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|  | **LONG TERM CURRICULUM PLAN : KS3 & KS4** | **Subject: SCIENCE** |

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| **Year** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 7** | **How do particles make up everything?****(13)****How do cells make up all living things?****(13)** | **How do forces control the world around us? (12)****How is everything made up of elements or compounds? (9)** | **How do body systems work to keep us alive? (11)****How does sound transfer information? (12)** | **How are new substances made during chemical reactions? (12)****How do living things reproduce? (12)** | **How does light transfer information? (11)****How do acids and alkalis react? (11)** | **Are we alone in the universe? (8)** |
| Threshold Concepts | Particles:Arrangement, behaviour and properties of solids, liquids and gases.Cells:Subcellular structures and function. Diffusion. | Forces:Effects of common forces. Elements and compounds: Definitions, properties, solutions. | Body systems:Cells --> organ systems, breathing, skeleton, joints, muscles.Sound:Vibrations, pitch, loudness, hearing. | Chemical reactions: Rearrangement of atoms, equations. Reproduction: Reproductive systems, pregnancy, menstruation. | Light:Reflection, refraction, the eye, colour. Acids and alkalis: Indicators and pH, neutralisation. | Space:The Earth, the moon, stars, the solar system. |
| Skills | Drawing line graphs (scaffolded), number lines, magnification calculations. | Drawing line graphs (scaffolded), weight equation. | Pie chart interpretation. | Bar chart interpretation. | Speed equation. |  |
| Summary | In year 7 pupils will learn:Cells make up living things; they are organised into tissues, organs, organ systems, and how the reproductive system works.Everything is made up of particles; they can be classified as elements or compounds, how they react together in chemical reactions to form new materials.Forces control the world around us; waves transfer energy, and the wonder of Earth in space. |

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| **Year** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 8** | **How are elements arranged in the periodic table? (11)****What is a healthy lifestyle? (14)** | **Where does energy come from? (14)** | **How are animals adapted? (13)****How can materials be separated? (12)** | **How does electricity behave? (14)****How do metals react with acids? (13)** | **How are organisms in an ecosystem connected? (13)****How do forces cause motion and pressure? (9)** | **How do humans disrupt the recycling of materials from the Earth? (8)** |
| Threshold Concepts | Periodic table:Metals/non-metals, groups periods, reactions group 1,7,0. Healthy lifestyle:Un/Healthy diets, food tests, digestion, smoking, drugs, alcohol. | Energy: Energy in food and fuels, energy transfers, temperature, power and work. | Adaptation:Variation, inheritance, natural selection.Separating techniques:Filtration, evaporation, distillation, chromatography. | Electricity:Charge, current, series and parallel, resistance, electromagnets.Metals and acid: Reactions of metals with oxygen, water, acid, displacement. | Ecosystem processes: Photosynthesis, respiration, food chains and webs.Motion and pressure:Speed, distance time graphs, pressure in solids, liquids and gases. | The Earth:Structure of the Earth, types of rocks, carbon cycle, climate change and recycling. |
| Skills |  | Equation to calculate power, energy used, and work done. | Line graph data interpretation, continuous and discontinuous data, normal distribution. | Line graph data interpretation.Equation to calculate current and resistance | Equation to calculate speed, pressure and moments.Distance time graph | Global warming line graph data interpretation. |
| Summary | In year 8 pupils will learn:How we can maintain a healthy lifestyle, how animals are adapted to their surroundings and how organisms depend on each other in ecosystems.How elements and metals in different groups of the periodic table react, how mixtures can be separated, the structure of the Earth.How humans disrupt the recycling of materials from the Earth. |

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| **Year** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 9** | **What are the key concepts in biology?****How is the structure of the atom linked to the periodic table?** | **How can atoms bond with each other?****What is Newton’s three laws?** | **What are Newton’s three laws?****How do acids and alkalis react?** | **How do we grow and sense the world around us?****How can substances be separated?** | **Where does energy go?** | **How can we work out the mass of a substance in a reaction?** |
| Threshold Concepts | CB1 Key concepts in biology:Cells, enzymes, cell transport CC3, 4.Atomic Structure and Periodic Table: structure of the atom, mass and atomic number, isotopes, periodic table. | CC5,6,7 Bonding:Ionic, simple covalent, giant covalent, metallic.CP1,2 & 8 Motion, Forces and motion, Forces and their effects: Newtons first, second, third law, power, work. | CP1, 2 and 8 Motion, Forces and motion, Forces and their effects:Newtons first, second, third law, power, work.CC8 Acids and alkalis:indicators, neutralisation, solubility, preparing salt, reactions with carbonates. | CB2 Cells and control:Mitosis/cell division, growth, the nervous system.CC1, CC2 States and separation techniques:filtration, crystallisation, distillation, chromatography. | P3&7 Conservation of energy and Energy - Forces Doing work(paper2):Energy transfers, gravitational potential energy, kinetic energy, power, work. | CC9 Calculations involving masses:Relative atomic mass, empirical formula, masses of reactants or products and moles. |
| Skills | Calculate magnification including standard form, draw and interpret line graph, RAM and isotope relative abundance calculation. | Calculations; speed, acceleration, weight, force, momentum. Draw, interpret and extract information from graphs for calculations; distance time, velocity time. | Concentration calculation. | Line graph interpretation Rf calculation. | Sankey diagrams, scale diagram for calculating resultant forces, calculations; efficiency, GPE, KE, work done, power. | Calculations; empirical formula, masses of reactants or products, number of moles. |
| Summary | In year 9 pupils will learn:How cells obtain the materials they need, how enzymes carry out reactions in the body, how cells divide to create new cells and how the nervous system detects and responds to stimuli.How to find information about an atom’s structure using the periodic table, how atoms are bonded together, how acid and alkalis react, how substances can be separated and how we can use calculations for reactions to find out information. |

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| **Year** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 10** | **How is genetic information stored and changed?** | **How do waves transfer information?****How do we obtain metals?** | **How do we obtain metals?****How does our body react when we are ill and how are new medicines developed?** | **How do radioactive substances behave?****(All paper 1 topics now covered)****How do plants get the substances they need?** | How do organisms depend on each other and recycle materials?How does electricity behave? | **How does electricity behave?****CB7 Animal coordination, control and homeostasis** |
| Threshold Concepts | CB3,4 Genetics and Natural Selection and genetic modification. | CP4,5 Waves, Light and the Electromagnetic Spectrum.CC10,11,12 Electrolytic Process, obtaining and using metals, Reversible reactions and Equilibria. | CC10,11,12 continued.CB5 Health, disease and the development of medicines: communicable diseases, the immune system. | CP6 Radioactivity: isotopes, radioactive decay and dangers.(All paper 1 topics now covered)CB6 Plant structures and their functions: photosynthesis, translocation, transpiration. | CB9 Ecosystems and material cycles: biotic/abioitic factors, carbon cycle, water cycle, nitrogen cycle.CP9,10,11 Electricity and circuits, magnetism and the motor effect and electromagnetic induction | CP9,10,11 continued.CB7 Animal coordination, control and homeostasis: hormones, the menstrual cycle, control of blood glucose concentration, diabetes. |
| Skills | Continuous and discontinuous data, normal distribution | Calculate wave speed. | Line graph interpretation. | Line graph interpretationCalculation of half-life from graph. | Quadrats calculation, line graph interpretation, calculate current, charge, energy transferred, resistance, power. |  |
| Summary | In year 10 pupils will learn:How the body stores genetic information, how this can be passed to offspring and modified through natural selection or genetic engineering.How the body reacts to non-communicable or communicable diseases and how body systems work together.How plants obtain the materials they need for photosynthesis and growth.How the Earth’s materials are recycled.How metals are obtained depending on their position in the reactivity series.How waves including light and electromagnetic waves transfer information, are used and can be dangerous. How electricity behaves. |

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| **Year** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 11** | **How do elements in different groups of the periodic table react?** | **How does the body obtain and transport the substances it needs?****How do particles affect density, energy transfer and pressure?** | **How are humans using hydrocarbons to affect climate change?** |  |  |  |
| Threshold Concepts | CC13,14,15 Groups in the periodic table, rates of reaction, heat energy changes in chemical reactions. | CB8 Exchange and transport: gas exchange, circulatory system, respiration.CP12,13 Particle model, forces and matter. | CC16, 17 Fuels, Earth and Atmospheric Science: fractional distillation, alkanes, complete and incomplete combustion, cracking, the Earth’s atmosphere and how it has changed. |  |  |  |
| Skills | Line graph data interpretation. | Line graph data interpretation.Calculate density, specific heat capacity, spring constant, specific latent heat. | Line graph data interpretation. |  |  |  |
| Summary | In year 11 pupils will learn:How body systems work together to obtain and transport the substances needed for respiration.How elements in different groups of the periodic table react and how their energy levels change during these reactions.How humans use hydrocarbons during fractional distillation, complete and incomplete combustion and cracking, then how these reactions have changed the Earth’s atmosphere. |

Cultural development Opportunities have been developed that will be shared at least once per half term with pupils that are Covid-safe: space week, NHS careers, science week, women in science, science journalism, a healthy heart.

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