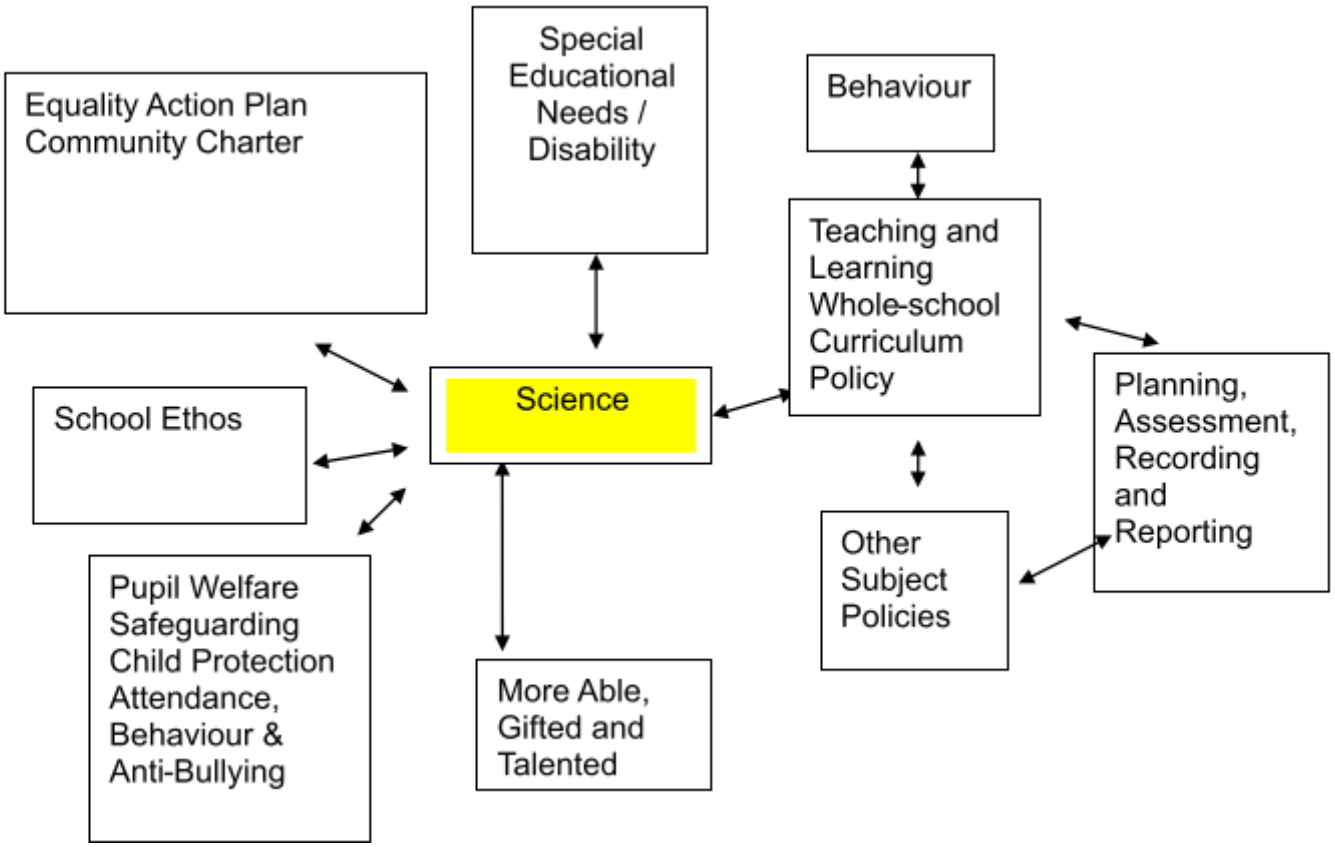
HOLBROOK PRIMARY SCHOOL

SCIENCE POLICY

DELEGATION OF APPROVAL:	Awaiting approval
FREQUENCY OF REVIEWS:	*Annually*
DATE APPROVED:	awaiting
CHAIR OF RESOURCES	Andy Wilesmith
CHAIR OF GOVERNORS:	Paul Hesketh
DATE RECEIVED BY WGB:	November 2024
DATE NEXT REVIEW DUE:	October ‘25

This policy relates to:



Holbrook Primary School Science Policy

Science policy written: October 2024 **Date approved by the full governing body:**
Subject Co-ordinator: L Johns **Review Date: October 2025**

Intent – what we believe for our curriculum

We wish to develop creative, independently thinking scientists with the motivation, knowledge and skills to succeed in a fast-changing world. All children, irrespective of needs, are fascinated by the world around them and we aim to inspire them to open their minds and develop a passion and curiosity to pursue scientific enquiry. We wish to ensure that every child is excited by scientific ideas and wants to learn to explain and analyse phenomena, make predictions and solve problems. As pupils learn science, they also learn about its uses and significance to society and their own lives. By learning about the products of science, our pupils will be able to explain the world around them.

By learning how scientific enquiry establishes scientific knowledge, pupils learn about its nature and status. They will learn how knowledge is changed by the discovery of new scientific evidence and the impact that it has in our world. This will highlight the significant contribution science has made in the past. For example, by eradicating smallpox, or discovering penicillin. Pupils will also learn about the continuing importance of science in solving global challenges such as climate change, food availability, controlling disease and access to water.

We aim to support this ethos through the interplay of two main forms of knowledge. The first is '***substantive***' knowledge, the knowledge of the products of science, such as models, laws and theories of science. Through our teaching of science, we aim to create 'Big Idea' thinking in the fundamental areas of *biology*, *chemistry* and *physics.* Our curriculum is carefully sequenced over time beginning with the concrete and moving onto the abstract, constantly building on what the children already know to create meaning. Substantive knowledge connected to more substantive knowledge creates understanding! We believe that we need to frequently practice retrieving the knowledge that builds these concepts, or else we forget them. In our teaching practice, quizzes are peppered throughout the curriculum to ensure that knowledge sticks.

The second category is '***disciplinary***' knowledge, which is knowledge of the practices of science. This is the knowledge scientists need so they can collect, understand and evaluate scientific evidence – it's the scientific method, e.g. changing one variable whilst keeping everything else the same and seeing what happens.

Teachers weave substantive and disciplinary knowledge into their teaching practice through encouraging children to:

- build up a body of key facts and an understanding of key scientific concepts.
- raise questions and, using their substantive knowledge, form a hypothesis to test.
- apply scientific understanding to rationalise and explain new phenomena.
- develop a sense of excitement and curiosity about science and natural phenomena.
- develop an understanding and appreciation of the place of science in society and the way in which it will affect their future on a personal, national and global level.

We know that children learn best when the curriculum is well sequenced to enable the revisiting of core knowledge, skills and understanding to deepen conceptual awareness before demanding application

across the whole curriculum. Our Science Progression of Skills document outlines how the key skills are developed, revisited, assessed, and built upon from EYFS to Year 6.

Implementation - How We Put Our Aims into Daily Practice

All classes in Key Stage 1 and 2 have dedicated Science sessions each week which may be split over two lessons to allow sufficient time before and after a practical investigation for pupils to learn what was intended. The units of work in science are planned so that they build upon prior learning. At the start of every lesson, teachers demand pupils to recall previous learning as a foundation to build upon. They do this through activities such as a short quiz or resources on explorify.uk like odd on out, big questions and zoom in zoom out. All of these encourage children to talk about science and ask further questions.

We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each curriculum area, building progression into the science scheme of work, so that the children are increasingly challenged as they move up through the school. Schema are developed through the building of scientific vocabulary, for example, EYFS pupils observe plants through magnifying glasses, naming the roots, stem, leaves, flowers and petals. By year 3, pupils have learnt about photosynthesis and dissect a plant to look under a microscope at the stamen, anther, stigma, ovary and ovule and learn how it reproduces. In year 6, children move on to learn how plants adapt to suit their environment in different ways and that adaptation may lead to evolution.

At Holbrook, lessons are fully planned and researched, giving confidence in delivery. Our children are inquisitive and encouraged to ask questions (even if teachers don't know the answers). Through constructive questioning, scientific misconceptions that the children may have can be addressed and discussed. Furthermore, we encourage children to apply their scientific knowledge across the curriculum. Pupils are taught to use a variety of scientific enquiry types to plan and carry out investigations making full use of all our resources, indoors and outdoors. We use technology to enhance science.

For the children to operate as successful scientists, we teach a wide range of essential enquiry skills. These skills build upon earlier opportunities they have had to play, explore, create, engage in active learning, and think critically in the Early Years Foundation Stage. To develop their enquiry skills, we encourage the children to ask, as well as answer, scientific questions through activities such as 'Odd One Out', where there are numerous answers. By being encouraged to talk about science, our pupils show their substantive knowledge when supporting their ideas and raising further questions. In key stage 2 they progress to being able to form their own hypothesis, set up a fair test and select the variables needed to prove or disprove a hypothesis. Pupils use a variety of data recording methods, such as statistics, graphs, pictures and photographs.

At Holbrook, we place a great emphasis on the value of discussion both as a means of eliciting children's prior knowledge but also as a means of collectively constructing new information and knowledge. They take part in role-play and discussions, and they present reports to the rest of the class. They engage in a wide variety of problem-solving activities. Science is not taught as a selection of facts; children are encouraged to question and speculate. Class teachers introduce Big Questions to encourage higher order thinking.
This also enables children that are less confident in writing to demonstrate their scientific knowledge. Wherever possible, we involve the pupils in real scientific activities, such as investigating a local environmental problem, such as the erosion of the riverbanks in Lower Holbrook or classifying the flora and fauna found in our school wood (the Hollow) and investigating how we can protect it from human impact.

We recognise that in all classes, children have a wide range of scientific abilities. We ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways:

- setting tasks which are open-ended and can have a variety of responses.
- setting tasks of increasing difficulty (we do not expect all children to complete all tasks)
- sometimes grouping children by ability and setting different tasks for each ability group
- using mixed-ability groupings to offer support for less able students and more responsibility to higher ability children
- where possible, using teaching assistants to support the work of individual children or groups.

Assessment

At Holbrook, we believe that effective assessment is a fundamental part of ensuring pupil progress. During the teaching sequence for Science, teachers use the progression of skills assessment criteria to assess whether children are emerging, at expected or exceeding in expectations in Science, as exemplified through our bespoke Holbrook contexts. This enables teachers to identify any gaps in pupils' knowledge, skills and understanding and for these to be targeted in future delivery. Teachers record this information and use it to plan the future work of each child. These records also enable the teacher to make an annual assessment of progress for each child, as part of the school's annual report to parents. The teacher passes this information on to the next teacher at the end of each year and to the subject leader for analysis. Through our Annual Subject Leader Cycle the assessment information is analysed and this informs teachers' planning and improves the development of the curriculum with the support of the subject leader. It is the responsibility of the Science Subject Leader to monitor the standards of children's work and the quality of teaching in science, and report back to SLT and Governors. The Science Subject Leader is also responsible for supporting colleagues in the teaching of science, for being informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school. The Science Subject Leader is responsible for writing and implementing an annual school development plan which forms part of the School Improvement Plan. Each year the Action Plan details the next steps for developing outstanding Science provision. The professional development needs of staff are assessed through monitoring and where necessary further training is provided. This may be CPD provided internally, or external courses as appropriate. As an example of quality training offered, in response to the latest Ofsted report, all staff were given training this March by Mrs Johns, our Science Lead, on substantive and disciplinary learning.

Entitlement

Science is a statutory subject. In Science lessons in both Key Stages, through the various units of work, we teach children that animals, including humans, move, feed, grow and reproduce, and we also teach them about the main parts of the body. Children learn to appreciate the differences between people and how to show respect for each other. In Key Stage 2 we teach about life processes and the main stages of the human life cycle in greater depth. We teach about the parts of the body and how these work, and we explain to them what will happen to their bodies during puberty. For example, we teach that boys' voices will change during puberty and they will begin to grow pubic hair, and we explain that girls will begin the process of menstruation.

Unlike the Sex and Relationships curriculum, (please see the PSHE policy for more details) which covers similar themes to some parts of the science curriculum, there is no option to withdraw a child from these statutory lessons. However, if concerns are raised, the subject lead will be happy to go through the content of these lessons with parents on request.

Pupils, irrespective of gender, ability or age will be given opportunities to develop skills and understanding through a framework which provides them with:

- Pre-teaching.
- Experiences in which they can succeed.
- Tasks which are adapted.
- Resources, which ensure equal access.

The curriculum will be differentiated by resources, tasks, responses and outcomes. Appropriate provision will be made for pupils with physical and sensory impairments using technology, alternative means of

communication and multi-sensory approaches. Where necessary, extra pre-teaching will be provided at the beginning of a unit of learning to support any children with less experiences, knowledge or understanding.

We teach science to all children, whatever their ability. Science forms part of the school curriculum policy to provide a broad and balanced education for all children. When progress falls significantly outside the expected range, the child may have special educational needs. Our assessment process looks at a range of factors – classroom organisation, teaching materials, teaching style, and differentiation – so that we can take some additional or different action to enable the child to learn more effectively. Assessment against the National Curriculum allows us to consider each child's attainment and progress against expected levels. This ensures that our teaching is matched to the child's needs.

When needed we provide learning opportunities that are matched to the needs of children who have English as an additional language (EAL) through the use of talk. Where appropriate lessons are supported by visual cues and word banks and investigative work is interactive. We provide learning opportunities that are matched to the needs of children who are on the More Able, Gifted and Talented register through setting challenging targets.

Provision for the more able gifted and talented

At Holbrook Primary, 'gifted' refers to children that are more able academically (e.g. writing, mathematics), 'talented' refers to children who are more able in a more creative channel (e.g. gymnastics, music, art). The School uses its own 'Talent Identification Framework' to identify pupils who are more able. This usually is represented by the 'top 5%' of each cohort. Provision for more able gifted and talented children includes:

- In-class differentiation to deepen conceptual understanding and reasoning through 'probing' application.
- Opportunities to work with external providers (e.g. masterclasses).
- Personalised Learning Plans (PLPs) which are termly documents that illustrate how more able gifted and talented pupils will be challenged in class and in school. The PLP is shared at each parent/teacher consultation.
- Teaching helps to develop a culture and ethos of scholastic excellence, where the highest achievement is recognised.

More able, gifted and talented children are recognised as a 'group' that is tracked with a particular focus in terms of pupils' achievement by Subject Leaders and Senior Leadership Team.

Pupil Premium Pupil Premium is the Government grant given to schools to support its 'disadvantaged' pupils. These are children whose families are eligible for free school meals or have ever been eligible for free school meals during their time at Holbrook Primary. It is a statutory responsibility of all schools to publish on-line the level of Pupil Premium funding received and how the school has spent the Pupil Premium, the impact of the spending on learning outcomes for this group. This can be found on the school's website by selecting the Pupil Premium tab. The subject lead will ensure, (in liaison with Pupil Premium Lead) that all pupils are enabled full access to the full curriculum offer.

English as an Additional Language (EAL)

At Holbrook, EAL children alongside SEND, Pupil Premium, more able, gifted and talented, cohort specific, are recognised as key groups to monitor achievement outcomes.

Early Years Foundation Stage

We teach Science in the EYFS class as an integral part of the curriculum work covered during the year. As stated in the Statutory framework for the EYFS (effective from Sept '21), the specific area of 'Understanding The World,'

"Understanding the world involves guiding children to make sense of their physical world and their community." We tailor guidance from Development Matters to meet the needs of our children at Holbrook

Primary School. Knowledge, skills, understanding and vocabulary in science begin in the EYFS and are the foundations of the whole school science curriculum that are built upon year on year throughout the school so that pupils know more and remember more. Throughout the year we use our own assessment system aligned to the UW curriculum taught. At the end of EYFS we also use the Early Learning Goals to assess children's knowledge and understanding.

SEND

For pupils who have special educational needs and / or disabilities, the science curriculum lead meets with the SENDCO to ensure and enable full access to the full curriculum offer. For example, resource review and tailoring of planning linked to specific pupils' needs. Depending upon pupils' needs, often, pupils who have SEN will need additional steps to reach ambitious objectives. SEND Funding has been used to facilitate this in many ways (e.g. LSA employment to provide pre teaching experiences for SEND pupils ahead of a new concept being introduced, larger/hands on manipulatives to facilitate the breakdown of aspirational composite end goals into much smaller, achievable component steps)…."

Spiritual, moral, social and cultural development

Science teaching offers children opportunities to examine some of the fundamental questions in life, for example, the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the teaching of science, children can discuss, for example, the effects of smoking and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

Impact - We Are Successful Because ..

There are many ways we can showcase the excellent impact our curriculum design has on our pupils. Here are some examples:

1. In the Autumn term, children learn about the life cycle of plants through the harvest of vegetables in our school garden and through our popular gardening club and Green Gang who grow and tend to our vegetable patch all year round. We take part in the Suffolk Show School's gardening competition, achieving three gold awards over the past three years.
2. Our local environment provides plenty of opportunities for outdoor learning in science. In the Autumn, to enhance their learning about rocks and soils, pupils in lower key stage 2 walked to Holbrook Bay to investigate the local bedrock, classify the rocks found and hunt for fossils. They looked at the erosion of the riverbanks to see at first hand the layers of soil and rock, finding evidence of change over thousands of years.
3. In November, to link with Black History month classes learnt about a prominent black scientist who has led the way for others, such as the astronaut Mae Jemison and the chemist Alice Ball.
4. Last March we celebrated British Science Week, filling it with hands-on experiences that brought the theme of "Time" to life! By inviting parents in STEM careers to run workshops for the day, our pupils not only learned about real-world jobs but also got to see potential future pathways. We also hold a whole school Science Day with a wide range of activities organised—from visiting a local farm to exploring climate change and evolution—allowing each age group to engage in exciting investigations.

Highlights of each year group's projects:

- **EYFS**: Visiting a farm connected our young learners to the natural world, exploring the cycle of growing food and connecting with their community.
- **Year 1**: Experimenting with paper aeroplanes and wing shapes allowed them to think about aerodynamics and time in flight.
- **Year 2:** Pond dipping in our school pond brought about lots of excitement, especially the variety of creatures, including newts that inhabit it. Learning about the life cycle of newts helped them to think about their growth from spring to summer.
- **Year 3**: Exploring constellation patterns introduced them to astronomy and the history of our understanding of the stars.
- **Year 4**: The greenhouse effect experiment provided a hands-on lesson on climate change and the impact of trapped heat on our environment.
- **Years 5 & 6**: Studying evolution and adaptation helped older students appreciate how species have changed over time to survive in diverse conditions.

Each activity tied beautifully to the theme of "Time" and gave students a tangible understanding of scientific concepts.

5. In addition to our in class investigations, another whole school experience during Science Week was a visit from a mobile planetarium. Every child across the school was given the opportunity to experience the wonder of the solar system.

6. In the summer term, the children that we have identified as gifted and talented in STEM attended a special event at the Royal Hospital School. Supported by the Royal Academy of Engineering, they brought together 21 leading organisations in STEM alongside some spectacular and explosive Royal Institution Science Shows, Army Careers Talks and Rapid Electronics Education Team delivering coding sessions using Codey Rocky Robots. Our pupils came away with a real buzz for STEM ambition and what it could offer them. At Holbrook,we aim to nurture and inspire future scientists and engineers.

7. To develop our pupils' understanding of animals and their habitats we have a school pond, rich in water creatures from newts to pond skaters which all classes make use of in the summer months. Our Forest school area, known as the Hollow, is a wonderful place for our young scientists to explore, investigate and learn about the plants that grow there and creatures that depend on them for their survival. Fires are built, giving children the opportunity to explore flammable materials and how they burn. Overlooking the Hollow we have set up a bird hide with several sets of good binoculars for our pupils to bird watch. The Hollow offers a great opportunity for links with science across the wider curriculum, such as providing inspiration for creative writing in English lessons, data collecting in Maths or caring for our environment in PSHE.

8. Over the past two years, we have developed new links with local farmers. Classes can walk to a local farm and gain hands-on experience of the journey food takes from field to fork. In the Spring term, we visit the Schools' Farm and Country Fayre at Trinity Park, where pupils gain hands-on experience of animals and farming. These visits have inspired pupils to develop a thriving vegetable garden in our school grounds where our pupils can experience the journey of a vegetable's life from seed to plate.
9. In July, our year 5 and 6 classes attend Suffolk Day at the Suffolk Food Hall. In finding out about "The Suffolk Trinity" – The Suffolk Punch, The Red Poll Cattle and The Suffolk Sheep, they gain an understanding of Suffolk's farming heritage. Local farmers and food producers meet with our pupils to teach them about sustainability and farming methods. The children then create their own nutritious Suffolk dish from a given budget.

Resources

A resource review is carried out annually. We have adequate resources for all teaching areas in the school which are kept in a central store where equipment is organised in labelled boxes and trays. These boxes are updated annually, after an audit of resources, or when teachers identify a need.

We have computer software to support children's individual research. Websites have been identified for all areas of the curriculum and can be used either on the IWB in each classroom or laptops.

Safety

Science poses several potential dangers in the classroom as a result of its practical nature. The school is aware of these dangers and will be always vigilant and include safety in their planning. Teachers need to review this when they are performing new techniques or introducing particular activities for the first time. Children should be made aware of safety requirements and be taught how to work safely considering their own safety and the safety of others.

Policy Review: October 2025

Date: 4th November 2024

Chair of Curriculum committee:

Head of School/Executive Head: