

Science

Year 8 Curriculum Intent 2024-2025

The course is based on the AQA activate scheme and is taught from Year 7 into Year 9

How can I support my child at home?

- Ensure weekly homework is completed on SatchelOne/Educake
- Use the knowledge organisers to support retention of knowledge and understanding
- Help encourage revision, especially around assessment times: [Revision techniques from BBC Bitesize - BBC Bitesize](#)
- Use: <https://www.bbc.co.uk/bitesize/subjects/zng4d2p>
- Watch: <https://www.youtube.com/@revisionmonkey3859>
- Watch the news for Science developments – Newsround is fantastic, watch David Attenborough documentaries and Brian Cox documentaries on iPlayer

Outside reading

While outside reading isn't required for Science, it can be very beneficial to inspire, motivate and help students progress. Books we recommend:

- All about Evolution Dr Robert Winston
- The Climate Book, Greta Thunberg
- Disgusting digestion Horrible Science

Students have 6 hours of Science a fortnight in Year 8

NB: Students may not follow the topics in the exact order stated below due to how topics are split between teaching staff

Big topics	Topic Name	National Curriculum links	Skill Components	Assessment Opportunities	KS2/Year 7 to KS4
Enquiry Processes	Taught throughout all topics	<ul style="list-style-type: none"> evaluate risks and alter practice accordingly ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience make predictions using scientific knowledge and understanding select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate use appropriate techniques, apparatus, and materials during laboratory work, paying attention to health and safety make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest improvements apply mathematical concepts and calculate results present observations and data using appropriate methods, including tables and graphs interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions present reasoned explanations, including explaining data in relation to predictions and hypotheses evaluate data, showing awareness of potential sources of random and systematic error identify further questions arising from their results. undertake basic data analysis including simple statistical techniques 	<ul style="list-style-type: none"> Recall key terminology. Identify hazard symbols and describe ways to reduce risks Choose appropriate lab equipment to complete practical activities Draw labelled scientific diagrams of equipment Use a Bunsen burner safely Draw tables to hold data Draw bar graphs to show discontinuous data Draw line graphs to show continuous data Plan a method to test one variable Complete a practical to obtain valid results Analyse data gained Calculate means Produce extended writing through practical write ups Collaborate and communicate in completion of practicals 	<ul style="list-style-type: none"> Bar charts and analysis (Forces) Line graphs (States of Matter) Method writing (Reactions) Educake quizzes Synoptic Assessments 	<ul style="list-style-type: none"> planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations <p>KS 4 – All required practicals</p>

Electricity	Electricity	<ul style="list-style-type: none"> electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge potential difference, measured in volts, battery, and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current differences in resistance between conducting and insulating components (quantitative). separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects the idea of electric field, forces acting across the space between objects not in contact. Investigate the production and strength of electromagnets Draw a labelled diagram of an atom 	<ul style="list-style-type: none"> Recall key terminology Relate the theory of charged particles to observations of static electricity Create series or parallel circuits Relate models of current, potential difference and resistance to practical findings Investigate the current and potential difference in series and parallel circuits Investigate the factors affecting the strength of electromagnets 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments End of topic test Practical write up Recall questions Practical write up 	Year 7 <ul style="list-style-type: none"> Electricity and Magnetism KS4 – Physics - Electricity
Energy		<ul style="list-style-type: none"> comparing power ratings of appliances in watts (W, kW) comparing amounts of energy transferred (J, kJ, kW hour) domestic fuel bills, fuel use and costs heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators 	<ul style="list-style-type: none"> Recall key terminology Apply mathematical concepts to calculating power Apply mathematical concepts to calculating energy transferred Calculate the cost of bills based on sample data Investigate conduction, convection, and radiation Investigate insulation Apply knowledge of particle model to describe conduction and convection and insulators 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments Practical write up 	Year 7 <ul style="list-style-type: none"> Energy KS4 – Physics - Energy
Organisms	Digestion	<ul style="list-style-type: none"> Investigate, through energy transfers, the energy values of different foods (from labels) (kJ) content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre, and water, and why each is needed 	<ul style="list-style-type: none"> Recall key terminology Accurately label a diagram of the digestive system Relate structure to function of distinct parts of the digestive system Relate diseases such as coeliac disease to the effect on the digestive system 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments End of topic test Key word test 	KS2 <ul style="list-style-type: none"> identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat

		<ul style="list-style-type: none"> calculations of energy requirements in a healthy daily diet the consequences of imbalances in the diet, including obesity, starvation, and deficiency diseases the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts) the importance of bacteria in the human digestive system the effects of recreational drugs (including substance misuse) on behaviour, health, and life processes. 	<ul style="list-style-type: none"> Calculate energy requirements in healthy and unhealthy daily diets Relate deficiencies to the problems they cause Model the digestive system Evaluate information and data about drugs Complete food tests 		<ul style="list-style-type: none"> describe the simple functions of the basic parts of the digestive system in humans recognise the impact of diet, exercise, drugs, and lifestyle on the way their bodies function describe the ways in which nutrients and water are transported within animals, including humans <p>Year 7</p> <ul style="list-style-type: none"> States of matter Organisms – Cells Energy <p>Year 8</p> <ul style="list-style-type: none"> Energy <p>KS4 – Biology - Organisation</p>
Forces	Forces	<ul style="list-style-type: none"> forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) change depending on direction of force and its size. speed and the quantitative relationship between average speed, distance, and time (speed = distance ÷ time) the representation of a journey on a distance-time graph relative motion: trains and cars passing one another. force-extension linear relation; Hooke's Law as a special case work done and energy changes on deformation atmospheric pressure, decreases with increase of height as weight of air above decreases with height pressure in liquids, increasing with depth; up thrust effects, floating and sinking pressure measured by ratio of force over area – acting normal to any surface. 	<ul style="list-style-type: none"> Recall key terminology Recap effect of balanced and unbalanced forces Apply speed calculation Apply knowledge of relative motion to why it looks like a parachutist goes up when they open their parachute Interpret distance time graphs Investigate the effect of forces on objects that obey Hooke's law Relate knowledge of air resistance to aerodynamic design Apply pressure calculation Investigate pressure on a solid such as sand Interpret graphs showing pressure and distance in relation to atmosphere and liquids Apply knowledge of the particle model to pressure 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments Key word test Presenting and evaluating data End of topic test 	<p>Year 7</p> <ul style="list-style-type: none"> Forces <p>KS4 – Physics - Forces</p>

		<ul style="list-style-type: none"> opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface. 			
Organisms	Photosynthesis	<ul style="list-style-type: none"> plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots. the reactants in, and products of, photosynthesis, and a word summary for photosynthesis the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere the adaptations of leaves for photosynthesis the role of leaf stomata in gas exchange in plants 	<ul style="list-style-type: none"> Recall key terminology Research using the internet Test a leaf for signs of photosynthesis <ul style="list-style-type: none"> Starch testing Write word and symbol equations for photosynthesis Use simulations to investigate limiting factors of photosynthesis Draw accurate labelled diagrams Use microscopes to look at the structure of stomata Relate knowledge of diffusion and introduce idea of pressure to the function of stomata Apply knowledge of plants to how to improve farmer yield of crops 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments EoTT 	<p>KS2</p> <ul style="list-style-type: none"> identify and describe the functions of distinct parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants <p>Year 7</p> <ul style="list-style-type: none"> Organisms - cells Energy <p>KS4 – Biology - Bioenergetics</p>
Periodic Table	The Periodic Table	<ul style="list-style-type: none"> a simple (Dalton) atomic model differences between atoms, elements, and compounds chemical symbols and formulae for elements and compounds the varying physical and chemical properties of different elements the principles underpinning the Mendeleev Periodic Table how patterns in reactions can be predicted with reference to the Periodic Table 	<ul style="list-style-type: none"> Recall key terminology Distinguish between atoms, elements, and compounds Navigate the periodic table to identify elements mentioned in chemical formulae Determine the number of atoms and elements in a chemical formula Identify patterns in the periodic table Observe the reactions of group 1 metals and be able to put them in order of reactivity Make predictions about an element's properties based on its position in the periodic table 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments Extended writing 	<p>Year 7</p> <ul style="list-style-type: none"> Periodic Table States of matter <p>KS4 – Chemistry – Periodic Table</p>
Waves	Waves	<ul style="list-style-type: none"> waves on water as undulations which travel through water with transverse motion; these waves can be reflected and add or cancel – superposition. 	<ul style="list-style-type: none"> Compare the speed of sound in air, water, and solids. Explain what an echo is. Identify materials that absorb sound well. 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes 	<ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel

		<ul style="list-style-type: none"> • frequencies of sound waves, measured in hertz (Hz); echoes, reflection, and absorption of sound • sound needs a medium to travel, the speed of sound in air, in water, in solids • sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal • auditory range of humans and animals. • pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound; waves transferring information for conversion to electrical signals by microphone. 	<ul style="list-style-type: none"> • Use oscilloscope to identify properties of waves • Apply knowledge of the particle model to explain the speed of sound through different materials • Apply the properties of pressure waves to their uses 	<ul style="list-style-type: none"> • Synoptic Assessments 	<p>through a medium to the ear</p> <ul style="list-style-type: none"> • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases <p>KS4 – Physics - Waves</p>
Waves	Waves	<ul style="list-style-type: none"> • the similarities and differences between light waves and waves in matter • light waves travelling through a vacuum; speed of light • the transmission of light through materials: absorption, diffuse scattering, and specular reflection at a surface use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye • light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras • colours and the different frequencies of light, white light, and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. • Recall that visible light is a wave within a spectrum called the electromagnetic spectrum 	<ul style="list-style-type: none"> • Recall key terminology • Identify translucent, transparent, and opaque objects • Relate the transmission of light to the above • Investigate the effect of reflection and refraction on rays of light • Draw ray diagrams • Determine the laws of reflection and refraction • Investigate the effect of lenses on light • Relate knowledge gained to how the eye and pinhole cameras work • Create a pinhole camera • Compare and contrast a pinhole camera and the eye • Identify the colours within white light using a prism • Relate the colours we perceive to the absorption and reflection of the colours within white light 	<ul style="list-style-type: none"> • Peer and self assessments throughout • Educake Quizzes • Synoptic Assessments • Presenting and evaluating data • Key word test • EoTT 	<p>Key Stage 2</p> <ul style="list-style-type: none"> • recognise that they need light to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change • recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye

					<ul style="list-style-type: none"> explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them <p>Year 7</p> <ul style="list-style-type: none"> Waves – Sound Energy KS4 – Physics - Waves
Reactions	Chemical Reactions	<ul style="list-style-type: none"> chemical reactions as the rearrangement of atoms representing chemical reactions using formulae and using equations combustion, thermal decomposition, oxidation, and displacement reactions the chemical properties of metal and non-metal oxides with respect to acidity. what catalysts do conservation of mass changes of state and chemical reactions. the chemical properties of metal and non-metal oxides with respect to acidity. energy changes on changes of state (qualitative) exothermic and endothermic chemical reactions (qualitative). 	<ul style="list-style-type: none"> Recall key terminology Apply knowledge of atoms/the Dalton method to their rearrangement in reactions Write equations Investigate combustion, thermal decomposition, oxidation, and displacement reactions Relate observations from displacement reactions to the reactivity of metals Apply the concept of conservation of mass Investigate energy changes in reactions Apply knowledge of exothermic and endothermic reactions to real world examples 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments Key word test EW End of topic test 	<p>Year 7</p> <ul style="list-style-type: none"> Reactions <p>Year 8</p> <ul style="list-style-type: none"> Periodic table <p>KS4 – Chemistry – Chemical Changes, Energy Changes</p>
Organisms	Breathing	<ul style="list-style-type: none"> the structure and functions of the gas exchange system in humans, including adaptations to function the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume the impact of exercise, asthma, and smoking on the human gas exchange system 	<ul style="list-style-type: none"> Recall key terminology Dissect safely and identify parts of lungs Accurately label a scientific diagram Relate a bell jar model to the function of lungs Sequence the events that occur during ventilation/breathing Relate the process of diffusion to gas exchange 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments Key word test Practical write up End of topic test 	<p>Year 7</p> <ul style="list-style-type: none"> Organisms – Cells States of matter <p>Year 8</p> <ul style="list-style-type: none"> Organisms - respiration <p>KS4 – Biology - Organisation</p>

		<ul style="list-style-type: none"> aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life a word summary for aerobic respiration the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism. 	<ul style="list-style-type: none"> Relate the structure to the function of the lungs Write the equation for respiration Relate the equation for photosynthesis to respiration Investigate fermentation - Hovis Compare anaerobic to aerobic respiration Investigate the effect of exercise on respiration – Silk Men Examine the effects of asthma on the respiratory system Examine the effects of smoking on the respiratory system 		
Genetics and the ecosystem	Genes	<ul style="list-style-type: none"> a simple model of chromosomes, genes, and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model Variation and inheritance Natural Selection Genetic modification the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. 	<ul style="list-style-type: none"> Extract DNA from a kiwi fruit Correctly label the structure of DNA and describe its key features Recall key terminology 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes End of topic test 	Year 7 <ul style="list-style-type: none"> Genes Reproduction KS4 – Biology - Cell Biology, Inheritance and Evolution
	Ecosystems	<ul style="list-style-type: none"> the importance of plant reproduction through insect pollination in human food security 	<ul style="list-style-type: none"> Research the importance of maintaining biodiversity and the use of gene banks. Relate this to the importance of bees to humans 		Year 7 <ul style="list-style-type: none"> Ecosystems KS4 – Biology - Ecology

Cultural and local

- Throughout the year students will also complete lessons to improve their cultural capital and skills such as problem solving. These themes will include:
 - Halloween blood splatter – problem solving and analytical skills
 - Bonfire night – flame tests
 - Christmas – Santa’s lighthouse
 - Valentines – the heart – first time doing a dissection
 - Easter – wine to water – Scripture related and kidney dissection
 - Macclesfield – Hovis Breadmaking – in respiration
 - Macclesfield – The silk men. Effects of exercise – in respiration

Assessment: Year 8 students will be assessed throughout the year through summative and formative assessment

