



Medium Term Planning – AC4

Curriculum: Science

**Excellence.
No Excuses.**

Year	Topic Detail and Sequence	Pre-requisite Knowledge	Key Vocabulary	Demonstrable Skills
7	<p>Gas Exchange</p> <ol style="list-style-type: none"> 1. Structure of gas exchange systems in humans 2. Functions of gas exchange systems 3. Adaptations of structures to carry out functions of gas exchange 4. Breathing 5. Using the pressure model to explain the movement of gases into and out of the lungs 6. Exercise 7. Asthma 8. Smoking 9. Gas exchange in plants <p>Earth and Atmosphere</p> <ol style="list-style-type: none"> 10. The composition of the Earth 11. The structure of the Earth 12. The rock cycle and the formation of igneous, sedimentary and metamorphic rocks 13. Earth as a source of limited resources and the efficacy of recycling 14. The carbon cycle 15. The composition of the atmosphere 16. The production of carbon dioxide by human activity and the impact on climate. 	<p>Students should know:</p> <p>How oxygen is used by the body.</p> <p>The factors affecting diffusion</p> <p>compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>recognise that soils are made from rocks and organic matter.</p>	<p>Breathing Diffusion Concentration gradient Diffusion pathway Pressure Igneous Metamorphic Sedimentary Resource Cycle</p>	<p>Know that in gas exchange, oxygen and carbon dioxide move between alveoli and the blood.</p> <p>Oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body.</p> <p>Breathing occurs through the action of muscles in the ribcage and diaphragm.</p> <p>The amount of oxygen required by body cells determines the rate of breathing.</p> <p>Explain how exercise, smoking and asthma affect the gas exchange system.</p> <p>Explain how the parts of the gas exchange system are adapted to their function.</p> <p>Explain observations about changes to breathing rate and volume.</p> <p>Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.</p> <p>Explain why a rock has a particular property based on how it was formed. Identify the causes of weathering and erosion and describe how they occur.</p> <p>Construct a labelled diagram to identify the processes of the rock cycle.</p> <p>Use a diagram to show how carbon is recycled in the environment and through living things.</p> <p>Describe how human activities affect the carbon cycle.</p> <p>Describe how global warming can impact on climate and local weather patterns.</p>



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8	<p>Relationships in an Ecosystem</p> <ol style="list-style-type: none"> 1. Interdependence 2. Ecosystems and communities 3. Food webs 4. Insect pollinated crops 5. The bee problem 6. Food security 7. How organisms affect their environment 8. Pollution <p>Magnetism</p> <ol style="list-style-type: none"> 9. Magnetic Poles 10. Attraction and repulsion 11. Magnetic fields plotting and representation 12. Earth's Magnetic Field 13. Compasses and Navigation 14. The magnetic effect of current 15. Electromagnets 16. DC Motors <p>Space Physics</p> <ol style="list-style-type: none"> 17. Gravity 18. $W=mg$ 19. Stars and the Sun 20. Galaxies 21. Seasons 22. The Seasons and Earth's Tilt 23. Phases of the moon 24. The light year 	<p>Students should know:</p> <p>How to identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>The requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</p> <p>Investigate the way in which water is transported within plants</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>Observe how magnets attract or repel each other and attract some materials and not others ?</p> <p>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>Describe magnets as having two poles</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> <p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <p>Describe the movement of the Moon relative to the Earth</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>	<p>Ecosystem</p> <p>Environment</p> <p>Population</p> <p>Magnetic poles</p> <p>Permanent magnet</p> <p>Solenoid</p> <p>Core</p> <p>Electromagnet</p> <p>Galaxy</p> <p>Orbit</p> <p>Weight</p> <p>Mass</p> <p>Gravity</p> <p>Light year</p>	<p>Describe how a species' population changes as its predator or prey population changes.</p> <p>Explain effects of environmental changes and toxic materials on a species' population. Combine food chains to form a food web.</p> <p>Explain issues with human food supplies in terms of insect pollinators</p> <p>Describe the main steps that take place when a plant reproduces successfully.</p> <p>Identify parts of the flower and link their structure to their function.</p> <p>Suggest how a plant carried out seed dispersal based on the features of its fruit or seed.</p> <p>Explain why seed dispersal is important to survival of the parent plant and its offspring.</p> <p>Use the idea of field lines to show how the direction or strength of the field around a magnet varies.</p> <p>Explain observations about navigation using Earth's magnetic field.</p> <p>Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction.</p> <p>The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences</p> <p>Describe the appearance of planets or moons from diagrams showing their position in relation to the Earth and Sun.</p> <p>Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year.</p> <p>Describe how space exploration and observations of stars are affected by the scale of the universe.</p> <p>Explain the choice of particular units for measuring distance</p>



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9	<p>Ecology</p> <ol style="list-style-type: none"> 1. Adaptations, interdependence and competition 2. Communities 3. Abiotic factors 4. Biotic factors 5. Adaptations 6. Levels of organisation 7. How materials are cycled 8. Decomposition (biology only) 9. Impact of environmental change (biology only) (HT only) 10. Biodiversity 11. Waste management 12. Land use 13. Deforestation 14. Global warming 15. Maintaining biodiversity 16. Trophic levels in an ecosystem (biology only) 17. Food production (biology only) <p>Chemical Analysis</p> <ol style="list-style-type: none"> 18. Pure substances 19. Formulations 20. Chromatography 21. Test for hydrogen 22. Test for oxygen 23. Test for carbon dioxide 24. Test for chlorine 25. Identification of ions by chemical and spectroscopic means (chemistry only) 	<p>Students should know:</p> <p>Describe how a species' population changes as its predator or prey population changes.</p> <p>Explain effects of environmental changes and toxic materials on a species' population. Combine food chains to form a food web.</p> <p>Properties of solids, liquids and gases can be described in terms of particles in motion but with differences in the arrangement and movement of these same particles: closely spaced and vibrating (solid), in random motion but in contact (liquid), or in random motion and widely spaced (gas).</p> <p>Observations where substances change temperature or state can be described in terms of particles gaining or losing energy</p> <p>A pure substance consists of only one type of element or compound and has a fixed melting and boiling point.</p> <p>Mixtures may be separated due to differences in their physical properties.</p> <p>The method chosen to separate a mixture depends on which physical properties of the individual substances are different.</p> <p>Most substances are not pure elements, but compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain.</p>	<p>Ecosystem Community Interdependence Population Producer Formulation Mixture Pure/Impure Solvent Mobile phase Stationary phase</p>	<p>Define the key terms such as community or ecosystem</p> <p>State and explain how different biotic and abiotic factors impact an ecosystem</p> <p>Explain the different cycles</p> <p>State factors that reduce biodiversity and explain why.</p> <p>Define a pure substances in chemistry and formulations.</p> <p>Describe how to carry out chromatography including calculation of Rf value.</p> <p>State the gas tests and their positive results.</p> <p>Use arrange of ion tests to identify unknown compounds.</p>



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10	Rate of Reaction/P.S. 1. Calculating rates of reactions 2. Factors which affect the rates of chemical reactions 3. Collision theory and activation energy 4. Catalysts 5. Reversible reactions 6. Energy changes and reversible reactions 7. Equilibrium 8. The effect of changing conditions on equilibrium (HT only) 9. The effect of changing concentration (HT only) 10. The effect of temperature changes on equilibrium (HT only) 11. The effect of pressure changes on equilibrium (HT only) 12. Rate of photosynthesis 13. Uses of glucose from photosynthesis Quantitative Chemistry 14. Conservation of mass and balanced chemical equations 15. Relative formula mass 16. Mass changes when a reactant or product is a gas 17. Chemical measurements 18. Moles (HT only) 19. Amounts of substances in equations (HT only) 20. Using moles to balance equations (HT only) 21. Limiting reactants (HT only) 22. Concentration of solutions 23. Yield and atom economy of chemical reactions (chemistry only) 24. Using concentrations of solutions in mol/dm³ (chemistry only) (HT only) 25. Use of amount of substance in relation to volumes of gases (chemistry only) (HT only) History of the Atmosphere 26. The composition of the atmosphere 27. The earth's early atmosphere 28. How oxygen increased 29. How carbon dioxide decreases	Metals and non-metals react with oxygen to form oxides which are either bases or acids. Metals can be arranged as a reactivity series in order of how readily they react with other substances. Some metals react with acids to produce salts and hydrogen. Describe an oxidation, displacement, or metal-acid reaction with a word equation. Use particle diagrams to represent oxidation, displacement and metal-acid reactions. Identify an unknown element from its physical and chemical properties. Place an unfamiliar metal into the reactivity series based on information about its reactions. Describe the respiration and photosynthesis reactions and explain their importance to living organisms	Product Reactant Rate Collision Activation Energy Catalyst Reaction Profile Equilibrium Glucose Conserve Relative Atomic Mass Relative Formula Mass Moles Amount Yield Concentration	Define rate of reaction Explain how different factors affect rate in terms of collisions. Describe catalysts and how they work Examine reversible reactions and predict the effect of changing conditions on equilibrium. Look at factors that affect the rate of photosynthesis. Explain how plants use glucose produced by photosynthesis. Balance simple equations Calculate Mr given formulae. Calculate percentage composition by mass. Calculate concentrations in terms of mass and moles. Calculate yield.