



Science Policy

2021-2022

This Science Policy is to be read alongside our Curriculum Policy.

Vision

At Urmston Primary School our aim in science is to develop the children's natural curiosity in the world through practical, engaging and real life scenarios.

Urmston Primary's school values of resilience, responsibility, respect, happiness, kindness and pride, like our motto of 'Growing Together. Empowered to Be More', has become engrained into the fabric of school life and into our school curriculum.

Our 'Being More' science curriculum provides a balance between focused learning- to develop the children's knowledge and understanding – and investigation and exploration- to enhance their skills in scientific enquiry. Science learning provides pupils with context, memorable learning experiences, gives learning relevance and ensures that our pupils are engaged, enthused and inspired. This leads to a lifelong love of science that our children carry with them as they move onto secondary education and beyond.

Rationale

A high-quality science education provides the foundations for the children to understanding the world with excitement and curiosity. We feel that it is important that children understand the world around them and are confident to ask and investigate questions that interest and

fascinates them. We want to equip the children with the scientific knowledge and skills required to understand the uses and implications of science, today and for the future, and to help us do this we use a range of diverse and inspirational figures to draw children in to the incredible scientific advancements that have been made.

Under the circumstances, we have also taken into consideration the DfE's 'Teaching and Broad and Balanced Curriculum for Educational Recovery', which states:

The first step in adjusting the science curriculum is to identify the content in biology, chemistry and physics that is most important for enabling pupils to build up their knowledge of key scientific concepts.

At key stage 1: • an example of content which will support future study is knowledge about herbivores because it allows pupils to learn about food chains in key stage 2. This, in turn, enables them to understand ecosystems in key stages 3 and 4.

At key stage 2: • concepts that are beneficial to future study include, but are not limited to, forces, electricity, magnetism, materials and substance, reactions, nutrition, evolution and inheritance, ecosystems, properties and changes of materials.

Our knowledge progressions, based on core and additional acquirement, ensure that our children gain essential core knowledge, before progressing further. This knowledge is outlined in our knowledge and skills progressions for Science.

Aims

- To ensure coverage of all science objectives set out in the EYFS and Primary national curriculum are included within our 'Being More' curriculum. Our curriculum is personal to us at UPS and the children's learning will be fun, evoke intrigue and inquisitiveness.
- To learn about a diverse array of inspirational scientists or inventors who teach us how to define our school values such as resilience, respect and responsibility.
- To give support, challenge and develop knowledge and skills for every child in science.
- To teach, develop and master practical scientific methods, processes and skills (Working scientifically) through the teaching of the programme of study content for each year group.
- To develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- To develop understanding of the nature, processes and methods of science through different types of science enquiries that help the children to answer scientific questions about the world around them.
- To give the children opportunities and experiences of science outside of the curriculum.
- To encourage children to ask questions about the world around them and discover how to answer them by applying their scientific knowledge, skills and vocabulary.

- For our children to be confident and independent learners. The children will be given the opportunity for learning to be child-led, giving children the licence to question the world and find out the answers.
- To equip the children with scientific knowledge required to understand the uses and implications of science, today and for the future. We want to nurture a desire for the children to make a positive difference to the world around them.

Planning, resources and teaching and learning (*refer also to the Curriculum, Teaching and Learning and Feedback Policies*)

Teachers will use the UPS 'Being More' curriculum document. Topics are planned for at the beginning of the year and although this is obviously subject to ongoing change and development, it enables teachers to ensure coverage and plan engaging learning around national curriculum objectives, whilst weaving the children's learning needs and interests in the programme of study. (See Curriculum Policy Appendix 1 for an Overview of each year group topics) (See UPS Values-led 'Being More' Curriculum for core and additional knowledge for each topic.)

'Working scientifically' specifies the understanding of the investigative process in science for each year group. It will be embedded throughout all of the topic areas, covered in Science. The children should be made aware of the skills and specific language associated with it through the natural process of teaching and learning. The children will learn about the 5 types of enquiry throughout the school and they will complete scientific enquiry based on these 5 areas.

Each science topic is structured in the following way:

- a clear topic rationale (explaining what is taught and why);
- year group skills progressions and learning statements;
- year group knowledge progressions (with a sharpened focus on core, additional and further knowledge acquirement);
- key topical and subject-based vocabulary;
- *possible* 'enrichment' activities;
- *possible* 'critical' and 'higher order' questioning (based on *Blooms Taxonomy* and highlighting the importance of the thinking process)
- Urmston Primary's core values – specifically respect and responsibility in Science

Children will also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data.

Teaching and Learning

Topics will be engaging, interesting and exciting for children of all abilities. This will, more often than not, include a 'hook' and an inspirational figure, ensuring that learners always have a point of context. Teachers will deliver lessons and programmes of study in line with our Teaching and Learning Policy, catering for all types of learning styles and incorporating all manner of activities; visual, audio, kinaesthetic, investigatory and exploratory – with an appropriate balance between child and teacher-led learning.

Science will be taught in planned science lessons based topic blocks. We build upon the knowledge and skill development of the previous years through skills progressions and the knowledge builds based upon the Biology, Chemistry and Physics taught within the National Curriculum in each year group. As the children's knowledge and understanding increases, they will become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence. Topics are themed on the areas of biology, chemistry and physics.

The children will have the names of the 5 types of scientific enquiry stuck into the front of their science books, lower down the school, these will be on display in the classroom. The different enquiry types are colour coded and will be referenced when completing scientific enquiry. The children will place corresponding enquiry stickers next to their 'Learning questions' in their books. This should be a visual aid for the types of enquiry that have been completed in class as well as an easy guide to show progression throughout the year group books.

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 is developed through the years, in-keeping with the topics and can be found in our Science knowledge and skills progressions. Teachers' deep knowledge and skilled questioning will support and challenge our pupils in broadening their own knowledge, skill and understanding. Children will develop their scientific vocabulary and be able to use and apply it with precision and accuracy. Please refer to the 'Teaching and learning' policy.

Our Teaching and Learning Policy makes clear the expectation that pupils of differing abilities are both supported and challenged. Teachers will use a range of age-appropriate models and activities to engage all learners and ensure progression year on year, with work set appropriate to the ability levels of all of the children. This is particularly the case for our SEND pupils, as well as stretching those children who excel and are particularly able, gifted or talented in certain areas of the curriculum, or indeed outside it. Quality First Teaching is a style of teaching used that focuses on high quality and inclusive teaching for every child in the classroom which is outlined in the Graduated Approach.

We strive to engage and include all children in their entitlement to 'Science capital'. This includes building on what science they know, how they think about science (their attitudes and dispositions), who they know (e.g. if their parents are very interested in science) and what sort of everyday engagement they have with science. Ensuring that science at UPS provides a

wealth of different positive scientific experiences alongside the expectations of the National curriculum.

EYFS

In the Early Years Foundation Stage, Science is taught through certain statements from the 7 areas of learning. The most relevant statements are within Understanding of the World, Communication and Language and Physical Development and are taken from the EYFS statutory framework as well as the Development Matters 2020 which is non-statutory. The statements demonstrate the prerequisite skills for Science within the national curriculum.

Knowledge Organisers outline how the science strands of biology, chemistry and physics are differentiated for Nursery and Reception and link to the Science curriculum in Year 1.

The children will be guided to make sense of their physical world and community and to develop knowledge and skills which build upon their natural curiosity and fascination for the world around them. Children are encouraged to use all their senses to observe, explore and make predictions about people, places, technology and the environment. They will have opportunities to talk about what they see, begin to understand changes, ask questions and show care for living things.

Their level of development in this area of learning (emerging, expected) will be assessed against the Early Learning Goals at the end of the Foundation Stage.

Assessment and 'end points' (see also the Curriculum and Assessment policies)

- The first lesson of each topic will involve a 'knowledge harvest'. Children will be encouraged to share key themes and ideas that they have learnt prior to the beginning of this new topic with the intention of then being able to link and contextual learning and build on what they know.
- A glossary will be in the front of each new section of work. The children will add their own definitions to this as they acquire new vocabulary.
- As part of the scientific enquiry work, teachers will use TAPS documents (Teacher Assessment in Primary Science). These resources will focus on learning across the full range of working scientifically elements; plan, do, review.
- A 'Big question' will be asked at the start (pre-learning task) and the end of a unit of work (post-learning task) to show progression in children's new-found knowledge and understanding.
- Short, focussed discussions using a 'discussion prompt' such as Odd one out, PMI or concept cartoons are encouraged to stimulate higher order thinking and encourage the children to share their ideas at the start of lessons.
- Near the end of a unit of work, teachers will conduct 'topic quizzes' based upon the core and additional knowledge that they have learnt.
- At the end of each term, in collaboration with subject leaders, teachers will assess specific skills and if a child is developing, broadly achieving, or exceeding expectations in such skills. This will happen at the end of each term. (See the

rationale for this in the section, *'Monitoring impact and outcomes: Assessment and End Points'*, on p14 of our Curriculum Policy (it is also in the Appendix below).

Monitoring, Evaluation and Review

Science subject leaders will use their monitoring procedures to gauge how pupils are performing in their subject areas and may use this as an indicator of areas for development in that subject across the school. With the use of skills progressions, they will be able to clearly see how skills develop year on year and the expectations set by each year group. Along with an awareness of the topics and objectives covered in each year group, book reviews, observations/learning walks and in talking to the pupils, science subject leaders will have a clear idea of how the children are enjoying and engaging in their subject area and what areas for development might be.

A science action plan will be created at the start of the academic year, including actions that are based on the subsequent needs of our school and our pupils in science. This may include additional resources for pupils of varying abilities or, indeed, highlight those pupils who may be gifted or talented, who can then be provided for and opportunities to hone these skills further can be looked into.

Success in science will be monitored through the activities mentioned above and will use this as a platform for implementing improvement and enhancing our pupils' experiences in science.

Beyond the curriculum

In science children will be encouraged to consider the world around them and the impact we, as individuals, communities and societies, have on the world. They will be engaged in experiences alongside and beyond the National curriculum which will encourage understanding of their own place in the world and the impact of others. This will be encouraged with events such as supporting year group charities e.g. Water Aid and WWF. They will also experience science assemblies lead by; 'Mad Science', school visits, learning about famous scientists and inventors and be given the opportunity to discuss 'science questions of the week' at home with their families.

Policy written: October 2021

Policy written by: Mrs. S Saint and Mrs. M Vitkin

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Appendix 1 (taken from p14 of the Curriculum Policy, 'Monitoring impact and outcomes: Assessment and 'End Points')

Monitoring impact and outcomes: Assessment and 'End Points'

Reading, Writing and Maths

Core literacy and maths knowledge and skills will be formally assessed on a termly basis, with ongoing assessment being more robust than other curriculum subjects. The purpose here is to ensure that pupils are developing key skills in order to access all areas of the curriculum and beyond. How this is done is outlined in our English, Maths and Assessment Policies, with the use of more summative assessment playing a useful role towards teachers' judgements in every year group and particularly at the end of each key stage.

'Foundation' Subjects

There are a number of different 'end points' that we use to gauge how well our children are learning across the curriculum and the impact of our practice. These depend on the monitoring method and may be at the end of a unit of work, at the end of a term, or at the end of a phase or key stage. 'End points' also depend on whether it is the teacher or the subject leader who is doing the monitoring...

The teacher's role: Teachers will assess 'foundation' subjects by looking at pupils' work in each year group and gauging a sense of achievement at each 'end point'. This will be partly based on books and pupil discussion, but also through the following:

- 1) Firstly, the first lesson of each topic will involve a **'knowledge harvest'**. Teachers provide the children with prompts and reminders of previous learning, linked primarily to our curriculum themes and school values where possible. Here, children will be encouraged to share these key themes and ideas that they have learnt prior to beginning this new topic. This will ensure that they can use their prior learning and build on it within a new context.
- 2) Secondly, pupils will complete their own **topic-based glossaries**, acquiring new knowledge and vocabulary as they learn. By the end of the topic, they'll have this new knowledge that they can take with them to the next topic and build upon, either later in the academic year, or in the following one.
- 3) Thirdly, teachers will conduct **'topic quizzes'** based upon the core and additional knowledge that the children have learnt in Science. This will give teachers the chance to review and revisit knowledge and to address misconceptions – children cannot complete without getting the answer right so need to amend their answers, and

therefore their thinking. This will then be used to help gauge how well the children's learning has stuck with them.

- 3) Finally, in collaboration with subject leaders, teachers will assess specific **skills** and whether each child is developing, broadly achieving, or exceeding expectations in such skills. This will happen at the end of each term. We believe that assessment should inform better practice and that a key purpose of assessment is to monitor the impact and effectiveness of our curriculum, move learning on, identify areas for development and act on them. Because there are so many skills to cover within our curriculum, we take a measured approach which enables subject leaders and teachers to prioritise and pinpoint areas for improvement. At the beginning of each term, subject leaders and teachers will highlight a particular skill area to assess, based upon their subject's priorities, following findings from their monitoring procedures (e.g. scientific enquiry/geographical fieldwork, etc), as well as in some cases being based on what is being covered that term or in a particular year group (e.g. certain art skills will only be covered in particular terms, in particular year groups). Sometimes this will change termly, sometimes, twice a year, with all skills areas being more specifically assessed at least two or three times within the course of a key stage, with teachers and subject leaders making themselves fully aware of their class' needs at the start of each year. Because of this, the focus will always be based upon the development needs of the subject. It also ensures a regular focus on each area so that progression in standards and the impact of the curriculum can be monitored and reviewed.

The subject leader's role: Monitoring, Evaluation and Review: the bigger picture

Subject Leaders will use a number of monitoring procedures to gauge how pupils are performing in their subject areas and may use this as an indicator of areas for development in that subject across the school. With the use of knowledge and skills progressions within the curriculum, embedded into year group topics, they will be able to clearly see how pupils develop year on year and the expectations set by each year group. These end points will be assessed once a term, based upon the topics covered. It should be pointed out that not every skill and piece of knowledge in the curriculum will be assessed at the end of each term as this is unmanageable and not purposeful. The most effective way for Subject Leaders to monitor the children's acquirement of subject knowledge is through analysis of the online quizzes and through pupil discussion, and here, they not only get a sense of how well the knowledge has stuck with the children, but also, in more open-ended questions, gain a deeper understanding of how the children feel about the topics and subjects studied and their engagement levels.

Subject Leaders will monitor their subject's success and the impact of our teaching and learning through the following monitoring strategies and these should be considered alongside this policy:

- *Pupil discussions in friendship groups;*
- *Learning walks;*
- *Pupil work reviews (books and Seesaw);*
- *Discussions with teachers;*
- *Data from topic quizzes;*
- *Data from skills assessments.*

Our Curriculum Lead oversees the Subject Leaders' practice and monitors this to ensure consistency and effectiveness.

Along with an awareness of the topics and objectives covered in each year group (as set out in the UPS 'Being More' Curriculum), using the strategies above will enable leaders to have a clear idea of pupil standards at each end point, how the children are enjoying and engaging in their subject area and what areas for development might be.

Subject Leaders will have an action plan at the start of each academic year, including actions that are based on their knowledge of their subject and the subsequent needs of our school and our pupils. This may include additional resources for pupils of varying abilities or, indeed, highlight those pupils who may be gifted or talented, who can then be provided for, and opportunities to hone these skills further can be looked into. They will again use all of this analysis as a platform for implementing improvement and enhancing our pupils' experiences in that area of the curriculum.