

Holywell School Curriculum Overview

Key Stage 3 Curriculum Overview – Science

Curriculum Intent

Science is diverse and exciting. It helps students to explore the world around them and understand many things that have such relevance to their daily lives, thus enabling them to ‘Live life in all its fullness’. Our science curriculum aims to inspire and excite children about science, stimulate curiosity, awareness, and challenge through scientific enquiry, and provide opportunities for collaboration and independent work to develop substantive and disciplinary knowledge. The core principals of science teaching at Holywell are to develop students’ knowledge and understanding of science; and equip students with the skills to be able to work scientifically.

Our school values are the driving force behind our attitudes, behaviours, and actions. A key aspiration in science is for students to be curious and have the confidence to explore their ideas. We want students to live and learn as scientists. This links explicitly with values such as patience, responsibility, courage, kindness, respect, honesty, humility, perseverance, and empathy. In lessons we promote our values and try to engender a spirit of collaboration.

We want students to have high aspirations and be the best versions of themselves. We encourage them to question, seek answers and have a love of learning. We have high expectations for all students to aim high and work hard. We courage students to set goals and think about how to achieve them. We promote the importance of taking care of yourself physically and mentally by eating well, exercising regularly, getting enough sleep, and managing stress. Our classrooms are positive, supportive, and encouraging.

With such a key focus on practical experimentation, we generate lots of communities – in terms of community spirit in lessons, paired and group work, discussion at small group and whole class level, and practical collaboration. Students are encouraged to develop their skills together, share knowledge, share findings, and seek and give feedback to/from peers.

It is our intention for all students to make progress from their respective starting point and to achieve personal success. To reach this goal requires versatile and imaginative teachers, effective teaching and learning strategies, and high expectations. We believe students should be able to recognise, describe, use, and apply key scientific ideas to explain abstract phenomena. Scientific enquiry links direct practical experience with key scientific ideas and is therefore integrated into lessons rather than taught separately. We encourage students to reflect on the evidence that supports scientific interpretations. Above all, Science is to be enjoyed.

Term	Year 7	Year 8
Autumn term 1	<p><u>Cells</u> To learn about the seven life processes used to classify living organisms, cells and their structure, how to use microscopes, the structure and function of specialised, movement of substances, and unicellular organisms.</p> <p>Know common characteristics, which enable us to distinguish between things that are alive, things that are dead, and things that have never been alive. Know cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope. Know the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria, and chloroplasts. Know the similarities and differences between plant and animal cells and the specialisation of cells. Know role of diffusion in the movement of materials in and between cells. Know the structural adaptations of some unicellular organisms.</p>	<p><u>Health and lifestyle</u> To learn about nutrients, food tests, unhealthy diets, the digestive system, bacteria and enzymes in digestion, drugs, alcohol, smoking and their effects on the body.</p> <p>Know the content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre, and water, and why each is needed. Know the calculations of energy requirements in a healthy daily diet. Know the consequences of imbalances in the diet, including obesity, starvation, and deficiency diseases. Know the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food. Know the importance of enzymes and bacteria in the human digestive system. Know the effects of drugs, alcohol, and smoking on the body.</p>

Holywell School Curriculum Overview

	<p><u>Particles and their behaviour</u></p> <p>To learn about the particle model, states of matter, melting and freezing, boiling, evaporation, condensation, diffusion, and gas pressure.</p> <p>Know the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure.</p> <p>Know changes of state in terms of the particle model.</p> <p>Know diffusion and Brownian motion in terms of the particle model.</p> <p>Know how gas pressure is created by particles and the factors affecting it.</p>	<p><u>Acids and alkalis</u></p> <p>To learn about acids and alkalis, indicators and pH, neutralisation, and making and naming salts.</p> <p>Know how to identify and minimise hazards and risk.</p> <p>Know the key differences and properties of acids and alkalis.</p> <p>Know the pH scale for measuring acidity/alkalinity, and indicators.</p> <p>Know how to define acids and alkalis in terms of neutralisation reactions.</p> <p>Know the reactions of acids with alkalis to produce a salt plus water.</p>
Evidence of learning	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.
Links to prior learning	<p>From KS2 most students will be able to: identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers (Y3); describe the simple functions of the basic parts of the digestive system in humans (Y4); describe the life cycles common to a variety of animals, including humans (birth, growth, development, reproduction and death), and to a variety of plants (growth, reproduction and death) (Y5); identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood (including the pulse and clotting) (Y5); describe the life process of reproduction in some plants and animals (Y6); use results from experiments as evidence (Y5 and 6).</p> <p>From KS2 most students will be able to identify that humans and some other animals have skeletons and muscles for support, protection and movement (Y3); identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (Y6). From previous units, most students may be able to describe the relationship between cells, tissues, organs and organ systems (Y7); recall the organs in and functions of the main human organ systems (Y7); recall that some cells are adapted to their functions (Y7); recall respiration as a life process (Y7). It will link to further study in Year 8.</p> <p>From KS2 most students will be able to compare and group materials together, according to whether they are solids, liquids or gases (Y4); understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (Y5); use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (Y5).</p>	<p>From KS2 most students will be able to recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function. From previous units, most student will be able to recall the main parts of the digestive system (Y7), describe how some cells are adapted to functions (Y7), describe how soluble substances are carried by the blood (Y7), explain the importance of a healthy skeleton (Y7), recall some of the effects of alcohol on the body (Y7), describe how animals depend on other animals and plants for food (Y7), describe what happens during diffusion, in terms of particles (Y7) and compare energy values of different foods using labels, including interpreting nutrition information labels (Y7).</p> <p>From KS2 most students will be able to: recall some examples of reversible and irreversible changes (Y5); recall what happens when acids are mixed with bicarbonate of soda (Y5); describe how a solution is formed from a solute and a solvent (Y7); describe how to obtain soluble solids from a solution (Y7).</p>

Holywell School Curriculum Overview

Links to future learning	GCSE Cell biology Organisation Particle model of matter	GCSE Infection and response Homeostasis and response Reactions of acids
Autumn term 2	<p><u>B1 – Structure and function of body systems</u></p> <p>To learn about the levels of organisation of living organisms focussing on different body systems with emphasis on gas exchange, breathing, skeleton, joints, and muscles.</p> <p>Define and state examples of tissues, organs, and organ systems. Explain the hierarchy of organisms in a multicellular organism. Describe the structure of the gas exchange system. Describe how parts of the gas exchange system are adapted to their function. Describe the processes of inhaling and exhaling. Describe how a bell jar can be used to model what happens during breathing. Explain how to measure lung volume. Describe the structure of the skeleton. Describe the functions of the skeletal system. Describe the role of joints in movement. Explain how to measure the force exerted by different muscles. Describe the function of major muscle groups. Explain how antagonistic muscles cause movement.</p>	<p><u>P2 – Electricity and magnetism</u></p> <p>To learn about electrical circuits and components, charge, potential difference, series and parallel circuits, resistance, magnets and magnetic fields, electromagnets, and their uses.</p> <p>Know electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. Know potential difference, measured in volts, battery, and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. Know differences in resistance between conducting and insulating components (quantitative). Know separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects. Know the idea of electric field, forces acting across the space between objects not in contact. Know magnetic poles, attraction, and repulsion. Know magnetic fields by plotting with compass, representation by field lines. Know Earth's magnetism, compass, and navigation. Know the magnetic effect of a current, electromagnets, D.C. motors (principles only).</p>
Evidence of learning	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.
Links to prior learning	From KS2 most students will be able to identify that humans and some other animals have skeletons and muscles for support, protection and movement (Y3); identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (Y6). From previous units, most students may be able to describe the relationship between cells, tissues, organs and organ systems (Y7); recall the organs in and functions of the main human organ systems (Y7); recall that some cells are adapted to their functions (Y7); recall respiration as a life process (Y7).	From KS2 most students will be able to construct simple circuits and use them to find out whether materials are conductors or insulators; know how switches work; draw circuit diagrams and construct circuits from diagrams using conventional symbols; be able to investigate the effect of changing components in a circuit on the brightness of bulbs; describe the effects of changing the voltage of a battery; describe the effects of short circuits and the use of fuses.

Holywell School Curriculum Overview

Links to future learning	GCSE Organisation Homeostasis and response	GCSE Electricity Magnetism and electromagnetism
Spring term 1	<p><u>Light</u> To learn about the properties of light, reflection, refraction, the camera and the eye, and colour.</p> <p>Describe what happens when light interacts with materials. State the speed of light. Explain how images are formed in a plane mirror. Explain the difference between specular reflection and diffuse scattering. Describe and explain what happens when light is refracted. Describe what happens when light travels through a lens. Describe how the eye works. Describe how a simple camera forms an image. Explain what happens when light passes through a prism. Describe how primary colours add to make secondary colours. Explain how filters and coloured materials subtract light.</p> <p><u>Reproduction</u> To learn about adolescence, puberty, reproductive systems, fertilisation, implantation, the development of a foetus, the menstrual cycle and contraception.</p> <p>Know the difference between adolescence and puberty. Know the main changes that take place during puberty. Describe the main structures in the male and female reproductive systems. Describe the function of the main structures in the male and female reproductive systems. Describe the structure and function of gametes. Describe the process of fertilisation. Describe what happens during gestation, to include the effect of maternal lifestyle on the foetus through the placenta. Describe what happens during birth. State what the menstrual cycle is. Describe the main stages in the menstrual cycle.</p>	<p><u>Energy</u> To learn about food and fuels, types of energy, energy and temperature, energy transfer by particles, energy transfer by radiation, energy resources (including renewables), energy and power, work, energy, and machines.</p> <p>Compare the energy values of foods and fuels. Compare the energy values in foods and fuels with the energy needed for different activities. Describe energy before and after a change. Explain what brings about changes in energy. State the difference between energy and temperature. Describe what happens when you heat up solids, liquids, and gases. Explain what is meant by equilibrium. Describe how energy is transferred by particles in conduction and convection. Describe how an insulator can reduce energy transfer. Describe some sources of infrared radiation. Explain how energy is transferred by radiation. Describe the difference between a renewable and non-renewable energy resource. Describe how electricity is generated in a power station. Explain the difference between energy and power. Describe the link between power, fuel use, and the cost of using domestic appliances.</p> <p><u>Separation techniques</u> To learn about mixtures, solutions, solubility, filtration, evaporation, distillation, and chromatography as methods for separating substances.</p> <p>Describe particle arrangements in mixtures. Explain how to identify pure substances. Describe solutions using key words. Use the particle model to explain dissolving. Explain what a saturated solution is. Explain the meaning of solubility. Explain how filtration works. Describe how to filter a mixture.</p>

Holywell School Curriculum Overview

		<p>Explain how to use evaporation to separate mixtures.</p> <p>Explain how distillation works.</p> <p>Explain how chromatography separates mixtures.</p> <p>Analyse chromatograms to identify substances in mixtures.</p>
Evidence of learning	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.
Links to prior learning	<p>This unit builds on the work on light in Y6. It gives teachers the opportunity to revisit key foundational knowledge and understanding and develop ideas around light in greater detail. Here we consider the law of reflection, refraction and the eye. From KS2 most pupils will understand that light travels in straight lines and use this idea to explain how objects are seen (Y6); Explain why shadows have the same shape as the objects that cast them and predict the size of shadows when the position of the light source changes (Y6). From previous KS3 units most pupils should recall that energy is transferred by waves (Y7); Describe different kinds of waves (Y7); Recall that waves travel at different speeds in different materials (Y7).</p> <p>The reproduction topic follows on from the life cycles topic in Y5 and the Cells topic at the beginning of Y7. We revisit specialised cells (gametes) and relate to function. The topic also forms cross curricular links with PSHE as the students are learning about sex and relationships at this time.</p>	<p>From previous work, most students will be able to use the particle model of matter to explain the properties of solids, liquids and gases (Y7); recall some ways in which energy is transferred and stored (Y7); recall the law of conservation of energy, and that the efficiency of a machine tells us how much energy is transferred as wasted energy (Y7).</p> <p>From KS2 most students will: observe that some materials change state when; they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C) (Y4); identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature (Y4); understand how some materials dissolve in liquid to form a solution (Y5); describe how to recover a substance from a solution (Y5); use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (Y5); demonstrate that dissolving, mixing and changes of state are reversible changes (Y5).</p>
Links to future learning	<p>GCSE</p> <p>Waves</p> <p>Energy</p> <p>Ecology</p> <p>Inheritance, variation and evolution</p>	<p>GCSE</p> <p>Energy</p> <p>Chemical analysis</p>
Spring term 2	<p><u>Atoms, elements, and compounds</u></p> <p>To learn about atoms, elements, compounds, and chemical formulae.</p> <p>State what an element is.</p> <p>Recall the chemical symbols of six elements.</p> <p>State what atoms are.</p> <p>Compare the properties of one atom of an element to the properties of many atoms.</p> <p>State what a compound is.</p> <p>Explain why a compound has different properties to the elements in it.</p> <p>Write the chemical names for some simple compounds.</p>	<p><u>The periodic table</u></p> <p>To learn about metals and non-metals, groups and periods, the elements of Group 1, the element of Group 7, and the elements of Group 0.</p> <p>Explain how elements are classified as metals and non-metals.</p> <p>Use patterns to classify an element as a metal or non-metal.</p> <p>Use patterns to predict the properties of elements.</p> <p>Compare patterns in properties in the groups and periods of the Periodic Table.</p> <p>Interpret data to describe the patterns in properties of the Group 1 elements.</p> <p>Use patterns to predict properties of Group 1 elements.</p>

Holywell School Curriculum Overview

	Write and interpret chemical formulae.	Use patterns to predict properties of group 7 elements. Describe displacement reactions. Describe the physical and chemical properties of the Group 0 elements. Use patterns to predict properties of Group 0 elements.
Evidence of learning	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.
Links to prior learning	This topic builds on the work done during the particles and their behaviour topic at the beginning of Y7. It aims to bridge the gap between 'Particles' and 'Atoms'. It is vital for this topic to be studied prior to our Y7 topic on 'Reactions' in order to understand more challenging concepts like 'combustion', 'decomposition' and 'conservation of mass'	From KS2, most students will be able to compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets, 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. From previous units, most students will be able to describe the difference between chemical and physical changes (Y7), use the particle model to explain other observations about matter (Y7), describe elements, mixtures and compounds using words and particle diagrams (Y7), use chemical symbols for common elements and explain why they are an international code (Y7), describe and identify metals and non-metals by their properties (Y7), describe the changes you might see when compounds are formed (Y7) and name simple compounds and use word equations to describe chemical reactions (Y7).
Links to future learning	GCSE Atomic structure and the periodic table Bonding, structure, and the properties of matter	GCSE Atomic structure and the periodic table Bonding, structure, and the properties of matter
Summer term 1	<p>Reactions</p> <p>To learn about chemical reactions, word equations, burning fuels, thermal decomposition, conservation of mass, and exothermic and endothermic reactions.</p> <p>Describe what happens to atoms in chemical reactions. Explain why chemical reactions are useful. Compare chemical reactions to physical changes. Identify reactants and products in word equations. Write word equations to represent chemical reactions. Predict products of combustion reactions. Categorise oxidation reactions as useful or not. Identify decomposition reactions from word equations. Use a pattern to predict products of decomposition reactions. Explain conservation of mass in chemical reactions.</p>	<p>Reactions of metals and acid</p> <p>To learn about acids and metals, metals and oxygen, metals and water, metal displacement reactions, extracting metals, ceramics, polymers, and composites.</p> <p>Compare the reactions of different metals with dilute acids. Explain the test for hydrogen gas. Compare the reactions of different metals with oxygen. Use state symbols in balanced formula equations. Compare the reactions of metals with water. Use the reactivity series to predict reactions. Predict pairs of substances that react in displacement reactions. Use the reactivity series to explain displacement reactions. Use the reactivity series to decide which metals can be extracted from their ores by heating with carbon.</p>

Holywell School Curriculum Overview

	<p>Calculate masses of reactants and products. Describe the characteristics of exothermic and endothermic changes. Classify changes as exothermic or endothermic.</p> <p><u>Forces</u> To learn forces, squashing and stretching, drag forces and friction, forces at a distance, and balanced and unbalanced forces.</p> <p>Explain what forces do. Describe what is meant by an interaction pair. Describe how forces deform objects. Explain how solid surfaces provide a support force. Use Hooke's law. Describe the effect of drag forces and friction. Explain why drag forces and friction arise. Describe the effects of a field. Describe the effect of gravitational forces on Earth and in space. Describe the difference between balanced and unbalanced forces. Describe situations that are in equilibrium. Explain why the speed or direction of motion of objects can change.</p>	<p>Calculate the amounts of metals in ores. Describe ceramic properties. Explain why the properties of ceramics make them suitable for their uses. Describe polymer properties. Explain how polymer properties make them suitable for their uses. Describe composite properties. Explain why composite properties make them suitable for their uses.</p> <p><u>Adaptation and inheritance</u> To learn about competition and adaptation, adapting to change, variation, continuous and discontinuous, inheritance, natural selection, and extinction.</p> <p>Describe some resources that plants and animals compete for. Describe how organisms are adapted to their environments. Describe how organisms adapt to environmental changes. Describe how competition can lead to adaptation. Describe how variation in species occurs. Describe the difference between environmental and inherited variation. Describe the difference between continuous and discontinuous variation. Represent variation within a species using graphs. Describe how characteristics are inherited. Describe how scientists worked together to develop the DNA model. Describe the process of natural selection. Describe how organisms evolve over time. Describe some factors that may lead to extinction. Describe the purpose of gene banks.</p>
Evidence of learning	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.
Links to prior learning	<p>This unit builds on the work on properties and changes in materials in Y6. It gives teachers the opportunity to revisit key foundational knowledge and understanding and develop ideas around evidence of reactions greater detail. Here we consider different types of reactions and develop understanding of word equations. This unit follows on from elements, atoms and compounds.</p> <p>We revisit types of forces and how forces affect objects. Further investigative work around drag, and friction allows development of working scientifically skills.</p>	<p>Metals and their uses – From KS2 most pupils will be able to compare and group together everyday materials based on their properties including hardness, solubility, transparency, conductivity and response to magnets; 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. From previous KS3 units most pupils will be able to describe the difference between chemical and physical changes (Y7); use the particle model to explain other observations about matter (Y7); Describe elements, mixtures and compounds using words and particle diagrams (Y7); Use chemical</p>

Holywell School Curriculum Overview

	<p>From KS2 most students will be able to describe different kinds of forces, including magnetism, gravity, upthrust and friction, and be able to classify these as contact or non-contact forces; identify the effect of drag forces that act between moving surfaces; describe why moving objects that are not driven tend to slow down. It will link to further study in Y8 through units (Energy transfers) and (Earth and space).</p>	<p>symbols for common elements (Y7); Describe and identify metals and non-metals by their properties (Y7); Name simple compounds and describe the changes you might see when they are formed (Y7).</p> <p>From KS2 most students will be able to identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other; construct and interpret a variety of food chains, identifying producers, predators and prey (Y4); describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals (Y6)</p>
Links to future learning	<p>GCSE Forces Organic chemistry The rate and extent of chemical change</p>	<p>GCSE Quantitative chemistry Inheritance, variation and evolution</p>
Summer term 2	<p><u>Waves</u> To learn about waves, vibrations and energy transfer, loudness and pitch, detecting sound, and echoes and ultrasound.</p> <p>Describe the different types of waves and their features. Describe what happens when water waves hit a barrier. Describe what happens when waves superpose. Describe how sound is produced and travels. Explain why the speed of sound is different in different materials. Contrast the speed of sound and the speed of light. Describe the link between loudness and amplitude. Describe the link between frequency and pitch. State the range of human hearing and describe how it differs from the range of hearing in animals. Describe how the ear works. Describe how your hearing can be damaged. Describe how a microphone detects sound. Describe what ultrasound is. Describe some uses of ultrasound.</p>	<p><u>Green plants and ecosystems</u> To learn about flowers and pollination, fertilisation and germination, seed dispersal, photosynthesis, leaves, plant minerals, chemosynthesis, aerobic and anaerobic respiration, food chains and webs, disruption to food chains and webs, and ecosystems.</p> <p>Identify the main structures of a flower. Describe the processes of pollination. Describe the differences between wind-pollinated and insect-pollinated plants. Describe the process of fertilisation in plants. Describe how seeds and fruits are formed. State the ways seeds can be dispersed. Describe how a seed is adapted to its method of dispersal. Describe the process of photosynthesis. State the word equation for photosynthesis. Describe the structure and function of the main components of a leaf. Explain the distribution of chloroplasts in a leaf. Describe how a plant uses minerals for healthy growth. Explain the role of nitrates in plant growth. Describe where chemosynthesis takes place. Describe the process of chemosynthesis.</p>

Holywell School Curriculum Overview

		<p>State the word equation for aerobic respiration. Describe the process of aerobic respiration. State the word equation for anaerobic respiration. Describe the differences between aerobic and anaerobic respiration. Describe what food chains and food webs show. Describe what food webs show. Describe the interdependence of organisms. Describe how toxic materials can accumulate in a food web. Describe how different organisms co-exist with an ecosystem. Identify niches within an ecosystem.</p>
Evidence of learning	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.	Students will know more and be able to do more than they could before completing the unit. Students will have the component knowledge listed above.
Links to prior learning	This topic builds on the work done in Y3/4 on sound and hearing. It also follows the topic on light in Y7 Spring term. Key terminology around loudness, amplitude, frequency and pitch is covered. Students look in detail at the ear and how it works and develop an understanding of echoes and ultrasound.	From previous units, most students will be able to recall that plants need light to make food by photosynthesis (Y7); describe how organisms need a male and a female for sexual reproduction (Y7); describe how energy is released from food by respiration, which usually needs oxygen from the air and releases carbon dioxide as a waste gas (Y7). It will link to further study in Y8 through Units (Plant reproduction) and (Unicellular organisms).
Links to future learning	GCSE Waves Forces	GCSE Ecology Bioenergetics
<p>Reading in the curriculum (Literacy & Vocabulary)</p> <p>We implement many strategies to help develop students' reading abilities through science study.</p> <p style="padding-left: 40px;">Vocabulary Building</p> <p style="padding-left: 80px;">When reading aloud, we introduce new vocabulary words and discuss their meanings. We encourage and support students to use new words in their writing. We develop subject specific vocabulary verbally and in writing.</p> <p style="padding-left: 40px;">Focus on Content</p> <p style="padding-left: 80px;">We dive deeply into a specific topic to expand vocabulary and comprehension We encourage students to summarise main ideas after reading.</p> <p style="padding-left: 40px;">Research Opportunities</p> <p style="padding-left: 80px;">We let students explore topics they enjoy through research projects. It enhances vocabulary and critical thinking.</p> <p style="padding-left: 40px;">Oral Language Practice</p> <p style="padding-left: 80px;">We provide opportunities for students to communicate and discuss content throughout lessons. We encourage students to read aloud together or with a partner.</p>		

Holywell School Curriculum Overview

Use Visual Aids

We incorporate visuals like charts, diagrams, and illustrations to enhance comprehension.

Expose Students to Different Discourse Patterns:

We explore various writing styles, and sentence structures (e.g. formal practical writing, comprehension, biography).

Promote Independent Reading Time:

We allocate time for students to consolidate and read independently.

Model Reading Strategies:

We demonstrate effective reading techniques, such as predicting, questioning, and inferring.

Careers in the curriculum

The Curriculum Careers Tool is a database of over 100 STEM careers sorted by National Curriculum topic in Science. By clicking on the topic, a selection of careers will be randomly presented. Each career includes a simple explanation of the job, a link that searches for counter-stereotypical images of that type of STEM worker and three attributes that are needed by people who do that job.

Please visit the link below to gain insight into the opportunities that open up to those who study science.

<https://nustem.uk/primarycareers/>

Protected Characteristics in the curriculum

We recognise the importance of exemplifying British values in our teaching and learning, and through our practice. In the science department, it is expected that this is much more likely to be effective through naturally occurring opportunities rather than specially contrived situations.

Democracy

We all have a role in influencing decisions, and everyone has a right to have their voices heard. We should be aware of our rights and responsibilities.

What does this look like in science?

Students work together practically in groups which encourages them to share views and opinions and take instructions from others.

There are opportunities for students to share their opinions and listen to the views of others.

The Rule of Law

Laws protect everyone and no-one is above the law. We should understand the need for rules to make a happy, safe and secure environment and know the consequences when rules are not followed.

What does this look like in science?

Students follow laboratory rules for the safety of all.

Individual Liberty

We have a freedom of choice and a right to respectfully express our views and beliefs. We can act as we choose within the law. The rights of ourselves and the others around us are protected.

What does this look like in science?

There are opportunities for students to work independently and make choices in a safe environment when carrying out investigations.

Mutual Respect and Tolerance

There is equality and fairness for all, regardless of background or religious beliefs. We understand that we do not all share the same beliefs. We respect the values, ideas and beliefs of others and do not impose our own onto them.

What does this look like in science?

Students work together practically in groups which encourages teamwork and respect for others.

There are opportunities to learn about scientific discoveries by a diverse range of people from our culture and other cultures.

Holywell School Curriculum Overview

Students learn about the continual evolution of scientific ideas which occurs through the acceptance that different people have different ideas about a concept

Safeguarding including safety in the curriculum

Although students have always been taught to work safely, there is now a more general requirement that they are taught about health and safety and how it should be implemented. Students should understand something of the principles of health and safety, which is more than learning how to follow a set of safe working instructions. Teaching and learning science offers many opportunities for students to learn about health and safety in a 'live' practical situation which can provide them with insights into health and safety in general. Recognising hazards, assessing risk and working safely are important skills not only in the school laboratory but also at home and at work.

Students are taught how to work safely. They learn how to follow a set of safe working instructions, recognising dangers and hazards, assessing risk and working safely with and around others.

Students are taught how to judge risks to which they might be exposed. The health & safety principles which students learn include the following:

How to recognise and identify dangers/hazards

How to identify the possible risks from those hazards

What actions are needed to reduce those risks to an acceptable level

Who to tell if something goes wrong and why this is important

Opportunities to teach students about health and safety includes (but is not limited to):

handling and using unusual equipment, which may be sharp, heavy, bulky or just awkward to handle, and may also be relatively fragile

Forces – pushes, pulls, the effect of gravity and mass

Friction, and the lack of friction

Handling animals and plants, and growing plants

Working outdoors

Dissecting animal parts

Growing microorganisms

Materials and chemicals provided by the teacher

Chemical reactions and the chemicals which are produced

Flames, heating, and handling hot things

Electricity, particularly at mains and higher voltages

The Sun, lasers and other very bright lights

Values across the curriculum

Living our values

Our school values are the driving force behind our attitudes, behaviours, and actions. A key aspiration in science is for students to be curious and have the confidence to explore their ideas. We want students to live and learn as scientists. This links explicitly with values such as patience, responsibility, courage, kindness, respect, honesty, humility, perseverance, and empathy. In lessons we promote our values and try to engender a spirit of collaboration.

Being the best we can be

We want students to have high aspirations and be the best versions of themselves. We encourage them to question, be curious and have a love of learning. We have high expectations for all students to aim high and work hard. We encourage students to set goals and think about how to achieve them. We promote the importance of taking care of yourself physically and mentally by eating well, exercising regularly, getting enough sleep, and managing stress. Our classrooms are positive, supportive, and encouraging.

In community

Holywell School Curriculum Overview

With such a key focus on practical experimentation, we generate lots of communities – in terms of community spirit in lessons, paired and group work, discussion at small group and whole class level, and practical collaboration. Students are encouraged to develop their skills together, share knowledge, share findings, and seek and give feedback to/from peers.

Spirituality in the curriculum

Our curriculum supports the spiritual development of students by creating an environment of curiosity, exploring interconnectedness, and fostering open-mindedness. By developing these key attributes, we hope to develop a sense of connection to something bigger than ourselves, to help students 'Live life in all its fullness', living our values; being the best we can be, in community.

Through the science curriculum we aim to:

Consider the Ethics – We discuss the moral side of scientific work to instil a sense of responsibility e.g. dissection work, animal testing, pollution. Explore the moral aspects of technological advancements.

Boost Curiosity – We encourage pondering life's big questions while studying science concepts e.g. where do we come from? Are we alone in the universe? Looking for meaning and purpose in natural and physical phenomena. Wonder about what is special about life. Emotional drive to know more and to wonder about the world. Wonder at the vastness of space and the beauty of natural objects.

Pause for Mindfulness Moments – We integrate short mindfulness exercises for self-awareness and focus.

Connect Concepts – We emphasize how different scientific ideas are interconnected and explore interconnectedness.

Develop Open-Minded Learning – We foster an open-minded approach to scientific inquiry. Develop open mindedness to the suggestions of others.

Encourage Earth Respect – We relate scientific knowledge to caring for the environment.

Support Art-Science Fusion – We combine art and science for creative spiritual expression.

Develop Social Education – We encourage group practical work, team working skills and taking responsibility for their own and other people's safety. Encourage understanding that science has a major effect on the quality of our lives. Consider the benefits of scientific developments and the social responsibility involved.

Promote Cultural Education – We explore scientific discoveries as a part of our culture and the discoveries of other cultures. Highlight the scientific discoveries of a wide range of men and women in many different cultures.

How we track your progress

We use a variety of strategies to enable us to reflect on the impact of our curriculum and our teaching on student learning, outcomes and progress. Linking to our progress descriptors, all students' progress is tracked through the work they produce in lessons and their contribution to lessons. Summative and formative assessments include (but are not limited to):

Talking to students; asking questions

Providing Next step challenges

Live feedback in lesson

Periodic assessment tasks

Quizzes

Concept maps

Verbal/written outcomes

Reflection tasks

Presentations

Tests (End of topic / unit / half term / term / year)

Online assessments

Holywell School Curriculum Overview

Assessed pieces of work
Assessed practical investigations

Parents/Carers can support their child by:

- Promoting science as one of the core subjects and its relevance in many careers and jobs
- Encouraging questions and stimulate thinking
- Encouraging curiosity by discussing the questions your child asks. If you don't know the answer, explore it together.
- Stimulating thought by saying, "What do you think?" or "Let's find out together."
- Using KS2 BBC Bite size science to recap or read ahead on each topic
- Considering buying a revision guide or science workbook from WHSmith or online. CGP provide excellent resources
- Encouraging them to view science in the media
- Making sure they know how to write up a practical correctly
- Supporting them with keyword spelling, definitions and homework
- Asking them about everyday events and how science links in

Sustainability within the subject

We recognise the importance of teaching about sustainability to develop students' understanding and ideas around this concept. In the science department, we recognise that this is much more likely to be effective through naturally occurring opportunities but also within our curriculum plan. We cover sustainability through:

Energy Conservation: We discuss the importance of using energy efficiently and explore renewable energy sources like solar and wind power.

Water Management: We teach students about water conservation, pollution prevention, and the water cycle.

Waste Reduction: We explore recycling, composting, and reducing single-use plastics, and encourage waste reduction practices.

Biodiversity: We study ecosystems, habitats, and the impact of human activities on biodiversity, and discuss conservation efforts.

Climate Change: We explain the greenhouse effect, global warming, and ways to mitigate climate change.

Sustainable Agriculture: We explore plant lifecycles, organic farming, crop rotation, and the impact of pesticides on ecosystems.

Ecological Footprint: We calculate and discuss personal and global ecological footprints.

Life Cycle Analysis: We analyse the life cycle of products (from production to disposal) and their environmental impact.

Environmental Laws and Policies: We discuss regulations and policies related to environmental protection