

Uplands Junior School



Science Policy 2022

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Date of Policy: September 2022

1. Subject Statement

Science is one of the core subjects in the national curriculum. This policy outlines the purpose, nature and management of the science taught at Uplands Junior School. **This policy has been written with the UN Conventions on the Rights of the Child: article 3 (best interests of the child), article 28 (right to an education) and article 29 (goals of education).**

The implementation of this policy is the responsibility of the Science Subject Co-ordinators, Head Teacher and all the teaching staff.

2. Teaching and Learning

Intent

The 2014 National Curriculum for Science aims to ensure that all children:

- 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 skills required to understand the uses and implications of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this.

At Uplands, we encourage children to be inquisitive throughout their time at our school and beyond in the wider world. The Science curriculum promotes a healthy curiosity in all children about our universe and encourages respect for the living and non-living things. This is in line with our '*Respect For All school*' motto. At Uplands we believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit at Key Stage 2, as well as the application of scientific skills. We ensure that the 'Working Scientifically' skills are built-on and developed throughout children's time at the school so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions and be curious about their surroundings.

Implementation

All teachers create a positive and engaging attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following:

Science will be taught in planned and arranged topic blocks by year group teams and delivered by the class teacher or cover teacher. The Science leader has an overview of the whole school and each year group team know when each topic is to be taught.



From September 2022, that a minimum of four 'Science Ninja' lessons are delivered to develop the skills of enquiry with a focus upon *observation, measuring, recording* and the *use of equipment*.

Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, involving high-quality work and practical resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills and assess children regularly to identify those children with gaps in

learning, so that all children keep up. Work is differentiated to meet the needs of all learners and when appropriate children are supported by the class teacher and any supporting adults in school.

As much as possible children are given the opportunity to work independently, in pairs and in mixed ability groupings. On occasion, teachers may carry out a practical experiment for the children to observe.

We build upon the learning and skill development of the previous years if topics are repeated. As the children's knowledge and understanding increases, and they become more proficient in selecting and using scientific equipment, collating, and interpreting results. They therefore become increasingly confident in their growing ability to come to conclusions based on real evidence.

'Working Scientifically' skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. A vocabulary list for each topic has been shared with all staff and staff are aware of age related and topic specific words. Each class has a science display which shares the 'Science Ninja' skills and lists the key vocabulary linked to the unit being taught. Additions are made to the display as the unit progresses to be used to re-enforce, consolidate, or extend learning. Staff use this display as a teaching tool and a reference point throughout a topic as learning progresses.

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 learning (school garden/ pond) and workshops with experts.

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group and this is embedded within lessons and focuses 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 include *comparative and fair testing* (controlled investigations); *observing over time*; *pattern seeking*; *identifying, classifying, and grouping*; and *researching using secondary sources*. Pupils are given opportunity to seek answers to questions through collecting, analysing, and presenting data.

Learning beyond the classroom

All our children are offered a wide range of extra-curricular activities, visits, trips, and visitors to complement and broaden the curriculum. These are purposeful and links with the knowledge being taught in class and include a themed weeks linked to healthy bodies and healthy minds and food technology as well as visits and visitors such as Carding Mill Valley and the Planetarium.

Yearly events, such as Science Week allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. Children are encouraged to these events often involve families and the wider community. A whole school theme is provided during 'Science Week' which staff plan for in year group teams during a planned staff meeting.

Opportunities to apply for additional Science Funding is undertaken by the subject lead - *British Science Week Grant, Edina Trust Grant*, where appropriate. Funding being used to purchase 'Science Week' additional resources and equipment or to allow school to invite Science workshops from outside providers

Children are provided with the opportunity to attend an after-school Science club where they can develop their science enquiry skills through practical experiments.

To support learning beyond the classroom a 'knowledge organiser' has been supplied to all parents regarding every science topic. These can be found on our school website in the curriculum section.

Recording and Marking

Within Science children are encouraged to become a 'good scientist' and marking reflects this. Marking in Science comments on the scientific content (see Developmental Marking Policy). Recording learning is expressed in a range of ways; all children have a Science Skills Books and in addition to this each class also has a 'Science Floor Book'. Here practical investigations are shared through the use of photographs, post-it notes, notes, newspaper cuttings and observations in note form. This provides the children the opportunity to record and reflect upon learning without dedicating learning time to written responses in their individual books.

A progression of Scientific writing is built into the curriculum and link to age related expectations for writing within each year group. Following the progression of writing skills children will use writing frames to support their prediction and conclusion recording.

Impact

The successful approach at Uplands results in a fun, engaging, high-quality science education, that provides all our children with the foundations and knowledge for understanding the world around them. Our engagement with the local environment ensures that children learn through varied first-hand experiences of the world. When possible, learning outside the classroom is embedded throughout the science curriculum utilising our newly refurbished school garden. Through various workshops, trips and interactions with experts and funding bids, children have the understanding that science has changed our lives and that it is vital to the world's future prosperity.

Children learn through the curriculum and assemblies about the positive role models within the field of science. The life and work of a range of different scientists from various backgrounds are introduced to the children across each year group and the children are shown how skills in science can be applied to other aspects of their lives. Through our teaching and learning all children feel they are scientists and capable of achieving.

Children at Uplands overwhelmingly enjoy science, and this results in motivated learners with sound scientific understanding.

Scientific knowledge and conceptual understanding

The programmes of study for each year group describe a sequence of knowledge and concepts around a theme. Children's starting points are identified at the beginning of each science topic whereby the children prior and knowledge and understanding is assessed. This is completed in a variety of ways including multiple choice quizzes, KWL grid, mini assessment, question/ answer sheet and its impact is evaluated at the end of each unit using similar approaches.

During this process staff will identify to what extent pupils are able to describe associated processes and key characteristics using a common language, making use of technical terminology accurately and precisely where necessary. The science curriculum ensures that children are provided with regular opportunities to apply their mathematical knowledge to their understanding of science, including collecting, presenting, and analysing data. A writing progression has been developed to provide the children with meaningful age-appropriate writing opportunities to apply the skills they have been taught in English. Through use of the KWL strategy, children are also able to suggest what they would like to learn at the start of each teaching sequence, and this ensures that teachers are able to adapt the programme of study to ensure that this is informed by children's interests and to maximise their engagement with and motivation to study science.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. At Uplands Junior school, science lessons provide a quality and variety of subject specific language to enable the development of children's confident and accurate use of scientific vocabulary and their ability to articulate scientific concepts clearly and precisely.

3. Assessment and Monitoring

Children's progress is continually monitored throughout their time at Uplands Junior School and is used to inform future teaching and learning. By the end of key stage 2, our pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum 2014. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of interest and challenge.

Teachers use a variety of methods to inform their end of unit teacher assessments. These include:

- Observing children at work, individually, in pairs, in a group, and in classes.
- Questioning, talking, and listening to children
- Published assessments - *Test base*, *Twinkl* and *Grammarsurus* end of unit assessment

Children are teacher assessed at the end of every unit according to key learning objectives in both enquiry and subject knowledge. Children will be given a grade of:

working towards, met expectations, or working above expectations.

Assessments are recorded by the class teacher on a grid and monitored by the science co-ordinator.

Data for each year group is collated and will be analysed in Staff or year group meetings. Teachers will discuss:

- Children who are not at expected standard
- Progress / attainment of pupil premium children
- Progress / attainment of SEN

Teams to record ways in which they intend to narrow the gap between these groups and others.

'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.' (NC 2014)

It is the responsibility of the science co-ordinator to monitor the standards of children's work and the quality of teaching of science is carried and out and is of a high standard and will be done so through a robust monitoring cycle. As part of the monitoring cycle, the science co-ordinator will monitor planning and use of resources, complete book trawls and learning walks and carry out pupil voice meetings. Feedback will be provided sharing strengths and areas for development to the senior leadership team and staff.

Continued professional development will be provided for staff as a result of monitoring as a whole staff during staff meetings. If required, the science co-ordinator will be released to work directly with year groups or individual staff in the development of teaching and learning. The subject co-ordinator will also share current developments in the subject and providing a strategic lead and direction for the subject in the school with the senior leadership team. An annual summary of science is made, in which strengths and weaknesses in the subject are evaluated using the tracking system on the school server.

4. Planning

At Uplands planning is a process which is undertaken collaboratively and is shared to school platform. The school uses enquiry and subject knowledge objectives from the 2014 national curriculum which are outlined by the end of unit assessment.

Planning includes key skill objectives, subject knowledge objectives, assessment focus, activities, resources, key vocabulary, and evaluations.

From September 2022, the Science Ninja programme has been introduced across the school for the development of the enquiry skills of *observation, recording, measuring* and *use of equipment*. During these lessons, staff will provide the children with the opportunity to practise the skill before carrying it out independently, using the '*I do, we do, you do*' approach. (See Appendix 1)

Planning and resources are located on the learning platform in Year group folders and are monitored as part of the subject leader's monitoring cycle.

Further evidence of 'good science' taking place in our classrooms include:

- An active learning environment, showcasing the Uplands Science Enquiry approach, and Relevant Working Scientifically posters for age phase on the working walls during science topic coverage.
- Children being encouraged to ask and answer questions and discuss their work and ideas.
- Children devising and conducting their own investigations within the context of the relevant curriculum content, as well as being given opportunities to develop their working scientifically skills.
- Children recording their findings in a variety of ways.
- Children showing enjoyment in the activities they are undertaking.
- Cross curricular links to science are used when appropriate in other curriculum subjects.

A 'Science Handbook' is held on the school platform which new staff are directed to. It outlines the following:

- What Science looks like at Uplands
- Enquiry cycle
- Expectations for teaching and learning, including how to deliver a 'Science Ninja' lesson
- Cross curricular skills – Maths and English
- Assessment and marking guidance
- Learning progression
- Use of the floor book

5. Resources

School possesses high-quality science equipment to aid and support the teaching of all units of work taught across Key stage 2 which are organised centrally.

All year groups have access to laptops and iPads to provide them with access information or enable them to communicate their findings. All staff have access to a range of online resources to enhance and engage learners.

The school library holds a range of non-fiction texts linked to their units and are given weekly opportunity to access and borrow books to support and encourage their independent learning.

6. Organisation

Science will be taught weekly and recorded in an orange Science book. The content is organised into topic blocks. There are 5 topics that are covered across the year. Each year the children are given a project to complete as part of British Science Week.

	Year 3	Year 4	Year 5	Year 6
Autumn 1	Forces and magnets	Living Things & Their Habitats	Earth & Space	Electricity
Autumn 2	Animals Including Humans	Electricity	Properties and changes	Animals Including Humans
Spring 1	Working Scientifically Science Week	Working Scientifically Science Week	Working Scientifically Science Week	Working Scientifically Science Week
Spring 2	Rocks	Sound	Living Things and their Habitats	Light
Summer 1	Light	Animals Including Humans	Animals Including Humans	Living things and Their Habitats
Summer 2	Plants	States of Matter	Forces	Evolution and inheritance

7. Healthy and Safety

The school's Health & Safety Policy outlines the safe codes of practice for our school and provides the necessary guidance on the response and the reporting of all incidents.

Children are encouraged to assess hazards and discuss the appropriate precautions. Children are taught the appropriate safe practice when using equipment.

This will include:

- how to use equipment correctly and in accordance with health and safety guidelines
- to behave in a considerate and responsible manner, showing respect for other people and the environment whilst on trips outside the classroom.

All staff should follow the health and safety guidelines set out in the 'Be Safe' publication held by the science co-ordinator.

8. Equal Opportunities (e.g., gender, race)

At Uplands Junior School we are committed to providing all children with an equal entitlement to scientific activities and opportunities regardless of race, gender, culture, or class.

9. Inclusion (e.g., EAL/SEND/PP/Provision for HA)

In school we aim to meet the needs of all our children by differentiation in our science planning and in providing a variety of approaches and tasks appropriate to ability levels. This involves providing opportunities for SEND children to complete their own projects, with support, to develop speech and language skills, as well as scientific skills and knowledge. This will enable children with learning and/or physical difficulties to take an active part in scientific learning and practical activities and investigations and to achieve the goals they have been set. Some children will require closer supervision and more adult support to allow them to progress whilst more able children will be extended through differentiated activities. By being given enhancing and enriching activities, more able children will be able to progress to a higher level of knowledge and understanding appropriate to their abilities. Teachers will use the school's inclusion planning key to ensure that a range of strategies are used which include and motivate all learners, ensuring that optimum progress is made throughout each part of the lesson.

10. Parents (including Homework)

Parental input is highly valued, and parents are regularly invited and welcomed into school to share their own expertise with the children. There is an annual family event that engages many families in scientific activities and view the projects created by their child and other children in the school. Children may receive science homework based on their current topic.

Review

This policy should be reviewed 3 years from the date on the front cover.

How to run a lesson

This is only for your **practical** lessons in science, where children need to develop skills in science, so their conclusions are reflective of their findings. Trying to focus on too many skills in one lesson can become overwhelming for children (and teachers!) so this helps to focus and celebrate on one skill at a time. As children move through topics, lessons, and year groups they will acquire a range of skills. If you need help to plan a practical Science lesson, please see the steps below or come and see me.

Step 1: Plan you 'Science Ninja' practical lesson in writing, this needs to be the first page of your Smart/PowerPoint.) This will allow you to decide on:

- a) science national curriculum objective
- b) science ninja skill - JUST PICK ONE to focus on - observation, recording, equipment or measuring
- c) success criteria - how will a pupil make progress in that skill? What will make the difference to their results?
- d) conclusion - what will a good conclusion look like? How does it meet the national curriculum objective? See 'Writing conclusions' support sheet.

Step 2: Create a 'steps to success' slide and share with the children during the lesson so they can see how to be successful.

Note: Allow children time to practise the skill e.g., if it's using a stopwatch - run through the success criteria before they are using them to investigate. If it's observation, allow child time to use magnifying glasses on objects in the room. If it's using equipment, allow child some explore time to use the equipment before setting up your investigation. If it's recording, think about practising drawing a table for those who are capable, and providing a scaffold if they need it.

Step 3: Celebrate! Award the stickers. Choose 6 children who have made progress in the skill. You can also ask your TA to look out for children who are making progress in the skill - if some children only manage some of the success criteria, they can still be awarded a sticker. One sticker on their jumper - one sticker in their book!



Step 4: Reflect on success. Give the child the speech bubbles to record and use the vocabulary from the success criteria. E.g., "I have been successful as I looked closely at the numbers on the thermometer, so I was accurate." Allow other child to hear/see these reflections by putting them on display, or in the floor book as well as them gluing it into their books.

Step 5: Link back to the national curriculum statement to ensure child achieve the objective by giving time to write a **conclusion** in their books supported using their 'Ninja' skill.

Step 6: Record who has received a sticker on the class record with the date.

