

Key Stage 3 Curriculum Journey: Science

The curriculum in Science will excite the expectations of our new intake. It will inspire awe and wonder so that pupils will marvel at the contrasts and similarities in nature's design.

YEAR 7 CURRICULUM JOURNEY						
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Topic	<p>Organisms – Cells</p> <p>Matter - Particle model</p> <p>Energy – Energy costs and transfers</p>	<p>Organisms – Movement</p> <p>Matter –Separating mixture</p> <p>Forces -Speed and Gravity</p>	<p>Organisms – Movement continued</p> <p>Chemical reactions –Metals and non-metals</p> <p>Forces –Speed and gravity continued</p>	<p>Genes –Human reproduction</p> <p>Ovum Sperm</p> <p>Chemical reactions –Metals and non-metals continued</p> <p>Electricity – Potential difference and current</p>	<p>Genes –Variation</p> <p>Chemical reactions - Acids and alkalis</p> <p>Electricity – Potential difference and current continued</p>	<p>Plants –Plant reproduction and Interdependence</p> <p>Earth - Earth structure</p> <p>Earth - The Universe</p>
Key Knowledge, Skills & Understanding	<ul style="list-style-type: none"> • Levels of organization • Animal and plant cells • Using a microscope • Specialised cells • Movement of Substances • Unicellular organisms • Particle arrangement of solids, liquids and gases • Condensation, evaporation • Expansion and contraction • Gas pressure • Food and fuels • Renewable and non-renewable energy resources • Energy and power • Energy stores and conservation • Energy dissipation 	<ul style="list-style-type: none"> • The skeleton • Movement and joints • Muscles • Dissection of chicken leg-tendons and ligaments to understand the role of tissue damage • Elements, compounds and molecules • Pure substances and mixtures • Solutions and dissolving • Solubility curves • Filtration, evaporation, distillation • Chromatography • Balanced and unbalanced forces • Friction • Speed graphs and distance/time graphs • Gravity, mass and weight 	<ul style="list-style-type: none"> • See content from last half term • Chemical and physical changes • Physical properties of metals and non-metals • Chemical reactions of metals and non-metals • Reactions of metals with acids, water • Displacement reactions • See content from last half term 	<ul style="list-style-type: none"> • Adolescence • Male and female reproductive systems • Menstrual cycle and fertility • Gametes, fertilisation and implantation • Development of foetus • Factors affecting fertility and foetal development • Circuit components • Potential difference in series and parallel circuits • Resistance • Measuring current in series and parallel circuits • Lightning-static electricity 	<ul style="list-style-type: none"> • Inherited and environmental variation • Continuous and discontinuous variation • Adapting to change-animals • Adapting to change-plants • Concentration and strength of acids • Neutralisation • Making salts • See content from last half term 	<ul style="list-style-type: none"> • Construction and destruction of food chains/webs • Ecosystems • Quantifying ecosystems and population size • Competition • Flowers and pollination (dissection) • Fertilisation and germination • Seed dispersal • The structure of the earth • Chemical, biological and physical weathering • Sedimentary, metamorphic and igneous rock • Rock cycle • Ceramics • Day, night, seasons • Phases of the moon • The structure of the Universe and space exploration

<p>KS3 National Curriculum Links</p>	<p>Please see K3 programme of study for details of KS3 content covered. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/335174/SECONDARY_national_curriculum_-_Science_220714.pdf</p> <p>Our KS3 course is also resourced using the AQA Activate Kerboodle resource and pupils are issued a login for this resource when they join Year 7. The Year 7 course is resourced using Activate I. https://global.oup.com/education/secondary/kerboodle/science/aqa-activate-kerboodle/?region=uk</p>					
<p>MAPs</p>	<p>MAP 1- Cells MAP 1- Particle model MAP 1- Energy costs and energy transfer</p>	<p>MAP 2 – Separating mixtures P2S1 P2S1 P2S1</p>	<p>MAP 2 – Movement MAP 2 - Speed and gravity</p>	<p>MAP 3 – Metals and non-metals P2S2 P2S2 P2S2</p>	<p>MAP 3 – Reproduction and Variation MAP 4 – Acids and alkalis MAP 3 – Potential difference and current</p>	<p>MAP 4 – Plant reproduction and Interdependence MAP 4 – Earth and the Universe P2S3 P2S3 P2S3</p>

Key Stage 3 Curriculum Journey: Science

The year 8 Science curriculum will explore year 7 concepts in greater depth. Pupils will embed their experience of practical science with greater dexterity, peer collaboration and validity

YEAR 8 CURRICULUM JOURNEY						
Topic	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
<p>Topic</p>	<p>Half Term 1</p>	<p>Half Term 2</p>	<p>Half Term 3</p>	<p>Half Term 4</p>	<p>Half Term 5</p>	<p>Half Term 6</p>
<p>Key Knowledge, Skills & Understanding</p>	<ul style="list-style-type: none"> Describe the key tissues that make up the lungs. Explain inhalation and exhalation using the bell jar model. Describe and explain factors that can affect the rate of gas exchange within the lungs. Describe aerobic and anaerobic respiration. Explain how certain activities may rely on one type of respiration over the other. Describe how the respiration of other organisms can be useful in manufacturing products e.g. bread. Describe the effects of drugs on mental and physical health. See content list for HT2 Describe and calculate work done. 	<ul style="list-style-type: none"> Identify the components that make up a 'balanced diet' and describe their importance in maintaining health. Describe the effects of nutrient deficiencies on health. Describe how to test foods for key nutrients and record data. Describe the main stages of digestion. Explain how the small intestine is adapted for the absorption of nutrients. Describe the role of enzymes and bacteria in digestion. Identify the difference between elements, compounds and mixtures. Identify the chemical symbols from the Periodic Table. 	<ul style="list-style-type: none"> Identify the reactants and products within a reaction. Explain chemical change and conservation of mass. Describe and write word equations for combustion. Compare non-renewable and renewable fuels. Describe thermal decomposition and write word equations for the reaction. Identify and analyse experimental data to determine endothermic and exothermic reactions. Interpret energy level diagram showing exothermic or endothermic changes. Calculate the bond energies for a reaction when given data on bond strengths. Compare longitudinal and transverse waves. 	<ul style="list-style-type: none"> Describe Darwin's theory of natural selection. Use Darwin's theory to explain how organisms evolve over time. Consider the implications of Darwin's theory on the accepted theory at the time (creationism). Describe factors that could lead to the extinction of a species. Define the term 'biodiversity' and explain its importance in an ecosystem. Describe some techniques used e.g. by Zoos to prevent extinction. Identify contact and non-contact forces. Describe and investigate Hooke's Law Describe levers and moments and apply equations to calculate moments. 	<ul style="list-style-type: none"> Describe how characteristics are inherited. Describe the structure of DNA and describe various collaborations by other scientists in the field. Describe the difference between dominant and recessive alleles and use a Punnett square to predict how genes can be inherited by offspring. Describe how a product can be genetically modified and give examples of such products. Define global warming and identify the names of the greenhouse gases. Describe the proportions of gases that make up the Earth's atmosphere the changes in the levels of carbon dioxide using the stages of the carbon cycle. 	<ul style="list-style-type: none"> Define the term 'producer'. Identify the raw material and products involved in photosynthesis. Describe how a plant obtains the raw materials for photosynthesis. Explain how the structure of the leaf is adapted for photosynthesis. State factors that can affect the rate of photosynthesis. Perform an investigation to test a leaf for starch. Describe how a plant uses key minerals found in fertiliser for healthy growth. Investigate properties of permanent magnets. Describe and investigate magnetic fields around a permanent magnet.

	<ul style="list-style-type: none"> Describe heating and cooling with reference to energy. Describe conduction, convection and radiation. Apply the particle model of matter to compare and explain conduction, convection and radiation 	<ul style="list-style-type: none"> Explain how chemical formulae is determined by the type and number of elements. Describe the structure and properties of polymers. Describe the arrangement of the periodic table. Analyse data to identify trends in Groups and predict properties of an unknown element. Describe and explain trends of Group 1, 7 and 0 elements. Describe and write word equations for the displacement of metal halides. 	<ul style="list-style-type: none"> Describe parts of a wave/wave properties. Describe sound waves. Investigate reflection and refraction of light. Describe primary and secondary colours of light. Explain the effect of filters on coloured light. Describe the EM spectrum. Compare uses of waves in the EM spectrum. 	<ul style="list-style-type: none"> Describe the effect of pressure in solids. Calculate pressure. Explain the effects pressure in liquids. Explain the effects pressure in gases. 	<ul style="list-style-type: none"> Compare the relative effects of human-produced and natural global warming. Describe how metals can be extracted from their ores. Explain why it is important that materials are recycled. Describe how some resources are recycled into useful materials. Analyse data and suggest ways of reducing consumption or propose alternatives. See content from last half term 	<ul style="list-style-type: none"> Compare magnets and electromagnets. Investigate the factors that affect the strength of an electromagnet. Describe uses of electromagnets:.
<p>KS3 National Curriculum Links</p>	<p>Please see K3 programme of study for details of KS3 content covered. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/335174/SECONDARY_national_curriculum_-_Science_220714.pdf</p> <p>Our KS3 course is also resourced using the AQA Activate Kerboodle resource. Year 8 is resourced using Activate 2. https://global.oup.com/education/secondary/kerboodle/science/aqa-activate-kerboodle/?region=uk</p>					
<p>MAPs</p>	<p>MAP 1 Breathing & Respiration MAP 1 Elements MAP 2 The Periodic Table</p>	<p>MAP 2 Digestion MAP 1 Energy 2</p> <p>P2S1 P2S1 P2S1</p>	<p>MAP 3 Types of Reactions & Energy Changes MAP 2 Waves</p>	<p>MAP 3 Evolution MAP 3 Forces</p> <p>P2S2 P2S2 P2S2</p>	<p>MAP 4 Evolution & Natural Selection MAP 4 Earth's Climate & Resources</p>	<p>MAP 5 Photosynthesis MAP 4 Magnets & Electromagnets</p> <p>P2S3 P2S3 P2S3</p>

Key Stage 3 Curriculum Journey: Science

Pupils recall prior learning and develop their use of concise, scientific language to communicate a deeper understanding of key concepts. The 'bigger picture' of science emerges as topics begin to overlap.

YEAR 9 CURRICULUM JOURNEY						
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Topic	<p>Cells: Cell Structure and Cell division</p> <p>Matter - Atomic Structure</p> <p>Matter - Energy in matter (particle theory)</p>	<p>Cells: Cell Transport</p> <p>Matter Periodic Table</p> <p>Energy in matter (continued)</p>	<p>Organisation: Digestion</p> <p>Reactivity of metals</p> <p>Energy</p>	<p>Organisation: Circulation</p> <p>Reactions of acids</p> <p>Energy continued</p>	<p>Bioenergetics: Respiration</p> <p>Energy Changes</p> <p>Electricity: Circuit Electricity</p>	<p>Bioenergetics: Photosynthesis</p> <p>Energy Changes</p> <p>Electricity: Circuit Electricity continued</p> <p>$V=IR$ $P=IV$</p>
Key Knowledge, Skills & Understanding	<ul style="list-style-type: none"> Give examples of organisational hierarchy in multicellular organisms Compare eukaryotic and prokaryotic cells Describe the function of their organelles Use a scale to calculate the size of an object using standard form Use a light microscope to observe, draw and label cells Describe the development of microscopy techniques over time. Describe the function of specialised plant and animal cells Explain how structure and function are related Explain the importance of cell differentiation. Describe diffusion. Explain factors that affect the rate of diffusion. 	<ul style="list-style-type: none"> Describe movement of water via osmosis. Explain effects of osmosis on plant and animal cells Investigate the effect of osmosis on Calculate percentage mass gain/loss via osmosis. Give examples of tissues that rely on active transport to absorb materials Describe how materials move by active transport. Compare diffusion, osmosis and active transport. State how the elements are ordered in the periodic table Explain the development of the periodic table Describe the properties and trends of Group I metals. Describe how Group I metals react with water using word and symbol equations 	<ul style="list-style-type: none"> Describe role of key organs in the digestive system. Explain their adaptations Link adaptations of the small intestine to the process of diffusion. Explain the role of enzymes in digestion. Identify factors that affect enzyme activity Explain how the body maintains optimum conditions for enzymes Investigate factors that affect the rate of enzyme activity Describe how to test foods for key nutrients and record data List the order of common metals in the reactivity series. Write word and balanced symbol equations for the 	<ul style="list-style-type: none"> Label the key tissues of the heart. Describe their function Describe the role of blood vessels Describe the functions of blood components Compare the composition of oxygenated and deoxygenated blood Describe what coronary heart disease is Identify factors that increase risk of CHD Describe interventions to treat coronary heart disease Evaluate treatments for CHD and faulty heart valves. Describe how universal indicator and pH scale can be used to classify a solution as acidic, neutral or alkaline. 	<ul style="list-style-type: none"> Define the term 'respiration'. Use word and symbol equations to summarise aerobic and anaerobic respiration. Compare the process of aerobic and anaerobic respiration. Describe the process of fermentation with an equation. Describe and explain the effects of exercise on the body. Explain what is meant by 'oxygen debt' and recovery time. Define exothermic and endothermic reactions. Investigate temperature changes in reactions between solutions 	<ul style="list-style-type: none"> Label a cross section of a leaf Explain how the structure and organisation of plant tissues is related to their function State the raw materials and products of photosynthesis Summarise the photosynthesis reaction with a word equation. Identify 'limiting factors' and explain how they affect rate of photosynthesis Describe the importance of limiting factors on economics e.g. farmers. Describe how plants use the products from photosynthesis See content from last term See content from last half term

	<ul style="list-style-type: none"> • Calculate surface area to volume ratios • Compare diffusion in unicellular and multicellular organisms • Recall names and symbols of the first 20 elements. • Write chemical formulae of elements and compounds. • Write word and balanced symbol equations including state symbols • Explain why mass is conserved in a chemical reaction. • Explain the difference between a compound and a mixture. • Explain different separation techniques. • Describe the development of the model of the atom based on evidence • State the relative charges and masses of sub-atomic particles • Describe atoms using the nuclear model • Use atomic number and mass numbers of atoms to determine the number of each sub-atomic particle • State location of electrons in shells • Explain patterns between elements in the same group • State the relative sizes of an atom. • Explain why ions have a charge • Define and describe an isotope. • Physical properties of solids, liquids and gases. • Density investigation • Define Internal Energy • Define specific heat capacity and specific latent heat 	<ul style="list-style-type: none"> • Explain how Group 1 metals form ions • Describe properties and trends of Group 7 elements. • Investigate halogen displacement reactions • Write word, symbol and ionic equations for Group 7 reactions. • Apply knowledge of reactivity and explain trend in reactivity of Groups 2 and 6. • List the typical properties of transition metals and their compounds. • Compare their properties with Group 1 • Interpret the formula and names of transition metal compounds. • See content from last half term 	<p>reaction of metals and oxygen</p> <ul style="list-style-type: none"> • Investigate the reaction of metals with acid • Use the reactivity series to predict and explain displacement reactions • Describe and explain oxidation and reduction reactions in terms of electron transfer • Describe how metals can be extracted from ores • Explain why some metals are found native in the Earth's • Evaluate the extraction process to obtain a metal from its ore. • Describe changes in energy systems • Calculate kinetic, gravitational potential and elastic potential energy. • Calculate specific heat Capacity • Calculate power • Describe wasted energy • Explain how to increase energy efficiency • Explain thermal insulation • Describe National and Global Energy Resources 	<ul style="list-style-type: none"> • Use ionic equations to explain how solutions can be acidic or alkaline • Name salts formed between a metal, metal carbonates, metal hydroxides, metal oxides and acids • Describe how to make a salt • Prepare a pure, dry sample of a soluble salt from an insoluble base and a dilute acid • Explain the agricultural importance of salts • Describe how an acid or alkali can be concentrated or dilute • Describe how an acid or alkali can be weak or strong • Explain the difference between concentration and strong or weak in terms of acids and alkalis • See content from last half term 	<ul style="list-style-type: none"> • Describe applications of exothermic and endothermic reactions. • Sketch reaction profiles • Explain activation energy • Explain how a chemical reaction occurs using particle model • Explain energy change in terms of bond making and bond breaking • Calculate energy transferred in a reaction using bond energy data • Evaluate the uses of exothermic and endothermic reactions. • Identify circuit symbols • Calculate charge flow • Calculate Potential Difference, current and resistance • Investigation-series and parallel Circuits • Describe current-voltage characteristics of resistors • Investigation -current-voltage characteristics • Describe how current, potential difference and resistance differ in series and parallel circuits. 	
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	<ul style="list-style-type: none"> • Explain and interpret heating/cooling curves • Describe particle motion in gases. • Calculate gas pressure and volume • Link Gas Pressure, Volume and Temperature 					
<p>KS3 National Curriculum Links</p>	<p>Please see K3 programme of study for details of KS3 content covered. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/335174/SECONDARY_national_curriculum_-_Science_220714.pdf</p> <p>Our KS3 course is also resourced using the AQA Activate Kerboodle resource. Year 9 is resourced using Activate 3. https://global.oup.com/education/secondary/kerboodle/science/aqa-activate-kerboodle/?region=uk</p>					
<p>MAPs</p>	<p>MAP 1- Cells MAP 1- Atomic Structure MAP 1- Particle Theory</p>	<p>P2S1 P2S1 P2S1</p>	<p>MAP 2- The Digestive System MAP 2 –The Periodic Table MAP 2- Energy Stores</p>	<p>P2S2 P2S2 P2S2</p>	<p>MAP 3- The Heart & Circulation MAP 3- Chemical changes MAP 3- National and Global Energy Resources</p>	<p>MAP 4- Bioenergetics MAP 4– Energy changes MAP 4- Series and parallel circuits P2S3 P2S3 P2S3</p>