

Curriculum Planning

Subject: GCSE Science - Trilogy

2 year Plan

Year 1

Time	Key Subject Content	Sequencing	Rationale	Careers, Industry Links and Cultural Capital	Reading	SEMH
Half Term 1: Sep – Oct	Biology 1: Cells and Organisation	Animal and plant cells, looking at onion and cheek cells, prokaryotes, specialised cells, light and electron microscopes, magnification, cell division, stem cells, diffusion, exchanging materials, osmosis, osmosis required practical, active transport, organisation in the human body, food tests, enzymes, digestive enzymes, enzymes required practical, the circulatory system, the heart, the breathing system, the blood, heart valves and coronary heart disease.	<p>Cells are the building blocks of all living organisms. Knowledge of cell structure is needed to understand life processes. Basic knowledge of cell structure and function is needed to access the rest of the content. The topics are taught in this sequence as it builds on knowledge and leads to the higher level content.</p> <p>Once cell structure, function and transport processes are understood, we start to look at how the different systems work. We look at the functions of the systems and how cell function complements each one</p>	<p>Science careers displayed around the science laboratory and throughout school.</p> <p>Pupils are introduced to the idea of scientific research and how this impacts our knowledge of the world around us</p>	<p>Pupils are provided with opportunities to learn through comprehension and DARTS exercises. Pupils are encouraged to participate in active reading throughout the course.</p> <p>Keywords and Root words displayed prominently in the classroom . Pupils are given regular opportunities to practice exam style questions with a focus on understanding command words and using</p>	<p>Lesson plans take into account individual and group needs as determined by BOXALL profiles. Activities to support this include: Encouraging pupils to be respectful while others are giving an opinion in the form of debates. Encouraging interest in the natural world through engaging and relevant activities.</p>

					science specific language in their answers	
Half Term 2: Oct – Dec	Biology 1: Infection and Response, Biodiversity	Health, non communicable diseases, cancer, plant tissues, plant organs, transpiration, communicable diseases, human defence systems, vaccination, painkillers, antibiotics, drug development, plant defences, photosynthesis, controlling photosynthesis, respiration and responding to exercise	Basic knowledge of bacteria and viruses and how they cause illness (again links back to cells). This then leads on to different diseases and what causes them. We then look at how the body fights against diseases and how we vaccinate against diseases and treat diseases. We also look at plant diseases and defences which links back to plant cells. Again, we build on basic knowledge and understanding to working on applying the knowledge to different contexts. Knowledge of cells and enzymes needed for photosynthesis. Knowledge needed of the circulatory system, enzymes cells and the digestive system to access this topic.	Visit by Medical Mavericks Pupils are introduced to healthcare careers through introduction of activities in which they are asked to take the role of Diversity of science careers is introduced with the inclusion of plant science. Again pupils are asked to complete work in a given role – Journalist , gardener, farmer.	Pupils are encouraged to take part in shared reading of texts with consideration given to pupil reading age and ability.	Boxall Strands A – Giving purposeful attention B – Participating Constructively C - Connecting up experiences D – Showing Insightful Involvement E - Engages cognitively with peers
Half Term 3: Jan – Feb	Chemistry 1: Atomic structure	The periodic table, atomic structure, electronic structure, the development of the periodic table, alkali metals, halogens, chemical reactions, ionic bonding, covalent bonding, structures and bonding, graphite, graphene, fullerenes, polymers,	The periodic table is the building block of all knowledge needed for Chemistry. Without this, the rest of the course would not make sense. Knowledge of atoms, electrons and bonding is needed to access the rest of the content. The topics	Pupils are introduced to careers in the chemical industry through discussion of	Pupils are provided with opportunities to learn through comprehension	Boxall Strands: A – Giving purposeful attention

		alloys, relative formula mass, conservation of mass, balancing equations, limiting reactants and solutions.	are taught in this sequence as it builds on knowledge and leads to the higher-level content.	development of new materials and their impact on the modern world.	and DARTS exercises. Pupils are encouraged to participate in active reading throughout the course.	<p>B – Participating Constructively</p> <p>C - Connecting up experiences</p> <p>D – Showing Insightful Involvement</p> <p>E - Engages cognitively with peers</p>
Half Term 4: Feb – April	Chemistry 1: Chemical changes and Energy changes	Metal oxides, metals and acids, extracting metals, naming ionic compounds, acids and alkalis, making salts (soluble and insoluble), making salts required practical, electrolysis, electrolysis to extract metals, electrolysis of aqueous solutions, endothermic and exothermic reactions, filtration, evaporation and distillation.	<p>Once the periodic table and bonding is understood, we start to look at how reactions occur including finding masses of elements and how mass is conserved in reactions. We look at how efficient reactions are and where products can be lost and what companies can do to maximise yields whilst saving cost. The basic knowledge of bonding and chemical reactions will be explored in this topic where we look at what chemical reactions take place in industry and why, what conditions are needed to maximise yields building on the knowledge of atoms, structures and bonding. This part of the course really links the knowledge to how the knowledge is applied to industrial processes to make products for us as consumers.</p> <p>This topic uses knowledge of electrolysis from the previous topic to look at what products can be made from end and exothermic reactions. It also looks at the</p>	Pupils will learn about how metal extraction takes place in industry and the careers involved.	Pupils are provided with opportunities to learn through comprehension and DARTS exercises. Pupils are encouraged to participate in active reading throughout the course.	<p>Boxall Strands:</p> <p>A – Giving purposeful attention</p> <p>B – Participating Constructively</p> <p>C - Connecting up experiences</p> <p>D – Showing Insightful Involvement</p> <p>E - Engages cognitively with peers</p>

			application of electrolysis to cells, batteries and fuel cells.			
Half Term 5: April – May	Physics 1: Energy and Electricity	Energy stores, elastic potential energy, gravitational potential energy, kinetic energy, specific heat capacity, work done, power, efficiency, insulating the home, improving efficiency, Sankey diagrams, energy resources, circuits, resistors, non ohmic resistors, series and parallel circuits, mains electricity, fuses and residual circuit breakers, power in electrical circuits, transfer of electrical energy, the national grid and static electricity.	Physics is the last unit to study in year 10 as it is the most challenging. We start by looking at energy as this is the fundamental of Physics on which all other knowledge is built. We then move onto electricity as it is a type of energy that we look at in more detail.	Pupils learn about roles in the energy sector and new roles opening up due to renewable energy sources Pupils are asked to consider impacts on environment from a number of different viewpoints	Pupils are exposed to a number of different texts for example newspaper articles, letters from the public and informational leaflets	Pupils are encouraged to take part in debates which encourages listening to others views and developing empathy for others situations.
Half Term 6: June – July	Physics 1: Particle model and matter	Density, states of matter, gas pressure, atomic structure, history of the atom, alpha, beta and gamma radiation, half-life, nuclear equations, hazards of radiation, nuclear fission and nuclear fusion.	Lastly in year 10 we look at radiation which is a very challenging topic and requires maturity to be able to access it.	Pupils learn about the key work of scientists.	Pupils are provided with opportunities to learn through comprehension and DARTS exercises. Pupils are encouraged to participate in active reading throughout the course.	<p>Boxall Strands:</p> <p>A – Giving purposeful attention</p> <p>B – Participating Constructively</p> <p>C - Connecting up experiences</p> <p>D – Showing Insightful Involvement</p> <p>E - Engages cognitively with peers</p>

Year 2

Time	Key Subject Content	Sequencing	Rationale	Careers, Industry Links and Cultural Capital	Reading	SEMH
Half Term 1 Sep – Oct	Biology 2: Homeostasis and Inheritance	Homeostasis, senses and stimuli, the nervous system, the reflex arc, reflex actions required practical, the endocrine system, diabetes, menstrual cycle, contraception, sexual and asexual reproduction, meiosis, DNA and the genome, inheritance, punnet squares, inherited diseases, selective breeding, genetic engineering, evolution, natural selection, fossils, extinction, antibiotic resistant bacteria and classification.	Builds on knowledge of cells, and organisation. A basic understanding of reproduction and meiosis is needed to understand how characteristics are inherited and how genetic diseases are passed on. We then look at how we can use that knowledge for selective breeding and genetic engineering. Students will need to know the structure of DNA to understand evolutionary theory. They also need basic knowledge of how humans impact the Earth to understand the reasons for extinction.	Pupils will learn about various different careers in this topic, including, doctors, genetic counsellors and careers in the environmental sector.	Pupils are provided with opportunities to learn through comprehension and DARTS exercises. Pupils are encouraged to participate in active reading throughout the course.	Boxall Strands: A – Giving purposeful attention B – Participating Constructively C - Connecting up experiences D – Showing Insightful Involvement E - Engages cognitively with peers
Half Term 2: Oct - Dec	Biology 2 and Chemistry 2: Ecology and rate and extent of chemical changes	Communities and competition, abiotic and biotic factors, adaptations, sampling techniques, producers, consumers, feeding relationships, carbon cycle, water cycle and biodiversity.	Knowledge of classification and the factors affecting where organisms are found is needed to understand adaptations, decay, sampling techniques, the cycles and biodiversity. This topic brings all knowledge of reactions learnt so far so that we can look	Pupils learn about the work of environmental experts and about industries that carry out reactions.	Pupils are provided with opportunities to learn through comprehension and DARTS exercises.	

		<p>Rates of reaction, increasing the rate of a reaction, rates of reaction required practical, and reversible reactions.</p>	<p>at how to make reactions more efficient, maximising product and profit.</p> <p>STEM Project ran by EDT where students gain the bronze industry cadet award. The project looked at sustainability and renewable energy</p>		<p>Pupils are encouraged to participate in active reading throughout the course.</p>	
<p>Half Term 3: Jan – Feb</p>	<p>Chemistry 2: Organic chemistry, chemical analysis, the atmosphere and using resources</p>	<p>Crude oil, fractional distillation, burning hydrocarbons, cracking and alkenes.</p> <p>Purity and formulations, chromatography and identifying common gases.</p> <p>The Earth's atmosphere, greenhouse gases, carbon footprint and atmospheric pollutants.</p> <p>The Earth's resources and uses, life cycle assessments, potable and waste water and extracting copper.</p>	<p>Now we start to look at more difficult chemical concepts. Organic chemistry is complicated and so we leave it until this point in the year. Knowledge of structure and bonding is required to access this topic.</p> <p>This topic looks at chemical analysis versus instrumental analysis. Students carry out various chemical analysis techniques with a view to find out that they take a long time and are not very accurate. Then we look at instrumental analysis as a quick and accurate process. Again here, knowledge of structures and bonding is needed to understand how the tests work.</p> <p>This final topic looks at the impact of chemistry on the Earth. We look at the changes in the atmosphere and why these changes have happened followed by what we are doing to the atmosphere today. We look at the impact of making products like polymers, we look at reusing resources, recycling resources and landfill sites. Then we look at how water is treated to make it safe and finally what we are doing to copper reserves and how we can extract more copper using environmentally friendly reactions.</p>	<p>Visit from Suez to explain what the company does, the various job roles in the company and what qualifications are needed for the roles.</p>	<p>Pupils are provided with opportunities to learn through comprehension and DARTS exercises. Pupils are encouraged to participate in active reading throughout the course.</p>	<p>Boxall Strands:</p> <p>A – Giving purposeful attention</p> <p>B – Participating Constructively</p> <p>C - Connecting up experiences</p> <p>D – Showing Insightful Involvement</p> <p>E - Engages cognitively with peers</p>

Half Term 4: Feb – April	Physics 2: Forces, waves, magnets and electromagnets.	Forces and gravity, resultant forces, work done, Hooke's law, moments, gears and moments, pressure, distance time graphs, velocity time graphs, acceleration, terminal velocity, Newton's Laws, stopping distances, momentum, waves, measuring wave speeds, detection and exploration, electromagnetic waves, infra-red radiation, magnets, magnetic fields and electromagnetism.	We start unit 2 Physics, again towards the end of the year as it has the most difficult concepts in it. We start with forces which is the basic knowledge pupils need to access knowledge of waves and magnetism.	Pupils will be exposed to a number of different careers within these topics	Pupils are given regular opportunities to practice exam style questions with a focus on understanding command words and using science specific language in their answers	Boxall Strands: A – Giving purposeful attention B – Participating Constructively C - Connecting up experiences D – Showing Insightful Involvement E - Engages cognitively with peers
Half Term 5: April – May	Revision	Revision of key topics and external exams				
Half Term 6: June - July	Revision	Revision of key topics and external exams				