

Science Curriculum Overview

Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	
Topic 1 – Ecosystems	Topic 3 – Earth	Topic 3 – Earth / Matter continued	Topic 6 – Organisms	Topic 7 – Forces continued	
<p>Introduction to fundamentals of ecology and natural systems. Students will –</p> <ul style="list-style-type: none"> • Examine taxonomy • Investigate relationships within the natural world • Learn about plants, their structure and importance in the natural world and with relation to themselves 	<p>Pupils will explore the composition of the earth and solar system. Students will –</p> <ul style="list-style-type: none"> • Examine earth structure • Investigate metamorphic, sedimentary and igneous rocks and their formation • Examine volcanoes and be introduced to plate tectonics • Explore the concepts that give rise to daily and seasonal fluctuations on Earth • Explore the solar system and beyond 	<ul style="list-style-type: none"> • 	<p>An introduction to Human biology. Students will –</p> <ul style="list-style-type: none"> • Investigate Cell structure, type and importance • Be able to describe how cells come together to form specialised structures • Investigate the circulatory, digestive and breathing systems • Be introduced to the skeleton, joints and muscles 	<ul style="list-style-type: none"> • 	<p>Pu int re Stu</p> <ul style="list-style-type: none"> • • • • •
Topic 2 - Waves	Topic 4 - Matter	Topic 5 - Reactions	Topic 7 - Forces	Topic 8 – Energy	To Ele
<p>Introduction to Physics investigating Sound and Light Students will –</p> <ul style="list-style-type: none"> • Learn about how both Sounds and Light travels • Be able to explain how changes to sound will impact upon its waveform • Be able to explain why echos occur and 	<p>Introduction and exploration of particle theory. Students will –</p> <ul style="list-style-type: none"> • Investigate and explore how matter is comprised • Be introduced to atomic structure • Investigate the separation of mixtures • Investigate the 	<p>Following from the matter topic pupils will investigate how materials interact with one another. Students will –</p> <ul style="list-style-type: none"> • Learn about the pH scale • Investigate neutralisation reactions • Will investigate how 	<p>A continuation of the introduction of Physics examining how objects interact. Students will –</p> <ul style="list-style-type: none"> • Investigate speed, friction aerodynamics • Will be able to analyse data gathered from experimental work 	<p>Pupils will look at where energy comes from and how it is used. Students will –</p> <ul style="list-style-type: none"> • Investigate how energy is produced • Understand where fossil fuels come from • The different types of renewable energy • Pupils will examine the cost of electricity 	<p>Pu int ele cir Stu</p> <ul style="list-style-type: none"> • • •

<p>describe the structure of the human ear</p> <ul style="list-style-type: none"> Students will investigate the structure of white light Investigate what happens when white light is split in terms of refraction, reflection and dispersion 	<p>properties of atoms, elements and mixtures</p>	<p>metals react with oxygen, water and acids</p> <ul style="list-style-type: none"> Be able to describe the tests for products of certain reactions Investigate reactivity and displacement 	<ul style="list-style-type: none"> Will be able to describe the difference between weight and mass in terms of the effect of gravity Examine gravity around the solar system 	<p>and electricity usage at home</p> <ul style="list-style-type: none"> Will investigate the energy that they use and how it is derived from the food that they consume 	<ul style="list-style-type: none">
Topic 1 – Maths Skills	Topic 3 – Forces	Topic 5 – Ecosystems	Topic 6 – Reactions continued	Topic 8 – Genes	
<p>Pupils will be given the opportunity to develop their mathematical skills in application to scientific problems. Students will –</p> <ul style="list-style-type: none"> Undertake Data recording Be able to determine the most appropriate measurements and be able to easily move between different units of measurement Learn about Accuracy and precision Draw Tables and graphs accurately Undertake Data analysis 	<p>Building on Year 7 work pupils will mainly investigate the effect of various forces as well as force interactions. Students will –</p> <ul style="list-style-type: none"> Examine how forces are balanced and how imbalances effect objects Examine friction and pressure Will look at pressure in fluids Investigate aerodynamics 	<p>Developing knowledge brought forward from year 7, Pupils are introduced to photosynthesis and its role. Students will –</p> <ul style="list-style-type: none"> Examine leaf structure Be able to describe the process of photosynthesis Investigate rates of photosynthesis and adaptations of plants to maximise photosynthesis Investigate aerobic and anaerobic respiration 	<p>Electricity and electromagnets. Students will –</p> <ul style="list-style-type: none"> Examine magnetic fields Construct electromagnets Investigate the uses of electromagnets 	<p>All about life on Earth Students will –</p> <ul style="list-style-type: none"> Be introduced to chromosomes and DNA Understand techniques used to extract DNA Investigate the determining factors of inheritance Be introduced to inherited diseases and Genetic modification Examine Biodiveristy Investigate natural selection and evolution 	<p>A t at no vis</p> <ul style="list-style-type: none">
Topic 2 - Earth	Topic 4 - Matter	Topic 6 - Reactions	Topic 7 – Electromagnets		To
<p>Pupils will examine how carbon moves</p>	<p>Developing knowledge of how</p>	<p>Combustion is the focus of this unit and</p>	<p>Electricity and electromagnets.</p>		<p>En wc</p>

<p>through the natural world and understand that they are a Carbon based lifeform. They will be introduced to the finite nature of earths' resources. Students will –</p> <ul style="list-style-type: none"> Investigate the carbon cycle and global warming Investigate ores and metal extraction techniques Consider the economic and environmental consequences of metal extraction Consider recycling 	<p>matter is put together students will –</p> <ul style="list-style-type: none"> Examine atomic structure Look at the use of models to describe the world around us Be able to describe the interactions of atoms in elements, mixtures and compounds To understand how elements are distributed in the periodic table 	<p>will build on knowledge gained in year 7 as well as in the earlier year 8 Earth topic. Students will –</p> <ul style="list-style-type: none"> Investigate complete and incomplete combustion Investigate conservation of mass in reaction Will examine exothermic and endothermic reactions Be able to apply knowledge to scenarios 	<p>Students will –</p> <ul style="list-style-type: none"> Examine magnetic fields Construct electromagnets Investigate the uses of electromagnets 		<ul style="list-style-type: none">
Topic 1 – Cell Biology	Topic 2 – Atomic Structure	Topic 3 - Forces	Topic 4 - Bonding	Topic 5 - Organisation	T
<p>Pupils will build upon knowledge gained in years 7 and 8 to build a bigger picture of how animal and plant cells work. Topics covered include:</p> <ul style="list-style-type: none"> Specialisation Stem Cells Microorganisms Culturing microorganisms Microscopy Cell division 	<p>Pupils develop their knowledge of Atomic structure and the periodic table</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> Atomic structure Elements, Mixtures and Compounds Development of the Periodic Table Group 0, 7 and 1 elements 	<p>Development of knowledge of forces</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> Hookes Law Contact and non Contact forces Acceleration Distance Time calculations Scalar and Vector quantities Work and Power 	<p>Building on knowledge gained in years 7 and 8 pupils will learn how everything is put together. Topics covered include:</p> <ul style="list-style-type: none"> Ionic, covalent and Metallic Bonding States of Matter Giant Ionic Structures Polymers Alloys 	<p>Developing an in depth knowledge and understanding of complex biological systems. Topics covered include:</p> <ul style="list-style-type: none"> Organisational hierarchy Digestive System Enzymes Circulatory System Breathing System Health and Lifestyle 	<p>To inc</p> <ul style="list-style-type: none">

<ul style="list-style-type: none"> Cellular Transport 	YEAR 9 EXAM	YEAR 9 OPTIONS	<ul style="list-style-type: none"> Allotropes of Carbon 	<ul style="list-style-type: none"> (including mental health) Communicable and non communicable disease Cancer Plant organisation, structure and transport Resistant Bacteria 	
Topic 3 – Infection First half	Topic 3 – Infection Second half	Unit 4 – Bioenergetics	Unit 5 – Homeostasis First Half	Homeostasis part 2 Inheritance Part 1	
<p>Students will –</p> <p>Communicable diseases.</p> <p>Viral, Bacterial, protist and Fungal diseases.</p> <p>Defence systems</p>	<p>Students will –</p> <p>Vaccination</p> <p>Antibiotics</p> <p>Painkillers</p> <p>Discovery and development of drugs.</p>	<p>Students will –</p> <p>Photosynthesis; Rate of Limiting factors</p> <p>Uses of glucose</p> <p>Respiration; Aerobic Anaerobic Exercise</p> <p>Metabolism</p>	<p>Students will -</p> <p>Structure and function of the nervous system</p> <p>Reflexes</p> <p>Endocrine system</p> <p>Control of Blood glucose levels</p> <p>Hormones in human reproduction</p>	<p>Students will –</p> <p>Contraception</p> <p>Infertility</p> <p>Negative feedback and co ordination</p> <p>Inheritance part 1</p> <p>Sexual and asexual reproduction.</p> <p>Mitosis and meiosis</p> <p>Sex determination</p> <p>Structure DNA, genes</p> <p>Inherited disorders</p>	
Particle Model & Energy	Electricity	Electricity	Atomic Structure	Forces and Motion	

<p>Measurement Density States of Matter Power Specific Heat Capacity Specific Latent Heat Forms of Energy Energy Transfers Energy Efficiency Energy Resources</p> <p>Required Practicals</p> <p><i>Triple Physics: Boyle's Law</i></p>	<p>Circuit Symbols Current Potential Difference Resistance Series & Parallel Circuits IV Graphs Thermistors, LDR & Diodes</p>	<p>Formulae/Calculations National Grid Plugs</p> <p>Required Practicals</p> <p><i>Triple Physics: Static Electricity Electric Fields</i></p>	<p>Structure of the atom Isotopes Rutherford scattering $\alpha\beta\gamma$ Nuclear Equations Radioactive Decay Half Lives Safety Contamination & irradiation</p> <p><i>Triple Physics: Background radiation Uses of Radioactivity Nuclear Fission Nuclear Fusion</i></p>	<p>Contact & non- contact Weight & gravity Resultant Forces</p> <p>Required Practical</p> <p><i>Triple Physics: Moments Pressure</i></p>	Te W H En
Organic Chemistry	Atmosphere	Chemical Analysis	Energy Changes	Energy Changes Continued	Ra
<ul style="list-style-type: none"> Hydrocarbons and crude oil, alkanes Fractional distillation Combustion Cracking Polymers <p><i>Triple Chemistry</i></p> <ul style="list-style-type: none"> Reactions of alkenes Structures of alcohols, carboxylic acids and esters Reactions and 	<ul style="list-style-type: none"> History of our atmosphere Evolving atmosphere Greenhouse gases Global climate change Atmospheric pollutants 	<ul style="list-style-type: none"> Purity and formulations Chromatography R_f values Testing for hydrogen, chlorine, carbon dioxide and oxygen Required practical: Chromatography <p><i>Triple Chemistry</i></p> <ul style="list-style-type: none"> Tests for negative ions (carbonates, 	<ul style="list-style-type: none"> Exothermic and endothermic reactions Reaction profiles Bond energy calculations Required practical: temperature changes <p><i>Triple Chemistry</i></p> <ul style="list-style-type: none"> Chemical cells and batteries Fuel cells 		<ul style="list-style-type: none"> F C s T t T c p T C F E r D e A F

<ul style="list-style-type: none"> uses of alcohols Carboxylic acids and making esters Addition polymerisation Condensation polymerisation Natural polymers DNA 		<ul style="list-style-type: none"> halides and sulfates) Tests for positive ions (flame tests and sodium hydroxide) Instrumental analysis (flame emission spectroscopy) 			
Unit 7 Ecology – Part 1	Unit 7 Ecology – Part 2	Unit 7 Ecology – Part 3	Fundamental Principles and concepts.	Revision	
<p>Fossils</p> <p>Evolution</p> <p>Extinction</p> <p><i>(Inheritance topics carried over from year 10)</i></p> <p>Communities</p> <p>Linnaeus Binomial system, Woese.</p> <p>Biotic and abiotic factors.</p> <p>Distribution, How to sample an area.</p> <p>Adaptations, extremophiles.</p>	<p>Producers, consumers, decomposers.</p> <p>Carbon, water and decay cycles.</p> <p>Biodiversity</p> <p>Waste management</p> <p>Pollution</p>	<p>Deforestation</p> <p>Destruction peat bogs.</p> <p>Trophic levels and transfer of biomass</p> <p>Global warming</p> <p>Maintaining Biodiversity</p> <p>GM Crops</p>	<p>Basic understanding of;</p> <p>Structure and function of cells, how they divide</p> <p>Variation occurs when gametes fuse</p> <p>Reactions for Life; Photosynthesis and respiration</p> <p>Metabolism</p> <p>All molecules are recycled to sustain life.</p>		

Predator prey graphs.					
Motion	Waves	Magnetism & Electromagnetism	Triple Physics : Space	Revision	Re
Speed Distance-Time Graphs Velocity-Time Graphs Acceleration Newton's Laws Stopping Distances Kinetic Energy Potential Energy Required Practical <i>Triple Physics: Momentum</i>	Transverse & Longitudinal Wave properties Wave Equation The EM Spectrum Refraction Required Practicals <i>Triple Physics: Reflection Sound & Ultrasound Lenses Colours Infra red Blackbody radiation</i>	Magnets Magnetic Field Earth's Magnetic Field Electromagnetism Electric motors Headphones & Speakers <i>Triple Physics: Generator Transformers</i>	<i>Our Solar system Life History of stars Orbits Red-Shift</i>		
Using Resources	Chemical Changes	Quantitative Chemistry			
<ul style="list-style-type: none"> • Finite and renewable resources • Potable water and 	<ul style="list-style-type: none"> • The reactivity series • Displacement reactions 	<ul style="list-style-type: none"> • Relative atomic mass • Moles • Balanced symbol 			

<ul style="list-style-type: none"> desalination • Treating waste water • Life cycle assessments • Reduce, reuse, and recycle • Extracting metals from ores • Required practical- Purifying salt water <p><i>Triple Chemistry</i></p> <ul style="list-style-type: none"> • Rusting • Useful alloys • The properties of polymers (thermosoftening and thermosetting) • Glass, ceramics and composites • Haber process • Making fertilisers in the lab and in industry 	<ul style="list-style-type: none"> • Extracting metals – by carbon and hydrogen • Salts from metals • Redox • Salts from insoluble bases • Charges on common ions 	<p>equations and masses of reactants and products</p> <ul style="list-style-type: none"> • Limiting reactants • Concentrations <p><i>Triple Chemistry</i></p> <ul style="list-style-type: none"> • Percentage yield • Atom economy • Titrations • Titration calculations • Volumes of gases 			
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