



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"> 1. Reactions 2. Metals and non-metals 3. Acids and alkalis 4. pH Scale 5. Indicators 6. Catalysts 7. Chemical energy 8. Endothermic and exothermic Reactions 9. Types of reaction 10. Respiration 11. Photosynthesis 12. Limiting Factors 13. Leaves 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>	<p>Product Acid Alkaline Neutralise Reactants Product Endothermic Exothermic Catalysts Diffusion Photosynthesis Mitochondria Respiration</p>	<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"> 1. The periodic table 2. Development of the periodic table 3. Metals and non-metals 4. Reactivity 5. Ceramics, polymers and composites 6. Pressure 7. Pressure in gases 8. Atmospheric pressure 9. Pressure in liquids 10. The Skeleton 11. Biomechanics 12. Muscles 13. Antagonistic 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>	<p>Periodic table Physical properties Chemical properties Groups Periods Displacement Oxidation Reactivity Fluid Pressure Upthrust Joints Ligaments Tendons Cartilage Antagonistic</p>	<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 atmosphere 2. The earth's early atmosphere 3. How oxygen increased 4. How carbon dioxide decreases 5. Properties of waves 6. Transverse and longitudinal waves 7. Reflection of waves 8. Sound waves 9. Waves for detection and exploration 10. Types of electromagnetic waves 11. Properties of electromagnetic waves 12. Uses and applications of electromagnetic waves 13. Lenses 14. Visible light 15. Emission and absorption of infrared radiation 16. Perfect black bodies and radiation 	<p>Students should know the following: Recognise that light appears to travel in straight lines 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>	<p>Global warming Fossil fuels Carbon sink Greenhouse effect Medium Oscillation Longitudinal Transverse Compression Rarefaction Crest Trough</p>	<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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<p style="font-size: 2em; font-weight: bold; text-align: center;">10</p>	<ol style="list-style-type: none"> 1. Chemical bonds 2. Ionic bonding 3. Ionic compounds 4. Covalent bonding 5. Metallic bonding 6. Properties of ionic compounds 7. Properties of small molecules 8. Polymers 9. Giant covalent structures 10. Properties of metals and alloys 11. Metals as conductors 12. Structure and bonding of carbon 13. Nanoparticles 14. Efficiency 15. National and global energy resources 16. Series and parallel circuits 17. Domestic uses and safety 18. Electrical energy transfers 19. Static electricity 20. Greenhouse gases 21. pollutants 22. Using the Earth's resources and sustainable development 23. Potable Water 24. Waste water treatment 25. Alternative methods of extracting metals 26. Life cycle assessments 27. Alloys, Ceramics, polymers and composites 28. The Haber process 29. NPK fertilisers 	<p>Students should know the following: 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 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>	<p>Ion Covalent Charge Intermolecular Delocalised Current Fuse Useful Waster Sustainable Renewable Potable Distillation</p>	<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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<p style="font-size: 2em; font-weight: bold; text-align: center;">11</p>	<p>Inheritance Variation and Evolution</p> <ol style="list-style-type: none"> 1. Sexual and asexual reproduction 2. Meiosis 3. Advantages and disadvantages of sexual and asexual reproduction (Biology) 4. DNA and the Genome 5. DNA structure (Biology only*onwards) 6. Genetic inheritance 7. Inherited disorders. 8. Sex Determination 9. Variation 10. Evolution 11. Selective breeding 12. Genetic Engineering 13. Cloning (Biology only) 14. Theory of Evolution 15. Speciation 16. Evidence for Evolution 17. Fossils 18. Extinction 19. Resistant bacteria 20. Classification of Living Organisms 21. Communities 22. Biotic and Abiotic Factors 23. Adaptations 22. Sampling Techniques 24. How Materials are Cycled 25. Decomposition (Biology only) 26. Impact of environmental change (Biology & HT only) 27. Biodiversity 28. Waste management 29. Land Use 30. Deforestation 31. Global Warming 32. Food production (Biology only) <p>Organisation</p> <ol style="list-style-type: none"> 1. Enzymes 2. The heart & blood vessels 3. Blood 4. Coronary heart disease: a non-communicable disease 5. Health issues 6. The effect of lifestyle on some non-communicable diseases 7. Cancer 8. Plant tissues, organs and systems 	<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>	<p>Chromosome DNA Double helix Gene Gamete Haploid Diploid Mitosis Meiosis Sexual Asexual Zygote Dominant Recessive Phenotype Genotype Heterozygous Homozygous Evolution Species Organ Tissue Cell System</p>	<p>Define, describe and explain types of reproduction.</p> <p>Explain DNA an 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>