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Ethos College

Curriculum Planning Chemistry

Curriculum intent statement: Science

“Science and everyday life cannot and should not be separated”

Rosalind Franklin

Intent:

We believe that our pupils deserve a broad and aspirational science curriculum rich in skills and knowledge preparing them for further education and employment. The science curriculum has been designed to provide pupils with a deep understanding of the scientific knowledge and ideas that impact them as individuals within a local and global context. As they move through the curriculum, pupils will be increasingly encouraged to develop their curiosity, work scientifically and appreciate the value of science in their everyday lives to improve their social and moral understanding of the world, and be able to form reasoned opinions around ‘big’ scientific questions.

Implementation:

The curriculum is designed to build and expand on previous skills and understanding over a 1 year period dependent on the course being studied. This is determined through use of appropriate baseline assessments and an understanding of the pupils SEND / SEMMH needs. We offer both Entry Level and GCSE qualifications at Ethos depending upon a pupil’s identified pathway through Key Stage 4. Pupils follow the appropriate AQA science specification meeting both the rigour of the national curriculum and building a greater understanding of science moving forward into the wider world.

Delivery of the curriculum is underpinned by quality first teaching, informed by frequent ‘low stakes’

retrieval testing. Marking and feedback addresses misconceptions promptly and enables interventions that are timely and effective. Pupils are encouraged to develop their own scientific ideas and have opportunities to interact with scientists in the ‘real world’ to deepen their understanding.

Impact:

The majority of pupils meet or exceed their targets in Science and required grades are attained to enable pupils to follow their chosen Post 16 pathways.


Pupils leave ETHOS with an understanding of the natural world and are scientifically literate.

Year 1

Time	Key Subject Content	Sequencing	Rationale	Careers, Industry Links and Cultural Capital	Reading	SEMH
Half Term 1: Sep – Oct	Unit 1 - Atomic Structure Unit 1 - Chemical Changes	The periodic table, structure of an atom, electronic configuration, the development of the periodic table, alkali metals, the halogens, transition metals, chemical reactions, ionic bonding, covalent bonding, metallic bonding, structures and bonding, graphite, polymers, alloys and nanoscience Relative formula mass, conservation of mass, limiting reactants, concentration, reacting masses, % yield and atom economy.	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 are taught in this sequence as it builds on knowledge and leads to the higher level content. 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	Science careers displayed around the science laboratory and throughout school. Pupils are introduced to the idea of scientific research and how this impacts our knowledge of the world around us	Pupils are provided with opportunities to learn through comprehension and DARTS exercises. Pupils are encouraged to participate in active reading throughout the course. Keywords and Root words displayed	Lesson planning takes 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

			what companies can do to maximise yields whilst saving cost.		prominently in the classroom . 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	debates. Encouraging interest in the natural world through engaging and relevant activities.
Half Term 2: Oct – Dec	Unit 1 - Chemical Changes continued	Metal oxides, metals and acids, extracting metals using reduction, naming ionic compounds, displacement reactions, acids and alkalis, titrations, strong and weak acids, making salts from insoluble bases, making salts from soluble bases, electrolysis of ionic compounds, electrolysis of metals and aqueous solutions.	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.	Pupils are introduced to careers in the chemical industry through discussion of development of new materials and their impact on the modern world.	Pupils are encouraged to take part in shared reading of texts with consideration given to pupil reading age and ability.	

	Unit 1 - Energy Changes	Endothermic and exothermic reactions, cells and batteries, and fuel cells.	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 application of electrolysis to cells, batteries and fuel cells.			
Half Term 3: Jan – Feb	Unit 2 - Rate and extent of a chemical change Unit 2 - Organic Chemistry	Rate of reaction, factors that affect the rate of a reaction and reversible reactions Crude oil, fractional distillation, burning hydrocarbons, cracking and alkenes, alcohols, carboxylic acids, addition polymerisation, condensation polymerisation and natural polymers	This topic brings all knowledge of reactions learnt so far so that we can look at how to make reactions more efficient, maximising product and profit. 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. Visit from Suez to explain what the company does, the various roles within the company and what qualifications are needed for the roles			
Half Term 4: Feb – April	Unit 2 - Chemical Analysis	Purity and formulations, chromatography, identifying common gases, flame tests, identifying metal hydroxides,	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			





Unit 2 -
Chemistry
of the
Earth's
atmosphere




carbonates, halides, sulfates and instrumental analysis

Earth's atmosphere, greenhouse gases, carbon footprint, atmospheric pollutants, earth's resources and uses, life cycle assessments, potable and waste water, copper, corrosion and prevention, alloys, ceramics, polymers and composites, the haber process and fertilisers

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.

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.





Half Term 5: April – May	Revision of key knowledge	All topics revisited using a personalised approach depending on what topics were more difficult for each cohort studying the course	To prepare students for final examinations.		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	
Half Term 6: June – July	External exams					