



Science Policy

Designated member of staff: Gary Wright

Chair of Governors: Alison Logan

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Introduction

This document is a statement of the intent, aims, principles and strategies for the teaching and learning of Science at Usworth Colliery Primary School. The policy reflects the views of teaching staff and has the full agreement of the Governing Body. The implementation is the responsibility of all teaching staff in school and the responsibility of the Science Subject Leader to monitor its implementation along with SMT.

Intent

Enjoy achieving together ... by being the best that we can be!

Our pupils learn best through experiential learning and the science curriculum is built around this. Our pupils learn science through real-life, hands-on experiences that broaden and **raise aspirations** as well as support **acquisition of new science knowledge** and skills. We **provide the pupils with experiences and opportunities** they may not otherwise access. In the classroom, this primarily occurs through a child-led approach to lessons, where children's questions are investigated through practical enquiry. Outside the classroom, this occurs through a range of science trips, STEM weeks, STEM competitions and a range of science experts visiting and delivering workshops. Through this approach, pupils are offered a curriculum which is **exciting, engaging** and ambitiously designed to deepen their understanding of an ever-changing world and the science within it. It also develops key skills that will **prepare them for their future** beyond school. Science fosters many key skills such as developing children's natural **curiosity, independence, confidence, resilience** and **adaptability**, all key skills for **citizens of the future**. The science curriculum through these experiences, in and out of the classroom, widens the **aspirations** of our young learners and allows them to understand that the sciences could be a possibility for them in their future.

To promote **resilience and independence** our curriculum encourages pupils to adopt a growth mind-set in order to **learn from mistakes** and develop as learners. Children are encouraged and empowered to develop their **own lines of enquiry**, working as part of a team or working **independently** to ask and answer their own scientific questions about the topic they are studying. We therefore want our children to be **curious** and in turn be **resilient** when trying to seek answers. In science, it is important that children learn the benefits of making mistakes when carrying out enquiries or the benefits of not giving up if an enquiry does not work as they hoped; this reflects how they too are like real-life scientists.

Our curriculum is based on the expectations of the national curriculum and is designed to be both progressive and matched to the needs and interests of our pupils. It starts with what the pupils already know and what they would like to know, added to this is what they need to know and from this a bespoke and flexible science curriculum is created. Long term plans are designed to be developmental and progressive and each new topic or learning experience builds on the skills, knowledge and understanding previously taught.

To support the unique needs of our pupils the curriculum has **vocabulary and reading** at its core. As pupils progress through school, children's vocabulary is improved through consistent exposure to subject specific vocabulary. Teaching builds on previously learnt vocabulary and is explicitly taught, displayed in the classroom and revisited during Bright Ideas Time. The acquisition of this scientific terminology allows the children to **communicate** their understanding effectively and reason about scientific concepts with **greater confidence**. Pupils also access a wide variety of high-quality written sources

to develop their **reading** skills, promote the use of secondary sources in science and spark their interest and **enthusiasm** for learning.

Our Curriculum creates learners who are:



Implementation

Leaders support quality teaching:

- Ensuring staff are following the agreed science policy and non-negotiables so the intent of the subject is met.
- By using feedback from monitoring and staff audits to organise CPD for staff to up-skill their teaching of science.
- By continuing to develop networks with science organisations, STEM organisations and further education providers to organise visits and experiences for pupils to raise aspirations and create an engaging experiential curriculum.
- Sharing best practice, with staff, of science teaching across school.
- Supporting teachers in their planning sessions so they can plan well pitched and progressive lessons within a unit of work.
- Creating and sharing a range of resources with staff that can be used to support their teaching of science.
- Providing staff with a progression of vocabulary document and implementing a dedicated discussion time (Bright Ideas) to support children to use scientific vocabulary.
- Developing, adapting and evaluating a precise action plan which identifies clear targets, times-scales and success criteria for its development and maintenance in line with the school development plan.
- Collecting and acting upon regular feedback from staff and pupils and adapting provision accordingly.

Leaders monitor the subject:

- Through learning walks, termly book scrutinies, pupil voice questionnaires and staff audits.
- Data analysis to ensure that assessments and evidence in books align with teacher judgments and to evaluate the progress and attainment in Science across school.

Governors ensure that the science curriculum is being led and taught effectively:

- Meeting with the subject leader at least twice a year to discuss the subject, actions and impact.
- Through learning walks, book scrutinies and pupil voice questionnaires alongside the science subject leader.

Staff plan, deliver and assess lessons that reflect the intent of the curriculum:

Planning

- A pacer document is created that details a series of well thought out progressive lessons, informed by the school's science progression document. The lessons take into account children's questions, relevant scientific vocabulary to be taught, experiences that will enhance the learning cycle, planned practical enquiry opportunities and the relevant working scientifically and knowledge objectives.
- Teachers plan lessons with cross-curricular links and real-life contexts where applicable and meaningful for the children. This approach provides pupils with a reason behind their learning.
- Teachers plan hands-on lessons for the pupils to develop their practical enquiry skills ensuring they have the correct resources for a successful lesson.
- Teachers use resources given by the subject lead to support them in planning high-quality science lessons.

- Teachers ensure that the lessons are inclusive and allow for all pupils to achieve through correct support and challenge.

Teaching

- Staff model relevant scientific vocabulary and develop children's reasoning within Bright Ideas Time in every lesson.
- Staff promote working scientifically skills to children through engaging practical lessons where pupils use resources effectively.
- Maintain high expectations of students and ensure that tasks are appropriate, with opportunities for challenge questions so pupils can apply their learning in different contexts.
- Teacher's foster children's curiosity by raising questions and allowing them to do so.
- In lessons children are allowed to be independent learners, making their own choices during enquiries and developing their resilience.
- Ensure misconceptions are addressed in lessons, throughout verbal feedback, written feedback and during Bright Ideas Time where necessary.

Assessment

- At the beginning of a unit, staff assess what pupils already know about that unit to inform their planning.
- Staff assess within lessons addressing misconceptions at the point of learning as well as addressing who needs to be supported or challenged and adapting tasks to the appropriate level so all pupils can achieve.
- At the end of topic an end of unit assessment is carried out.
- In line with school guidelines, at the end of topic, teachers will input DNA ticks on Pupil Asset to show how individual children have met certain objectives. Teacher's use their teacher judgment along with the end of unit assessment results and evidence in books to complete the DNA ticks.
- At the end of a lesson, staff recap what was learnt in that lesson, what was learnt last week and what was learnt last term. This ensures children are constantly revisiting prior learning.

Working Scientifically Skills

We teach the three types of Science: Biology, Chemistry and Physics at Usworth Colliery Primary School.

The topics covered across year groups are:

- Animals including Humans
- Living Things and Their Habitats
- Plants
- Materials and States of Matter
- Forces and Magnets
- Rocks and Soil
- Evolution and Inheritance
- Light
- Earth and Space
- Electricity
- Seasonal Change
- Sound

In each of these areas we focus on 'working scientifically' skills so that pupils learn to use a variety of approaches to answer relevant scientific questions. Scientific investigations include: observing over time; finding patterns; identifying, classifying and grouping; comparing and fair testing (controlled investigations); and researching using books, internet, etc. All of these enquiry types have been discussed with children, across the whole school, and teachers ensure that their lessons are planned with a focus on these types of enquiry. We believe, it is vital to focus on these working scientifically objectives as it allows our children to learn skills that can be used not only in science but across the curriculum. As a result, we are providing opportunities for our children to be lifelong learners as they are able to seek and find answers to questions in a number of ways. The working scientifically skills are on a two-year programme (eg Y1 and Y2 have the same objectives) to enable them to be taught effectively and with depth. These working scientifically objectives have all been shared with children and staff are encouraged to ask the children how they have been scientists in each lesson, with children referring to what working scientifically skills they have used in that lesson.

Scientific Knowledge and Conceptual Understanding

Scientific knowledge is assessed at the beginning of each unit in Science when the children are asked what they know and what they would like to find out during the topic. This can highlight to teachers' individual children who may require support as well as gaps in knowledge or misconceptions that will then need to be addressed throughout teaching. The children's scientific knowledge is then assessed again at the end of the unit with an assessment. In all year groups, children are taught to describe processes and key characteristics using an extended technical vocabulary. Staff have been supplied and given CPD on vocabulary in Science, with a progression document of vocabulary for each year group and science topic taught. Vocabulary should be displayed in most classrooms on displays as well as in each science lesson on the interactive whiteboard. All staff also deliver 'Bright Ideas Time' in each science lesson. This is a designated discussion time that helps to develop children's reasoning and confidence using scientific vocabulary accurately. Bright Ideas time is also used to recap prior knowledge from topics previously taught to ensure knowledge is being revisited and embedded. Furthermore, children should also apply their mathematical knowledge to their understanding of Science, including collecting, presenting and analysing data using graphs. Staff have been supplied and given CPD on using graphs accurately in Science including a graph progression document enabling them to see how data should be presented in their year group

Science in the Early Years Foundation Stage

In the Early Years Foundation Stage, Science forms part of the learning pupils acquire under the 'Understanding the World' branch of the Early Years Curriculum. EYFS staff have been supplied with their own working scientifically objectives that correlate to the appropriate early learning goals, including The Natural World. These objectives are met throughout the year as pupils are given the opportunity to explore their world through a variety of teacher-led and independent activities. Furthermore, pupils learn through first-hand experiences and are encouraged to explore the indoor and outdoor environment; observe things closely through a variety of means including magnifiers and photographs and ask questions and speculate on the reasons why things happen or how things work. Pupils are given the opportunities to record findings by drawing, writing and model making. Additionally, pupils are supported in developing the knowledge, skills and understanding that help them to make sense of the natural world around them.

Planning

Teachers should draw upon high quality subject knowledge and astute planning to set challenging tasks based on systematic, accurate assessment of pupils' prior skills, knowledge and understanding. They should use well-judged, imaginative teaching strategies to engage and inspire learners.

Long Term Planning is taken from the statutory science programmes of study in the National Curriculum using our curriculum coverage documents (*Appendix 1*).

Short Term Planning - This pacer document (*Appendix 2*) is completed to ensure objectives, vocabulary, activities and differentiation have been planned in a way that is progressive and allows children to embed knowledge and develop skills in depth.

Progression

Progression in the curriculum is built around essential scientific knowledge and understanding as well as working scientifically key skills. We have a science curriculum coverage document that ensures progress, continuity and consistency throughout the school in certain science skills and objectives outlined in the National Curriculum (*See Curriculum coverage documents- Appendix 1*). As a staff, all teachers also internally moderate science books each year so we can ensure tasks and evidence in book is progressive year on year but also allowing time to discuss what areas will need to be recapped from certain year groups to embed a deeper understanding.

Equal Opportunities

Staff endeavour to maintain an awareness of and to provide for equal opportunities for all pupils within Science lessons. We aim to consider cultural background, gender, disadvantage, special needs pupils and higher attaining pupils when planning activities, selecting resources and use of teaching styles to enable every child to equally access an inclusive science curriculum with plenty of support and challenge. Staff will also include, where possible, trips and experiences within a unit of work. These opportunities provide pupils with a means to understand how the science they are learning is applied in a real-life context. In science, we also use opportunities, such as working with Northumbria and Newcastle Universities to challenge stereotypes, particularly around gender.

Differentiation

Differentiation is planned for on the short-term pacer planning, with high expectations of all pupils at all times. This differentiation is then incorporated into Science lessons in a variety of ways.

Higher-attaining pupils

Pupils are taught within their class and extended through use of questioning or by being offered a more challenging or demanding activity requiring the pupil to utilise a greater range of skills and applying them across a range of contexts. Furthermore, a challenge task will always be planned, with a scientific context., to extended more able pupils. This should be evident in books as challenge will be written above the task to indicate the extension. Teachers also differentiate by outcome, expecting a higher-attaining or gifted pupil to produce work at a higher level (e.g. in terms of its originality, the level of questions a pupil is able to raise, their consideration of results and their hypotheses as to the reasons for their findings etc). More able pupils can also support other children in the classroom, their explanations to others and accurate use of scientific vocabulary shows can show greater depth of understanding.

Pupils with Special Educational Needs

Teacher ensure science lessons are inclusive to all, including SEN pupils in a number of ways. Mixed-ability groupings can allow pupils to share skills, ideas, knowledge and resources in collaborative way. Where pupils have particular difficulties, the teacher can also provide further demonstrations and individual support to enable the pupil to participate in practical activities. All children's ideas are valued and support is given to enable children with special educational needs to communicate their thoughts and observations in a variety of ways (especially if writing is a difficulty) e.g. use of Seesaw, photographs, discussions with an adult, the adult being a scribe, writing scaffolds and drawings etc. All strategies used do not distract from the scientific content being taught in lesson but instead are a support to ensure pupils can show and evidence their understanding.

Resources

Usworth Colliery Primary School has a range of materials sufficient to deliver the Science curriculum effectively and in an engaging way for all pupils. These are reviewed and extended annually (where funding allows) based upon responses from staff questionnaires asking what is required to adequately teach the topics in each year group. Resources have been sorted into topic boxes for each area of the science curriculum and general and specific investigation equipment has been grouped together by type. The topic boxes and scientific equipment are kept in the Science and Technology cupboard but staff, while teaching that unit, should get that box and keep resources in their classroom. Where possible, equipment should be displayed in the classroom so children can access and gain a greater insight to when and how they should be used.

NOTE: In the current climate, and in accordance with our school risk assessment, resources can be used in the classroom but must be cleaned with D10 before being used by a new bubble or returned to the science cupboard.

Information and Communication Technology (ICT)

ICT should be used in lessons to enhance science learning. iPads and computers can be an effective tool to record scientific findings, conduct scientific research and present findings in a variety of ways. Further ICT resources that are available, such as data loggers, should be utilised to full effect when

appropriate in lessons. Also our curriculum coverage documents highlight effective ICT links to each area of the Science curriculum (*Appendix 1*). Staff also evidence practical investigations and working scientifically objectives by using our ICT portfolio called Seesaw, this was introduced in 2017 after winning the Enthuse Award grant. Evidence of this work on Seesaw is put in books with a QR code to scan, which takes you the Seesaw portfolio. Seesaw has been a very successful tool and is now used across all subjects in the curriculum and in EYFS.

Health and Safety

It is the responsibility of all staff to ensure that activities being conducted are done so safely and in accordance with the School's Health and Safety policy and LA guidance. Staff will always teach the safe handling of tools and equipment and insist on good practice using safety equipment where necessary. Children are also taught how to work safely in accordance to the curriculum, for example when working with electricity. Teachers will always supervise the children in lessons ensuring they are responsible and demonstrate how to work with equipment safely. The use of hot water should only be at 'hand tolerant' temperature to avoid scalds. Children should not use boiling water. (See also the *Health and Safety Policy*)

Marking (see Marking policy and Guidance)

The main purpose of our marking policy is to give children consistency in their learning – to ensure that as children progress through school they benefit from the feedback they are given through constructive guidance about how to improve and given time to make those improvements. Within Science, marking is also used to address misconceptions or pick up basic skill errors in children's writing and presentation.

Homework (see Homework Policy)

It is our school policy to provide parents and carers with opportunities to work with their children at home. Opportunities to complete science homework will be given through our learning challenge homework, this maybe science or maybe topic based, each half term. These activities are often creative and to promote independence we also give children freedom to choose their own activities based on a topic e.g evolution. We also allow children to choose how to present their homework, this allows for a variety of creative approaches to be undertaken. To promote pride in homework we host a family homework sharing afternoon each term which allows children from each year group to showcase their homework in the hall to visiting parents and guardians.

Reporting to Parents

Parents receive an end of year report indicating their pupils' achievement in Science in line with the overall assessment level on Pupil Asset (below, on track , expected, just above or above).

Website

The science page of the school website will provide a range of supporting and informative materials for parents and children such as:

- a copy of the science curriculum coverage document used in school which provides a list of objectives taught as well as all relevant scientific vocabulary.
- links to places in the local area where science visits and trips could be undertaken outside of school
- links to science websites and interactive games for children
- a copy of a scientific glossary
- a copy of this science policy

Other relevant policies/guidance:

Homework Policy
Marking and Feedback policy

Assessment Policy
Health and Safety Policy

Previously agreed: March 2018
Agreed Date: September 2020

Review Date: 3 years

Signed..... Date.....
Head Teacher

Signed..... Date.....
Chair of Governors