-style-type: none"> <li>chemical reactions as the rearrangement of atoms</li> <li>representing chemical reactions using formulae and using equations</li> <li>combustion, thermal decomposition, oxidation and displacement reactions</li> </ul>	<p><b>Types of Reaction:</b></p> <ul style="list-style-type: none"> <li>chemical reactions as the rearrangement of atoms</li> <li>representing chemical reactions using formulae and using equations</li> <li>combustion, thermal decomposition, oxidation and displacement reactions</li> </ul> <p><b>Pressure:</b></p> <ul style="list-style-type: none"> <li>atmospheric pressure, decreases with increase of height as weight of air above decreases with height</li> <li>pressure in liquids, increasing with depth; upthrust effects, floating and sinking</li> <li>pressure measured by ratio of force over area – acting normal to any surface.</li> </ul>	<p><b>Magnets and Electromagnets:</b></p> <ul style="list-style-type: none"> <li>magnetic poles, attraction and repulsion</li> <li>magnetic fields by plotting with compass, representation by field lines</li> <li>Earth's magnetism, compass and navigation</li> <li>the magnetic effect of a current, electromagnets, D.C. motors (principles only).</li> </ul> <p><b>Light:</b></p> <ul style="list-style-type: none"> <li>the similarities and differences between light waves and waves in matter</li> <li>light waves travelling through a vacuum; speed of light</li> <li>the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface</li> <li>use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye</li> <li>light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras</li> <li>colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.</li> </ul>	<p><b>Light:</b></p> <ul style="list-style-type: none"> <li>the similarities and differences between light waves and waves in matter</li> <li>light waves travelling through a vacuum; speed of light</li> <li>the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface</li> <li>use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye</li> <li>light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras</li> <li>colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.</li> </ul>
<p><b>Spiritual, Moral, Social and cultural.</b></p>	<p>Linking their understanding to the chemicals around them in everyday life.</p> <p>Understand the issues linked to plastic usage and the environment.</p>		<p>Appreciating the work of scientists and the impact that they have had on life, society and culture – Edward Jenner.</p> <p>Linking their understanding to the chemicals around them in everyday life.</p>	<p>Linking their understanding to the chemicals around them in everyday life.</p>		
<p><b>British Values</b></p>	<p>Respect and tolerance, collaboration during experiments and group work.</p> <p>Following the laboratory rules when conducting practical work.</p> <p>Understanding where variation comes from and having a mutual respect for those who are different from us.</p> <p>Recognise how our actions have an impact on others and the environment around us.</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>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><b>Cultural Capital</b></p>	<p>Science - Careers display on W side corridor.</p> <p>Understand how the plastics we use and the waste that we create affects the environment around us.</p>	<p>Science - Careers display on W side corridor.</p> <p>Understand the impact of the advances in medicines/ diseases on everyday life.</p>	<p>Science - Careers display on W side corridor.</p> <p>Understand the impact of the advances in medicines/ diseases on everyday life.</p>	<p>Science - Careers display on W side corridor.</p> <p>Understand where chemicals reactions impact their everyday life – e.g self-heating cans, handwarmers, cool packs etc.</p>	<p>Science - Careers display on W side corridor.</p> <p>Understand how scientific advancements have an impact in everyday life - Silverstone Trip (Science and Maths).</p>	<p>Science - Careers display on W side corridor.</p>