Holywell School Curriculum Overview

Key Stage 2 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 5	Year 6
Autumn term 1	**Practical introduction to Science** To learn about the skills of scientific investigation. Safety in Science - How and why should we work safely in science? Following instructions - Why is it important to follow instructions? Baseline assessment - GL Baseline Assessment Identifying apparatus - How do we draw scientific equipment? Estimating, measuring, recording - What is estimating, measuring, recording, and analysing? Theory and evidence - How do scientists come up with their ideas, and how do they test them?	**Working scientifically** To review the skills required to work scientifically. To use a Bunsen burner safely. Safety in Science - How can we work safely in science? Following instructions - Why is it important to follow instructions? Identifying apparatus - How do we draw scientific equipment? Estimating, measuring, recording - What is estimating, measuring, recording, and analysing? Theory and evidence - How do scientists come up with their ideas, and how do they test them?

	Question to test – Flying straws - How do we plan an investigation with fair testing in mind? Variables/fair test – Bouncing balls - How do we write a conclusion based on our results?	Question to test – Flying straws - How do we plan an investigation with fair testing in mind? Variables/fair test – Bouncing balls How do we write a conclusion based on our results? Bunsen burner – parts/lighting - How do we use a Bunsen burner safely and effectively? Bunsen burner – How do we use a Bunsen burner safely and effectively?
Evidence of learning	Identify hazards and assess risk Follow lab rules to keep safe Can accurately draw apparatus and diagrams using a pencil and ruler Can make accurate estimates with justification Can measure with increasing accuracy Can draw a results table and record information appropriately Can draw a simple graph Can state a comparative relationship Can make a simple conclusion based on results Can develop lines of enquiry by asking simple questions Understands the concept of fair testing	Using a range of equipment and recording key measurements. Using straightforward to scientific evidence to answer questions. Making sensible estimates and taking a range of measurements with increasing accuracy and precision. Understanding how to decide whether results are accurate and reliable. Planning experiments for different kinds of scientific questions including how to make tests fair. Recording and interpreting data and results in diagrams, tables, bar graphs and line graphs Identify key evidence that has been linked to support our ideas. Writing conclusions that describe and explain our results. Analysing results and making suggestions to improve the investigation. Develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience. Identify key hazards within the science laboratory and state ways in which the risk can be minimised. Select and plan the most appropriate types of scientific enquires to test predictions. Identify the different types of variables. Use and derive simple equations and carry out appropriate calculations using SI units. Undertake basic data analysis of investigation results Evaluate data, showing awareness of potential sources of random and systematic error. Pay attention to objectivity and apply awareness for accuracy, precision, repeatability and reproducibility. Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations
Links to prior learning	Asking relevant questions and using different types of scientific enquiries to answer them Setting up simple practical enquiries, comparative and fair tests	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

<table>
<tr><td></td><td>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
Identifying differences, similarities or changes related to simple scientific ideas and processes
Using straightforward scientific evidence to answer questions or to support their findings.</td><td>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
Identifying scientific evidence that has been used to support or refute ideas or arguments</td></tr>
<tr><td>Links to future learning</td><td colspan="2"><u>Working scientifically in KS3</u>
Scientific attitudes
• pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
• 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
• evaluate risks
Experimental skills and investigations
• 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
• use appropriate techniques, apparatus, and materials during fieldwork and 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 possible improvements
• apply sampling techniques
Analysis and evaluation
• 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
Measurement</td></tr>
</table>

	• understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature • use and derive simple equations and carry out appropriate calculations • undertake basic data analysis including simple statistical techniques	
Autumn term 2	**<u>Forces</u>** To learn about forces and their effects, how to measure forces, how forces are represented, investigate friction and how to reduce it, upthrust, magnetism, gravity and air resistance, action and reactions forces, gears, pulleys, and simple machines. Forces - How do forces affect objects? Investigating magnetism - Which materials are magnetic? Measuring forces - How do we measure force accurately? Balanced and unbalanced forces - How can we tell if forces are balanced or unbalanced? Friction - Which surfaces create the most friction? Reducing friction - How can we reduce friction force? Investigating upthrust - What causes floating and sinking? Gravity and air resistance - How does gravity and air resistance affect an object? Gears and Pulley's- How can we use simple machines to our advantage? Action and Reaction - What is action and reaction?	**<u>Animals including humans – Adaptations and Habitats</u>** To learn about habitats and the conditions found within, adaptations and how animals and plant are adapted to their environment, design their own creature with adaptations and justification, Carl Linnaeus and his work, vertebrate and invertebrate groups, classification keys. Habitats - What is a habitat? Habitats 2 - Habitat research, presentation and Peer Review Adaptations - What are adaptations? Mythical monsters - What adaptations are found in literature? Classification - Why classify? Linnaeus - Who was Carl Linnaeus? The animal kingdom - What are vertebrates? The animal kingdom - What are invertebrates? Classification keys - How can classification keys help us to identify organisms?
Evidence of learning	**Students will be able to**: Identify forces and say how they affect objects Describe how magnets interact Investigate magnetic materials Use a force meter (Newton meter) accurately Draw force diagrams Identify balanced and unbalanced forces on an object Describe how balanced and unbalanced forces affect an object Investigate frication and how we can increase and reduce friction Investigate upthrust and density Investigate air resistance	**Students will be able to**: Identify different habitats and describe the environmental conditions Work collaboratively to research and present information about a habitat Peer review Describe adaptations of different plants and animals for different habitats Design a mystery creature with adaptations and justify them Describe and explain the current classification system of plants and animals Appreciate the work of People in Science: Carl Linnaeus
Links to prior learning	Forces – From previous units most pupils will know how to measure forces, and that they are measured in Newtons, recognise a variety of forces (including magnetism, friction, and air resistance), understand that forces can act in different directions, know that friction can slow moving objects looks at weight as a force. This unit builds	Interdependence, adaptation, classification, and keys – From previous units most pupils will Know what a habitat is and that animals eat plants and other animals; Know what plants need to grow well. Be able to explain differences between living and non-living things in terms of characteristics such as movement and growth;

	on work covered on forces from year 4 and looks at weight as a force caused by gravitational attraction of the Earth. Extension work is provided on the difference between weight and mass. It will link to KS3 through weight, gravitational attraction and mass; unbalanced forces affecting objects; ways in which frictional forces affect motion.	recognise similarities between large animals and between plants, and differences within groups of large animals; use simple keys to identify animals and plants. The Unit builds on Unit 3B Helping plants grow, Unit 4B Habitats, 5A keeping healthy, 5B Lifecycles. It also links to Units 3D Rocks and soils, 3F Light and shadows, 5C Gases around us and 6D Reversible and irreversible changes. It will link to further study in KS3 through plants, photosynthesis, and biomass; how to classify living things into major taxonomic groups; habitats, diversity, and interdependence; daily and seasonal changes in habitats and food webs and chains linking with toxicity. (7 and 8)
Links to future learning	P1.1 – Forces (Y7)	B2.3 – Adaptation and inheritance (Y8)
Spring term 1	**<u>Earth and space</u>** To learn about the awe and wonder of our universe, the planets, what makes Earth so special, day and night, years and leap years, seasons, phases of the moon. The rocky planets - What are the rocky planets? The gas giants - What are the gas giant planets? Our solar system 1 - Why is Earth so special in our solar system? Day and night - Why does the sun appear to move across the sky? Years and leap years - What is a leap year? The seasons - Why do we have seasons? Phases of the moon - Why does the Moon change shape? Mission to the moon - Could humans live on the Moon?	**<u>Electricity and circuits</u>** To learn about the dangers of electricity and how to be safe, investigate conductors and insulators, circuit symbols, drawing circuits, series and parallel circuits, switches, fuses. Electricity and safety - What are the dangers of electricity? Conductors and insulators - How do conductors and insulators affect electrical flow? Circuit symbols - How do we represent circuit components? Circuit diagrams - How do we draw accurate circuit diagrams? Retrieval and consolidation Building series circuits - What is a series circuit? Building parallel circuits - What is a parallel circuit? Switches - How do switches control current? Fuses - How do fuses work?
Evidence of learning	**Students will be able to**: Identify and describe the rocky planets Identify and describe the gas giant planets Recall the planets in order of distance from the sun Describe why Earth is a special planet Describe why we have day and night Describe why we have years and leap years Recall the names of the seasons Describe and explain why seasons change Recall the phase of the moon	**Students will be able to**: Identify dangers of using electricity in school and at home Describe how to be safe around electricity Describe the difference between insulators and conductors Explain why materials can / cannot conduct electricity Describe the difference between series and parallel circuits Investigate how series and parallel circuits affect components Describe how switches can control current Explain how fuses work.

	Consider the possibility of living on the moon	
Links to prior learning	From previous units, most pupils will: know that the sun seems to move across the sky during the day; know that the apparent movement of the sun can be investigated by observing shadows; know that shadows are formed when light is blocked; know the compass directions north, south, east, and west. This unit builds on other units by reviewing the sun as a source of light, moving shadows and how we see things. It will link to KS3 through studying how the movement of the Earth causes apparent daily and annual movement of the sun, the relative positions of the Earth, Sun and planets in the solar system.	Changing circuits – From earlier units, most pupils will know that a complete circuit is needed for a device to work; how to use switches to control a circuit; that metals are good conductors of electricity, and plastics are poor conductors; that changing the number of cells or other components in a circuit can affect the brightness of bulbs. It will link to KS3 y7 Electrical circuits, y7 Energy resources, y8 Energy transfers and y8 Metals and their uses.
Links to future learning	P1.4 – Space (Y7)	P2.1 – Electricity and magnetism (Y8)
Spring term 2	**<u>Properties and changes of materials</u>** To learn about materials and their properties, justify why we choose materials for different purposes, SLG, evidence that air is real, building a kite, investigating air spaces, changing state, evaporation, condensation, and the water cycle. Natural and artificial materials - What's the difference between natural and artificial materials? Properties of materials - How do we describe and investigate the properties of materials? Choosing suitable materials - How do we decide which materials are used for certain jobs? Solids, liquids, and gases - What are the properties of solids, liquids, and gases? Solids, liquids, and gases - How does the particle model help to explain properties? Air is real – proving it - How can we see that air is real? Building a kite – planning and build - Explain and apply the steps of the engineering design process. Testing and write up Air spaces - How could you find out how much air is in different soils? Different sorts of gases - How are different gases used? Changes of state – melting - How do solids change into liquids? Evaporation - How do liquids change into gases? Condensation - How can a gas turn into a liquid? The water cycle - Where does our water come from?	**<u>Light</u>** To learn about light and its properties, artificial and natural light, light sources, light rays, how we see things, materials, shadows, reflections, white light. Light - What is light? Light sources - What is natural and artificial light? Light rays - How do we see things? Materials - What are transparent, translucent, and opaque? Investigating shadows - How do shadows change? Shadows - What is a shadow puppet theatre? Complete Shadow puppet theatre Reflection - Which materials are the best reflectors? White light - Why is the sky blue?

Evidence of learning	**Students will be able to**: Identify natural and artificial materials Describe the properties of materials Justify the selection of different materials for different situations Recall the states of matter Draw accurate particle diagrams of solids, liquids and gases Describe how particle arrangement affects properties Investigate evidence to prove air is real Work collaboratively to build a kite using ideas of materials properties Describe how to change between each state of matter Investigate melting and evaporation Recall the water cycle and link it to changes of state	**Students will be able to**: Identify light sources and light reflectors Describe the difference between natural and artificial light Describe how do we see things Draw accurate light ray diagrams Describe the difference between transparent, translucent, and opaque materials State how shadows form Investigate how shadows change and the factors that change them Design and make a simple shadow puppet theatre using ideas about light Describe which materials make the best reflectors Consider why the sky is blue
Links to prior learning	Previous learning most pupils will know that the amount of space something takes up is its volume; know the differences between solids and liquids. This unit builds on work covered on rocks and soils in year 3, solids, liquids and how they can be separated in year 4 and friction in year 4. There are also some common themes with unit 5D. It will link to KS3 through elements; physical properties, appearance, state at room temp etc. (y7) Changes of state - From earlier Units, most pupils will know that materials can be classified as solids, liquids, and gases; know some of the properties of solids, liquids and gases; understand terms 'melting' and 'freezing'; know that liquids can turn into gases through evaporation; be able to use a thermometer accurately. This unit builds on work covered in y4 Solids, liquids and how they can be separated and unit 5C Gases around us. It will link to KS3 through relating changes of state to energy transfers and how energy is transferred (7) (8)	Light and Sight - From earlier Units, most pupils will: Know that shadows are formed when light is blocked by certain materials. Be able to make careful observations and measurements of shadow. This unit builds on work covered in Unit 3F Light and shadows. The extension work provided builds on work covered in y5 Earth, Sun, and Moon. It will link to further study in KS3 through light properties, scattering of light, reflection, refraction, and the eye.
Links to future learning	C1.1 – Particles and their behaviour (Y7)	P1.3 – Light (Y7)
Summer term 1	**<u>Dissolving, Burning and Separating</u>** To learn about chemical reactions and physical changes, reversible and irreversible changes, burning, fire safety, dissolving, separating techniques. Changing materials (spooky hands) - What happens when we mix different materials?	**<u>Healthy living</u>** To learn about food groups, food testing, teeth, the heart, circulatory system, blood, pulse, investigating affect of exercise, effect of drugs. Food groups and balanced diet - What is a balanced diet? Testing foods – carbs & protein - How do we test foods for different nutrients?

	How much gas? - How much gas is made when you mix different materials? Reversible and irreversible reactions - What are reversible and irreversible changes? Investigating burning - What happens when materials burn? Fire safety - How can we keep ourselves safe from fire? Dissolving – soluble v insoluble - What are soluble and insoluble substances? Investigating factors – dissolving - How can you dissolve a solid more quickly? Dirty water challenge - What happens when you filter something?	Teeth – Why are our teeth different shapes? The heart - Where is the heart and what does it do? Heart dissection Circulatory system & blood - What is blood and what does it do? Investigating pulse rates - What factors affect your pulse rate? Keeping healthy – exercise & drugs - What are the dangers of some drugs?
Evidence of learning	**Students will be able to**: Describe signs of a chemical reaction Describe the difference between reversible and irreversible changes Recall the fire triangle Investigate burning materials Describe how to keep themselves safe from fire Describe the difference between soluble and insoluble substances Investigate factors that affect dissolving Describe different methods of separation (Sieving, filtering, evaporation)	**Students will be able to**: Identify the seven food groups Describe what nutrients are and why they are important Describe what a balanced diet is Test foods for different nutrients (carbohydrate, protein and fat) Identify different teeth and describe their functions Describe the job of the heart Identify different parts of the heart Carry out a heart dissection Link heart rate and pulse rate Describe the effect of exercise on pulse rate Describe the importance of exercise on health Describe the dangers of drugs
Links to prior learning	Dissolving and Separation – From previous study, most pupils will know that some solids can dissolve in water, and some cannot; know that filtering can be used to separate undissolved solids from a liquid. The unit builds on work in solids, liquids, and gases and y5 gases around us and y5 changing state. It also links in with unit y6 reversible and irreversible changes. It will link to further study in KS3 during topics 7 mixtures and separation. Reversible and irreversible changes – From previous study, most pupils will know about dissolving, evaporating, condensing, melting, and freezing as changes that can be reversed; know how to use filtering and evaporation to separate mixtures. The unit build on work covered in 5D changing state and 6C dissolving and separation. It will link to further study in KS3 during topics 7E mixtures and separation, 7H atoms, elements, and molecules and 8E combustion.	From previous units most pupils will Know some types of food and recognise that a varied diet is needed for health, know that muscles move bones in the skeleton. The unit builds on Unit 3A Teeth and eating and on Unit 4A Moving and growing. The concepts met in these units are revised and extended, using various sports as contexts. It will link to KS3 through balanced diets; the production of digestion; transportation and absorption; respiration; skeleton, joints antagonistic pairs; lung structure and gas exchange; aerobic respiration; reactants and products. (y7 and y8)

Links to future learning	C2.2 – Separation techniques (Y8)	B2.1 – Health and lifestyle (Y8)
Summer term 2	**<u>Animals including humans – Lifecycles and microbes</u>** To learn about life cycles of plants, pollination, germination, lifecycle of butterfly, lifecycle of frog, other lifecycles, microbes, Edward Jenner, uses of microbes. Plants - What structure do plants have? Mixed fruits - Why to plants have fruits? The scattering of seeds - What is seed dispersal? The flower - Why do plants have flowers? Pollination - What is pollination? Germination - What do seeds need to germinate? Plant lifecycle - Retrieval and consolidation Life cycle of a butterfly - How do caterpillars turn into butterfly's Life cycle of an amphibian - How does a tadpole turn into a frog? Other life cycles - What is the lifecycle of a human? Introducing micro-organisms - What are micro-organisms? Bacteria, viruses, and fungi - How are microbes different? Microbes and diseases - Which diseases are caused by microbes? Cholera - Who was John Snow? Stopping the spread - How can we stop the spread of diseases? Edward Jenner - Who was Edward Jenner? Research and presentation about their life and work. Useful Microbes - How can microbes be useful in our lives?	**<u>Evolution and inheritance</u>** To learn about fossils and how they were created, research Mary Anning and her work, evolution, natural selection, characteristics, Darwin and Wallace, Peppered moths. History of life on Earth - How are fossils created and what can they tell us? Making fossils - How can we create our own fossils? People in Science – Mary Anning Who was Mary Anning? Mary Anning Write-up - Complete write-up about Mary Anning Evolution - What is evolution? Natural selection - How does natural selection cause evolution? Darwin and Wallace - Who was Charles Darwin? Who was Alfred Wallace? Peppered moths – Case study - How does the story of peppered moths support natural selection?
Evidence of learning	**Students will be able to**: Draw a basic plant structure and label the key parts Describe the function of each part of a plant Describe why plants have fruits Describe several methods of seed dispersal State why seeds need to be dispersed Identify different parts of a flower State the function of each part of a flower Describe the process of pollination State why pollinators are important Describe the conditions needed for germination Describe the life cycles of humans, insects, amphibians and birds	**Students will be able to**: Describe what fossils are and how they were created Recall the work of Mary Anning Describe what evolution is and how it happens Describe the process of natural selection Recall who Charles Darwin was and why his ideas are important Use the example of the story of peppered moths support ideas about natural selection Identify variation caused by inheritance and the environment Describe desirable characteristics

	Identify different types of microbes Describe how microbe can be useful Describe how microbe can be harmful	
Links to prior learning	This unit builds on previous work covering health and growth and helping plants grow well (KS1/2). It will link to unit 6E parachutes in KS2 and 7A Cells, 7B Reproduction, 7D Ecosystems, 8B Plants and their reproduction and 8D Unicellular organisms in KS3. This unit builds on work in unit 5D Changing state. It will link to unit Lifecycles – From previous study, most pupils will know that plants need light and water to grow and will know the main parts of a plant. Microbes – From previous study, most pupils will know the differences between things that are living and things that have never been alive; that living things move, feed, grow, use their senses, and reproduce. The unit builds on 3A teeth and eating and 6A feeding and adaptations. It also links in with unit 5A keeping healthy and 5B life cycles. It will link to further study in KS3 during topics 7 cells and unicellular organisms.	Evolution and inheritance – From earlier units, 5B Life cycles, 6A Interdependence and adaptation pupils will know that there are differences in the life cycles of a mammal, an amphibian, an insect and a bird; describe the life process of reproduction in some plants and animals; that living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals and give reasons for classifying plants and animals based on specific characteristics. It will link to KS3 7 & 8.
Links to future learning	B1.3 – Reproduction (Y7) B2.1 – Health and lifestyle (Y8)	B2.3 – Adaptation and inheritance (Y8)

Reading in the curriculum (Literacy & Vocabulary)

We implement many strategies to help develop students' reading abilities through science study.

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.
We dive deeply into a specific topic to expand vocabulary and comprehension
We encourage students to summarise main ideas after reading.
We let students explore topics they enjoy through research projects. It enhances vocabulary and critical thinking.
We provide opportunities for students to communicate and discuss content throughout lessons.
We encourage students to read aloud together or with a partner.
We incorporate visuals like charts, diagrams, and illustrations to enhance comprehension.
We explore various writing styles, and sentence structures (e.g. formal practical writing, comprehension, biography).
We allocate time for students to consolidate and read independently.
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.

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 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.

In community

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 fulness', 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
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:

Holywell School Curriculum Overview

Materials: We look at material properties and using materials in a sustainable way
Burning: The impact of burning and pollution caused by burning fuels.
Life Cycles: We look at life cycles and extinction and the environmental impact.
Habitats: We consider the impact of human activity on habitats and species adapting to human influences.
Water: We teach students about water conservation, pollution prevention, and the water cycle.
Waste Reduction: We explore recycling and encourage waste reduction practices.
Biodiversity: We study ecosystems, habitats, and the impact of human activities on biodiversity, and discuss conservation efforts.