Department	Science
Key Stage	KS4 – Year 10
Course Level	GCSE
Exam Board	AQA - https://filestore.aqa.org.uk/resources/science/specifications/AQA-8464-SP-2016.PDF

Unit Titles	Why This Is Important and Why Is It Taught at This Point?
• Particle Model of Matter • Bioenergetics • Quantitative chemistry • Forces • Chemical Changes • Energy Changes • Homeostasis • Electricity	Year 10 topics build on the fundamentals of each science specialism from year 9. In addition, having developed further their mathematically competency in year 9, students are in a stronger position to access these science topics, some of which involve mathematical skills which have now been learned in their maths curriculum. The sequencing of the science curriculum allows from frequent retrieval practice and revisiting of knowledge. Bioenergetics builds on the knowledge from KS3 respiration and photosynthesis and also allows for a recap of chemical equations. Quantitative chemistry relies on the students understanding from the previous chemistry topics and allows the opportunity to revisit past learning. Forces is taught in two sections, motion, and Newtons Laws, this allows students to grasp the vast amount of information more successfully. Chemical changes build on from the KS3 topics such as acids and alkalis and chemical reactions. Within energy changes links are made back to respiration and photosynthesis in terms of endothermic and exothermic reactions, make links across the science specialisms.

Dates Delivered	**Unit Title**	**End points**	**Substantive Knowledge What will they learn about in this topic?**	**Disciplinary Knowledge What subject concepts will be developed through this topic?**	**Assessment Method**	**Key Course Guides & Reading**
Autumn 1	Particle Model of Matter	From studying this the students will be able to describe the states in which matter on earth exists. They will be able to apply this knowledge to explain how these principles are fundamental in engineering for example when designing vessels to withstand high pressures and temperatures, such as submarines and spacecraft.	• The different states of matter. • Uses of the particle model to explain the different states of matter and differences in density. • Density equation • Explain the differences in density. • Describe the changes of state and how they happen. • Differences between physical and chemical changes. • Internal energy • The definition of specific latent heat, equation for calculating specific latent heat. • Movement of particles in a gas, in relation to temperature and pressure.	• Recognise and draw diagrams to model. • Use appropriate apparatus to make and record measurements. • Measure dimensions using appropriate apparatus. • Use, rearrange and apply scientific equations •	End of unit assessment after each topic. This assesses core questions from the topic and exam questions from current (60%) and prior learning (40%), to aid retrieval of knowledge	Catch up video content https://www.youtube.com/playlist?list=PL9IouNCPbCxWdHszkb6n6503ommOpg_t7 https://www.bbc.co.uk/bitesize/topics/z33rrwx

Autumn 1	Bioenergetics	From studying this students should be able to articulate the importance of the two essential reactions for life on Earth: photosynthesis and respiration. Students should also be able to describe how their bodies respond to exercise and the importance of these responses/	• Chemical equations for photosynthesis and respirations. • The importance of photosynthesis and the used of glucose. • Factors affecting the rate of photosynthesis • Limiting factor graphs • The importance of aerobic respiration and the uses of energy • Anaerobic respiration in animals produces lactic acid • Fermentation • Importance of anaerobic respiration • The body response to exercise, and meeting the demand for oxygen and glucose.	• Understand how scientific methods and theories develop over time. • Measure and calculate rates of photosynthesis. • Extract and interpret information on graphs . • Use data to make informed decisions. • Use appropriate apparatus to record measurements accurately.	End of unit assessment after each topic. This assesses core questions from the topic and exam questions from current (60%) and prior learning (40%), to aid retrieval of knowledge	Catch up video content https://www.youtube.com/playlist?list=PL9IouNCPbCxXVpEqkFRN5Jq8ZZTBBRWUz https://www.bbc.co.uk/bitesize/topics/zgr997h
Autumn 2	Quantitative Chemistry	From studying this topic students will be able to use quantitative analysis to determine the formulae of compounds and the equations for reactions. Given this information, they should then be able use quantitative methods to determine the purity of chemical samples and to monitor the yield from chemical reactions.	• Describe and calculate relative mass of substances. • The law of conservation of mass in balancing equations. • Calculate % of an element in a compound • Avogadro's constant. • The measurement of amounts in moles can apply to atoms, molecules, ions, electrons, formulae, and equations. • The masses of reactants and products can be calculated from balanced symbol equations. • The concentration of solutions can be measured in mass per given volume of solution.	• Understand the use of the multipliers in equations. • Input values into mathematical equations and formulas. • Use ratios, fractions, and decimals • Evaluate methods and suggest possible improvements and further investigations. • Set up and use scientific apparatus • Use of significant figures to display a value. • Change the subject of an equation	End of unit assessment after each topic. This assesses core questions from the topic and exam questions from current (60%) and prior learning (40%), to aid retrieval of knowledge	Catch up video content https://www.youtube.com/playlist?list=PL9IouNCPbCxUhxxFUbR4SNfwmaRB8mYX3 https://www.bbc.co.uk/bitesize/topics/zsnyy4j
Autumn 2/ Spring 1	Forces		• Using distance-time graphs to calculate speed. • Distance vs displacement • Calculating velocity and speed • Defining and calculating Acceleration	• Recall and input values into equations • Change the subject of an equation. • Draw and interpret graphs	End of unit assessment after each topic. This assesses core questions from the	Catch up video content https://www.youtube.com/playlist?list=PL9IouNCPbCxUrQ

			• Acceleration on a distance-time graph • Velocity-time graphs • Finding acceleration from the gradient of a velocity-time graph • Contact vs non-contact forces • Newtons 3 laws • The gravitational force • Hooke's Law • Terminal Velocity • Stopping distance • Work done • Momentum and its conservation	• Describe variables within an investigation • Carry out an investigation safely from a written method. • Write a hypothesis • Describe relationships from numerical and graphical data • Evaluate data to make judgements and decisions.	topic and exam questions from current (60%) and prior learning (40%), to aid retrieval of knowledge	kFLoPwB67nDbhw2NfAO https://www.bbc.co.uk/bitesize/topics/ztmttv4
Spring 2	Chemical Changes	From studying this topic students should be able to make predictions about the formation of products as well as suggest methods to produce a named product.	• Reactions of metals with oxygen • Reduction and oxidation reactions. • Half equations. • Reactivity of metals, based on their tendency to form + ions • Displacement reactions • Solubility • Acids and alkalis, strength vs concentration • Strong and weak acids. Examples of strong and weak acids. • Reactions of metals with acid • Neutralisation of acidic and basic substances • Making a soluble salt – $CuSO_4$ • Making ionic substances conduct electricity • Electrolysis of aluminium • Electrolysis of ionic compounds • Electrolysis of aqueous solutions • Extracting metals using electrolysis	• Interpret numerical and graphical data • Carry out an investigation safely from a written method. • Suggest reactants needed to produce a named product. • Evaluate methods and suggest possible improvements and further investigations	End of unit assessment after each topic. This assesses core questions from the topic and exam questions from current (60%) and prior learning (40%), to aid retrieval of knowledge	Catch up video content https://www.youtube.com/playlist?list=PL9IouNCPbCxXDlRtCQEG0cGehBvJ7t9Pf https://www.bbc.co.uk/bitesize/topics/zt6ppbk
Summer 1	Energy Changes	Form studying this topic students should be able to describe chemical reactions as endothermic or exothermic through understanding energy transfers, as well as	• Energy is conserved in chemical reactions • Endothermic vs exothermic reactions • Everyday uses of endothermic and exothermic reactions • Variables which affect temperature change in a reactions	• Draw scientific diagrams to display data • Investigating variables • Carry out an investigation safely from a written method.	End of unit assessment after each topic. This assesses core questions from the topic and exam questions from	Catch up video content https://www.youtube.com/playlist?list=PL9IouNCPbCxX74bPfz0TGVVmyGYgMarWu

		interaction between particles in terms of bond breaking and bond making.	• Bond breaking and bond making • Calculating energy changes • Reaction profile diagrams and activation energy	• Evaluate methods and suggest possible improvements and further investigations	current (60%) and prior learning (40%), to aid retrieval of knowledge	https://www.bbc.co.uk/bitesize/topics/z27xxfr
Summer 1 /2	Homeostasis	In this topic students should be able to explain the importance of homeostasis in order to maintain optimum functioning, through the use of the nervous and endocrine systems. They should also be able to discuss consequences which can arise when optimum functioning is not achieved, for example diabetes. Finally, students should be able to describe and explain ways of increasing and decreasing fertility through the use of hormonal and non-hormonal methods.	• Homeostasis • The nervous system. • Reflexes • Reaction time • The endocrine system • Control of blood glucose • Diabetes • Puberty and the menstrual cycle • Increasing fertility • Contraception	• Extract and interpret data from graphs, charts, and tables • Translate information between numerical and graphical forms • Evaluate information, taking into account social and ethical issues.	End of unit assessment after each topic. This assesses core questions from the topic and exam questions from current (60%) and prior learning (40%), to aid retrieval of knowledge	Catch up video content https://www.youtube.com/playlist?list=PL9IouNCPbCxW3lptxS1yHCP2I9YDfM2co https://www.bbc.co.uk/bitesize/topics/zyybb82
Summer 2	Electricity	From studying this topic students should be able to explain how altering conditions in a circuit can affect the flow of charge. Students should be able to describe how the national grid provides electricity to homes safely.	• Electric charge and current Q=It • Circuit symbols and circuits • Current and potential difference in series vs parallel circuits • V=IR • Resistance • Investigating I-V Graphs • Adding resistors in series and parallel • Domestic uses and safety • Energy transfers $P=I^2R$, P=IV, E=Pt • The national grid and transformers	• Draw and interpret scientific diagrams • Recall scientific equations • Changing the subject of an equation. • Investigating variables • Carry out an investigation safely from a written method. • Evaluate methods and suggest possible improvements and further investigations	End of unit assessment after each topic. This assesses core questions from the topic and exam questions from current (60%) and prior learning (40%), to aid retrieval of knowledge	Catch up video content https://www.youtube.com/playlist?list=PL9IouNCPbCxXc2NQoIZN7-3jIKN7vW-Sq https://www.bbc.co.uk/bitesize/topics/zcg44qt