

Science

Year 7 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 Chemistry by Dr Robert Winston
- All about Biology by Dr Robert Winston
- All about physics by Dr Robert Winston

Students have 6 hours of Science a fortnight in Year 7

Big topics	Topic Name	National Curriculum Links	Skill Components	Assessment Points	from Key Stage 2 to Key Stage 4
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>
Forces	Forces	<ul style="list-style-type: none"> • forces as pushes or pulls, arising from the interaction between two objects 	<ul style="list-style-type: none"> • Recall key terminology. • Experimentally determine the effect of forces on a spring and 	<ul style="list-style-type: none"> • Peer and Self Assessment 	<ul style="list-style-type: none"> • notice that some forces need contact between 2 objects,

		<ul style="list-style-type: none"> • using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces • forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water • moment as the turning effect of a force • The size of the turning effect depends on the size of the force and on its (perpendicular) distance from the pivot • forces measured in newtons, measurements of stretch or compression as force is changed • non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity. • simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged 	<p>how this can be used to measure a force</p> <ul style="list-style-type: none"> • Use a force-meter to measure forces • Draw diagrams to model forces on an object • Experimentally determine how shape effects floating and sinking • Use appropriate equipment in practicals • Determine hazards and ways to reduce risks • Apply moment calculation • Research how machines help to reduce effort 	<p>embedded throughout</p> <ul style="list-style-type: none"> • Educake Quizzes • Presenting and Evaluating data • End of Topic Test • Synoptic Assessments 	<p>but magnetic forces can act at a distance</p> <ul style="list-style-type: none"> • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect <p>KS4 – Physics - Forces</p>
Matter	States of Matter	<ul style="list-style-type: none"> • the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure • changes of state in terms of the particle model. • the concept of a pure substance • mixtures, including dissolving • diffusion in terms of the particle model • simple techniques for separating mixtures: filtration, evaporation, chromatography, and distillation • Identifying pure substances 	<ul style="list-style-type: none"> • Recall key terminology • Make and record measurements for heating curves • Use a model to show the movement of particles • Use a substance melting and boiling point to determine its state in different temperatures • Apply knowledge of particles to changes in state • Apply knowledge of particles to describe dissolving • Apply knowledge of particles to describe diffusion • Apply knowledge of particles to describe physical separation techniques and apply these techniques 	<ul style="list-style-type: none"> • Peer and self assessment throughout • Educake Quizzes • Line graphs • Key word test • End of Topic Test • Synoptic Assessments 	<ul style="list-style-type: none"> • compare and group materials together, according to whether they are solids, liquids, or gases • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution

			<ul style="list-style-type: none"> Determine how density effects whether an object will float or sink Apply knowledge of particles to describe density 		<ul style="list-style-type: none"> use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving, and evaporating demonstrate that dissolving, mixing and changes of state are reversible changes <p>KS4 – Chemistry and Physics – atom structure, chemical analysis</p>
Organisms	Organ systems, organs and cells	<ul style="list-style-type: none"> cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria, and chloroplasts the similarities and differences between plant and animal cells the role of diffusion in the movement of materials in and between cells the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms 	<ul style="list-style-type: none"> Recall key terminology. Accurate labelling of diagrams (cells and microscope). How to focus and correctly use a microscope to view cells. Carry out basic magnification calculations. Begin to develop the skills required for cell drawing (Make and record observations) Apply knowledge of diffusion to red blood cell structure Relate structure to function of cells 	<ul style="list-style-type: none"> Peer and self assessment throughout Educake Quizzes End of topic test Synoptic Assessments 	KS 4 – Biology – Cell Biology
Space	Our Universe	<ul style="list-style-type: none"> gravity force, weight = mass x gravitational field strength (g), on Earth $g=10 \text{ N/kg}$, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) our Sun as a star, other stars in our galaxy, other galaxies the seasons and the Earth's tilt, day length at various times of year, in different hemispheres the light year as a unit of astronomical distance. Ideas about the nature of the solar system have changed over time 	<ul style="list-style-type: none"> Recall key terminology. Use rulers Calculate weight on different planets using the formula: weight = mass x gravitational field strength. Use a light year as a unit of astronomical distance. Explain how the Earth's tilt causes seasons. 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments Extended writing 	<ul style="list-style-type: none"> identifying scientific evidence that has been used to support or refute ideas or arguments describe the movement of the Earth and other planets relative to the sun in the solar system describe the movement of the moon relative to the Earth

		<ul style="list-style-type: none"> Describe natural and man-made satellites Describe the phases of the moon 	<ul style="list-style-type: none"> Explain why seasons are different in the northern and southern hemispheres. Describe how day length varies at different times of year. Research the phases of the moon understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review 		<ul style="list-style-type: none"> describe the sun, Earth, and moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky <p>KS4 – Triple Physics</p>
Earth		<ul style="list-style-type: none"> the composition of the Earth the structure of the Earth the rock cycle and the formation of igneous, sedimentary, and metamorphic rocks Earth as a source of limited resources and the efficacy of recycling Properties of ceramics Magnetic poles, attraction, and repulsion magnetic fields by plotting with compass, representation by field lines Earth's magnetism, compass, and navigation 	<ul style="list-style-type: none"> Recall key terminology. Use models to represent an idea or structure. Making accurate observations during salol experiment Application of the ideas within the rock cycle Keep to a budget in "cookie mining" Contrast advantages and disadvantages of processes Apply the idea that 'like' poles will repel and 'unlike' poles will attract Plot the fields lines around a bar magnet using a plotting compass. 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments End of topic test 	<ul style="list-style-type: none"> compare and group together distinct kinds of rocks based on their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter compare and group together everyday materials based on their properties <p>KS4 - electricity and magnets</p>
Organisms	Reproduction	<ul style="list-style-type: none"> reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation, and birth, to 	<ul style="list-style-type: none"> Recall key terminology Apply knowledge of how changes in puberty lead to reproductive maturity Accurately label diagrams 	<ul style="list-style-type: none"> Extended writing MCQ Key word test Conclusions and evaluations 	<ul style="list-style-type: none"> explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

		<p>include the effect of maternal lifestyle on the foetus through the placenta</p> <ul style="list-style-type: none"> reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. 	<ul style="list-style-type: none"> Relate modes of contraception to how they prevent pregnancy Complete a dissection of a flower safely Experimentally investigate a seed dispersal method of plants 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments 	<ul style="list-style-type: none"> describe the life process of reproduction in some plants and animals describe the differences in the life cycles of a mammal, an amphibian, an insect, and a bird describe the changes as humans develop to old age <p>KS4 – Biology - Homeostasis, Inheritance and Evolution</p>
Matter	Periodic Table (in Reactions)	<ul style="list-style-type: none"> the Periodic Table: periods and groups; metals and non-metals the properties of metals and non-metals 	<ul style="list-style-type: none"> Recall key terminology. Navigate the periodic table to find elements and determine the group they are in Using correct symbols for elements from the periodic table Distinguish between the properties of metals and non-metals 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments 	<ul style="list-style-type: none"> Properties of materials including metals <p>KS 4 – Chemistry – Periodic Table</p>
Reactions	Chemical Reactions	<ul style="list-style-type: none"> defining acids and alkalis in terms of neutralisation reactions the pH scale for measuring acidity/alkalinity; and indicators reactions of acids with metals to produce a salt plus hydrogen reactions of acids with alkalis to produce a salt plus water Reactions of acids with metal carbonates to produce a salt plus carbon dioxide and water 	<ul style="list-style-type: none"> Using a wider range of more complex laboratory apparatus when carrying out experiments and paying attention to health & safety. Making and recording accurate observations and using them to draw conclusions Use of acids and alkali to make neutral solutions Use indicators to determine pH of a solution Know how to make cabbage indicator 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments Key word test Extended writing - planning 	<ul style="list-style-type: none"> explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda <p>KS4 – Chemistry – Chemical Changes</p>
Energy	Energy	<ul style="list-style-type: none"> other processes that involve energy transfer: changing motion, dropping an object, completing 	<ul style="list-style-type: none"> Recall key terminology. 	<ul style="list-style-type: none"> Peer and self assessments throughout 	<p>KS4 – Physics - Energy</p>

		<p>an electrical circuit, stretching a spring, metabolism of food, burning fuels</p> <ul style="list-style-type: none"> energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions Identify useful and wasted energy pathways using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes fuels and energy resources. 	<ul style="list-style-type: none"> Identify which energy stores are changing for a variety of situations. Compare the amount of energy in different stores before and after a change. Apply mathematical concepts to determine amount of energy in different stores to conserve energy Apply knowledge of machines to energy 	<ul style="list-style-type: none"> Educake Quizzes Synoptic Assessments End of topic test 	
Electricity	Electricity	<ul style="list-style-type: none"> How electricity is made Electric current, measured in amperes, in circuits, series and parallel, Potential difference measured in volts Separation of positive and negative charge when objects are rubbed 	<ul style="list-style-type: none"> Recall key terminology Create series and parallel circuits Identify components from the symbols Problem solve if a circuit will not work measure current and potential difference Determine the effects of switches in parallel and series circuits 	<ul style="list-style-type: none"> Peer and self assessments throughout Educake Quizzes Synoptic Assessments Keyword test MCQ 	<ul style="list-style-type: none"> observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials based on whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having 2 poles predict whether 2 magnets will attract or repel each other, depending on which poles are facing use recognised symbols when representing a simple circuit in a diagram identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts,

					<p>including cells, wires, bulbs, switches, and buzzers</p> <ul style="list-style-type: none"> • identify whether a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors <p>KS4 – Physics – Electricity</p>
Genes	Genes	<ul style="list-style-type: none"> • heredity as the process by which genetic information is transmitted from one generation to the next • differences between species • the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation • changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction • the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection 	<ul style="list-style-type: none"> • Analysis of organisms to identify variation • Application of knowledge of sexual reproduction to inheritance • Relate adaptations to environment • Research animals that have gone extinct and why this happened 	<ul style="list-style-type: none"> • Peer and self assessments throughout • Educake Quizzes • End of topic test 	<ul style="list-style-type: none"> • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution <p>KS4 – Biology - Cell Biology, Inheritance and Evolution</p>
Ecosystems		<ul style="list-style-type: none"> • the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops 	<ul style="list-style-type: none"> • Recall key terminology • construct food chains, food webs and pyramids of number, to scale 		<ul style="list-style-type: none"> • recognise that environments can change and that this can sometimes pose dangers to living things • construct and interpret a variety of food chains,

		<ul style="list-style-type: none"> • how organisms affect, and are affected by, their environment, including the accumulation of toxic materials • apply sampling techniques. 	<ul style="list-style-type: none"> • Interpret graphs showing predator-prey cycles. • Interpret graphs showing the accumulation of toxic materials • Apply sampling techniques • Use mathematical concepts to process data from sampling methods • use appropriate techniques, apparatus, and materials during fieldwork 		<p>identifying producers, predators, and prey</p> <ul style="list-style-type: none"> • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants, and animals • give reasons for classifying plants and animals based on specific characteristics <p>KS4 – Biology- Ecology</p>
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Cultural and skills lessons:

- Throughout the year students will also complete lessons to improve their cultural capital and skills such as problem solving. These themes will include:
 - Forensics Halloween - Problem solving
 - Bonfire Night – Making sparklers
 - How to revise
 - Christmas mix up - Using Chemical Tests to analyse substances
 - Valentines – Hormones
 - Macclesfield silk
 - How to revise
 - How to use textbooks
 - How to use Seneca learning and BBC bitesize to aid independent learning

Assessment: Year 7 students will be assessed throughout the year through summative and formative assessments

