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| **Year 10 - Science** | | | | | | |
| **Curriculum intent** | During year 10 learners will consolidate the knowledge they have learnt so far in KS3 science, to further develop their scientific knowledge and conceptual understanding through the study of biology, chemistry and physics. Learners will deepen there understanding of the nature, processes and methods of science through different types of scientific enquiries that help them to answer scientific questions about the world around them. Through these learners will be given the opportunities to apply their scientific knowledge to understand the uses and implications of science, today and for the future. | | | | | |
| **Term** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Knowledge** | **Cells and Systems -** Learners will review the organisation of cells, tissues and organs and the different organ systems in the body, as well as a focus on the differences between unicellular and multicellular organisms and the importance of surface area to volume ratio. Learners will then develop their understanding of the role played by organs in the digestive, respiratory and circulatory system.  Students will then study how substances are transported around the body to cells and how they are then used by cells in the process of aerobic respiration.  **Atomic Structure and Bonding -** Learners will begin by studying the structure of the atom, particularly electronic configuration. They will then learn about ionic and covalent bonding in terms of electrons and the properties of ionic and covalent substances. Learners will look in more detail at a number of different compounds that contain ionic and covalent bonding, and they will relate the bonding and structure in these compounds to their properties, for example sodium chloride, graphite, diamond, fullerenes and polymers. | **Matter –** Learners will review the particle model and the arrangement and movement of particles in each of the states of matter. They will also review ideas about what happens during changes of state, including the internal energy of a system. They will also investigate density and compare the different states of matter in terms of density, as well as how gases exert pressure.  **Plant and Material Cycling –** Learners will study plant and material cycling, including the process of photosynthesis and the uses of glucose in a plant, as well as limiting factors of photosynthesis. They will review the structure of the leaf, linking to plant structures and the processes of transpiration and translocation. Learners will also study some of the key ecological cycling processes of decay, the carbon cycle and the water cycle, and particularly the role of plants in these. | **Extraction of Metals -** Learners will explore the reactivity and extraction of metals. Metals are a finite resource that are extracted from the Earth using a variety of methods that learners will study in more detail such as displacement, electrolysis and mining. Learners will then appreciate the energy required to extract metals, and the scarcity of some ores, and so realise the value of preventing corrosion of extracted metals, and recycling these where possible to preserve valuable resources. | **Energy –** Learners will study energy stores and transfers, particularly energy transfers in heating before looking at the different energy stores and their associated equations. Learners will also study power and efficiency, then renewable and non-renewable energy resources. | **Health and Disease –** Learners will study communicable diseases and non-communicable diseases and their associated risk factors. Learners will study examples of communicable diseases, methods of transmission, treatments, the immune response and the function of vaccination are all covered, as are the process of drug development and correlation and causation with risk factors and non-communicable diseases.  **Quantitative Chemistry –** Learners will study key ideas about quantitative chemistry, including the mole and reacting masses calculations. It features a review of relative formula mass and percentage by mass and concentration. The unit also applies quantitative content to acids, alkalis and neutralisation reactions. | **Home Electricity -** Learners will use a range of investigativetechniques to understandhow reaction energy may be transferred to or from the surroundings and apply this to the efficiency of electrical appliances.  **Energy Changes –** Learners will investigate energy changes in chemical reactions, including exothermic and endothermic reactions. Learners will also study quantitative topics of percentage yield and atom economy, and the chemistry of cells, batteries and fuel cells. |
| **Skills** | **The following skills will be developed throughout the whole of year 9 and will enable learners to build a deep understanding of science:**  **Scientific attitudes:**   pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility   understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review   evaluate risks.  **Experimental skills and investigations:**   ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience   make predictions using scientific knowledge and understanding   select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate   use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety   make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements   apply sampling techniques.  **Analysis and evaluation:**   apply mathematical concepts and calculate results   present observations and data using appropriate methods, including tables and graphs   interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions   present reasoned explanations, including explaining data in relation to predictions and hypotheses   evaluate data, showing awareness of potential sources of random and systematic error   identify further questions arising from their results.  **Measurement:**   understand and use SI units and IUPAC (International Union of Pure and Applied  Chemistry) chemical nomenclature   use and derive simple equations and carry out appropriate calculations   undertake basic data analysis including simple statistical techniques. | | | | | |
| **Assessments** | End of half term tests | End of half term tests | End of half term tests | End of half term tests | End of half term tests | End of half term tests |
| **Enrichment** | Science in the Spotlight activities, STEM activities, British Science Week | | | | | |