

SCIENCE YEAR 10 AQA Combined Trilogy science and Triple Science



**THE OLDHAM
ACADEMY** NORTH

YEAR 10	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Curriculum Content	<p>Composite 1: 4.1 Understand the fundamentals of Cell Biology and microscopes. Component 1: identify the structure of plant, animal, prokaryotic and eukaryotic organisms, and the functions of major structures. Component 2: compare the level of detail revealed by light and electron microscopes, calculating magnifications. Component 3: describe how cells divide by mitosis and the application of this in cloning techniques. Component 4: Describe the use of stem cells in producing new tissues and organs. Component 5: Evaluated the use of stem cells in terms of ethical and moral considerations</p> <p>Composite 2: 4.2 Understand the organisation in animals and plants and how the environment can affect them. Component 1: investigate food breakdown from food testing. Component 2: discover and explain why enzymes are so important and investigate the effect of pH on enzyme activity. Component 3: explain the role of enzymes in digestion and how the digestive system is adapted to its function. Component 4: describe and explain gas exchange surfaces in plants and animals. Component 5: describe transport in animals and research facts about coronary heart disease.</p>	<p>Composite 1: 4.3 Understand how the body fights infection and responds Component 1: understand the differences between communicable and non-communicable diseases. Component 2: investigate risk factors linked to health and will then look at the different pathogens and some of the diseases they cause. Component 3: explain how the immune system and how vaccinations are used to prevent the spread of disease. Component 4: describe how drugs are developed and why clinical trials are needed.</p> <p>Composite 2: 4.4 Understand the basics Biogenetics in plants. Component 1: describe process of photosynthesis, including the many uses of glucose in the plant. Component 2: investigate how to test a leaf for the presence of starch and investigate how to change the rate of photosynthesis. Component 3: explain how leaves are adapted for photosynthesis. Component 4: explain how the process of photosynthesis is linked to increasing food production. Component 5: compare the differences between aerobic and anaerobic respiration, and learn about the uses of anaerobic respiration in baking and brewing.</p>	<p>Composite 1: 5.1 Understand the Atomic structure and the periodic table Component 1: identify the structure of atoms and use a range of different models to describe both the atoms themselves and the physical and chemical properties of the elements and compounds they form. Component 2: explore how atomic models have developed as new data became available and how the periodic table was constructed. Component 3: explain how testing predictions can support or refute new scientific ideas.</p> <p>Composite 2: 5.2 Understand bond structures and the properties of matter Component 1: describe and explain the different types of bonding; ionic, covalent and metallic. Component 2: identify how to represent both ionic and covalent bonding using dot and cross diagrams. Component 3: describe suitable diagrams to show metallic bonding and find out about delocalised electrons. Component 4: calculate the charge on the ions in an ionic compound. Component 5: explore the types of structures produced by the different types of bonding. This includes giant ionic structures, small molecules, polymers, giant covalent structures, and metals and alloys. Component 6: investigate properties of each substance type, concentrating on the explanations around bonding and structure. This will include knowledge of intermolecular forces, which is supported by a lesson on states of matter whereby students use the particle theory to explain changes of state. Component 7: describe and explain specific examples of bonding types; for giant covalent it is graphite and diamond. Component 8: explain the properties of specific examples based on structure and bonding. Component 9: explore the new developments of graphene, fullerenes and nanoparticles.</p>	<p>Composite 1: 5.3 Understand Quantitative chemistry by determining the formulas for compounds and using equation for reactions. Component 1: Identify common symbols and equations. Component 2: calculate relative formula masses and be introduced to moles. Component 3: use moles to calculate reacting masses and to balance equations, and learn how to calculate theoretical and percentage yields. Component 4: describe how concentration is expressed and use this in simple titrations. Component 5: describe how to calculate gas volumes and how they apply in equations.</p> <p>Composite 2: 5.4 Understand Chemical Changes are vital extraction of metals and producing salts. Component 1: explain the oxidation and reduction of metals in terms of loss or gain of oxygen or electrons. Component 2: deduce a reactivity series of metals based on experimental results, and relate this to the tendency of metals to form positive ions and the extraction method used to extract each metal. Component 3: make soluble salts by neutralising acids with metals, metal oxides, carbonates or alkalis and write equations for these reactions. Component 4: distinguish between strong acids and concentrated acids, and explain what happens during neutralisation. Component 5: identify the products formed when molten or dissolved binary compounds are electrolysed, and write equations for the reactions at each electrode.</p> <p>Composite 3: 5.5 Understand how interactions of particles involves Energy Changes Component 1: identify exothermic and endothermic changes, use reaction profiles to describe them, calculate theoretical energy transfers using bond energies and investigate the variables that affect the temperature changes in solutions. Component 2: investigate voltaic cells and fuel cells and evaluate their usefulness as sources of energy.</p>	<p>Composite 1: 6.1 Understand energy changes in a system and the ways energy is stored before and after such changes. Component 1: identify different types of energy transfers, especially elastic potential energy, gravitational potential energy and kinetic energy. Component 2: calculate work done and power and how they are useful in different ways. Component 3: describe temperature and how this relates to energy. Component 4: recognise that different substances have different specific heat capacities and the consequences of this, e.g. causing the wind between the land and the sea. Component 5: use the law of conservation of energy and will look at both useful and waste energies. Component 6: describe what efficiency is; not just how to calculate it but also the importance of improving the efficiency of transducers and various ways in which this can be done. Component 7: compare different energy resources of Earth that are used, particularly in terms of generating electricity. Component 8: explore the advantages and disadvantages of the different resources and how our use of such resources may change in the future, both at a local and a global scale. Component 9: justify decisions about their own energy use in the future.</p> <p>Composite 2: 6.2 Understand the basics of Electricity how is it supplied to domestic users. Component 1: identify different types of circuit and describe some of the key features of each type of circuit. Component 2: distinguish between current and potential difference and investigate factors that affect resistance in a circuit. Component 3: explain how electricity is transmitted to homes and the features of mains electricity. Component 4: investigate power and energy transfers and calculate power.</p>	<p>Composite 1: 6.3 Understand Particle model of Matter and the role of particles when thinking about density, changes between states of matter, pressure and volume. Component 1: describe and apply their understanding of particle behaviour to the energy in closed systems of solids, liquids and gases with a particular focus on internal energy, specific heat capacity and latent heat. Component 2: develop own models of microscopic particle motion to understand some macroscopic behaviours. Component 3: describe the effects of latent heat in exploring, both qualitatively and quantitatively, how matter changes state from one phase to the other. Component 4: explain the fundamental theory behind the gas laws. Composite 5: analyse basic particle theory as well as thinking and investigating how pressure affects volume and how temperature affects volume, while solving problems for both relationships.</p> <p>Composite 2: 6.4 Understand Atomic Structure and the historic changes. Component 1: describe the current model of the atoms, and how ideas about the structure of the atom have changed over the years. Component 2: describe the three types of ionising radiation and consider hazards related to and uses of each type of radiation.</p>

				Component 3: identify independent, dependent and control variables; identify the main hazards in practical contexts; plan experiments to test hypotheses; carry out experiments appropriately; describe techniques; read measurements from scales; make and record observations; present data appropriately; recognise and describe patterns and trends; use models in explanations; use data to make predictions; and communicate findings and reasoned conclusions.		
Prior knowledge and skills (from previous year / key stage)	Students should recognise the organisation of the body and the structure and function of cells including prokaryotes and Eukaryotes	Students should understand how pathogens can spread and examples of diseases they cause, along with prevention methods and treatments.	-Students should recognise subatomic particles and why atoms form bonds. They should also describe ions formed.	-students can use atomic mass to calculate formula mass. Students should also understand why mass is conserved in reactions. -students will recognise key features of the pH scale and identify reactions as endothermic or exothermic.	-Students can identify the different types of energy store, how energy is dissipated and the types of energy resource we use. -Students should also compare the differences between series and parallel circuits -Students understand the structure of the plug and how the national grid transmits energy around the UK	-Students can use the particle theory to explain changes in state -Students can recall and use the density equation -students can explain the internal energy changes when particles change state -students can describe properties of alpha, beta and gamma - students can determine half-life from a graph
Assessment Objectives	AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.
Assessment 1	Mastery Task	Mastery Task	Mastery Task	Mastery Task	Mastery Task	Mastery Task
Assessment 2	EOT Exam	EOT Exam	EOT Exam	EOT Exam	EOT Exam	EOT Exam

SCIENCE YEAR 11 AQA Combined Trilogy science and Triple Science



YEAR 11	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Curriculum Content	<p>Composite 1: 4.5 Explore the structure and function of the nervous and hormonal system to maintain Homeostasis Component 1: Identify the different components of the CNS and the Endocrine system. Component 2: Describe the functions of the main hormones in the endocrine system. Component 3: Explain the process of negative feedback in different contexts. Component 4: Compare and contrast hormonal and nerve responses. Component 5: Evaluate the use of IVF to promote fertility and the use of contraceptives to control fertility.</p> <p>Composite 2: 4.6 Understand the processes of Inheritance Evolution and Variation Component 1: State what the genome of an organism is. Component 2: Investigate the structure of DNA and how genes code for proteins. Component 3: Describe how cells divide by meiosis to form gametes. Component 4: Interpret genetic cross diagrams in the form of Punnett squares. Component 5: Discuss how genes can be manipulated using techniques such as selective breeding and genetic engineering.</p>	<p>Composite 1: 4.7 Understand how all organisms within an ecosystem depend on each other for survival Component 1: Investigate the effects of abiotic factors on the ecosystem and predator prey relationships. Component 2: Investigate competition between organisms and how animals and plants are adapted for survival. Component 3: Describe how materials such as water and carbon are recycled in the environment. Component 4: Investigate the impact humans are having on the environment.</p> <p>Composite 2: 5.6 Understand the Extent and rate of chemical change Component 1: Identify ways of speeding up reactions and use collision theory and ideas about activation energy to make predictions. Component 2: Explore reversible reactions and use Le Chateliers principle to predict the effects of changing temperature, pressure and concentration on equilibrium systems. Component 3: Identify variables and hazards in an investigation. Component 4: Plan and carry out investigations to test different hypotheses. Component 5: Recognise and describe patterns and trends in data Component 6: Use models and data to make predictions and communicate findings and reasoned conclusions.</p> <p>Composite 3: 5.7 Understand the chemistry of Carbon (Organic Chemistry) Component 1: Describe how fractional distillation and cracking of crude oil is carried out to produce fuels. Component 2: Identify and describe the difference between alkanes and alkenes. Component 3: Recognise how organic molecules can be modified to produce new and useful materials such as polymers.</p> <p>Composite 4: 5.8 Understand how scientists use Chemical analysis to detect specific chemicals Component 1: Describe what is meant by 'pure substances' and how they can be distinguished from mixtures.</p>	<p>Composite 1: 5.9 Understand the Chemistry of the atmosphere Component 1: Describe how the composition of gases has changed from earths early atmosphere. Component 2: Explain why data needed to answer scientific questions may be uncertain, incomplete or unavailable. Component 3: Explore the way the atmosphere has changed over geological timescales. Component 4: Evaluate the environmental implications of greenhouse gas emissions and other pollutants. Component 5: Explore the use of computer models to make predictions. Component 6: Evaluate the quality of evidence in reports about global climate change and learn how peer review works.</p> <p>Composite 2: 5.10 Understand aspects of sustainable development in using earth's resources Component 1: Investigate what is required to produce potable water and to treat waste water. Component 2: Consider alternative methods to extract a metal from low-grade ores that avoid the environmental impact of mining. Component 3: Compare the impact of products on the environment from the raw materials through to their disposal. Component 4: Consider the reusing, recycling or reducing of materials to sustain raw materials and have less impact on the environment.</p> <p>Composite 3: 6.5 Understand what Forces and what they do Component 1: Identify contact and non-contact forces. Component 2: Describe how forces affect objects and can cause acceleration and deceleration. Component 3: Recall Newtons three laws of motion. Component 4: Describe the turning effect of a force and how forces affect the pressure in solids, liquids and gases.</p>	<p>Composite 1: 6.6 Understand the behaviour Waves Component 1: Describe the behaviour of Transverse and Longitudinal waves. Component 2: Describe the behaviour of electromagnetic waves. Component 3: Investigate the behaviour waves and learn about some applications of waves in medicine and other situations. Component 4: Investigate lenses and the difference between convex and concave lenses.</p> <p>Composite 2: 6.7 Understand Magnetism and Electromagnets Component 1: Describe the difference between an electromagnet and a permanent magnet. Component 2: Discuss the applications of electromagnets in different objects. Component 3: Explain how motors can be manipulated by changing the direction of current flow or the direction of the magnetic field.</p> <p>Composite 3: Physics Only 6.8 Understand the origin and life cycle of stars Component 1: Describe the theory that states the universe is expanding. Component 2: Investigate red-shift and the Big Bang to support the theory of the expanding universe. Component 3: Explore the role of gravity in the life cycle of stars. Component 4: Discuss how and why ideas about the universe have developed over time.</p>	EXAM CONSOLIDATION	

		<p>Component 2: Investigate and use instrumental methods to identify substances.</p> <p>Component 3: Carry out and describe the different tests used to test gases such as hydrogen, oxygen carbon dioxide and chlorine.</p>				
Prior knowledge and skills (from previous year / key stage)	-Students can identify hormones and understand how genes are passed onto offspring	<p>-students should be able to describe how some nutrients and water are transported within animals, including humans.</p> <p>-Students should have knowledge of how to separate mixtures through filtering, sieving and evaporation</p> <p>-students should recognise some gases released from reactions</p>	<p>-students will have prior knowledge of stages in the evolution of the Earth's atmosphere and dangers of greenhouse gas emissions</p> <p>-students will recognise forces as contact or non-contact</p>	<p>-Students recognise that light appears to travel in straight lines</p> <p>-Students understand that objects are seen because light enters the eyes</p> <p>-students can recognise reflection</p>		
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Assessment 1	Mastery Task: trends in reactivity application	Mastery Task: students must apply their understanding of processes to separate and make mixtures useful	Mastery Task: students apply their maths in science skills to different contexts and draw conclusions	Mastery Task: Students use their knowledge and understanding to draw conclusions		
Assessment 2	EOT Exam-GCSE questions level 1 and level 2 and Some exposure to level 3	EOT Exam-GCSE questions level 1 and level 2 and Some exposure to level 3	EOT Exam-GCSE questions level 1 and level 2 and Some exposure to level 3	EOT Exam-GCSE questions level 1 and level 2 and Some exposure to level 3		

