


Year 8: Science	Curriculum Intent: Students will build upon the core subject knowledge and procedural knowledge gained in Year 7 by studying the following key areas: <ul style="list-style-type: none"> • Physics: Magnetism, Forces, Space and Electricity • Chemistry: particles, periodic table, chemical reactions and environmental science • Biology: life processes, inside cells, ecosystems and modern biology Key questions will continue to be the central focus to lessons. The models and explanations become more complex. Application of the core knowledge of the scientific method is expanded into the above areas. Learning is supported by practical work and investigations.						
Key ideas and sequence of learning	Autumn 1 Physics Module 1 - magnetism <ul style="list-style-type: none"> • magnetism • magnetic materials • magnetic fields • electromagnets Chemistry Module 1 - particles <ul style="list-style-type: none"> • Chem and physical changes • Separating techniques- filtration, crystallisation, distillation and chromatography • Counting atoms • Word equations 	Autumn 2 Biology Module 1 – life processes <ul style="list-style-type: none"> • Breathing • Circulatory system • Illness (Asthma and Smoking) • Effect of exercise Physics Module 2 - energy <ul style="list-style-type: none"> • energy stores. • energy transfers • heat transfers • insulation • thermal power stations. • The cost of energy. Chemistry Module 2- periodic table <ul style="list-style-type: none"> • Metal properties • Diamond and graphite • Protons, neutrons and electrons, isotopes • Covalent/ionic • Electronic configuration • Mendeleev 	Spring 1 Biology Module 2 – inside cells <ul style="list-style-type: none"> • Photosynthesis • Role of stomata (gas exchange) • Respiration – Aerobic and Anaerobic • Enzymes – as a biological catalyst Physics Module 3 - forces <ul style="list-style-type: none"> • The 3 different types of forces. The 3 effects of forces. • How to measure forces. • Investigating the effects of forces in real life scenarios. 	Spring 2 Chemistry Module 3 – chemical reactions <ul style="list-style-type: none"> • reactivity of metals • displacement • word equations • introduction to rates • investigating factors affecting rates of reaction Biology Module 3 – ecosystems <ul style="list-style-type: none"> • Ecosystems • Different levels of an ecosystem • Nutrient cycling (carbon), including decomposers • Variation due to genetics and the environment • Genetics including genotype and phenotype 	Summer 1 Physics Module 4 - space <ul style="list-style-type: none"> • The structure of the solar system. • What causes day and night and the seasons. • Formation of the solar system and the life cycle of stars. • Difference between weight and mass. <p>Students will then revise for their end of exams</p>	Summer 2 Chemistry Module 4 – environmental science <ul style="list-style-type: none"> • choosing materials • recycling materials • potable water Biology Module 4 – modern biology <ul style="list-style-type: none"> • Recreational drugs • Genomic impact on future medicines • Natural selection and its links to evolution • Farming practices and selective breeding • Biotechnology Physics Module 5 - electricity <ul style="list-style-type: none"> • That circuit properties can be changed by adding more paths. • That current at a junction splits and rules that govern this. • That each branch receives the same p.d. from the cell 	

<p style="text-align: center;">Key Questions</p>	<p>Physics Module 1 - magnetism</p> <ol style="list-style-type: none"> 1. What happens when magnets, magnetic materials and non-magnetic metals are brought close to each other? 2. What materials can magnetism pass through? 3. How do we plot a magnetic field? 4. How to make an electromagnet? 5. What are the uses of electromagnets? How can we vary the strength of an electromagnet? <p>Chemistry module 1 - particles</p> <ol style="list-style-type: none"> 1. identifying differences between chem and physical changes in terms formation of new substances and reversible (not) 2. choosing appropriate separation 	<p>Biology Module 1 – life processes</p> <ol style="list-style-type: none"> 1. What is breathing? 2. How does the body transport useful substances to different parts? 3. How do the respiratory and circulatory systems work in unison? 4. What factors affect how our respiratory and circulatory systems work? <p>Physics Module 2 - energy</p> <ol style="list-style-type: none"> 1. What are the different energy stores? 2. How can energy be transferred between the different stores? 3. What is conduction 4. What is convection 5. What is radiation? 6. Which materials make good insulators? <p>Chemistry Module 2 – periodic table</p> <ol style="list-style-type: none"> 1. Testing materials for conductivity, solubility, effect of heating, density etc. to classify materials as metals /covalent /ionic /polymers 	<p>Biology Module 2 – inside cells</p> <ol style="list-style-type: none"> 1. Why does all life on Earth rely on photosynthesis? 2. What is respiration and how is it different to breathing? 3. Why does all life on Earth rely on enzymes? <p>Physics Module 3 – forces</p> <ol style="list-style-type: none"> 1. What are the effects of balanced and unbalanced forces? 2. What are the 3 effects of a force? 3. Floating, sinking and density. 4. How can we measure forces? 5. How can forces and pressure be calculated? 6. How forces affect springs 7. What factors determine the size of a frictional force 	<p>Chemistry Module 3 – chemical reactions</p> <ol style="list-style-type: none"> 1. Reactivity series and idea of displacement reactions 2. Word equations and predicting displacement reactions 3. Types of reactions- endo and exothermic reactions – including practical task 4. Rates of reaction- an investigation project. <p>Biology Module 3 – ecosystems</p> <ol style="list-style-type: none"> 1. How do animals rely on each other within an ecosystem? 2. What is interdependence? 3. What is variation and how does it occur? 4. How to use genetic diagrams to predict physical characteristics? 	<p>Physics Module 4 - space</p> <ol style="list-style-type: none"> 1. What are the different 5 things that make up the solar system? 2. What causes day and night? 3. What causes the seasons? 4. How can we classify satellites? 5. What are the 2 types of eclipse and how do they happen? 6. Are stars the same for ever? 7. What is mass and how is it different from weight? 	<p>Chemistry Module 4 – environmental science</p> <ol style="list-style-type: none"> 1. Links to testing materials to choose appropriate material for making products 2. Purpose and Methods of recycling for glass/metals/plastic etc. 3. Life cycle assessment of material 4. Making water fit for drinking <p>Biology Module 4 – modern biology</p> <ol style="list-style-type: none"> 1. What are recreational drugs? 2. How can we predict the risk of certain illnesses and how will we treat them? (Including future developments) 3. How can we prove that dinosaurs are related to chickens? And how has this impacted classification? 4. How can Science help us feed the world?

	<p>technique based on physical state/type of mixture/solubility of a substance.</p> <p>3. Practical techniques, assemble equipment for filtration, crystallisation (obtaining pure salt from rock salt) distillation (ink water/salt water) and chromatography (flet tips and other pens).</p> <p>4. Link back to chemical changes and write word equations</p> <p>5. Identifying the type and number of atoms and elements in formulae</p>	<p>2. Comparing and contrasting properties of diamond and graphite- linking them with their uses</p> <p>3. Data analysis activities- using a given data to choose best material for making a product</p> <p>4. Recap PNE and idea of isotopes and electron configurations</p> <p>5. Linking electron configuration with the position of an element in periodic table</p> <p>6. Development of periodic table</p> <p>7. Comparing and contrasting Mendeleev's and modern periodic table.</p>				<p>Physics Module 5 - electricity</p> <p>1. What differences are there between series and parallel circuits?</p> <p>2. How does current split at a junction?</p> <p>3. How is p.d. shared between loops?</p>
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Vocabulary

Physics Module 1 - magnetism

- magnet
- electromagnet
- field
- pole
- attraction
- repulsion

Chemistry Module 1- particles

- Chemical change
- Physical change
- Filtration
- Chromatography
- Distillation
- Soluble
- Insoluble
- Solution
- Crystallisation
- Formula

Biology Module 1 – life processes

- Diaphragm, Gas exchange, alveoli, lungs, bronchi
- Heart, double circulatory system, valves, pulse, resting heart rate
- Illness, Asthma, Smoking illnesses

Physics Module 2 - energy

- Thermal
- Gravitational
- Chemical
- Magnetic
- Kinetic
- Nuclear
- Electrostatic
- Forces, waves, heating and current
- Conduction, Convection
- Radiation

Chemistry Module 2 – periodic table

- Density
- Conductivity
- Solubility
- Polymer
- Ionic
- Covalent
- Isotope
- Proton, neutron, electron
- Electron Configuration

Biology Module 2 – inside cells

- Oxygen,
- carbon dioxide, glucose
- energy, products, reactants
- Lock and key, scientific models

Physics Module 3 – forces

- Force
- Newton
- Resultant
- Friction
- Weight
- Gravity
- density
- Pressure
- Pascal

Chemistry Module 3 – chemical reactions

- Displacement
- Reactivity
- Hypothesis
- Particles and collisions

Biology Module 3 – ecosystems

- Ecosystem, habitat, population, community, decomposers, carbon cycle
- Alleles, genes, genotype, phenotype, dominant, recessive, heterozygous, homozygous

Physics Module 4 - space

- Sun
- Moon
- Earth
- Asteroids
- Planets
- Comets
- Lunar eclipse
- Solar eclipse
- Mass
- Weight
- Main sequence
- Red giant
- White dwarf
- Red supergiant
- Supernova
- Black Hole
- Neutron star

Chemistry Module 4 – environmental science

- Recycling
- Life-cycle assessment
- Biodegradable
- Landfill
- Incineration
- Materials
- Potable

Biology Module 4 – modern biology

- Drugs, recreational, prescription, stimulants, depressants
- Genome, DNA, Chromosomes
- Natural selection, evolution, variation, adaptation, phylogeny
- Selective breeding, inbreeding, Biotechnology, genetic engineering

Physics Module 5 - electricity

- Series
- Parallel
- Path, loop
- components
- current
- potential difference
- resistance

<p style="text-align: center;">Practical Skills</p>	<p>Physics Module 1 - magnetism</p> <ul style="list-style-type: none"> • Testing materials for magnetism. • Investigating an electromagnet <p>Chemistry Module 1- particles</p> <ul style="list-style-type: none"> • Assembling equipment for: filtration, crystallisation, simple distillation. • Simple paper chromatography 	<p>Biology Module 1 – life processes</p> <ul style="list-style-type: none"> • Model of lungs, bell jar lungs demo • Pluck demo • Heart dissection demo/practical • Heartrate and exercise investigation <p>Physics Module 1 - energy</p> <ul style="list-style-type: none"> • Measuring changes in temperature with a thermometer • Investigating the effect of insulation <p>Chemistry Module 2- periodic table</p> <ul style="list-style-type: none"> • Testing materials for conductivity, solubility, effect of heating, density, electrical conductivity. 	<p>Biology Module 2 – inside cells</p> <ul style="list-style-type: none"> • Starch testing leaves • Microscopes – looking at stomata of plants • Investigate different plants (that contain different amounts of catalase) on the breakdown of hydrogen peroxide. <p>Physics Module 3 – forces</p> <ul style="list-style-type: none"> • Investigating unbalanced forces • Measuring density • Measuring force with a Newtonmeter • Investigating springs • Investigating friction 	<p>Chemistry Module 3 – chemical reactions</p> <ul style="list-style-type: none"> • Making observations – metal displacement reactions • Rates of reaction investigation – gas collection method <p>Biology Module 3 – ecosystems</p> <ul style="list-style-type: none"> • Sampling • Pond dipping • Investigating variation amongst a class 	<p>Physics Module 4 – space</p> <ul style="list-style-type: none"> • N/A 	<p>Chemistry Module 4 – environmental science</p> <ul style="list-style-type: none"> • Purification of water <p>Biology Module 4 – modern biology</p> <ul style="list-style-type: none"> • Investigating the effects of caffeine on heartrate and reaction time • Extracting DNA • Cloning geraniums/ cauliflower <p>Physics Module 5 - electricity</p> <ul style="list-style-type: none"> • Wiring a circuit • Drawing circuit diagrams • Measuring current and potential difference
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