

Key Stage 4 GCSE Science Curriculum

Year 10 Combined Science Trilogy						
Biology	Advent 1	Advent 2	Lent 1	Lent 2	Pentecost 1	Pentecost 2
Topics	Organisation and the Digestive System and Organising animals and plants	Communicable Diseases and Preventing and Treating Disease	Preventing and Treating Disease and Non-communicable Diseases	Photosynthesis and Respiration.	The Human Nervous System	Adaptations, Interdependence, and Competition and Organisms and Ecosystems
Skills	To understand the chemistry of food (carbohydrates, proteins, lipids) and the enzymes that break them down. How blood flows around the body and through the heart. Describe and explain the tissues and organs in a plant.	To understand what pathogens are (bacterial, viruses, fungi and protists), how they spread and how to prevent infections. Explain the difference between antibiotics, vaccines and painkillers along with how we develop new drugs. Triples: Use their practical skills to grow bacteria, identify plant defences and know how monoclonal antibodies are made and what we use them for.	Evaluate information re non-communicable diseases and the risk factors for them. Understand the causes and treatment for specific non-communicable diseases.	Understand what photosynthesis is and how plants use glucose. Use practical skills to complete the light intensity and rate of photosynthesis practical. Identify similarities and differences between aerobic and anaerobic respiration.	Know the principles of homeostasis. Understand the structure and function of the human nervous system and what a reflex is. Triples: Describe the structure of the brain and the eye.	Define communities, ecosystems, abiotic and biotic. Use practical skills to measure the population size of a species in a habitat using sampling techniques. Understand what plants and animals compete for along with their adaptations. Understand how cycles work for carbon, decay and water.

Key Questions	How do enzymes and bile help to make digestion efficient? Evaluate the scientific and social arguments around artificial hearts / pacemakers.	Why do we need a full trial of all newly developed drugs? Explain all of the defence responses your body has to prevent microorganisms from making you ill.	Describe and explain the different treatments used to treat cancer. Type 2 diabetes is sometimes called an epidemic. Suggest how the 'epidemic' might be controlled.	Explain the difference between aerobic and anaerobic respiration. In terms of limiting factors explain why plants in the rainforest are much larger than those in UK woodland.	Describe and explain what happens when you touch a hot pan indicating when it's electrical or chemical. Triples: Explain what myopia and hyperopia are.	Explain how a new predator can change the balance or organisms in a community and an entire habitat. Describe the processes of photosynthesis, respiration, and combustion in the carbon cycle.
Assessment	End of topic key sticky knowledge assessment (QQQs)	End of topic key sticky knowledge assessment (QQQs) . Cumulative written assessment.	End of topic key sticky knowledge assessment (QQQs). Cumulative written assessment.	End of topic key sticky knowledge assessment (QQQs)	End of topic key sticky knowledge assessment (QQQs) . Paper 1 Mock Exam	End of topic key sticky knowledge assessment (QQQs).

Chemistry	Advent 1	Advent 2	Lent 1	Lent 2	Pentecost 1	Pentecost 2
Topics	Bonding, structure, and the properties of matter	Quantitative Chemistry and understanding chemical changes	Extraction of aluminium and energy changes in a reaction	More quantitative chemistry	The rate and extent of chemical change	carbon compounds as fuels and feedstock
Skills	Use theories of structure and bonding to explain the physical and chemical properties of materials.	Use quantitative analysis to determine the formulae of compounds and the equations for reactions. To understand how to predict exactly what new substances would be formed in a reaction. Use graphical display to determine energy changes in a reaction.	To understand how to predict exactly what new substances would be formed in a reaction. To understand how energy is transferred during a reaction.	Identifying different types of chemical reaction to establish patterns and to make predictions about the behaviour of other chemicals.	Using the particle model to explain how fast chemical reactions proceed. Use graphical displays to determine rate of reaction.	Identify the source of crude oil and use our knowledge of the properties of hydrocarbons to separate crude oil into useful fractions.

Key Questions	How does the boiling point and melting point relate to bonding and structure?	How do analysts determine the purity of chemical samples and monitor the yield? How do scientists develop the wide range of different materials we use daily?	How do we extract aluminium from an ore? How do cells and batteries use these chemical reactions to provide electricity?	How do chemists communicate ideas and work with industry?	How can we manipulate reactions in order to speed them up or slow them down? Are chemical reactions reversible?	How do scientists modify organic molecules from crude oil to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents?
Assessment	End of topic key sticky knowledge assessment (QQQs)	End of topic key sticky knowledge assessment (QQQs). Cumulative written assessment.	End of topic key sticky knowledge assessment (QQQs)	End of topic key sticky knowledge assessment (QQQs). cumulative written assessment.	End of topic key sticky knowledge assessment (QQQs) . Paper 1 Mock Exam	End of topic key sticky knowledge assessment (QQQs).

Physics	Advent 1	Advent 2	Lent 1	Lent 2	Pentecost 1	Pentecost 2
Topics	Energy Transfer by Heating and Electric Circuits	Electricity in the home and Molecules and Molecules and Matter.	Molecules and Matter and Radioactivity.	Forces and Balance	Forces and Balance	Motion and Force and Pressure
Skills	To be able to carry out in-depth practical assessments in terms of specific heat capacity calculations and associated thermal radiation investigations	To be able to describe and explain the nature of electricity and its key components. Students should be able to recognise key components by their graphical nature and use this information to design and explain series and parallel circuits	Students should be able to explain how the particle model of matter can be used in various situations, to explain change of state between various materials in the periodic table. Students should also be able to discuss the nature and use of radioactive materials in modern society	To be able to explain why objects move in various situations using newtons laws of motion. To analyse industrial situations in terms of pivots, force magnifiers and reducers and gearing systems	To be able to analyse more complex force situations using more advanced calculation methods such as parallelogram of forces	Learn how to calculate pressure in various situations both above ground and below sea level

Key Questions	What is the nature of thermal radiation and how is it used in modern society	What are the key difference between series and parallel circuits and which type would you use in various situations	What is meant by the term state of matter. Is nuclear energy the way forward and its pros and cons to this argument	Why does an object move, stay stationary or change direction and what forces are behind these movements	How does a pulley, lever or gear system work	What depth can a human or submarine dive to without causing injury or structural failure to the person or machine
Assessment	End of topic key sticky knowledge assessment (QQQs)	End of topic key sticky knowledge assessment (QQQs) . Cumulative written assessment.	End of topic key sticky knowledge assessment (QQQs).	End of topic key sticky knowledge assessment (QQQs) . Cumulative written assessment.	End of topic key sticky knowledge assessment (QQQs) . Paper 1 Mock Exam	End of topic key sticky knowledge assessment (QQQs).

Year 11 Combined Science Trilogy

Biology	Advent 1	Advent 2	Lent 1	Lent 2	Pentecost 1
Topics	Separate Scientists - Hormonal Coordination and Homeostasis in Action Combined Scientists - Hormonal Coordination and Reproduction	Separate Scientists - Reproduction. Combined Scientists - Variation and Evolution and Genetics	Separate Scientists - Variation and Evolution. Combined Scientists - Genetics and Evolution	Separate Scientists - genetics and Evolution. Combined Scientists Revision for exams.	Revision for exams

<p>Skills</p>	<p>Use scientific knowledge to understand how the hormones in a human interact and the outcomes that result. Describe the role of negative feedback. Triples: Understand plant hormones and their responses. Use practical skills to show this. Explain how the kidney works, dialysis and transplants.</p>	<p>Triples: Define asexual and sexual reproduction. Use probability, ratios and percentages for using punnet squares. Understand genetic inherited disorders and link it to punnet squares. Combined: Use data to explain nature / nurture. Understand genetic engineering and selective breeding, along with the ethics.</p>	<p>Triples: Use data to explain nature / nurture. Understand genetic engineering and selective breeding, along with the ethics. Combined: Understand how scientists use fossils. Describe different possible methods of extinction.</p>	<p>Triples: Understand how scientists use fossils. Describe different possible methods of extinction.</p>	<p>Use different revision techniques to help remember and use the key scientific knowledge.</p>
<p>Key Questions</p>	<p>Explain the main events of the menstrual cycle and describe the role of the hormones. Triple: Explain the advantages and disadvantages of treating kidney failure with dialysis or with a kidney transplant.</p>	<p>Compare cell division meiosis to mitosis. Evaluate the advantages and disadvantages of offering embryo screening for genetic disorders. Evaluate the ethical concerns surrounding genetic engineering.</p>	<p>Combined: Describe how different fossils are formed. Triple: Evaluate the ethical concerns surrounding genetic engineering.</p>	<p>Describe how different fossils are formed.</p>	<p>How do I revise the science knowledge? How can I check that I can use my knowledge in an exam situation?</p>

Assessment	End of topic key sticky knowledge assessment (QQQs) cumulative written assessment.	Y11 Mock Exam - Paper 1 Physics	End of topic key sticky knowledge assessment (QQQs) Mock Exam Paper 2	End of topic key sticky knowledge assessment (QQQs) Mock Exam Paper 2	Actual GCSE Exams Begin
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Chemistry	Advent 1	Advent 2	Lent 1	Lent 2	Pentecost 1
Topics	Chemical Analysis	Chemistry of our atmosphere	Earths Resources	Reteach of the core scientific principles	Exam Revision
Skills	To use a range of qualitative tests to detect specific chemicals. Analyse of the natural and man-made causes of climate change.	Analyse of the natural and man-made causes of climate change.	To use scientific knowledge to understand how the Earth's limited resources.	Revision skills. Exam technique and practice	Use different revision techniques to help remember and use the key scientific knowledge.
Key Questions	How do forensic scientists use chemical tests to identify unknown materials? How has human activity affected the global climate?	How has human activity affected the global climate?	How do we use the Earth's limited resources? How can chemists limit the use of these limited resources?	What is the best approach to revision? How can I manage my time to revise efficiently and successfully for my GCSE's?	How do I revise the science knowledge? How can I check that I can use my knowledge in an exam situation?

Assessment	End of topic key sticky knowledge assessment (QQQs) cumulative written assessment.	Y11 Mock Exam - Paper 1 Physics	End of topic key sticky knowledge assessment (QQQs) Mock Exam Paper 2	End of topic key sticky knowledge assessment (QQQs) Mock Exam Paper 2	Actual GCSE Exams Begin
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Physics	Advent 1	Advent 2	Lent 1	Lent 2	Pentecoste 1
Topics	Motion, Force and Motion and Force and Pressure	Wave Properties and Electromagnetic Waves	Light	Electromagnets	Space for Separate Scientists only. Revision for Combined Scientists
Skills	Be able to carry out and explain key experiments of wave properties and Boyles law using the relative equipment to provide reproducible results	Be able to explain all the parts of the electromagnetic spectrum and there uses in a modern society	Students must be able to draw all the pathways of light associated with refraction, reflection and convex and concave lens	Students should be able to apply the principles of electric motors and transformers to everyday situations.	Students should be able to explain how our universe, galaxy and solar system were formed and analyse this process using red and blue shift
Key Questions	What causes any object to change direction in any situation, in any place in the universe	How do scientists use electromagnetic waves to treat cancer and communicate across vast distances	How do opticians use the physical theories of light to design glasses and other optical equipment	How does a speaker work. What type of motor is in and electric car, and how does electricity get safely transported to my home.	How do I revise the science knowledge? How can I check that I can use my knowledge in and exam situation?

Assessment	End of topic key sticky knowledge assessment (QQQs) cumulative written assessment.	Y11 Mock Exam - Paper 1 Physics	End of topic key sticky knowledge assessment (QQQs) Mock Exam Paper 2	End of topic key sticky knowledge assessment (QQQs) Mock Exam Paper 2	Actual GCSE Exams Begin
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