

What are the aims and intentions of this curriculum?

The aim of our Key Stage 4 Curriculum is to ensure that the topics taught at KS3 are covered in progressively greater depth over the course of this key stage. GCSE study in combined science provides the foundations for understanding the material world. Scientific understanding is changing our lives and is vital to the world's future prosperity, and all students should be taught essential aspects of the knowledge, methods, processes and uses of science. They should be helped to appreciate how the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas relating to the sciences which are both inter-linked, and are of universal application. Students will be able to

- Work as a team and to respect each other's opinions.
- Develop psychomotor and critical thinking skills when undertaking project based learning.
- Deal with ethical issues, moral issues, environmental issue and health and wellbeing.
- Develop mathematical skills, for example, calculations and analysing data.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	B9 Respiration C6 Electrolysis C7 Energy changes P5 Electricity in the home P6 Molecules and matter	Aerobic, exothermic reaction, glycogen, Anaerobic, oxygen debt. Electrolyte, anode, cathode, activation energy, bond energy, fuel cells. Live wire, neutral wire, fuse, physical changes, latent heat, internal energy, Boyle's law.	<ul style="list-style-type: none"> • To be able to compare the processes of aerobic and anaerobic respiration. • To recognise the chemical symbols: $C_6H_{12}O_6 + O_2 = CO_2 + H_2O$. • To be able to predict the products of the electrolysis of binary ionic compounds in the molten state. • To recall and apply the power equation. • To be able to give examples that illustrate the definition of power. 	Formative: <ul style="list-style-type: none"> • Questioning • Discussions • Self/ peer assessments • Problem solving activities Summative: <ul style="list-style-type: none"> • Termly exams

<p>Autumn 2</p>	<p>P7 Radioactivity</p> <p>P8 Forces in balance</p> <p>P9 Motion</p> <p>P10 Force and motion</p>	<p>Alpha radiation, beta radiation, gamma radiation, emission, irradiated, activity, count rate, chain reaction, fission, instability, magnitude, Newton's third law, principle of moments, gradient, terminal velocity, stopping distances.</p>	<ul style="list-style-type: none"> • To be able to apply the knowledge of radiation and evaluate the best sources of radiation to use in a given situation. • To be able to use the names and symbols of common nuclei and particles to write balanced equations that show single alpha (α) and beta (β) decay. • To be able to describe the interaction between pairs of objects which produce a force on each object. The forces to be represented as vectors. • To calculate the resultant of two forces that act in a straight line. • To apply the following equation, weight = mass \times gravitational field strength. 	<p>Formative:</p> <ul style="list-style-type: none"> • Questioning • Discussions • Self/ peer assessments • Problem solving activities <p>Summative:</p> <ul style="list-style-type: none"> • Termly exams
<p>Spring 1</p>	<p>B10 The human nervous system</p> <p>B11 Hormonal coordination</p> <p>C8 Rates and equilibrium</p>	<p>Homeostasis, control system, central nervous system, reflexes, brain, eye, endocrine system, insulin, type 1 diabetes, type 2 diabetes, negative feedback, oestrogen, ovaries, menstrual cycle, fertility, tropisms, phototropism, gravitropism, auxins.</p> <p>Collision theory, climate change, reversible reaction, anhydrous, equilibrium.</p>	<ul style="list-style-type: none"> • To identify the various structures in a reflex arc. • To be able to extract and interpret data from graphs, charts and tables, about the functioning of the nervous system. • To identify the cerebral cortex, cerebellum and medulla on a diagram of the brain, and describe their functions • To relate the structures of the eye to their functions. • To describe the principles of hormonal coordination and control by the human endocrine system. • To recognise and use expressions in decimal form. • To translate information between graphical and numeric form. 	<p>Formative:</p> <ul style="list-style-type: none"> • Questioning • Discussions • Self/ peer assessments • Problem solving activities <p>Summative:</p> <ul style="list-style-type: none"> • Termly exams

Spring 2	C9 Crude oil and fuels B12 Homeostasis In action B13 Reproduction	Hydrocarbons, general formula, flammable, oxidised, cracking, thermal decomposition. Thermoregulatory centre, vasoconstriction, removing waste products, kidney, reproduction, meiosis, natural selection, DNA, genome, mutation, inheritance, genetic disorders.	<ul style="list-style-type: none"> To recognise substances as alkanes given their formulae. To know the names of only these following alkanes; methane, ethane, propane and butane is required. To explain that homeostasis is the regulation of the internal conditions. To describe the function of kidneys in maintaining the water balance of the body. To understand that meiosis leads to non-identical cells being formed while mitosis leads to identical cells being formed. To interpret a diagram of DNA structure. Modelling insertions and deletions in chromosomes to illustrate mutations. 	Formative: <ul style="list-style-type: none"> Questioning Discussions Presentations Self/ peer assessments Problem solving activities Summative: <ul style="list-style-type: none"> Termly exams
Summer 1	B14 Variation and evolution C10 Organic reactions C11 Polymers C12 Chemical analysis	Variation, evolution, selective breeding, genetic engineering, ethics. Functional group, homologous series, fermentation, monomers, polymers, purity, analyzing chromatograms, carbonates, halides.	<ul style="list-style-type: none"> To use the theory of evolution by natural selection in an explanation. To explain the benefits and risks of selective breeding. To interpret information about genetic engineering techniques and to make informed judgements about issues concerning cloning and genetic engineering, including GM crops. To investigate the reactions of carboxylic acids and alcohols. To use ratios, fractions and percentages. 	Formative: <ul style="list-style-type: none"> Questioning Discussions Self/ peer assessments Problem solving activities Summative: <ul style="list-style-type: none"> Termly exams
Summer 2	P11 Force and pressure P12 Wave properties P13 Electromagnetic waves Work experience Alliance Challenge	Pressure, density, electromagnetic waves, frequency, wavelength, reflection, refraction, transmitted, seismic waves, optical fibre communications, contrast medium. Team building, self confidence	<ul style="list-style-type: none"> To recall and apply this equation: Pressure = force normal to a surface ÷ area of that surface. To describe the difference between longitudinal and transverse waves. To describe wave motion in terms of their amplitude, wavelength, frequency and period. To construct ray diagrams to illustrate the reflection of a wave at a surface. To describe the effects of reflection, transmission and absorption of waves at material interfaces To give examples that illustrate the transfer of energy by electromagnetic waves. 	Formative: <ul style="list-style-type: none"> Questioning Discussions Presentations Self/ peer assessments Problem solving activities Summative: <ul style="list-style-type: none"> Termly exams