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| **Year 11 Curriculum Overview [2023-2024]**  **Science – Combined Science** | | | | | | |
| **Autumn Term** | **Knowledge & Understanding** | | | **Literacy Skills**  **Opportunities for**  **developing**  **literacy skills** | **Employability Skills**  **[if any]** | **Assessment Opportunities** |
| **Composites** | **Components**  **[KEY concepts & subject specific vocab]** | **Formal Retrieval**  **[if any]** |
| **HT1** | **B4**  **Bioenergetics** | * Photosynthetic reaction * Rate of photosynthesis * Uses of glucose from photosynthesis * Aerobic and anaerobic respiration * Response to exercise * Metabolism | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Forestry * Horticulture * Food Scientists * Conservation Scientist * Environmental Engineer * Soil Scientists | Formative  Assessment  Summative  Assessment |
| **HT1** | **C4 & C5**  **Chemical Changes and Energy Changes** | * Metal oxides * The reactivity series * Extraction of metals and reduction * Oxidation and reduction in terms of electrons * Reactions of acids with metals * Neutralisation of acids and salt production * Soluble salts * The pH scale and neutralisation * Strong and weak acids * Titrations * The process of electrolysis * Electrolysis of molten ionic compounds * Using electrolysis to extract metals * Electrolysis of aqueous solutions * Representation of reactions at electrodes as half equations * Energy Transfer during exothermic and endothermic reactions * Reaction profiles   The energy change of reactions  Cells and batteries  Fuel cells | Do Now  MCQ x4 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Chemist | Formative  Assessment X2  Summative  Assessment X2 |
| **HT2** | **P5**  **Forces** | * Scalar and vector quantities * Contact and non-contact forces * Gravity * Resultant forces * Work done and energy transfer * Moments, levers and gears * Pressure in a fluid * Atmospheric pressure * Forces and elasticity * Describing motion along a line - Distance and displacement * Speed * Velocity * The distance-time relationship * Acceleration * Newton’s first law * Newton’s second law * Newton’s third law * Stopping distance * Reaction time * Factors affecting braking distance * Momentum as a property of moving objects * Conservation of momentum * Changes in momentum | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Pilot * Pro cyclists * Aerospace engineer * race car drivers * Gymnast * Engineer – wind tunnel testing | Formative  Assessment  Summative  Assessment |
| **HT2** | **B5**  **Homeostasis and Response** | * Homeostasis * The human nervous system * The brain * The eye * Control of body temperature * Human endocrine system * Control of blood glucose concentration * Maintaining water and nitrogen balance in the body * Hormones in human reproduction * Contraception * The use of hormones to treat infertility * Negative feedback * Plant hormones: control and co-ordination * Uses of plant hormones | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Midwife, * Gynaecologist * Data scientist * Dialysis nurse * Doctor * Diabetic specialist dietician * Embryologist * Fertility nurse * Health care assistant * Phlebotomist * Neurologist * Neuroscientist * Diabetes specialist nurse | Formative  Assessment  Summative  Assessment |
| **HT2** | **C6**  **Rates of Reaction** | * Calculating rates of reactions * Factors which affect the rates of chemical reactions * Collision theory and activation energy * Catalysts * Reversible reactions * Energy changes and reversible reactions * Equilibrium * The effect of changing conditions on equilibrium * The effect of changing concentration * The effect of temperature changes on equilibrium * The effect of pressure changes on equilibrium | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Research scientist * Laboratory technician * Analytical Chemist | Formative  Assessment  Summative  Assessment |
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| **Spring**  **Term** |  | | |  |  |  |
| **Composites** |  |  |
| **HT3** | **P6**  **Waves** | * Transverse and longitudinal waves * Properties of waves Reflection of waves * Sound waves * Waves for detection and exploration * Types of electromagnetic waves * Properties of electromagnetic waves * Uses and applications of electromagnetic waves * Lenses * Visible Light * Emission and absorption of infrared radiation * Perfect black bodies and radiation | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Ophthalmologist * Lighting technician * Audiologist * Architecture * Sound engineer * Decorator | Formative  Assessment  Summative  Assessment |
| **HT3** | **B6**  **Inheritance, variation and evolution** | * Sexual and asexual reproduction * Meiosis * Advantages and disadvantages of sexual and asexual reproduction * DNA and the genome * DNA Structure * Genetic Inheritance * Inherited disorders * Sex determination * Variation * Evolution * Selective breeding * Genetic engineering * Cloning * Theory of evolution * Speciation * The understanding of genetics * Evidence for evolution * Fossils * Extinction * Resistant bacteria * Classification of living organisms | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Medical research * Genetics counselling * Farming * Genetic research * Managerial roles – problem solving and sequencing * Food production | Formative  Assessment  Summative  Assessment |
| **HT3** | **C7**  **Organic Chemistry** | * Crude oil, hydrocarbons and alkanes * Fractional distillation and petrochemicals * Properties of hydrocarbons * Cracking and alkenes * Structure and formula of alkenes * Reactions of alkenes * Alcohols * Carboxylic acids * Addition polymerisation * Condensation polymerisation * Amino acids * DNA and other naturally occurring polymers | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Fine fragrance evaluator * Flavour chemist * Medicinal chemist * R&D Chemist | Formative  Assessment  Summative  Assessment |
| **HT4** | **P7**  **Electromagnetism** | * Poles of a magnet * Magnetic fields * Electromagnetism * Fleming’s left-hand rule * Electric motors * Loudspeakers * Induced potential * Uses of the generator effect * Microphones * Transformers | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Electric car design * Magnet design * Recycling Centre sorting * National grid | Formative  Assessment  Summative  Assessment |
| **HT4** | **B7**  **Ecology** | * Communities * Abiotic factors * Biotic factors * Adaptations * Levels of organisation * How materials are cycled * Decomposition * Impact of environmental change * Biodiversity * Waste management * Land use * Deforestation * Global Warming * Maintaining biodiversity * Trophic levels * Pyramids of biomass * Transfer of biomass * Factors affecting food security * Farming technqiues * Sustainable fisheries * Role of biotechnology | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Ecologist * Conservationist * Microbiologist * Zoologist * Hydrologist * Horticulturalist * Water treatment engineer / scientist * Geologist * Environmental engineer * Environmental manager | Formative  Assessment  Summative  Assessment |
| **HT4** | **C8**  **Chemical Analysis** | * Pure substances * Formulations * Chromatography * Test for hydrogen * Test for oxygen * Test for carbon dioxide * Test for chlorine * Flame tests * Metal hydroxides * Carbonates * Halides * Sulfates * Instrumental methods * Flame emission spectroscopy | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Computational toxicologist * Soil scientist * Bioanalytical scientist * Process chemist * Pollution control officer * Astrochemist * Forensic scientist * Sports scientist | Formative  Assessment  Summative  Assessment |
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| **Summer**  **Term** |  | | |  |  |  |
| **Composites** |  |  |
| **HT5** | **C9**  **Chemistry of the atmosphere** | * The proportions of different gases in the atmosphere * The Earth’s early atmosphere * How oxygen increased * How carbon dioxide decreased * Greenhouse gases * Human activities which contribute to an increase in greenhouse gases in the atmosphere * Global climate change * The carbon footprint and its reduction * Atmospheric pollutants from fuels * Properties and effects of atmospheric pollutants | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Astrochemist * Atmospheric chemist * Solar technology engineer * Marine biogeochemist | Formative  Assessment  Summative  Assessment |
| **HT5** | **C10**  **Using Resources** | * Using the earth’s resources and sustainable development * Potable water * Waste water treatment * Alternative methods of extracting metals * Life cycle assessment * Ways of reducing the use of resources * Corrosion and its prevention * Alloys as useful materials * Ceramics, polymers and composites * The Haber Process * Production and use of NPK fertilisers | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Analytical chemist * Bioleaching lab technician * R&D chemist * Science communicator * Water treatment engineer / scientist | Formative  Assessment  Summative  Assessment |
| **HT5** | **P8**  **Space Physics (Physics only)** | * Our solar system * The life cycle of a star * Orbital motion, natural and artificial satellites * Red-shift | Do Now  MCQ x2 | * Keyword and definition * Subject language [Speak like a Scientist] * Inclusive questioning * Writing a method * Write like a Scientist * Comprehension/Extended reading * Extract key points from texts | Personal Skills   * Teamwork * Problem solving * Practical applications   Scientific Careers   * Astronomer * Aerospace engineer * Teacher * Astronaut * Cosmologist | Formative  Assessment  Summative  Assessment |