



Medium Term Planning – AC2

Curriculum: Science

**Excellence.
No Excuses.**

Year	Topic Detail and Sequence	Pre-requisite Knowledge	Key Vocabulary	Demonstrable Skills
7	<ol style="list-style-type: none">ReactionsMetals and non-metalsAcids and alkalispH ScaleIndicatorsCatalystsChemical energyEndothermic and exothermic ReactionsTypes of reactionRespirationPhotosynthesisLimiting FactorsLeaves and their adaptations	<p>Students should know the following: 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>	Product Acid Alkaline Neutralise Reactants Product Endothermic Exothermic Catalysts Diffusion Photosynthesis Mitochondria Respiration	<p>Identify the reactants and products in a chemical reaction</p> <p>Describe the properties, reactions and their products of metals.</p> <p>Explain how metals can be placed in a reactivity series.</p> <p>Define acids and alkalis in terms of ions.</p> <p>Describe the pH scale and place common chemicals on there.</p> <p>Name common indicators and state the colours for different pH values.</p> <p>Describe the process of bond breaking as requiring energy and the making of bonds as releasing energy.</p> <p>Define endo and exothermic reactions in terms of energy transfer to or from the surroundings.</p> <p>Differentiate between types of reactions such as combustion or thermal decomposition.</p> <p>Model chemical reactions in different ways.</p> <p>Describe the respiration and photosynthesis reactions and explain their importance to living organisms</p>
8	<ol style="list-style-type: none">The periodic tableDevelopment of the periodic tableMetals and non-metalsReactivityCeramics, polymers and compositesPressurePressure in gasesAtmospheric pressurePressure in liquidsThe SkeletonBiomechanicsMusclesAntagonistic pairs	<p>Students should know the following: Identify the reactants and products in a chemical reaction</p> <p>Describe the properties, reactions and their products of metals.</p> <p>Explain how metals can be placed in a reactivity series.</p> <p>Define acids and alkalis in terms of ions.</p> <p>Understand forces and their effects.</p> <p>Understand the effects of turning forces.</p>	Periodic table Physical properties Chemical properties Groups Periods Displacement Oxidation Reactivity Fluid Pressure Upthrust Joints Ligaments Tendons Cartilage Antagonistic	<p>Know that the elements in a group all react in a similar way and sometimes show a pattern in reactivity.</p> <p>Explain how as you go down a group and across a period the elements show patterns in physical properties.</p> <p>Understand the idea that pressure acts in a fluid in all directions. It increases with depth due to the increased weight of fluid, and results in an upthrust.</p> <p>Objects sink or float depending on whether the weight of the object is bigger or smaller than the upthrust.</p> <p>Explain how different stresses on a solid object can be used to explain observations where objects scratch, sink into or break surfaces</p>



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9	<ol style="list-style-type: none">1. The composition of the atmosphere2. The earth's early atmosphere3. How oxygen increased4. How carbon dioxide decreases5. Properties of waves6. Transverse and longitudinal waves7. Reflection of waves8. Sound waves9. Waves for detection and exploration10. Types of electromagnetic waves11. Properties of electromagnetic waves12. Uses and applications of electromagnetic waves13. Lenses14. Visible light15. Emission and absorption of infrared radiation16. Perfect black bodies and radiation	<p>Students should know the following:</p> <p>Recognise that light appears to travel in straight lines</p> <p>use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</p> <p>Describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth's crust (such as photosynthesis and respiration) as well as human activities (burning fuels).</p> <p>Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen.</p>	Global warming Fossil fuels Carbon sink Greenhouse effect Medium Oscillation Longitudinal Transverse Compression Rarefaction Crest Trough	<p>Describe the composition of the modern atmosphere.</p> <p>Describe the likely composition of the earth's early atmosphere, likening it to other planets current atmosphere's.</p> <p>Describe and explain the processes that increased the concentration of oxygen in the atmosphere.</p> <p>Describe and explain the processes that removed carbon dioxide from the atmosphere.</p> <p>Define waves, their different types, behaviours and uses.</p> <p>Name the electromagnetic waves giving their uses and hazards. Link frequency to hazard.</p> <p>Describe the behaviour of convex and concave lenses both qualitatively and quantitatively using appropriate ray diagrams.</p> <p>Describe the features of black body radiation.</p>



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10	<ul style="list-style-type: none">1. Chemical bonds2. Ionic bonding3. Ionic compounds4. Covalent bonding5. Metallic bonding6. Properties of ionic compounds7. Properties of small molecules8. Polymers9. Giant covalent structures10. Properties of metals and alloys11. Metals as conductors12. Structure and bonding of carbon13. Nanoparticles14. Efficiency15. National and global energy resources16. Series and parallel circuits17. Domestic uses and safety18. Electrical energy transfers19. Static electricity20. Greenhouse gases21. pollutants22. Using the Earth's resources and sustainable development23. Potable Water24. Waste water treatment25. Alternative methods of extracting metals26. Life cycle assessments27. Alloys, Ceramics, polymers and composites28. The Haber process29. NPK fertilisers	<p>Students should know the following:</p> <p>Chemical reactions as the rearrangement of atoms</p> <p>Representing chemical reactions using formulae and using equations</p> <p>The varying physical and chemical properties of different elements</p> <p>The principles underpinning the Mendeleev Periodic Table</p> <p>The Periodic Table: periods and groups; metals and non-metals</p> <p>How patterns in reactions can be predicted with reference to the Periodic Table</p> <p>The properties of metals and non-metals</p> <p>Calculation of fuel uses and costs in the domestic context</p> <p>Energy changes and transfers</p> <p>chemical reactions as the rearrangement of atoms</p> <p>Representing chemical reactions using formulae and using equations</p> <p>Combustion, thermal decomposition, oxidation and displacement reactions</p>	Ion Covalent Charge Intermolecular Delocalised Current Fuse Useful Waster Sustainable Renewable Potable Distillation	<p>Define the different bonds in terms of electrons</p> <p>Link the type of bonding to the properties</p> <p>Calculate efficiencies</p> <p>Evaluate different methods of energy generation</p> <p>Identify the energy transfers that take place in different appliances</p> <p>Identify forms of energy that are useful or wasted</p> <p>Describe how a static charge forms in terms of movement of electrons</p> <p>Describe the impact on the environment of human activities</p>



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11	<p>Inheritance Variation and Evolution</p> <ol style="list-style-type: none">1. Sexual and asexual reproduction2. Meiosis3. Advantages and disadvantages of sexual and asexual reproduction (Biology)4. DNA and the Genome5. DNA structure (Biology only*onwards)6. Genetic inheritance7. Inherited disorders.8. Sex Determination9. Variation10. Evolution11. Selective breeding12. Genetic Engineering13. Cloning (Biology only)14. Theory of Evolution15. Speciation16. Evidence for Evolution17. Fossils18. Extinction19. Resistant bacteria20. Classification of Living Organisms21. Communities22. Biotic and Abiotic Factors23. Adaptations22. Sampling Techniques24. How Materials are Cycled25. Decomposition (Biology only)26. Impact of environmental change (Biology & HT only)27. Biodiversity28. Waste management29. Land Use30. Deforestation31. Global Warming32. Food production (Biology only)33. Properties of waves34. Transverse and longitudinal waves35. Reflection of waves36. Sound waves37. Waves for detection and exploration38. Types of electromagnetic waves39. Properties of electromagnetic waves40. Uses and applications of electromagnetic waves41. Lenses42. Visible light43. Emission and absorption of infrared radiation44. Perfect black bodies and radiation15. Communicable (infectious) diseases16. Viral diseases17. Bacterial diseases18. Fungal diseases19. Protist diseases20. Human defence systems21. Vaccination22. Antibiotics and painkillers23. Discovery and development of drugs24. Monoclonal antibodies)25. Plant disease	<p>Students should know the following:</p> <p>The structural adaptations of some unicellular organisms</p> <p>The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</p> <p>Reproduction</p> <p>The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</p> <p>Heredity as the process by which genetic information is transmitted from one generation to the next</p> <p>A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model</p> <p>Differences between species the order of metals and carbon in the reactivity series</p> <p>The use of carbon in obtaining metals from metal oxides</p> <p>Properties of ceramics, polymers and composites (qualitative).</p>	Chromosome DNA Double helix Gene Gamete Haploid Diploid Mitosis Meiosis Sexual Asexual Zygote Dominant Recessive Phenotype Genotype Heterozygous Homozygous Evolution Species	<p>Define, describe and explain types of reproduction.</p> <p>Explain DNA and the Genome</p> <p>Explain how characteristics are inherited and how genetic conditions are passed on.</p> <p>Link together the ideas of variation, evolution, selective breeding and genetic engineering.</p> <p>Use antibiotic resistance as evidence for evolution</p> <p>Explain how fossils are formed and how they support evolution.</p> <p>Describe how populations of organisms interact with each other and their environment.</p> <p>Describe how the systems of the human body are organised.</p>