



Science Policy 2021

Reviewed February 2021
Next review February 2022

Science at Newdale Primary is taught through the three disciplines of biology, chemistry and physics all under the umbrella heading of Science. We aim to develop a sense of excitement and curiosity and enable pupils to rationally explain their understanding by creating a good understanding of key Scientific knowledge and concepts. Children are taught how to explain what is occurring, predict how things will behave and analyse causes. We are passionate about teaching and nurturing high quality working scientifically skills and this firmly lies at the core of all our Science teaching.

Aims for Science

- To develop **scientific knowledge and conceptual understanding**
- To 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
- To equip children with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.
- To develop enjoyment and awe and wonder when carrying out investigations.
- To teach key skills in Science - predicting, questioning, interpreting, recording, observing, concluding and analysing.
- To link Science with Numeracy skills when observing links and patterns with their results.
- For children to be taught about safety and to ensure all work is carried out safely both for themselves and other people.
- To ensure children are taught how to store and use resources correctly, including developing independence in the use of these from an early age.
- To teach children the appropriate scientific vocabulary, both based on knowledge and skills.
- To recognise Science as a core subject area and to ensure that it is allocated the correct status and time.
- To explore values and attitudes towards Science.
- Learn ways of thinking and finding out and communicating ideas, including the use of higher order thinking skills to develop awareness further.
- To develop knowledge and understanding of important scientific ideas, processes and skills and relate these to everyday experiences.
- To learn and know the names and findings of key British Scientists and those from other parts of the world.

Why we teach science

Children are encouraged to be 'scientists' right from Early Years through to Upper Key Stage Two and beyond. All children will experience the Working Scientifically skills at varying levels depending on their age and ability. The following elements will be taught throughout:

Knowledge - Children are taught and learn key facts linked to the three scientific strands that they study. Children are expected to learn about key scientists and their impact on scientific findings.

Working Scientifically- children are directly taught a variety of key scientific skills such as: observation, asking questions, sorting and classifying, concluding, recording results.

Working Scientifically - This strand from the National Curriculum focuses on the pupils being taught to use practical scientific methods, processes and skills.



These working scientifically skills will be taught and developed through Science investigations. EYFS and KS1 will focus on five working scientifically skills. KS2 will develop all seven skills.

The logos representing each of these skills will be present within classrooms, on Flipcharts and in the pupils' books (on learning objective strips). As pupils move through school, they will develop an increased awareness and knowledge of the working scientifically skills represented by each logo. They will be involved in discussions within Science lessons to identify the skill they have been developing in investigations.

Working Scientifically skills are taught and developed through five key investigation types. They are:

Types of Investigation



Pre and Post assessments are used at the beginning and end of each unit of work. Children will demonstrate what they already know via an informal test and then take a content test at the end. The pre assessment will inform the teacher as to how to plan the relevant lessons, what individual children need to learn and how to differentiate the lessons so all children are learning and discovering new concepts. The post assessment allows the teacher to build a picture of where the children are in terms of Working at the Expected Standard.

Experimental and Investigative Science lies at the heart of Science teaching and learning. Through these techniques, children are given the opportunity to experience and understand the world around them.

Science and the curriculum

Science is a core subject in its own right and various elements of science need to be taught specifically. However, curriculum links can be made, especially within Literacy, Numeracy, ICT, Design and Technology, PE, Eco-Schools and Healthy Schools.

Some examples of how Science and Literacy can support each other:

Report writing as a result of a Sc1 investigation.

Note writing as part of planning

Non-fiction writing

Poetry following an Sc1 investigation, illustrative activities related to the senses - music sound and touching etc. Speaking and listening skills are also an integral part of teaching science through asking questions, talking about their ideas, justifying their thinking and exploring concepts through drama. As part of this, it is important that children are encouraged to develop their scientific vocabulary through specific word level work.

Some examples of how Science and Maths support each other:

Using a range of instruments which use scales of measurement e.g.

- Rulers, metre sticks, trundle wheels.
- Thermometers, stopwatches, clocks.
- Balances and scales
- Various measuring cylinders and beakers
- Using various tables and charts to record observations and present their results.
- Using a systematic approach to problem solving.

Some examples of how Science and Design Technology support each other:

Using and applying knowledge of measurements.

Applying their knowledge of materials, their purposes and properties.

Some examples of how Science and PE can support each other:

Developing understanding of forces through dance

Focuses on the human body and how we move and grow.

Explaining concepts such as the movement of solids, liquids and gases.

These reflect just a few ways in which Science can be linked to other curriculum areas. It is important to identify clearly the focus for these sessions to ensure the correct time allocation is given to the different subjects.

Ways of recording:

It is important that mathematical skills are taught within Numeracy and then applied within the science lesson, and, that Literacy lessons are used to record scientific concepts and findings when appropriate. Other ways of recording could include the use of photographs, videos, whiteboards and laminated planning boards. Work completed in Literacy can be referred to in the science book or photocopied.

Children's work will be recorded in the following books:

Early Years will use either their knowledge and understanding books or will choose to have a separate plain book, specifically for Science work.

Key Stage 1 and 2 will use lined green books.

Time allocation (In accordance with Government guidelines)

Science is to be taught weekly, using the time allocation shown below. However, a greater amount of time may need to be reallocated to the weeks where a Sc1 investigation is being carried out. This will allow for the whole process to be followed through by the children and also allow the teacher to assess a focus area of the investigation.

Key Stage 1 - 2 hours per week

Key Stage 2 - 2/2.5 hours per week.

Science is to be taught in an allocated morning or afternoon, by the Class Teacher.

Knowledge and Understanding

Children should be taught to:

- Be curious about the things that they observe and experience and explore the world around then using all their senses.
- Use these experiences to develop their understanding of key scientific ideas and make links between different phenomena and experiences.

- Begin to think about models to represent things they cannot directly experience.
- Try to make sense of phenomena, seeking explanations and critically thinking about claims and ideas.

Process and skills

Children should be taught to:

- Acquire and refine the practical skills needed to investigate questions safely.
- Develop skills of predicting and asking questions, making inferences, concluding and evaluating based on evidence and understanding and use these skills in investigative work.
- Practice scientific and mathematical skills in real contexts.
- Learn why numerical and mathematical skills are useful and helpful in understanding.

Language and communication

Children should be taught to:

- Think creatively about science and enjoy trying to make sense of the phenomena.
- Develop language skills through talking about their work and presenting their own ideas using sustained and systematic writing of different kinds (appendix 1)
- Use scientific and mathematical language including technical vocabulary and conventions and to draw diagrams and charts to communicate scientific ideas.
- Read non-fiction and extract information from sources such as reference books or the internet.

Building on children's earlier experience

Children should be taught to:

- Ask questions as to why things happen
- Investigate a wide variety of objects and materials in the natural and man-made world.
- Learn about themselves and living things.
- Look closely at similarities and differences, patterns and change.
- Talk about their observations and sometimes record them.

Values and attitudes

Children should be taught to:

- Work with others, listening to ideas and treating these with respect
- Develop respect for evidence and evaluate critically ideas which may or may not fit evidence available
- Develop a respect for the environment and living things and for their own health and safety.

Features of progression

Children should be taught to:

- Move on from using everyday language to increasingly precise use of technical and scientific vocabulary, notation and symbols (appendix ii)
- Move from personal scientific knowledge on a few areas of understanding to a wider range of areas and make links between them.
- Move from describing events and phenomena to explaining about events and phenomena
- Develop their independence in investigations from explaining modelled investigations to teacher led practical work then independent investigations.
- Move from explaining phenomena in terms of their own ideas to explaining in terms of accepted ideas or models
- Participate in practical science activities to building increasingly abstract models of real situations
- Move from unstructured exploration to more systematic investigation of a question
- Move from using simple drawings, diagrams and charts to represent and communicate scientific information to using more conventional diagrams and graphs.

Special educational needs

Work and activities planned are differentiated to suit the needs of individuals and groups of children. Children who have specific learning needs may have been working with the Teaching Assistant, who in turn will be working under instruction and guidance from the class teacher.

Able and Talented

As a school, we strive to meet the needs of our G&T learners. We enable children to stretch and challenge themselves, through the development of

- Thinking skills
- Enquiry skills
- Questioning skills
- Reasoning skills
- Evaluative skills
- Extra curricular visits

We identify G&T children through monitoring children who operate significantly above that of their peers. We expect these children to make accelerated progress. In Science we do this by digging deeper with the children's learning similar to the concept of the Mastery Curriculum in Maths. Children will be moved forwards with their explanations and uses of Scientific Vocabulary. The most gifted learners will strive to apply their findings within a new context.

Assessment

Opportunities for assessment occur throughout the teaching and learning process such as: during the pre-test and post test, during investigations, through questioning both verbally and from wishes in books, observations and from the teacher's own professional judgements. The Engaging Science Scheme, that we use to support planning, has clear statements regarding what children working below, at and above age-related expectations will be able to do. This will support class teachers when making their assessments. Teacher's use these assessments to adapt teaching in order to challenge and correct any misconceptions that the children may have. Class teachers will also be able to make assessments on the pupils' understanding of the working scientifically skills through the questioning and discussion that arises when children circle the relevant skills on the slips in their books.

Currently, Years 1-6 are assessed on their Science knowledge and understanding at the end of each unit. The information is recorded in line with the whole school assessment policy of whether a child is working at, above or below national expectations. These assessments are then recorded as best fit upon the termly grids. The co-ordinator will analyse these and identify steps and actions to move forward. End of Term assessments are saved on O-track.

From September 2020, class teachers' assessments will be moderated regularly by the Science coordinator team. For each Science unit taught, teachers will submit one example piece of work for pupils assessed as working below, at and above age-related expectations. Teachers can use the statements from the Engaging Science Scheme to support these judgements.

Planning

Planning for science is shown on the Long Term Matrix, which can be found on the school work group. Science is then planned for each term. Teachers specifically plan each lesson linked to a different Working Scientifically strand as this is very much at the core of all Science teaching at Newdale. Objectives are selected from the new National Curriculum 2014 and teachers have freedom as to which units to teach within the year.

Nature Walks

Nature walks are part of a whole school initiative which began in 2018. This initiative was created so that all year groups have the opportunity to investigate their local area. Each year group will go on three nature walks per year and will have a focus 'viewpoint' that they revisit each time. This allows each year group to track the changes that occur within their area over the course of a year.

Resources

Science Resources can be found outside the Family Room and in a cupboard next to The Den. They are labelled within different drawers.

If any equipment is running low, please inform the science co-ordinators as soon as possible so that an order can be made.

Health and Safety

All activities need to be carried out with care and children need to be taught how to use the equipment in a careful and safe manner. Individual children need to be checked for allergies prior to senses work i.e. touching and food tasting. Parents are asked to sign a form holding this information when registering a child at our school. The School is registered with CLEAPPS.

Role of the Science Co-ordinator

- To provide up to date INSERVICE training for other members of staff.
- To attend relevant courses to improve personal subject knowledge
- To monitor classroom teaching and to scrutinise work.
- To provide feedback of findings to Head teacher, SMT, teachers and Governors.
- To liaise with the link Governor and inform them of work being carried out in school and further developments.
- To liaise with other science teachers.
- To support teachers with their planning.
- To ensure staff are planning appropriately and to monitor planning.
- To monitor the teaching and learning of Science including the teaching of Working Scientifically skills.
- To monitor children's work.
- To be aware of any changes to the curriculum and to make sure that appropriate action is taken.
- To be a lead teacher in the teaching of science.
- To develop a positive ethos about the teaching of science.
- To monitor resources.

Success criteria

- Improved resources throughout the school.
- All pupils are given the compulsory set amount of Science teaching each week.
- Children will become confident scientists.
- Teachers will feel more confident to teach all aspects of the science curriculum.
- Quality of children's work will be in place.
- Link Governor will have an understanding of how Science is taught in school.
- Science will have a raised profile within the school.
- Progress is tabbed to demonstrate teacher evidence
- Children will be using technical science vocabulary appropriate for their topics.
- Pupils will be explicitly taught working scientifically skills suitable for their age range.
- A balance of illustrative and investigative science will be taught throughout the school.

Further developments

- To develop the use of data loggers across school.
- To ensure independence of activities in KS2.
- To ensure a clear progression of scientific enquiry skills throughout school.

Science policy to be reviewed and updated Spring 2022