SCIENCE

Year 9

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.

Furthermore, students are given the opportunity to study in ways that help them to develop curiosity about the natural world, gain insight into how science works, and develop an appreciation of its relevance to their everyday lives. The scope and nature of the study is broad, coherent, practical and satisfying, and therefore encourage students to be inspired, motivated and challenged.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Summer 2	Transition week Introduction to Cell structure and transport Alliance Challenge	Character development, thinking outside the box, designing, project based learning, group work, leadership, gathering different ideas. Microscope, cells, bacteria, xylem	• Communicative • Collaborative • Creative • Innovative • Research • Review • drawing	Formative: • Discussions • Projects • Presentations
Autumn 1	B1 Cell structure and transport B2 Cell division B3 Organisation and the digestive system	Microscope, cells, bacteria, xylem, phloem, diffusion, osmosis, active transport, cell cycle, stem cells, cloning, organs, digestive system, the chemistry of food, catalysts,	• To identify the functions of each of the blood components. • Recognise, draw and interpret images of cells. • Use prefixes centi, milli, micro and nano. • Calculate the number of bacteria in a population after a certain time if given the mean division time	Formative: • Questioning • Discussions • Presentations • Self/ peer assessments • Problem solving activities Summative: • Termly exams

Autumn 2	B4 Organising animals and plants P1 Conservation and dissipation of energy P2 Energy transfer by heating	Blood, coronary arteries, pulmonary artery, capillaries, epidermal tissues, translocation, transpiration, Energy stores, conservation, work done, friction, dissipated, efficiency, power, conduction, infrared radiation, absorption, heat capacity, insulating,	• To identify the link between work done (energy transfer) and current flow in a circuit. • Know and apply this equation: **kinetic energy = 0.5 × mass × speed^2** • To be able to investigate the transfer of energy from a gravitational potential energy store to a kinetic energy store. • To investigate thermal conductivity using rods of different materials.	Formative: • Questioning • Discussions • Presentations • Self/ peer assessments • Problem solving activities Summative: • Termly exams
Spring 1	P3 Energy resources P4 Electric circuits C1 Atomic structure C2 The periodic table	Biofuels, renewable, carbon-neutral, nuclear fuel, geothermal energy, fossil fuels, protons, neutrons, current, charge, potential difference, resistance, series circuits. Atoms, chemical equations, separating mixtures, ions, isotopes, metals, non-metals, noble gases, melting points, boiling points, halogens, reactivity.	• To apply the following equations: change in thermal energy, charge flow, potential difference and resistance. • To investigate the relationship between the resistance of a thermistor and temperature. • To be able to state the relationship between the resistance of an LDR and light intensity. • To be able to use a range of equipment to separate chemical mixtures. • To be able to use the nuclear model to describe atoms. • To recognise expressions in standard form.	Formative: • Questioning • Discussions • Presentations • Self/ peer assessments • Problem solving activities Summative: • Termly exams
Spring 2	C3 Structure and bonding C4 Chemical calculations C5 Chemical changes B5 Communicable diseases	States of matter, covalent bonding, ionic bonding, simple molecules, fullerenes, graphene, nanoparticles, relative masses, moles, expressing concentrations, titrations, volume of gases, salts from metals, neutralisation, pH scale. Infectious diseases, pathogens, microorganisms, culture medium, viral diseases, bacterial diseases, immune system.	• To be able to represent the electronic structures of the first twenty elements of the periodic table in 2D and 3D forms. • To recognise substances as small molecules, polymers or giant structures from diagrams showing their bonding. • To recognise graphene and fullerenes from diagrams and descriptions of their bonding and structure. • To interpret data about risk factors for specified diseases. • To be able to use a scatter diagram to identify a correlation between two variables in terms of risk factors.	Formative: • Questioning • Discussions • Presentations • Self/ peer assessments • Problem solving activities Summative: • Termly exams

Summer 1	B6 Preventing and treating disease B7 Non communicable disease B8 Photosynthesis	Vaccine, antibiotics, painkillers, drugs, human trials, hybridomas, correlation, causal mechanism, carcinogens, tumour, diet, exercise, glucose, endothermic reaction, limiting factors, greenhouse,	• To evaluate the global use of vaccination in the prevention of disease. • To understand that the results of testing and trials are published only after scrutiny by peer review. • To consider any ethical issues using monoclonal antibodies. • To evaluate methods of treatment bearing in mind the benefits and risks associated with the treatment. • To be able to describe photosynthesis as an endothermic reaction.	Formative: • Questioning • Discussions • Presentations • Self/ peer assessments • Problem solving activities Summative: • Termly exams