

The High School  
Leckhampton

# Year 8 SCIENCE



## Topic Titles

**8B1 Biology Topic 1** Respiration, Gas Exchange and Biomechanics

**8C1 Chemistry Topic 1** Energetics, The Periodic Table and Materials

**8P1 Physics Topic 1** Electricity and Magnetism

**8B2 Biology Topic 2** Genetics and Evolution

**8C2 Chemistry Topic 2** The Earth, Atmosphere and Chemical Reactions

**8P2 Physics Topic 2** Energy, Machines, Fuels and Power

**8WS Working Scientifically Topic** Being a Scientist

## Intent

Our main aim and ambition in science is for our students to develop a curiosity and a desire to want to find out and understand more about the world around them. Science is a subject rich in knowledge that can change lives and open so many doors for our students. Through teaching a varied curriculum of biology, chemistry and physics, students develop the skills that they require to be able to apply their understanding of science to situations all around them and allow them to make informed choices as an educated citizen who promotes inclusivity. Students will be encouraged to question and recognise the power of rational explanation, fostering a sense of enthusiasm and creativity about natural phenomena.

## Links with other subjects

ART – Drawing accurate, annotated scientific diagrams.

DT – Material and machine properties.

ENGLISH – Comparatives, etymology, recalling exact definitions, writing and following detailed instructions.

GEOGRAPHY – Geology and nutrient cycles.

HISTORY – Periodic table, genetics and evolution theory developments, extinctions & atmosphere composition.

MATHS - Converting units, calculations, using and rearranging equations, rounding results, drawing scatter and bar graphs.

PE – Effect of exercise on respiration types and gas exchange.

## How will knowledge and skills be taught?

In lessons students will learn from their teacher, and work individually or with others, to develop their scientific knowledge and conceptual understanding.

Practical activities will help students understand the nature, processes, and methods of science, as well as the uses and implications of science for today and the future.

Completing homework using provided resources will help consolidate students' understanding and prepare them for future lessons.

Optional activities will challenge and extend students' scientific application.

## How can parents help?

Encourage students to use the topic resources on the VLE, the Year 8 Science Topic Basics and the CGP KS3 Science Study Guide provided.

Extend students' understanding using appropriate YouTube channels [e.g. Cognito, PrimroseKitten, KhanAcademy, FuseSchool, AmoebaSisters, Freesciencelessons, AsapScience, Crash Course, SciShow, Veritasium, Kurzgesagt – In a Nutshell, BBC Earth Lab, TED-Ed, Royal Society of Chemistry] and relevant Science-related films, series, and documentaries on various streaming services.

Take an interest – be curious and ask students about their learning.

## Recommended Reading and Preparation for Learning

How to Grow a Human: Adventures in Who We Are and How We Are Made – Philip Ball

The Periodic Table Book: A Visual Encyclopedia of the Elements - Dorling Kindersley

How the Body Works: The Facts Simply Explained – Dorling Kindersley

Magnetic Electricity! The Power of Magnets and Their Role in

Electricity - Science for Kids - Children's Energy Books

Genes and DNA (Kingfisher Knowledge) – Richard Walker

The Incredible Human Journey – Alice Roberts

Horrible Science Collection – Nick Arnold

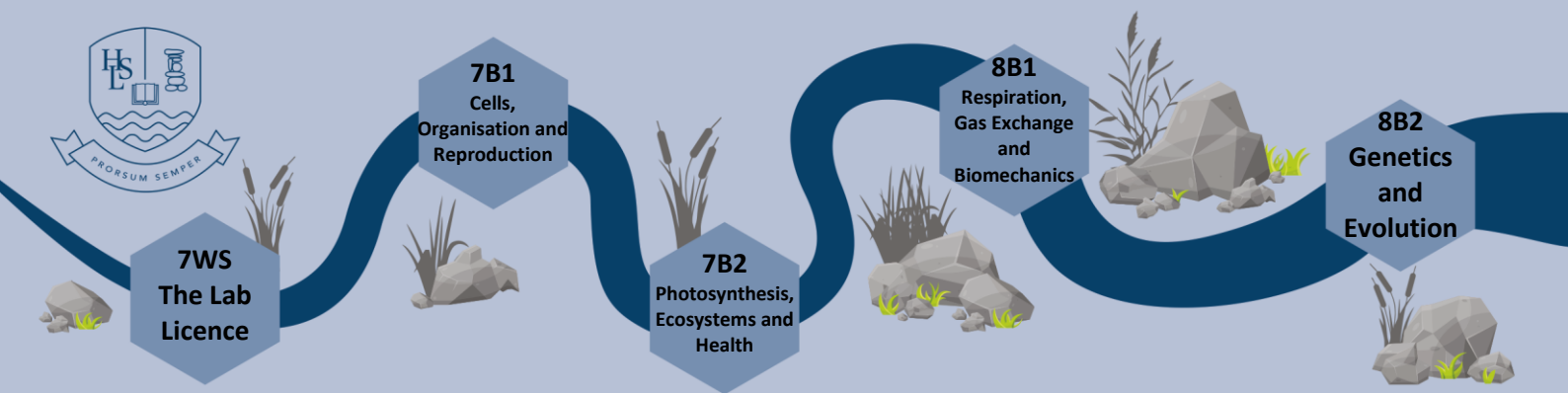
The Secret Life of Genes – Derek Harvey

There Is No Planet B - Mike Berners-Lee

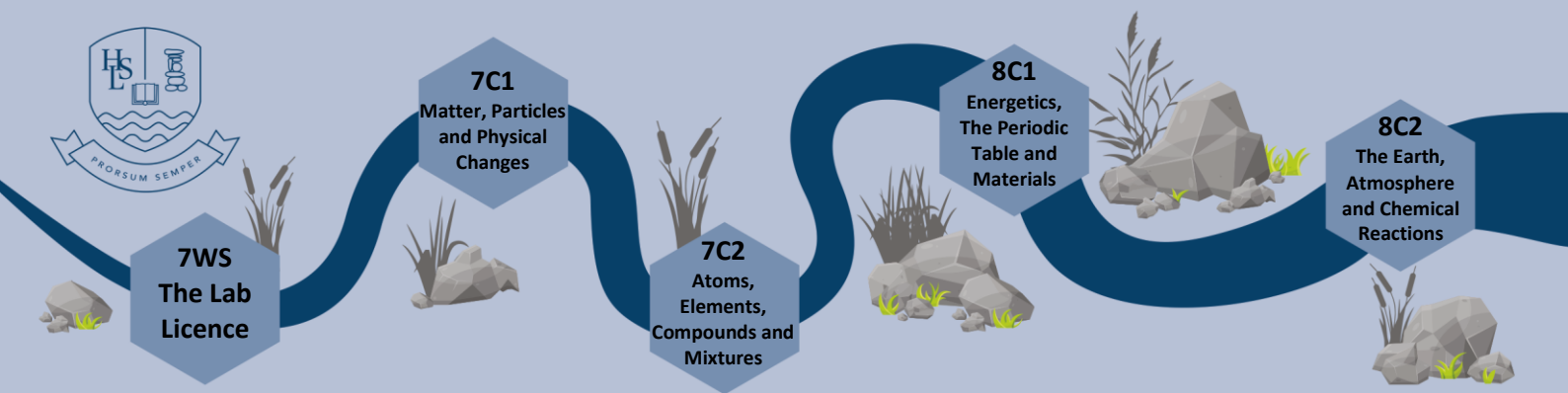
Genetics in Minutes – Tom Jackson

The Periodic Table – Primo Levi

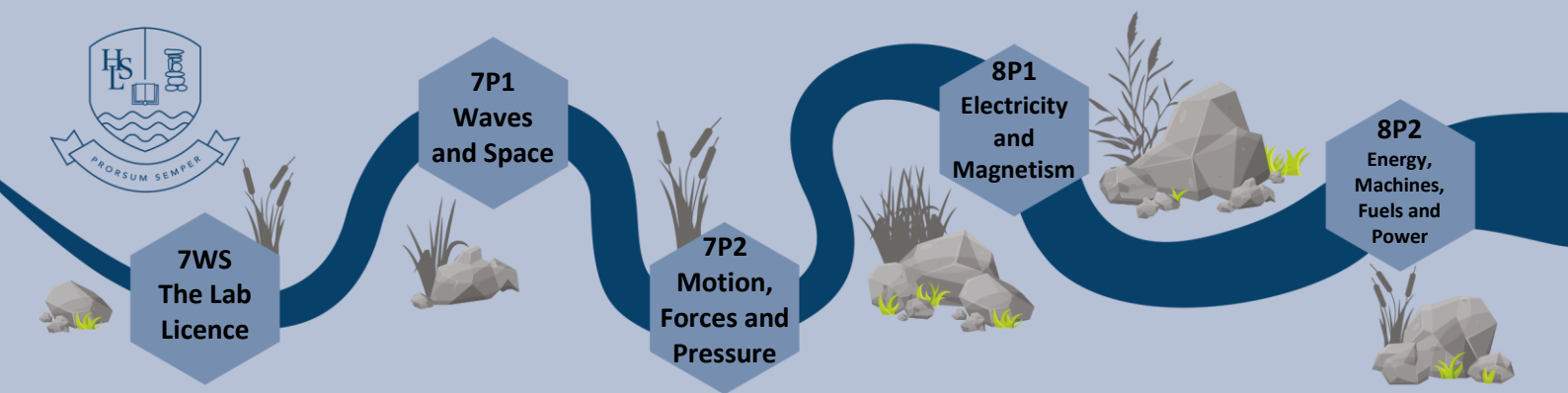
More recommendations at:  
<https://www.hsl.gloucs.sch.uk/literacy-and-recommended-reading>



Science	Year 8	Autumn Term	
<b>8B1 Biology Topic 1 – Respiration, Gas Exchange and Biomechanics</b>			
<b>Topic Outline &amp; Aims (Intent)</b> <ol style="list-style-type: none"> <li><u>Aerobic Respiration</u>: What is aerobic respiration?</li> <li><u>Anaerobic Respiration</u>: What is anaerobic respiration?</li> <li><u>Human Gas Exchange</u>: How does gas exchange happen in humans?</li> <li><u>Asthma and Smoking</u>: How does asthma and smoking affect the lungs?</li> <li><u>Skeleton and Joints</u>: What is the structure and function of the human skeleton?</li> <li><u>Muscles</u>: How do muscles function to help the skeleton move?</li> <li><u>Exercise</u>: How does exercise affect the human gas exchange system?</li> </ol>			
<b>Key Skills and Knowledge taught through this topic (Intent)</b> <ul style="list-style-type: none"> <li>✓ Recall where respiration takes place in cells; Define respiration; Describe aerobic respiration; Compare respiration and breathing.</li> <li>✓ Define anaerobic respiration in different organisms; Describe anaerobic respiration in muscle cells; Describe anaerobic respiration in yeast cells; Compare aerobic and anaerobic respiration.</li> <li>✓ Identify and describe the structure of the lungs; Describe how ventilation of the lungs occurs; Describe how gas exchange occurs in the lungs; Estimate total lung capacity.</li> <li>✓ Define asthma; Describe the symptoms, triggers and effects of an asthma attack on the lungs; Identify harmful chemicals in cigarettes; Describe the effects of smoking on the lungs.</li> <li>✓ Identify bones in the human skeleton; Describe the functions of the human skeleton; Define joints; Describe the structure and function of synovial joints.</li> <li>✓ Define skeletal muscles; Describe how skeletal muscles function in antagonistic pairs to move the skeleton; Measure the force exerted by different skeletal muscles.</li> <li>✓ Define exercise; Describe how exercise affects the human gas exchange system; Investigate how exercise affects heart rate and breathing rate.</li> </ul>			
<b>Prior Learning (Context)</b> <a href="#">KS2: Science Programmes of Study</a> ➤ Animals, including humans (pages 17, 31)	<b>Future Learning (Context)</b> <a href="#">KS3: Science Programmes of Study</a> ➤ Inheritance, chromosomes, DNA and genes (page 7) <a href="#">KS4: Science Programmes of Study</a> ➤ Cell biology (pages 7-8)	<b>National Curriculum Links (Context)</b> <a href="#">KS3: Science Programmes of Study</a> ➤ Cellular respiration (page 7) ➤ Gas exchange systems (page 6) ➤ The skeletal and muscular systems (page 5)	
<b>RRSA Links</b> ARTICLE 6: Life, survival and development. ARTICLE 12: Respect for the views of the child. ARTICLE 13: Freedom of expression. ARTICLE 31: Leisure, play and culture ARTICLE 24: Health and health services. ARTICLE 23: Children with a disability. ARTICLE 28: Right to education. ARTICLE 29: Goals of education.		<b>Assessment of Learning (Impact)</b> <ul style="list-style-type: none"> <li>• Individual questioning, lesson and homework activities</li> <li>• Classwork in student folders with Review lesson</li> <li>• Practical activities carried out throughout topic</li> <li>• 8B1 Standard Homework 1 and 2 with Feedback lesson</li> <li>• 8B1 Topic Test with Revision and Feedback lessons</li> </ul>	
<b>British Values Links</b> MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect. THE RULE OF LAW: Understanding and following lab rules and the laws of nature. INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.			
<b>Eco-Schools Links</b> HEALTHY LIVING: Addressing your, and our planet's health. TRANSPORT: Promoting and encouraging sustainable transport.			
<b>Reading / Enrichment</b> How the Body Works: The Facts Simply Explained – Tom Jackson All About Biology (Big Questions) – Robert Winston The Science Book: Big Ideas Simply Explained – Dorling Kindersley <a href="#">Recommended Reading List.</a>	<b>Key Vocabulary (Literacy)</b> Respiration; Aerobic respiration; Anaerobic respiration; Breathing; Fermentation; Asthma; Nicotine; Tar; Carbon monoxide; Joints; Skeleton; Skeletal muscles; Antagonistic pair; Exercise. <i>Complete topic glossary provided.</i>	<b>Numeracy Opportunities</b> Making measurements; Comparing size; Converting units; Balancing chemical equations; Calculating averages and percentages; Rounding results; Analysing results tables and scatter graphs.	<b>Career Links</b> Cell Biologist; Baker; Chef; Brewer; Winemaker; Pulmonologist; Oncologist; Allergist; Physiotherapist; Chiropractor; Orthopaedist; Rheumatologist; Athlete; Personal trainer; Doctor; Nurse; Teacher; Research Scientist.

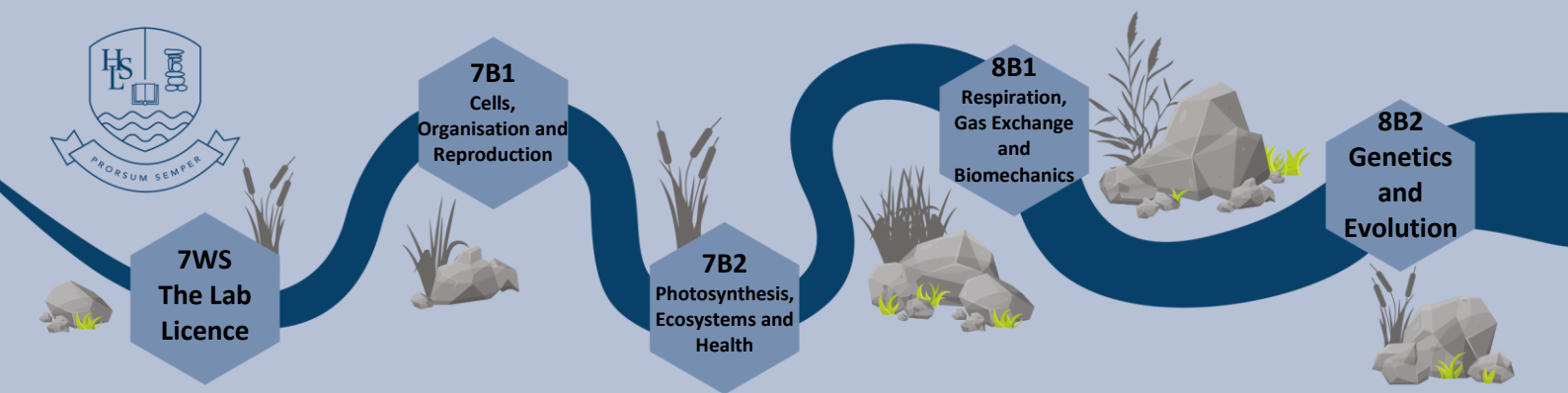


Science	Year 8		Autumn Term
<b>8C1 Chemistry Topic 1 – Energetics, The Periodic Table and Materials</b>			
<b>Topic Outline &amp; Aims (Intent)</b> 1. <u>Changes of State</u> : What causes changes of state? 2. <u>Endothermic and Exothermic Reactions</u> : How do chemical reactions affect their environment? 3. <u>The Periodic Table</u> : What does the periodic table show? 4. <u>Metals and Non-Metals</u> : What are the differences between metals and non-metals? 5. <u>Metal and Non-Metal Oxides</u> : What are metal and non-metal oxides?		6. <u>Reactivity of Metals</u> : How reactive are metals? 7. <u>Displacement Reactions</u> : Which metals displace each other? 8. <u>Extracting Metals</u> : How can we extract metals? 9. <u>Useful Materials</u> : How can we use different materials? 10. <u>Composites</u> : What are the components of a composite? 11. <u>Investigating Composites</u> : What affects the properties of a composite? 12. <u>Polymers</u> : What affects the properties of polymers? 13. <u>Assessing Risk</u> : How are risk assessments carried out?	
<b>Key Skills and Knowledge taught through this topic (Intent)</b> <ul style="list-style-type: none"> <li>✓ Describe the arrangement of particles for each state; Name changes of state; Describe the energy changes during changes of state; Investigate energy changes in different substances.</li> <li>✓ Identify signs of a chemical reaction; Define exothermic and endothermic; Investigate whether reactions are exothermic or endothermic.</li> <li>✓ Identify the structure of the periodic table; Describe how scientists designed the periodic table; Predict patterns using the periodic table.</li> <li>✓ Define the properties of substances; Compare the properties of metals and non-metals; Identify metals from their properties.</li> <li>✓ Define metal and non-metal oxides; Identify the chemical and physical properties of oxides; State chemical equations for oxidation reactions.</li> <li>✓ Identify what metals can react with; Investigate the reactivity of metals; State the reactivity series.</li> </ul>		<ul style="list-style-type: none"> <li>✓ Define displacement; Recall the reactivity series; Investigate displacement reactions; State word equations for displacement reactions.</li> <li>✓ Describe how metals are normally found; Define a metal ore; Describe how metals can be extracted from metal ores; Explain why carbon is typically used when extracting metals.</li> <li>✓ Recall properties of metals and non-metals; Identify properties of different materials that make them useful; Evaluate the properties and uses of ceramics, polymers and composites.</li> <li>✓ Recall examples of composites; Identify components of composites; Investigate what affects the properties of a composite.</li> <li>✓ Record accurate results in a detailed results table; Conclude whether the quantity of filler affected the properties of a composite; Evaluate the composite investigation.</li> <li>✓ Define polymer; Describe how polymers are made; Investigate the properties of polymers; Evaluate the use of polymers.</li> <li>✓ Recall definitions of hazard, risk and precaution; Identify hazards, risks and precautions in a risk assessment; Safely investigate exothermic reactions.</li> </ul>	
<b>Prior Learning (Context)</b> <a href="#">KS2: Science Programmes of Study</a> ➤ Properties and changes of materials (page 28)	<b>Future Learning (Context)</b> <a href="#">KS3: Science Programmes of Study</a> ➤ Chemical reactions (page 8) ➤ Earth and atmosphere (page 9) <a href="#">KS4: Science Programmes of Study</a> ➤ Energy changes in chemistry (page 12) ➤ Atomic structure and the Periodic Table (pages 11-12) ➤ Chemical and allied industries (page 13) ➤ Structure, bonding and the properties of matter (page 12)		<b>National Curriculum Links (Context)</b> <a href="#">KS3: Science Programmes of Study</a> ➤ Energetics (page 8) ➤ The Periodic Table (page 9) ➤ Materials (page 9)
<b>RRSA Links</b> ARTICLE 12: Respect for the views of the child.    ARTICLE 13: Freedom of expression. ARTICLE 28: Right to education.    ARTICLE 29: Goals of education.		<b>Assessment of Learning (Impact)</b> <ul style="list-style-type: none"> <li>• Individual questioning, lesson and homework activities</li> <li>• Classwork in student folders with Review lesson</li> <li>• Practical activities carried out throughout topic</li> <li>• 8C1 Standard Homework 1 and 2 with Feedback lesson</li> <li>• 8C1 Topic Test with Revision and Feedback lessons</li> </ul>	
<b>British Values Links</b> MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect. THE RULE OF LAW: Understanding and following lab rules and the laws of nature. INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.			
<b>Eco-Schools Links</b> WASTE: Refusing, reducing, reusing, repairing, recycling. LITTER: Reducing litter, which harms wildlife and costs millions to clear every year.			
<b>Reading / Enrichment</b> The Periodic Table Book – Dorling Kindersley Built To Last – David Macaulay Built – Roma Agrawal <a href="#">Recommended Reading List.</a>	<b>Key Vocabulary (Literacy)</b> Exothermic; Endothermic; Properties; Periodic table; Metal oxide; Non-metal oxide; Displacement; Metal ore; Composite; Polymer; Ceramic; Hazard; Risk; Precaution. <i>Complete topic glossary provided.</i>	<b>Numeracy Opportunities</b> Making measurements; Comparing size; Converting units; Identifying patterns; Calculating averages and percentages; Rounding results; Drawing and analysing results tables.	<b>Career Links</b> Chemical Engineer; Surveyor; Environmental Chemist; Metalworker; Architect; Materials Scientist; Metallurgist; Engineer; Operations Manager; Risk Manager; Manufacturer; Teacher; Research Scientist.

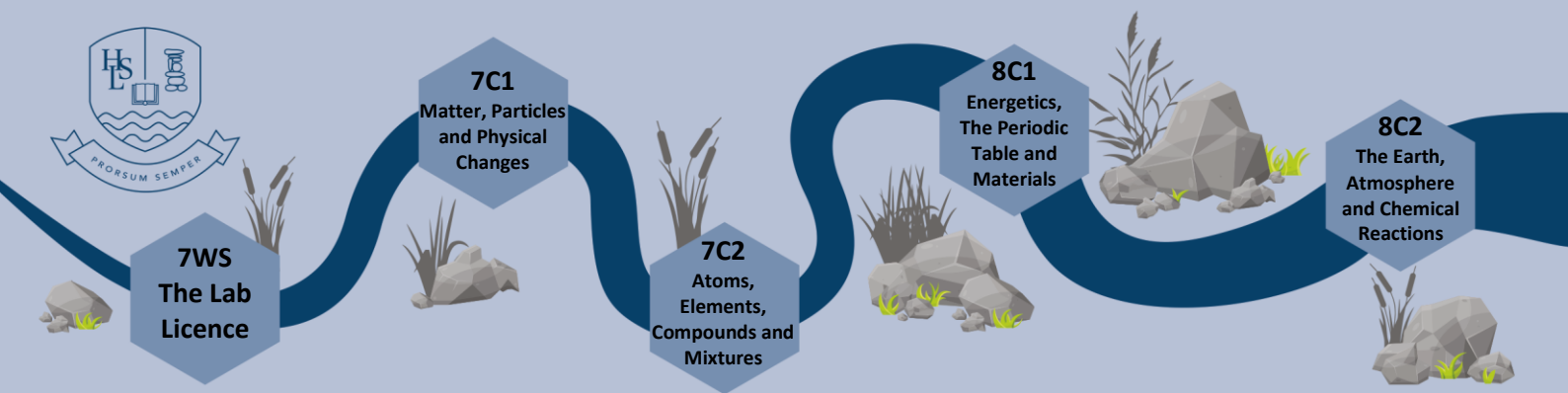


Science	Year 8	Autumn Term	
<b>8P1 Physics Topic 1 – Electricity and Magnetism</b>			
<b>Topic Outline &amp; Aims (Intent)</b> 1. <u>Charge</u> : How does charge affect substances? 2. <u>Static Electricity</u> : What causes static electricity? 3. <u>Current and Potential Difference</u> : What is current and potential difference? 4. <u>Series Circuits and Circuit Symbols</u> : What are the components of a series circuit? 5. <u>Current</u> : How does current flow in circuits? 6. <u>Parallel Circuits</u> : How are ammeters and voltmeters used in circuits?		7. <u>Resistance</u> : What is resistance in circuits? 8. <u>Investigating Resistance</u> : What affects resistance in circuits? 9. <u>Calculating Resistance</u> : How is resistance in circuits calculated? 10. <u>Magnetic Poles and Field Lines</u> : What are the properties of permanent magnets? 11. <u>The Earth as a Magnet</u> : What are the functions of the Earth's magnetic field? 12. <u>Electromagnets</u> : What is an electromagnet? 13. <u>Uses of Electromagnets</u> : What are the uses of electromagnets? 14. <u>Electric Motors</u> : How does a simple electric motor work?	
<b>Key Skills and Knowledge taught through this topic (Intent)</b> <ul style="list-style-type: none"> <li>✓ Recall the structure of an atom; Describe charge; Identify the charges of sub-atomic particles; Explain the difference between conductors and insulators.</li> <li>✓ Describe an electric field; Explain how objects can become charged; Investigate the effect of electrostatic forces.</li> <li>✓ Describe electricity; Define electric current; Describe potential difference; Evaluate models of current and potential difference.</li> <li>✓ Describe how to draw circuit diagrams; Identify circuit symbols for electrical components; Describe the properties of a series circuit.</li> <li>✓ Recall the definition of electric current; Describe how current flows in a series circuit; Describe how current flows in a parallel circuit.</li> <li>✓ Identify parallel circuits; Describe how to use an ammeter and voltmeter in a circuit.</li> <li>✓ Describe resistance in circuits; Describe how resistance is measured in circuits; Investigate how variable resistors work.</li> </ul>		<ul style="list-style-type: none"> <li>✓ Describe what causes resistance in circuits; Recall the variables in an experiment; Investigate how the length of a wire affects the resistance in a circuit; Recall how to draw a scatter graph of results.</li> <li>✓ Identify what affects the resistance of a conductor; State Ohm's Law; Calculate resistance in circuits using Ohm's Law.</li> <li>✓ Define a permanent magnet; Describe how magnets and magnetic materials interact; Investigate magnetic field lines around a magnet.</li> <li>✓ Describe and explain the Earth's magnetic field; Describe the function of a compass; Investigate how to make a magnetic compass.</li> <li>✓ Define an electromagnet; Draw the magnetic field around electromagnets; Describe how to increase the strength of an electromagnet.</li> <li>✓ Identify uses of electromagnets; Label the parts of an electric bell; Describe how an electric bell works.</li> <li>✓ Recall the function of a motor; Label the parts of a simple electric motor; Describe how a simple electric motor works.</li> </ul>	
<b>Prior Learning (Context)</b> <a href="#">KS2: Science Programmes of Study</a> <ul style="list-style-type: none"> <li>➤ Electricity (pages 23, 34)</li> <li>➤ Forces and magnets (page 19)</li> </ul>	<b>Future Learning (Context)</b> <a href="#">KS3: Science Programmes of Study</a> <ul style="list-style-type: none"> <li>➤ Energy (pages 9-10)</li> </ul> <a href="#">KS4: Science Programmes of Study</a> <ul style="list-style-type: none"> <li>➤ Electricity (pages 15-16)</li> <li>➤ Magnetism and electromagnetism (page 16)</li> </ul>	<b>National Curriculum Links (Context)</b> <a href="#">KS3: Science Programmes of Study</a> <ul style="list-style-type: none"> <li>➤ Static electricity (page 12)</li> <li>➤ Current electricity (page 12)</li> <li>➤ Magnetism (page 12)</li> </ul>	
<b>RRSA Links</b> ARTICLE 12: Respect for the views of the child. ARTICLE 13: Freedom of expression. ARTICLE 28: Right to education. ARTICLE 29: Goals of education.		<b>Assessment of Learning (Impact)</b> <ul style="list-style-type: none"> <li>• Individual questioning, lesson and homework activities</li> <li>• Classwork in student folders with Review lesson</li> <li>• Practical activities carried out throughout topic</li> <li>• 8P1 Standard Homework 1 and 2 with Feedback lesson</li> <li>• 8P1 Topic Test with Revision and Feedback lessons</li> </ul>	
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<b>Eco-Schools Links</b> ENERGY: Reducing energy use and investigating greener energy sources. WASTE: Refusing, reducing, reusing, repairing, recycling.			
<b>Reading / Enrichment</b> All About Physics (Big Questions) – Richard Hammond Magnetic Electricity! The Power of Magnets and Their Role in Electricity - Baby IQ Builder Books  <a href="#">Recommended Reading List.</a>	<b>Key Vocabulary (Literacy)</b> Charge; Electric Field; Electricity; Electric current; Potential difference; Resistance; Series circuit; Parallel circuit; Permanent magnet; Magnetic field; Electromagnet; Electric Bell; Electric Motor.  <i>Complete topic glossary provided.</i>	<b>Numeracy Opportunities</b> Making measurements; Comparing size; Converting units; Using and rearranging equations; Calculating averages and percentages; Rounding results; Drawing and analysing accurate scientific diagrams, results tables, and scatter graphs.	<b>Career Links</b> Electrician; Electrical Engineer; Circuit Developer; Geologist; IT Technician; Navigator; Software Designer; Teacher; Magnetic Engineer; Geomagnetist; Radiographer; Automotive Designer; Engineer; Research Scientist.

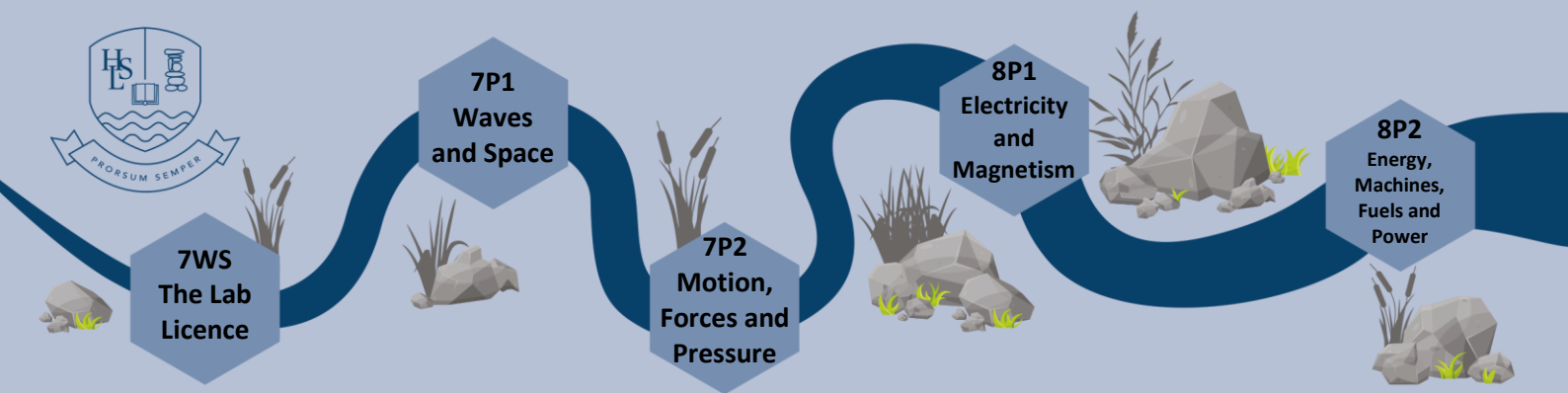




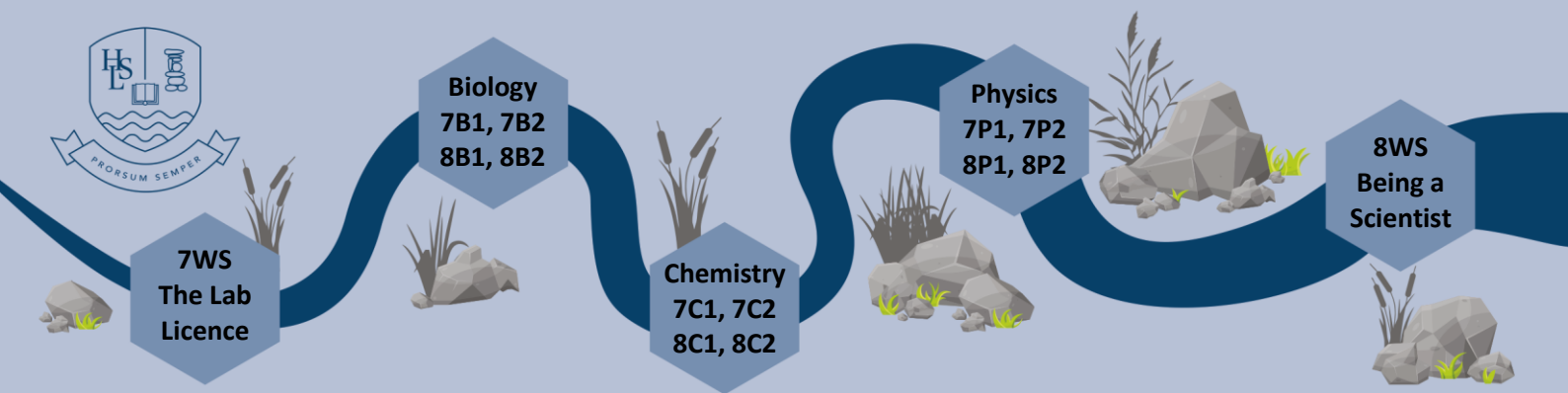
Science		Year 8		Spring Term	
<b>8B2 Biology Topic 2 – Genetics and Evolution</b>					
<b>Topic Outline &amp; Aims (Intent)</b> 1. <u>Heredity</u> : What is heredity? 2. <u>DNA</u> : What is DNA? 3. <u>The Discovery of DNA</u> : How was DNA discovered?			4. <u>Variation</u> : What causes variation? 5. <u>Natural Selection</u> : What is the process of natural selection? 6. <u>Extinction</u> : What are the causes of extinction? 7. <u>Biodiversity</u> : How can we maintain biodiversity?		
<b>Key Skills and Knowledge taught through this topic (Intent)</b> <ul style="list-style-type: none"> <li>✓ Describe what is inside the nucleus; Describe how organisms inherit characteristics; Define heredity.</li> <li>✓ Describe the structure of DNA; Describe the function of DNA.</li> <li>✓ Identify the scientists that contributed to the discovery of DNA; Describe the discovery of DNA; Evaluate the contributions of scientists to the discovery of DNA.</li> </ul>			<ul style="list-style-type: none"> <li>✓ Define variation; Identify examples of genetic and environmental variation; Describe the difference between continuous and discontinuous variation.</li> <li>✓ Define evolution; Define species; Identify sources of intraspecific competition; Describe the process of natural selection.</li> <li>✓ Define extinction; Describe causes of extinction; Identify how species at risk of extinction are classified.</li> <li>✓ Define biodiversity; Explain why biodiversity should be maintained; Describe how to prevent the loss of biodiversity.</li> </ul>		
<b>Prior Learning (Context)</b> <u>KS2: Science Programmes of Study</u> <ul style="list-style-type: none"> <li>➤ Evolution and inheritance (pages 32-33)</li> <li>➤ Living things and their habitats (page 20)</li> </ul>		<b>Future Learning (Context)</b> <u>KS4: Science Programmes of Study</u> <ul style="list-style-type: none"> <li>➤ Evolution, inheritance and variation (pages 9-10)</li> </ul>		<b>National Curriculum Links (Context)</b> <u>KS3: Science Programmes of Study</u> <ul style="list-style-type: none"> <li>➤ Inheritance, chromosomes, DNA and genes (page 7)</li> </ul>	
<b>RRSA Links</b> ARTICLE 6: Life, survival and development. ARTICLE 13: Freedom of expression. ARTICLE 24: Health and health services. ARTICLE 28: Right to education.				<b>Assessment of Learning (Impact)</b> <ul style="list-style-type: none"> <li>• Individual questioning, lesson and homework activities</li> <li>• Classwork in student folders with Review lesson</li> <li>• Practical activities carried out throughout topic</li> <li>• 8B2 Standard Homework 1 and 2 with Feedback lesson</li> <li>• 8B2 Topic Test with Revision and Feedback lessons</li> </ul>	
<b>British Values Links</b> MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect. THE RULE OF LAW: Understanding and following lab rules and the laws of nature. INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.					
<b>Eco-Schools Links</b> BIODIVERSITY: Maintaining a high level of plant, insect and animal life locally and globally. GLOBAL CITIZENSHIP: Taking an active role in your community and making our planet more peaceful, sustainable and fair. LITTER: Reducing litter, which harms wildlife and costs millions to clear every year. MARINE: Protecting and conserving water-based ecosystems. WASTE: Refusing, reducing, reusing, repairing, recycling.					
<b>Reading / Enrichment</b> Genes and DNA (Kingfisher Knowledge) – Richard Walker The Secret Life of Genes – Derek Harvey Genetics in Minutes – Tom Jackson There Is No Planet B – Mike Berners-Lee Fossils From Lost Worlds – Helene Rajcak 100 Things to Know About Saving the Planet – Usborne Publishing <a href="https://www.yourgenome.org/">https://www.yourgenome.org/</a> <a href="https://www.iucnredlist.org/Recommended Reading List">https://www.iucnredlist.org/Recommended Reading List</a>		<b>Key Vocabulary (Literacy)</b> DNA; Gene; Chromosome; Interspecific Variation; Intraspecific Variation; Heredity; Genetic Variation; Environmental Variation; Continuous Variation; Discontinuous Variation; Evolution; Species; Natural Selection; Extinction; Biodiversity; Gene Bank; Cryo Bank. <i>Complete topic glossary provided.</i>		<b>Numeracy Opportunities</b> Making measurements; Comparing size; Converting units; Calculating averages and percentages; Rounding results; Analysing results tables and scatter graphs.	
		<b>Career Links</b> Clinical Geneticist; Anthropologist; DNA Analyst; Genetic Counsellor; Natural Conservation Officer; Forensic scientist; Ecologist; Environmental Policy Advisor; Marine Biologist; Molecular Biologist; Plant Scientist; Doctor; Nurse; Teacher; Research Scientist.			



Science	Year 8		Spring Term
<b>8C2 Chemistry Topic 2 – The Earth, Atmosphere and Chemical Reactions</b>			
<b>Topic Outline &amp; Aims (Intent)</b> 1. <u>The Structure of the Earth</u> : What is the structure of the Earth? 2. <u>Types of Rock</u> : What types of rock are there on Earth? 3. <u>The Rock Cycle</u> : How are rocks recycled on Earth? 4. <u>Resources from the Earth</u> : How can Earth's natural resources be conserved? 5. <u>The Atmosphere</u> : What is the composition of the Earth's atmosphere? 6. <u>The Carbon Cycle</u> : How is carbon recycled on Earth? 7. <u>Chemical Reactions</u> : What happens in chemical reactions?		8. <u>Combustion and Oxidation</u> : What is combustion and oxidation? 9. <u>Thermal Decomposition</u> : What is thermal decomposition? 10. <u>Displacement</u> : How can displacement be used to identify substances? 11. <u>Acids, Bases and pH Indicators</u> : How can acids, bases and pH be identified? 12. <u>Neutralisation</u> : What happens in neutralisation reactions? 13. <u>Metals and Acids</u> : What happens when metals are reacted with acids? 14. <u>Catalysts</u> : What are catalysts?	
<b>Key Skills and Knowledge taught through this topic (Intent)</b> <ul style="list-style-type: none"> <li>✓ Identify the structure of the Earth; Describe the composition of the Earth's layers; Evaluate models of the Earth's structure.</li> <li>✓ Describe the formation of sedimentary rock; Describe the formation of igneous rock; Describe the formation of metamorphic rock.</li> <li>✓ Describe the process of weathering; Describe the process of erosion; Identify the stages of the rock cycle.</li> <li>✓ Identify some of Earth's natural resources; Define finite and renewable resources; Explain the advantages of recycling Earth's natural resources.</li> <li>✓ Identify the structure of the Earth's atmosphere; Describe the composition of the Earth's atmosphere; Explain the effects of a changing atmosphere.</li> <li>✓ Identify where carbon is found on Earth; Describe the processes that recycle carbon on Earth.</li> <li>✓ Describe what happens in chemical reactions; Identify signs of chemical reactions; Describe how chemical reactions are represented.</li> </ul>		<ul style="list-style-type: none"> <li>✓ Define combustion; Describe oxidation; Investigate factors affecting slow oxidation.</li> <li>✓ Define thermal decomposition; Represent thermal decomposition reactions using chemical equations.</li> <li>✓ Recall the definition of a displacement reaction; Describe how to use displacement to identify an unknown substance.</li> <li>✓ Describe the properties of acids; Describe the properties of bases; Describe what the pH scale shows; Investigate the pH of various substances using different indicators.</li> <li>✓ Identify common components in acids and alkalis; Describe what happens in a neutralisation reaction; Identify reactants and products in neutralisation reactions.</li> <li>✓ Describe what happens when metals are reacted with acids; Identify how to test the gas produced in a metal-acid reaction.</li> <li>✓ Define catalyst; Explain the advantages of using catalysts; Describe the disadvantages of using catalysts; Identify the test for oxygen gas.</li> </ul>	
<b>Prior Learning (Context)</b> <a href="#">KS2: Science Programmes of Study</a> ➤ Rocks (page 17-18)	<b>Future Learning (Context)</b> <a href="#">KS4: Science Programmes of Study</a> ➤ Earth and atmospheric science (page 13) ➤ Chemical and allied industries (page 13) ➤ Chemical changes (page 12) ➤ Rate and extent of chemical change (page 13)		<b>National Curriculum Links (Context)</b> <a href="#">KS3: Science Programmes of Study</a> ➤ Chemical reactions (page 8) ➤ Earth and atmosphere (page 9)
<b>RRSA Links</b> ARTICLE 6: Life, survival and development. ARTICLE 13: Freedom of expression. ARTICLE 28: Right to education. ARTICLE 12: Respect for the views of the child. ARTICLE 24: Health and health services. ARTICLE 29: Goals of education.		<b>Assessment of Learning (Impact)</b> <ul style="list-style-type: none"> <li>• Individual questioning, lesson and homework activities</li> <li>• Classwork in student folders with Review lesson</li> <li>• Practical activities carried out throughout topic</li> <li>• 8C2 Standard Homework 1 and 2 with Feedback lesson</li> <li>• 8C2 Topic Test with Revision and Feedback lessons</li> </ul>	
<b>British Values Links</b> MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect. THE RULE OF LAW: Understanding and following lab rules and the laws of nature. INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.			
<b>Eco-Schools Links</b> ENERGY: Reducing energy use and investigating greener energy source. WASTE: Refusing, reducing, reusing, repairing, recycling. LITTER: Reducing litter, which harms wildlife and costs millions to clear every year.			
<b>Reading / Enrichment</b> Journey to the Centre of the Earth – Jules Verne Built To Last – David Macaulay Built – Roma Agrawal <a href="#">Recommended Reading List.</a>	<b>Key Vocabulary (Literacy)</b> Core; Mantle; Crust; Sedimentary; Igneous; Metamorphic; Rusting; Atmosphere; Catalyst; Combustion; Oxidation; Thermal Decomposition; Acids; Bases; pH; Neutralisation. <i>Complete topic glossary provided.</i>	<b>Numeracy Opportunities</b> Making measurements; Comparing size; Converting units; Using and rearranging equations; Calculating averages and percentages; Rounding results; Drawing and analysing figures.	<b>Career Links</b> Geologist; Mineralogist; Chemical Engineer; Teacher; Environmental Chemist; Meteorologist; Manufacturer; Materials Scientist; Risk Manager; Research Scientist.



Science		Year 8		Spring Term	
<b>8P2 Physics Topic 2 – Energy, Machines, Fuels and Power</b>					
<b>Topic Outline &amp; Aims (Intent)</b> 1. <u>Energy</u> : What are the different stores of energy? 2. <u>Energy Changes</u> : How is energy transferred between stores? 3. <u>Heat Flow</u> : How does heat flow between objects? 4. <u>Conduction, Convection and Radiation</u> : How can thermal energy be transferred? 5. <u>Insulation</u> : How do insulators work? 6. <u>Work</u> : How can work be calculated? 7. <u>Simple Machines - Levers</u> : How do simple machines transfer energy?			8. <u>Simple Machines - Pulleys</u> : How do simple machines transfer energy? 9. <u>Fuels</u> : What are fuels? 10. <u>Energy in Food</u> : How can the energy content of different foods be compared? 11. <u>Energy Resources</u> : How can electricity be generated? 12. <u>Power</u> : What is power? 13. <u>Electricity Bills</u> : How is the cost of using electrical appliances calculated? 14. <u>Solar Cells</u> : Which factors affect solar cell performance?		
<b>Key Skills and Knowledge taught through this topic (Intent)</b> ✓ Define energy; Describe the different stores of energy. ✓ Identify energy changes; Describe how energy is transferred between different energy stores. ✓ Define heat and temperature; Describe how heat flows between objects; Recall how to draw a scatter graph of results. ✓ Describe thermal energy transfer by conduction; Describe thermal energy transfer by convection; Describe thermal energy transfer by radiation. ✓ Describe how insulators work; Investigate which materials are better insulators; Explain how objects reduce heat flow. ✓ Define work; Calculate work; Identify useful and wasted output energy.			✓ Describe how levers work; Identify the three classes of lever; Calculate the energy transferred by levers. ✓ Describe how pulleys work; Evaluate the use of multiple pulleys. ✓ Describe what fuels are; Explain the energy changes when fuels are burned. ✓ Compare the energy content of different foods. ✓ Describe energy resources; Describe how electricity is generated; Evaluate different energy resources. ✓ Define power; Calculate power; Describe how the power of an appliance affects the energy transferred. ✓ Calculate the cost of using electrical appliances; Identify how we can reduce our electricity bills. ✓ Investigate a factor affecting solar cell performance; Write a conclusion and evaluation for an investigation.		
<b>Prior Learning (Context)</b> <a href="#">KS2: Science Programmes of Study</a> ➤ Forces (page 30)		<b>Future Learning (Context)</b> <a href="#">KS4: Science Programmes of Study</a> ➤ Energy (page 14)		<b>National Curriculum Links (Context)</b> <a href="#">KS3: Science Programmes of Study</a> ➤ Changes in systems (page 10) ➤ Energy changes and transfers (page 10) ➤ Calculation of fuel uses & costs in the domestic context (page 9)	
<b>RRSA Links</b> ARTICLE 12: Respect for the views of the child. ARTICLE 13: Freedom of expression. ARTICLE 28: Right to education. ARTICLE 29: Goals of education.			<b>Assessment of Learning (Impact)</b> <ul style="list-style-type: none"> <li>Individual questioning, lesson and homework activities</li> <li>Classwork in student folders with Review lesson</li> <li>Practical activities carried out throughout topic</li> <li>8P2 Standard Homework 1 and 2 with Feedback lesson</li> <li>8P2 Topic Test with Revision and Feedback lessons</li> </ul>		
<b>British Values Links</b> MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect. THE RULE OF LAW: Understanding and following lab rules and the laws of nature. INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.					
<b>Eco-Schools Links</b> ENERGY: Reducing energy use and investigating greener energy sources. WASTE: Refusing, reducing, reusing, repairing, recycling.					
<b>Reading / Enrichment</b> There Is No Planet B – Mike Berners-Lee 100 Things to Know About Saving the Planet – Usborne Publishing How to Invent Everything: A Survival Guide for the Stranded Time Traveler - Ryan North <a href="#">Recommended Reading List</a>		<b>Key Vocabulary (Literacy)</b> Energy, Chemical, Thermal, Gravitational Potential, Elastic Potential, Kinetic, Nuclear, Heat, Temperature, Insulation, Work, Conduction, Convection, Radiation, Levers, Pulley, Hydroelectric, Geothermal, Fossil Fuels, Power. <i>Complete topic glossary provided.</i>		<b>Numeracy Opportunities</b> Making measurements; Comparing size; Converting units; Using and rearranging equations; Calculating averages, costs and percentages; Rounding results; Drawing and analysing accurate scientific diagrams, results tables, and scatter graphs.	
<b>Career Links</b> Geologist; Gas Engineer; Environmental Policy Advisor; Environmental Chemist; Teacher; Welder; Turbine Technician; Electrician; Particle Physicist; Water Treatment Specialist; Management Consultant; Solicitor; Research Scientist.					



Science	Year 8		Summer Term
<b>8WS Working Scientifically Topic – Being a Scientist</b>			
<b>Topic Outline &amp; Aims (Intent)</b> 1. <u>Investigation Introduction</u> : How do scientists decide what to investigate? 2. <u>Experiment Planning</u> : How do scientists plan an experiment? 3. <u>Results Table and Practical</u> : How do scientists conduct a Biology / Chemistry / Physics experiment?		4. <u>Results Table and Practical</u> : How do scientists conduct a Biology / Chemistry / Physics experiment? 5. <u>Drawing Graphs</u> : How do scientists graph the results of an experiment? 6. <u>Conclusion and Evaluation</u> : How do scientists decide if their results are valid?	
<b>Key Skills and Knowledge taught through this topic (Intent)</b> ✓ Define and identify the different variables in science investigations; Define hypothesis; State a hypothesis for different investigation. ✓ Identify what a method should include; Define prediction; Plan and predict the result of an experiment.		✓ Identify what a results table should include; Follow a method to carry out an experiment; Record accurate results; Calculate a mean. ✓ Describe how to draw a scatter graph; Draw a scatter graph of your results. ✓ Define conclusion and evaluation; Describe what an experiment shows using results as evidence; Explain how an experiment could be improved.	
<b>Prior Learning (Context)</b> <a href="#">KS2: Science Programmes of Study</a> ➤ Working scientifically (page 25)	<b>Future Learning (Context)</b> <a href="#">KS3: Science Programmes of Study</a> <a href="#">KS4: Science Programmes of Study</a> ➤ Working Scientifically throughout each topic (pages 4-5) ➤ The development of scientific thinking (page 5) ➤ Experimental skills and strategies (page 5) ➤ Analysis and evaluation (page 6) ➤ Vocabulary, units, symbols and nomenclature (page 6)		<b>National Curriculum Links (Context)</b> <a href="#">KS3: Science Programmes of Study</a> ➤ Scientific attitudes (page 4) ➤ Experimental skills and investigations (page 4) ➤ Analysis and evaluation (page 4) ➤ Measurement (pages 5)
<b>RRSA Links</b> ARTICLE 12: Respect for the views of the child. ARTICLE 13: Freedom of expression. ARTICLE 28: Right to education. ARTICLE 29: Goals of education.			<b>Assessment of Learning (Impact)</b> <ul style="list-style-type: none"> <li>Individual questioning and lesson activities</li> <li>Classwork in student folders with Review lesson</li> <li>Practical activities carried out throughout topic</li> <li>8WS Homework 1 and 2 with feedback provide during lessons</li> </ul>
<b>British Values Links</b> MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect. THE RULE OF LAW: Understanding and following lab rules and the laws of nature. INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.			
<b>Eco-Schools Links</b> GLOBAL CITIZENSHIP: Taking an active role in your community and making our planet more peaceful, sustainable and fair.			
<b>Reading / Enrichment</b> Richard Hammond's Blast Lab – Richard Hammond Think Like a Scientist: Ask Questions! Read! Understand! – Susan Martineau and Vicky Barker How To: Absurd Scientific Advice for Common Real-World Problems – Randall Munroe <a href="#">Recommended Reading List.</a>	<b>Key Vocabulary (Literacy)</b> Hazard; Risk; Precaution; Accurate; Measurement; Hypothesis; Prediction; Independent variable; Dependent variable; Control variable; Conclusion; Evaluation.  <i>Complete topic glossary provided.</i>	<b>Numeracy Opportunities</b> Making measurements; Comparing size; Converting units; Calculating averages and percentages; Rounding results; Drawing and analysing scatter graphs.	<b>Career Links</b> Statistician; Risk Manager; Manufacturer; Safety Manager; Operations Manager; Editor; Quality Engineer; Teacher; Financial Modeler; Health and Safety Officer; Research Scientist.