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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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 reactionsCells and batteriesFuel cells | Do NowMCQ 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
 | FormativeAssessment X2SummativeAssessment 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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
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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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
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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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **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 NowMCQ 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
 | FormativeAssessmentSummativeAssessment |
| **HT5** | **P8****Space Physics (Physics only)** | * Our solar system
* The life cycle of a star
* Orbital motion, natural and artificial satellites
* Red-shift
 | Do NowMCQ 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
 | FormativeAssessmentSummativeAssessment |