Science at the Hart School

Yr 12 AQA Chemistry Curriculum overview

Curriculum intent: Science encompasses everything that we are and allows us to make sense of the world around us. Science at The Hart School is more than just a core subject. We believe an outstanding science edu should develop students' curiosity and scientific knowledge to question the world in which we live, enable critical-thinking and encourage students to become socially aware global citizens.

Our Science faculty has planned an inspiring, inclusive, and diverse curriculum that is designed to engage and enthuse students with the real-life applications of the subject whilst promoting ambition and aspirations fo future.

In an ever-changing world, in which STEAM subjects are at the forefront of advancements for the future, we want to prepare our students for this by not only looking at the knowledge of the subject, but also the methods, processing skills and applications associated with it. This ensures that our students are scientifically literate, able to evaluate what they see in the news and the world around them and make informed decisions that will affect their future lives and the planet.

	Autumn 1			Autumn 2		Spring 1				Spring 2		Summer 1			Summer 2			
Core Course Topic: These topics are taught in small bitesize chunks and revisited regularly.	**Module 1: Chapter 1. Atomic atructure**	**Module 1: Chapter 2. Amount of a substance**		**Module 1: Chapter 3. Bonding**	**Module 3: Chapter 11. Introduction to organic chemistry**	**Module 1: Chapter 4. Energetics**	**Module 1: Chapter 5: Kinetics**	**Module 3: Chapter 12. Alkanes**	**Module 3: Chapter 13. Halogenoalkanes**	**Module 1: Chapter 6. Equilibria**	**Module 3: Chapter 14. Alkenes**	**Module 1: Chapter 7. Oxidation, reduction and REDOX**	**Module 2: Chapter 8. Periodicity**	**Module 3: Chapter 15. Alcohols**	**Module 2: Chapter 9. The alkaine Earth metals**	**Module 2: Chapter 10. The halogens**	**Module 3: Chapter 16. Organic analysis**	
Additional support links: Here are links to additional resources which will help your child	Module 1: revision resources			Module 2: revision resources								Module 3: revision resources						
Knowledge: Included here is the specific knowledge your child will learn in detail	Atomic structure revises the idea of the atom, looking at some of the evidence for sub-atomic particles. It introduces the mass spectrometer. Which is used to measure the masses of atoms. The evidence for the arrangement of electrons is studied and you will see how a more sophisticated model using atomic orbitals was developed.	Amount of a substance is about quantitative chemistry, that is, how much product you can get from a given mass of reactant. The idea of the mole is used as the unit of quantity to compare equal numbers of atoms and molecules of different substances., including gases and solutions. Balanced equations are used to describe and measure the efficiency of chemical processes.	**Assessment 1**	Bonding revisits the three types of bonding that hild atoms together - ionic, covalent and metallic. It introduces three weaker types of forces that act between molecules, the most significant of these being hydrogen bonding. It examines how various types of forces are responsible for the solid, liquid and gaseous states, and explores how the electrons contribute to the shapes of molecules and ions.	An introduction to organic chemistry looks at the nature of carbon compounds and explains the different types of formulae that can be used to represent a compound, and also the IUPAC naming system used to describe organic compounds. It looks at the different sorts of isomers that are possoble in some organic compounds.	Energetics revisits exothermic and endothermic reactions and introduces the concept of enthalpy. It looks at different ways of measuring enthalpy changes and the uses Hess' law to predict energy changes of reactions. The idea of bond energies is explored to work out theoretical enthalpychanges by measuring the energy needed to make and break bonds.	Kinetics deals with the rate at which reactionstake place, reinforcing the idea that reactions only happen when molecules of the reactants collide with enough energy to break bonds. The Maxwell-Boltzmann distribution shows us mathematically what fraction fo the reactant molecules have enough collision energy at a given temperature. the role of catalysts is then explored.	Alkanes is about crude oil and its fractional distillation. It also looks at the different ways that large alkane molecules can be cracked into smaller, more useful molecules. It deals with the combustion of carbon compounds.	Halogeno-alkanes looks at how these compounds are formed, how they react and their role in the problem of depletion of the ozone layer.	Equilibria is about reactions that do not go to completion so that the end result is a mixture of reactants and products. It examines how to get the greatest proportion of desired products in the mixture by changing the conditions, and how to calculate the equilibrium composition. Some industrially important reversible reactions are thn discussed.	Alkenes describe the reactions of these compounds which have one or more carbon-carbon double bonds.	Redox reactions expands the defintion of oxidation as addition of oxygen to include reactions that involve electron transfers. It explains the idea of oxidation state for elements and ions, and uses this to help balance complex redox equations.	Periodicity gives an overview of the Periodic Table and classifies blocks of elements in terms of s-, d-, p- and f-orbitals. It then concentrates on the properties of the elements in Period 3.	Alcohols shows the importance of ethanol and describes the primary, secondary, and tertiary structures of alcohols and their reactions.	Group 2, the alkaline earth metals uses the ideas of electron arrangements to understand the bonding in compounds of these elements and the reactions and trends in reactvity in the group.	Group 7, the halogens deals with these reactive non-metal elements, explaining the trends in their reactivity in terms of electronic structure. It includes the reactions of elementsand their compounds using the ideas of redox reactions and oxidation states, and also the uses of chlorine and some of its compounds.	Organic analysis revisits the mass spectrometer and describes its use in determining the relative molecular masses of compounds and their molecular formula. Infra-red spectroscopy is introduced as a vital tool for identifying the functional groups in organic compounds. Some test tube reactions that may be used to help identify organic compounds are also described.	**Assessment 2 - As level mock papers (2 papers)**
Skills: Included here is the specific skills your child will learn in detail	Module 1: • Finding the concentration of a solution by titration • Finding the yield of a reaction • Calculating the enthalpy change of reactions using Hess's law • Investigating the factors that affect the rate of reaction • Finding equilibrium constants through practical investigation • Using standard form in calculations • Carrying out calculations with Avogadro's constant • Interpreting mass spectra • Determining the shapes of molecules			Module 2: • Testing reactions of group 2 metals with water • Testing the solubility of group 2 hydroxides and sulphates • Testing for non-metal ions using text tube reactions • Identifying trends in the periodic table, using patterns in data • Constructing and balancing symbol equations							Module 3: • Investigating the hydrolysis of haloalkanes to find their relative rates of reaction • Testing organic compounds to identify functional groups using text-tube reactions • Making a polymer from its monomer • Producing ethanol by fermentation and purifying it by distillation • Investigating the oxidation of alcohols • Preparing cyclo-hexene using organic synthetic techniques • Constructing and balancing symbol equations • Identifying and drawing isomers of a substance by its formula					
Home learning online platform	Seneca AQA Chemistry																	