



## SCIENCE AT GILDREDGE HOUSE

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. *Statutory guidance from the National Curriculum for Science.*

### Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

### SEND Provision

We recognise as a school, the importance of ensuring that children identified with Special Educational Needs and/or Disabilities have access to an ambitious Science curriculum. We will therefore aim to plan first for our students with SEND, with appropriate tasks, support and level of challenge to enable them to access the curriculum. Advice can be sought from the school's SENDCo where applicable.

### Science in the school curriculum

#### Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

#### The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology,



chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

## Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum - cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

## School curriculum

The programmes of study for science are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage if appropriate. All schools are also required to set out their school curriculum for science on a year-by-year basis and make this information available online.

## Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

## Science at Gildredge House

### Our Vision:

Inclusive, Engaging, Progression: allowing children to explore, discover, question, and understand the world around them, as well as to be confident with scientific knowledge, vocabulary and understanding.

Being an all-through school has enabled us to create a bespoke programme that builds on skills and knowledge across the whole school. We are able to offer children the opportunity to experience science labs, as well as work with subject specialist teachers.

At Gildredge House, our aim is to:

- Promote a high standard of excellence and consistency of approach amongst all staff.
- Ensure procedures for planning and assessment enable a broad and balanced curriculum that has continuity and progression.
- Provide students with scientific experiences that develop their understanding of themselves and the world in which they live.



- Provide opportunities for observing over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing and researching using both primary and secondary sources.
- Ensure that as teachers we use a varied and appropriate range of strategies, to deliver an inclusive curriculum for students of all abilities and needs, including those with SEN and more able students.
- Set targets to encourage high achievement from all students, appropriate to their ability.
- Foster in students the confidence to apply their knowledge, skills and ideas in real life contexts both within and outside the classroom and become aware of the uses of science in the wider world.
- To develop the enquiry skills of predicting, asking questions, making inferences, concluding and evaluating based on evidence and understanding and use these skills in investigative work.
- To develop the ability of pupils to communicate their ideas using appropriate scientific vocabulary.
- To promote, model and encourage high order questioning.
- To encourage safe practice in all areas of science.

In KS1, the focus is to enable pupils to experience and observe the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. This may be done as a whole class, or in small groups.

In lower KS2, children are taught how to set up simple practical enquiries, including comparative and fair testing; make careful observations and know how to record them appropriately; record this data accurately and in different ways; ask questions and seek results to draw conclusions; identify similarities or differences related to simple scientific processes; and to use scientific evidence to support their findings.

In upper KS2, children build on this knowledge, by presenting their findings in different mediums; exploring different ways to draw conclusions; and to work more independently. This is all done through subject specialist teachers from Secondary to give children scientific lab experience.

### Time Allocation

EYFS & Key Stage 1: 1 hour per week, minimum. This is split into shorter sessions and continuous provision.

Key Stage 2: 1 hour per week, minimum.

### Intent

At Gildredge House we aim to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to allow the children to be inquisitive throughout their time at school and beyond. This approach is accessible to all and will improve the outcomes for every child, so that they know, understand, and remember key scientific information. The Science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living. We teach the children to understand scientific processes and understand the uses and implications of Science, today and for the future.



We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes.

At Gildredge House, scientific enquiry skills are embedded in each topic the children study - these topics are revisited and developed throughout their time at school. Topics, such as Plants, are taught in Key Stage One and studied again in further detail throughout Key Stage Two. This model allows children to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this procedural knowledge into the long-term memory.

All children are encouraged to develop and use a range of skills including observations, planning and investigations; children are also encouraged to question the world around them to enable them to become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and built on, and effective questioning to communicate ideas is encouraged. Concepts taught will be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

At Gildredge House, our Science curriculum intentions are:

Intent	Implementation	Impact
<p><u><a href="#">Intention 1:</a></u></p> <p>To allow children to explore, discover, question, and understand the world around them, as well as to be confident with scientific knowledge, vocabulary and understanding.</p> <p>To design a curriculum subject with appropriate subject knowledge, skills and understanding so that children can achieve, and then exceed their potential to learn, understand and remember key scientific information and concepts.</p>	<p>In the <a href="#">Foundation Stage</a>, teachers encourage pupils to question and explore the world around them, allowing them to begin appropriate scientific enquiry.</p> <p>In <a href="#">KS1</a>, teachers create a positive learning environment that values scientific enquiry and curiosity for the world around them. Children are encouraged to ask their own questions, linked to their topic, and are given opportunities to use their scientific skills and research to discover the answers. This is often carried out through practical investigations and class discussions.</p> <p>Teachers introduce new vocabulary and challenging concepts through direct teaching. The use of precision questioning in class is used to test conceptual knowledge and skills, and directed time is given to enable all children to access the learning.</p> <p>Planning involves teachers creating engaging, accessible lessons, involving high-quality</p>	<p>The impact of this approach at Gildredge House means that children overwhelmingly enjoy science and this results in motivated learners with sound scientific understanding.</p> <p>This is done through</p> <ul style="list-style-type: none"> <li>• Learning walks</li> <li>• Data collection</li> <li>• Book looks</li> <li>• Pupil discussion</li> <li>• Key Questions</li> </ul>



	<p>resources to aid understanding of conceptual knowledge.</p> <p>In <b>Lower KS2</b>, teachers continue to create a positive learning environment, showing that they value the scientific enquiry. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. Working Scientifically skills are embedded into lessons to ensure that skills are systematically developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging, accessible lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess pupils regularly to identify those children with gaps in learning, so that all pupils achieve.</p> <p>In <b>Upper KS2</b>, the same principles as Lower KS2 are applied, however, children are taught by subject specialist science teachers. This not only allows children access to expert scientific thinking, but also deepens their understanding and aids their transition to KS3.</p> <p>Each unit of work identifies prior learning and shows how this is built upon.</p> <p>Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor</p>	
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	<p>learning and workshops with experts.</p> <p>Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.</p> <p>Regular events, such as Saturday family gardening workshops, Science Week or project days, such as Pet Day, allow pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. These events often involve families and the wider community.</p>	
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During KS3, pupils will continue to study science.

### Equal Opportunities

Science follows the schools Equality Policy.

### Responsibilities

The Science Subject Leaders are responsible for:

- Monitoring the teaching and learning of Science within the Primary phase, ensuring that children know and understand how the world works, as well as enabling children access to scientific knowledge and findings.
- Writing an annual action plan for The School Improvement Plan and evaluating progress throughout the year.
- Liaising with the Secondary colleague responsible for the implementation of Science to secondary students to ensure that the curriculum is fit for purpose, providing continuity and progression
- Attending regular courses to keep knowledge up to date and feedback to staff upon return.
- Researching the Primary Quality Science Mark.