

Science

Our aim is to equip our young people with the knowledge needed to understand the world and technology around them. We strive to encourage a curiosity in the natural, physical and chemical world around them. We want to foster critical thinking and provide our young people with a chance to broaden their horizons and provide multiple routes into STEM careers.

Year 8 Science

Term One

Content of study	Periodic Table, Elements, Breathing, Digestion
What are the aims and objectives of this term?	<u>Periodic Table</u> The elements in a group all react in a similar way and sometimes show a pattern in reactivity. As you go down a group and across a period the elements show patterns in physical properties. <u>Knowledge</u> Metals are generally found on the left side of the table, non-metals on the right. Group 1 contains reactive metals called alkali metals. Group 7 contains non-metals called halogens. Group 0 contains unreactive gases called noble gases. <u>Elements</u> Most substances are not pure elements, but compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain. <u>Skills</u> Use particle diagrams to classify a substance as an element, mixture or compound and as molecules or atoms. Name simple compounds using rules: change non-metal to -ide; mono, di, tri prefixes; and symbols of hydroxide, nitrate, sulfate and carbonate. <u>Knowledge</u> The symbols of hydrogen, oxygen, nitrogen, carbon, hydrogen, iron, zinc, copper, sulfur, aluminium, iodine, bromine, chlorine, sodium, potassium and magnesium. <u>Breathing</u> In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. Oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body. Breathing occurs through the action of muscles in the ribcage and diaphragm. The amount of oxygen required by body cells determines the rate of breathing. <u>Digestion</u> The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance. Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes. <u>Knowledge</u> Iron is a mineral important for red blood cells. Calcium is a mineral needed for strong teeth and bones. Vitamins and minerals are needed in small amounts to keep the body healthy.
What previous knowledge is required?	From Year 6, knowledge of body systems including basic breathing & digestion.

How will this term's content help with future learning?	All AQA KS3 Science content feeds into our AQA GCSE Programme. It forms the building blocks required to be successful at GCSE and A Level.
Resources	https://www.bbc.co.uk/bitesize
Links to the national curriculum/specification	National Curriculum: https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study#key-stage-3 Specification: https://www.aqa.org.uk/subjects/science/ks3/science-3/specification
Assessments	Students are assessed through an end of unit test paper.
Term Two	
Content of study	Separating Techniques, Magnets, Electromagnets, Light
What are the aims and objectives of this term?	<u>Separating Techniques</u> A pure substance consists of only one type of element or compound and has a fixed melting and boiling point. Mixtures may be separated due to differences in their physical properties. The method chosen to separate a mixture depends on which physical properties of the individual substances are different. Skill Use techniques to separate mixtures. Knowledge Air, fruit juice, sea water and milk are mixtures. Liquids have different boiling points. <u>Electromagnets</u> An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid. Knowledge The magnetic field of an electromagnet decreases in strength with distance. <u>Magnets</u> Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction. The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences. Knowledge Two 'like' magnetic poles repel and two 'unlike' magnetic poles attract. Field lines flow from the north-seeking pole to the south-seeking pole. <u>Light</u> When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. The ray model can describe the formation of an image in a mirror and how objects appear different colours. When light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal. Refraction through lenses and prisms can be described using a ray diagram as a model. Skill Construct ray diagrams to show how light reflects off mirrors, forms images and refracts. Knowledge Light travels at 300 million metres per second in a vacuum.

	Different colours of light have different frequencies.
What previous knowledge is required?	Students will have looked at simple separating techniques and the basics of magnets from KS2.
How will this term's content help with future learning?	All AQA KS3 Science content feeds into our AQA GCSE Programme. It forms the building blocks required to be successful at GCSE and A Level.
Resources	https://www.bbc.co.uk/bitesize
Links to the national curriculum/specification	National Curriculum: https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study#key-stage-3 Specification: https://www.aqa.org.uk/subjects/science/ks3/science-3/specification
Assessments	Students are assessed through an end of unit test paper.
Term Three	
Content of study	Forces, Pressure, Climate, Earth's Resources
What are the aims and objectives of this term?	Forces When the resultant force on an object is zero, it is in equilibrium and does not move or remains at constant speed in a straight line. One effect of a force is to change an object's form, causing it to be stretched or compressed. In some materials, the change is proportional to the force applied. Skill Sketch the forces acting on an object and label their size and direction. Pressure Pressure acts in a fluid in all directions. It increases with depth due to the increased weight of fluid, and results in an upthrust. Objects sink or float depending on whether the weight of the object is bigger or smaller than the upthrust. Different stresses on a solid object can be used to explain observations where objects scratch, sink into or break surfaces. Skill Use the formula: fluid pressure, or stress on a surface = force (N)/area (m²). Climate Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth's crust (such as photosynthesis and respiration) as well as human activities (burning fuels). Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen. Scientists have evidence that global warming caused by human activity is causing changes in climate. Knowledge Methane and carbon dioxide are greenhouse gases. Earth's atmosphere contains around 78 % nitrogen, 21 % oxygen, <1 % carbon dioxide, plus small amounts of other gases. Earth There is only a certain quantity of any resource on Earth, so the faster it is extracted, the sooner it will run out. Recycling reduces the need to extract resources. Most metals are found combined with other elements, as a compound, in ores. The more reactive a metal, the more difficult it is to separate it from its compound.

	Carbon displaces less reactive metals, while electrolysis is needed for more reactive metals.
What previous knowledge is required?	KS2 Science covers the basics of forces and in some schools, they will have covered some aspects of climate change.
How will this term's content help with future learning?	All AQA KS3 Science content feeds into our AQA GCSE Programme. It forms the building blocks required to be successful at GCSE and A Level.
Resources	https://www.bbc.co.uk/bitesize
Links to the national curriculum/specification	National Curriculum: https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study#key-stage-3 Specification: https://www.aqa.org.uk/subjects/science/ks3/science-3/specification
Assessments	Students are assessed through an end of unit test paper.
Term Four	
Content of study	Evolution, Inheritance, Work, Conduction & Convection
What are the aims and objectives of this term?	<u>Evolution</u> Natural selection is a theory that explains how species evolve and why extinction occurs. Biodiversity is vital to maintaining populations. Within a species variation helps against environment changes, avoiding extinction. Within an ecosystem, having many different species ensures resources are available for other populations, like humans. <u>Inheritance</u> Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction. Chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation. <u>Knowledge</u> The DNA of every individual is different, except for identical twins. There is more than one version of each gene eg different blood groups. <u>Work</u> Work is done and energy transferred when a force moves an object. The bigger the force or distance, the greater the work. Machines make work easier by reducing the force needed. Levers and pulleys do this by increasing the distance moved, and wheels reduce friction. <u>Conduction & Convection</u> The thermal energy of an object depends upon its mass, temperature and what it's made of. When there is a temperature difference, energy transfers from the hotter to the cooler object. Thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation.
What previous knowledge is required?	From Year 6, an understanding that all species are different. Basic adaptations should have been covered in Key Stage 2. Some basic understanding of conduction may also be present.
How will this term's content help with future learning?	All AQA KS3 Science content feeds into our AQA GCSE Programme. It forms the building blocks required to be successful at GCSE and A Level.
Resources	https://www.bbc.co.uk/bitesize

Links to the national curriculum/specification	National Curriculum: https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study#key-stage-3 Specification: https://www.aqa.org.uk/subjects/science/ks3/science-3/specification
Assessments	Students are assessed through an end of unit test paper.
Term Five	
Content of study	Waves, Chemical Energy, Types of reaction
What are the aims and objectives of this term?	Waves When a wave travels through a substance, particles move to and fro. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy. A physical model of a transverse wave demonstrates it moves from place to place, while the material it travels through does not, and describes the properties of speed, wavelength and reflection. Chemical Energy During a chemical reaction bonds are broken (Requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is exothermic. If the reverse, it is endothermic. Types of Reaction Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light. Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating. Chemical changes can be described by a model where atoms and molecules in reactants rearrange to make the products, and the total number of atoms is conserved. Skill Write word equations from information about chemical reactions.
What previous knowledge is required?	Students may have covered light and sound in KS2 and this will feature in this unit.
How will this term's content help with future learning?	All AQA KS3 Science content feeds into our AQA GCSE Programme. It forms the building blocks required to be successful at GCSE and A Level.
Resources	https://www.bbc.co.uk/bitesize
Links to the national curriculum/specification	National Curriculum: https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study#key-stage-3 Specification: https://www.aqa.org.uk/subjects/science/ks3/science-3/specification
Assessments	Students are assessed through an end of unit test paper.
Term Six	
Content of study	Moja Island
What are the aims and objectives of this term?	Skills topic linking together the following ideas through the scenario of shipwreck and consequential discovery of an island and it's inhabitants: - Ecology - Food chains and webs - Human effects on the environment

	• Circuits ○ Series and Parallel Circuits ○ Building Plugs ○ Safety in Electricity • Energy ○ Renewable Energy Resources • Density • Separating techniques ○ Distillation • Other ○ Human requirements for survival ○ Critical thinking skills ○ Practical skills ♣ Density ♣ Circuits ♣ Plug building ♣ Distillation
What previous knowledge is required?	<i>Variety of content covered in Year 7 and Year 8.</i>
How will this term's content help with future learning?	<i>Skills in investigations, data handling, identifying variables and drawing conclusions from presented data are key to exam success at KS4 and KS5, around 35% of all questions will require these skills over actual recalled information. These skills are vital for success at KS4. Knowledge builds upon the foundations of KS3 to prepare for KS4.</i>
Resources	https://www.bbc.co.uk/bitesize
Links to the national curriculum/specification	National Curriculum: https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study#key-stage-3
Assessments	Students are assessed through an end of unit test paper.