

Subject:

Chemistry

Chemistry Intent:

We study Science because Science is about understanding. Understanding of how everything works, our place, impact, role and responsibilities in the Universe. To explore how scientific ideas develop and how we learn through experimentation. We provide stimulating, engaging and intellectually challenging learning environments to enable all our students to develop their scientific investigative and analytical skills. We are committed to promoting equal opportunity and take up of STEM careers. We want ALL of our students to be able to ask good questions, and thereby make informed decisions. May the force be with you!

Our Exam Board is: AQA

The Big Questions...

Year 10 (Bold italics Treble Only)

Atomic structure & the periodic table – What is an atom, compound and mixture? What is a chemical reaction? How is mass affected during a chemical reaction? What type of separating techniques is needed to separate certain mixtures? How have ideas of the atom changed due to experimental results? What subatomic particles make up the atom and what are their properties? What happens when electrons are lost or gained? How does changing the number of neutrons in an atom affect its properties? How are electrons arranged in an atom? How has the periodic table evolved over time? Why are lithium, sodium and potassium all in group 1? What are the halogens and how do they react? **Why are the transition metals so useful?**

Bonding, structure & properties of matter – What are the three different states of matter? What happens when a substance changes state? Why do atoms form ions? Why do some substances form giant ionic compounds and others simple covalent? Why does salt have a high melting point but water does not? Why does a material conduct electricity? Are diamond and graphite really made from the same element? What is an intermolecular force? Why is graphene so special? **How small is a nanoparticle? Where can we go with nanotechnology? What are the dangers of nanoparticles?**

Quantitative chemistry – What is the mole? How much of one substance will completely react with another? Does the amount of one substance limit the amount of product made? **What is a yield and why is it important to have a high percentage yield in the chemical industry? Why is sustainable production crucial for the future?** What is concentration? Why is one solution more concentrated than another? **How can you determine the concentration of an unknown solution using a titration? What volume holds one mole of any gas?**

Chemical changes – Do all metals react in the same way? What is displacement and why does it happen? What is OILRIG? What is an ore? How are salts made? What are the products from neutralisation reactions? What does the pH scale represent? Why can an acid be strong but be at a low concentration and another be weak at a high concentration? What happens in electrolysis? Why can only certain substances be electrolysed? What happens at the cathode and anode during electrolysis? Why does water change the products of electrolysis? What is aluminium used for and how is it extracted from its ore?

Energy changes – What is exothermic and endothermic? Why does a reaction that takes in energy feel cold? What everyday items are useful due to containing an exo- or endothermic reaction? What is activation energy? What do reaction profiles represent? Is energy required to make or break chemical bonds? **How is the difference in reactivity utilised to make chemical cells? Why are we looking to use hydrogen fuel cells in the future?**

Year 11 (Bold italics Treble Only)

Rates of reactions – What causes a chemical reaction? How can you measure the rate of a reaction? Why is rusting slow and an explosion fast? What factors affect the reaction rate? How do catalysts affect the activation energy of a reaction? Are chemical reactions irreversible? What is a dynamic equilibrium?

Organic Chemistry – What are hydrocarbons? How is crude oil separated? How do long hydrocarbon chains differ in properties to short chains? What is combustion? Why is incomplete combustion dangerous? What is the difference between saturated and unsaturated hydrocarbons? Why are long chains cracked into short chain hydrocarbons? **What are alkenes and how can they be used to create useful products? What are functional groups? What are the properties of alcohols, carboxylic acids and esters? Why organic groups are so useful and what do we use organic substances for? What are polymers? How do we make different polymers?**

Chemical analysis – What does pure mean in chemistry? How are useful mixtures made? How can we identify an unknown gas? **Which metal ion burns with a lilac flame? Which metal ion produces a blue precipitate? Which negative ion can be identified using silver?**

Chemistry of the atmosphere – The Earth and atmosphere has evolved over billions of years, why did it change? How does our atmosphere keep our Earth warm? What are humans doing to change the composition of the atmosphere? What other pollutants come from burning fuels?

Using resources – How quickly are we using up the Earth's natural resources? Which resources are renewable and which are finite? How do we process our water to ensure it is safe to drink or safe to return back into the environment? How are we using plants and bacteria to extract copper? Why do companies complete life cycle assessments for the products they make? How can we reduce the amount of finite resources we use? **Why does iron rust and how can we prolong the life of metal objects? Why are pure metals not as useful as metal alloys? How can plastics made of the same polymer have different properties? What are the physical properties of glass, ceramics and composites? How to make ammonia and why it is so important for agriculture?**

What skills will I develop?

Studying chemistry gives students an insight in how atoms, ions and molecules behave. Chemists are well equipped to tackle the problems that are facing our modern society. Chemical technologies are essential for meeting our basic human needs of food, clothing, shelter, health, energy and clean water, soil and air. Studying chemistry explains the world around us, it is the keystone of the scientific world. In practical lessons you will gain valuable laboratory and problem solving skills as well as the ability to analyse results and evaluate data. Chemistry is a door to many exciting and rewarding careers such as medicine, pharmacy, veterinary science, oceanography, chemical engineering, forensic science, law, environmental science and molecular biology as just a few examples.

What great resources can I use?

- The "Science Read Only Drive" (<https://yateleyschool.sharepoint.com/sites/Science-ReadOnly>) has the best resources we can find including past papers & question packs.
- www.senecalearning.com covers all the core information. Make sure you choose AQA!
- https://www.youtube.com/channel/UCqbOeHaAUxw9II7sBVG3_bw has excellent short videos covering the whole of the course.
- <https://myonlinesciencetutor.com/> has multiple choice questions linked to videos

How will I be assessed?

At Key stage 4 work is assessed through a series of GCSE graded exams on the units shown above so that students can understand their strengths and weaknesses on each unit. Students sit Paper 1 GCSE exams at the end of Year 10 to give an accurate measure of attainment. Teacher written feedback is given on a series of 'Teacher Assessed Tasks'.

Examination: The end of the GCSE course is 100% exam-based. Double students will sit two 1hr15min papers that count towards their double award. Trebles will sit two 1hr45min papers for their Chemistry GCSE.

Three ways that parents/carers can help...

- 1) Encourage students to sign up with the royal society of chemistry.
- 2) Watch scientific documentaries.
- 3) Test students regularly at home with key questions about their topics using revision guides and other resources. Encourage the printing and completion of past paper questions.
- 4) Discuss scientific discoveries and environmental concerns in the news.