



Medium Term Planning – AC3

Curriculum: Science

**Excellence.
No Excuses.**

Year	Topic Detail and Sequence	Pre-requisite Knowledge	Key Vocabulary	Demonstrable Skills
<h1>7</h1>	<p>Cells and Organisation</p> <ol style="list-style-type: none"> 1. Cells 2. Observing Cells 3. Cell Structure 4. Functions of cell structures 5. Plant v Animal Cells 6. Diffusion in cells 7. Unicellular organisms and their adaptations 8. Organisation <p>Nutrition and Digestion</p> <ol style="list-style-type: none"> 9. The healthy diet 10. Energy Requirement calculations 11. Dangers of an imbalanced diet 12. The digestive system 13. Enzymes 14. Bacteria and digestion 15. How plants make food 	<p>Students should know:</p> <p>Living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals</p> <p>Reasons for classifying plants and animals based on specific characteristics.</p> <p>The main parts of the human circulatory system</p> <p>The functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>The ways in which nutrients and water are transported within animals, including humans.</p>	<p>Cell Uni-cellular Multi-cellular Tissue Organ Diffusion Structural adaptation Cell membrane Nucleus Vacuole Mitochondria Cell wall Enzymes Dietary fibre Carbohydrates Lipids Protein Stomach Small intestine Large intestine Gut bacteria</p>	<p>Know that multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes.</p> <p>Know that there are many types of cell. Each has a different structure or feature so it can do a specific job.</p> <p>Explain why multi-cellular organisms need organ systems to keep their cells alive.</p> <p>Suggest what kind of tissue or organism a cell is part of, based on its features.</p> <p>Explain how to use a microscope to identify and compare different types of cells.</p> <p>Explain how uni-cellular organisms are adapted to carry out functions that in multi-cellular organisms are done by different types of cell.</p> <p>Know the body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance.</p> <p>Know that organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.</p> <p>Describe possible health effects of unbalanced diets from data provided.</p> <p>Calculate food requirements for a healthy diet, using information provided.</p> <p>Describe how organs and tissues involved in digestion are adapted for their role.</p> <p>Describe the events that take place in order to turn a meal into simple food molecules inside a cell.</p>



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8	<p>Pure and Impure Substances</p> <ol style="list-style-type: none"> 1. What is a pure substance? 2. Mixtures 3. Dissolving 4. Diffusion 5. Filtration 6. Evaporation 7. Distillation 8. Chromatography 9. Identifying pure substances <p>Current Electricity</p> <ol style="list-style-type: none"> 10. Current 11. Series and Parallel Circuits 12. Branches in circuits 13. Rate of flow of charge 14. PD 15. Resistance (as a ratio) 16. Measuring the resistance of different materials <p>Static Electricity</p> <ol style="list-style-type: none"> 17. Charging objects by the movement of electrons 18. Concept of fields as areas in which a forces acts 	<p>Students should know:</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>Identify common appliances that run on electricity</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p>	<p>Particle</p> <p>Particle Density</p> <p>Evaporate</p> <p>Solvent</p> <p>Solute</p> <p>Dissolve</p> <p>Solution</p> <p>Solute</p> <p>Pure substance</p> <p>Mixture</p> <p>Element</p> <p>Compound</p> <p>Potential difference</p> <p>Negatively charged</p> <p>Electrons</p> <p>Charged up</p> <p>Electrostatic force</p> <p>Current</p> <p>Series</p> <p>Parallel</p> <p>Field</p>	<p>Properties of solids, liquids and gases can be described in terms of particles in motion but with differences in the arrangement and</p> <p>Observations where substances change temperature or state can be described in terms of particles gaining or losing energy.</p> <p>Explain unfamiliar observations about gas pressure in terms of particles.</p> <p>Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles.</p> <p>Explain changes in states in terms of changes to the energy of particles.</p> <p>A pure substance consists of only one type of element or compound and has a fixed melting and boiling point.</p> <p>Explain how substances dissolve using the particle model.</p> <p>Use the solubility curve of a solute to explain observations about solutions.</p> <p>Use evidence from chromatography to identify unknown substances in mixtures.</p> <p>Choose the most suitable technique to separate out a mixture of substances</p> <p>Model different electrical quantities</p> <p>Describe how current changes in series and parallel circuits when components are changed.</p> <p>Turn circuit diagrams into real series and parallel circuits, and vice versa.</p> <p>Describe what happens when charged objects are placed near to each other or touching.</p> <p>Use a sketch to describe how an object charged positively or negatively became charged up.</p>



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9	<p>Reproduction</p> <ol style="list-style-type: none"> 1. Reproduction in humans 2. Male and female reproductive systems 3. Menstrual Cycle 4. Gametes 5. Fertilisation 6. Pregnancy and birth 7. Impact of lifestyle on pregnancy 8. Reproduction in plants 9. Flower structure 10. Fertilisation and dispersal in plants 11. Quantitative investigation of dispersal methods <p>Health</p> <ol style="list-style-type: none"> 12. Drugs and behaviour 13. Drugs and health problems 14. Drugs and life processes <p>Infection and Response</p> <ol style="list-style-type: none"> 15. Communicable (infectious) diseases 16. Viral diseases 17. Bacterial diseases 18. Fungal diseases 19. Protist diseases 20. Human defence systems 21. Vaccination 22. Antibiotics and painkillers 23. Discovery and development of drugs 24. Monoclonal antibodies (biology only) (HT only) 25. Plant disease (biology only) 	<p>Students should know:</p> <p>The differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>The life process of reproduction in some plants and animals.</p>	<p>Gamete Fertilisation Gestation Bacteria Antibiotics Antibody Antigen Vaccine Transmission Efficacy Immunity</p>	<p>Explain whether substances are passed from the mother to the foetus or not.</p> <p>Use a diagram to show stages in development of a foetus from the production of sex cells to birth.</p> <p>Describe causes of low fertility in male and female reproductive systems.</p> <p>Identify key events on a diagram of the menstrual cycle.</p> <p>Describe the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.</p> <p>Describe key features of different pathogens and give examples of diseases caused in plants and animals.</p> <p>Describe how the human body fights disease</p> <p>Describe how vaccination, antibiotics and painkillers help the body.</p> <p>Describe the process of drug development.</p>



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<p style="font-size: 2em; font-weight: bold; margin: 0;">10</p>	<p>Chemical Changes</p> <ol style="list-style-type: none"> 1. Reactivity of metals 2. Metal oxides 3. The reactivity series 4. Extraction of metals and reduction 5. Oxidation and reduction in terms of electrons (HT only) 6. Reactions of acids with metals 7. Neutralisation of acids and salt production 8. Soluble salts 9. The pH scale and neutralisation 10. Titrations (chemistry only) 11. Strong and weak acids (HT only) 12. The process of electrolysis 13. Electrolysis of molten ionic compounds 14. Using electrolysis to extract metals 15. Electrolysis of aqueous solutions 16. Representation of reactions at electrodes as half equations (HT only) <p>Homeostasis & Response</p> <ol style="list-style-type: none"> 17. Homeostasis 18. The human nervous system 19. The brain (biology only) 20. The eye (biology only) 21. Control of body temperature (biology only) 22. Human endocrine system 23. Control of blood glucose concentration 24. Maintaining water and nitrogen balance in the body (biology only) 25. Hormones in human reproduction 26. Contraception 27. The use of hormones to treat infertility (HT only) 28. Negative feedback (HT only) 29. Plant hormones (biology only) 	<p>Students should know:</p> <p>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>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>Explain how uni-cellular organisms are adapted to carry out functions that in multi-cellular organisms are done by different types of cell.</p> <p>Know the body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance.</p> <p>Know that organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.</p>	<p>Brain</p> <p>Central nervous system (CNS)</p> <p>Cerebellum</p> <p>Cerebral cortex</p> <p>Enzyme</p> <p>Glucose</p> <p>Hypothalamus</p> <p>Medulla</p> <p>MRI</p> <p>Nervous system</p> <p>Neurone</p> <p>Neurotransmitter</p> <p>Receptors</p> <p>Reflex action</p> <p>Stimulus</p> <p>System</p> <p>Synapse</p> <p>Anode</p> <p>Cathode</p> <p>Electrolysis</p> <p>Ionic</p> <p>Metal</p> <p>Reactivity</p>	<p>The reactivity series shows metals in order of reactivity.</p> <p>The reactivity of a metal is related to its tendency to form positive ions.</p> <p>Iron and aluminium are extracted from their ores in various ways.</p> <p>Indicators are used to determine whether a solution is acidic or alkaline.</p> <p>Acids react with metals, bases and carbonates to produce salts. Neutralisation is the reaction between an acid and a base.</p> <p>Electrolysis involves using electricity to break down electrolytes to form elements.</p> <p>The products of electrolysis can be predicted for a given electrolyte.</p> <p>The nervous system enables humans to react to their surroundings and to coordinate their behaviour. It comprises millions of neurones and uses electrical impulses to communicate very quickly.</p> <p>The endocrine system secretes hormones into the bloodstream from glands throughout the body. Hormones produce an effect on specific target organs in the body.</p> <p>Hormones are secreted by glands in the endocrine system. During puberty, hormones create changes in physical and emotional characteristics.</p> <p>Homeostasis is the regulation of internal conditions inside cells or organisms, to create the optimum conditions for biological function.</p> <p>Hormones promote growth within plants. Plant hormones are unequally distributed throughout the stems and roots, which results in parts of the plant growing in a particular direction.</p>