

Science Policy

Reviewed September 2023



The Stour Academy Trust

Introduction

This policy outlines the aims, organisation and management of teaching and learning of Science within The Stour Academy Trust. This policy explains why and how we design, plan, teach and assess Science. It is based on the National Curriculum 2014 Programmes of Study and review of research, literature, classroom practice, global events, school contexts and feedback from staff, parents, members of the community and the children. Our science curriculum is being transformed into a 21st Century teaching and learning practice incorporating collaboration, skilled communication, knowledge constructions, self-regulation and real-world problem-solving using technology to enhance the teaching and learning whilst using a digital exercise book for pupils. With the use of video and audio capabilities children will be able to review and critical question scientific thinking and how we can improve the world around us with scientific thinking and get a deeper understanding.

All pupils should be taught essential aspects of the knowledge, methods and uses of science. Through building up a body of key foundational scientific knowledge, concepts and scientific skills, they should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. Pupils should be encouraged to understand how key foundational knowledge and concepts can be used for explanation of what is occurring, prediction of how things will behave, and analysis of causes. This foundational understanding should be consolidated through appreciation of specific applications in the world around us.

Intent

Our Science curriculum has been carefully researched and designed for progression and depth of learning, learning across contexts, which are working scientifically through enquiry-based questioning. This has been meticulously planned for within each science topic by reading the *Long Term Plan*. There are 10 key components, which underpin our Science Curriculum as a whole:

1. **Learning and Remembering** - We have designed the Science curriculum with a model of Learning and Remembering in mind. This means, scientific knowledge of concepts and working scientifically are meaningfully repeated with the aim to secure these in longer-term memory and developed further each time they are revisited and built upon.
2. **Progression** – The progression of the concepts and processes within each topic have been mapped out and integrated into the Long Term Plan from EYFS all the way through to Y6.
3. **Challenge and Mastery** – Lessons planned to be challenging, increasing in the level of challenge over time, applied within a range of contexts to reach a level of mastery through exploration and research.



4. **Scientific Vocabulary, Language and Concepts** – We teach a scientific concept but build on scientific knowledge in a different context, frequently, so children have the best chance to link and fully learn new vocabulary and related knowledge.
5. **Cross-Curricular**– Maths, Computing and other creative curriculum subjects help bring knowledge and skills to a topic and to do so in depth: a topic viewed through the multiple lenses from which the selected subject disciplines can provide.
6. **Sequence of Topics for Progression and Depth** – Each topic has been carefully sequenced so that scientific knowledge is revisited, built on, linked and progress in complexity. Each topic builds from the previous learning, helping children to secure a strong body of knowledge by the end of each year, which is then built upon the following year. A topic has earned its place, as the learning involved is essential for making deeper sense of the next using small scientific steps. This ensures learning is always revisited, linking, building, deepening and never lost.
7. **Key scientific concepts and scientific skills**.-. We teach children the process of being a scientific thinker. Through this scientific thinking, we plan sufficient time to be curious, show enjoyment and interest, ask and answer questions, explore, build on previous knowledge, make links across contexts, reason, develop, refine, rehearse, embed and demonstrate learning, building to a final response to develop positive attitudes to science which encourage collaborative learning and perseverance. As part of this process, we plan experiences, which inspire our children to respond meaningfully, taking ownership of how to do this.
8. **21st Century Learning Skills** – Not just teaching subject content, but key values to prepare children for life, along with characteristics of effective learning. This is planned into the scientific texts and the challenging tasks, questions and issues embedded within each topic, becoming more sophisticated over time.
9. **Rich and Varied Experiences** – Our children do not always come to school with the wealth of experiences required to fully understand our world. It is through our curriculum where we ensure every child does have these experiences as part of a well-planned sequence of lessons in skilled communication and opportunities in real world problem solving.
10. **Adaptable** - Adapted to the needs of all the children, the local community and to our ever-changing wider world. Our curriculum will develop pupils' awareness of how science influences and affects our everyday lives and therefore the relevance of their learning. This means we actively seek to review our curriculum in order to meet the needs of our children and their world today and of the world tomorrow. There will be opportunities to allow children's understanding of jobs that use scientific skills, using well-known scientists across the world, visitors and inspirational ambassadors.

In short, it is a curriculum sequenced for remembering and mastery. It is designed to inspire genuine learners and develop learning in depth, enabling all children to make meaningful links across scientific contexts. This will ensure they better understand and engage with the self, the content, the world and life. It challenges all children to reach a level of well-informed, critical and scientific thinking. A curriculum, which ultimately, gets children desperate to learn and prepared for the future that awaits them.



The Science Curriculum

EYFS Stage

- Science is taught in the Nursery & Reception classes according to the Curriculum guidance for the Foundation Stage. It is incorporated in the Early Learning Goal 'Knowledge and Understanding of the World' in which pupils develop the crucial knowledge; skills and understanding that helps them make sense of their world.

Key Stages 1 and 2

- The knowledge and skills within The National Curriculum Programme of Study (2014) are met using our Science Long Term Plan and appropriate cross-curricular opportunities using our creative curriculum.
- Each year group will cover units of work as shown in our Science Long Term Plan.
- Lesson plans will identify the intended learning of both scientific skills and knowledge.
- Links to other areas of the curriculum that enhance their understanding of science are identified and incorporated into planning.

Implementation

Science is taught with an emphasis on the pupils engaging in scientific enquiry to develop their understanding of scientific concepts and skills. Teachers ensure that some of the children's ideas are used as a basis for enquiry and challenged through deeper thinking.

We ensure the intention of the curriculum, as stated above, is implemented at the Medium-Term Planning stage and through to the teaching and learning within classrooms. This section outlines how this is achieved.

Researching and Planning

- A Skeleton MTP is provided by the Trust Science team, following the National Curriculum's aims and objectives for each year group.
- Teachers within schools utilise this planning to develop and adapt the skeleton using their thorough knowledge of their individual cohorts.
- Through the planning process, teachers are able to notice where links within subjects and across contexts can be made. Individual teachers will adapt these links into their planning.
- All Medium Term Planning is prepared using the National Curriculum, the Long-Term Plan, programmes of study, websites, literature, research, each other, assessments and the children.



Medium Term Planning

- Teachers adapt any plans to meet the needs of their children, the curriculum and the context of their school.
- Teachers use assessments to check where any learning may have been lost or not secured from the previous term and integrate this into the plan.
- Teachers base each week on a sequence of learning objectives, engaging with purposeful, rich experiences. They plan for activities that best help children to make sense of the experience and develop meaningful learning which can be taught and applied across the contexts in that week.
- The planned sequence of teaching and learning is that of a Scientific Process and skills (see table below): children can explore, perform investigative practical work and solve problems through challenge and deeper thinking.
- This takes the shape of enquiry experiences, opportunities to link up vocabulary and previous knowledge, children taking the lead in responding to the experience further, children to ask and answer their own questions, teaching skills to help with this response and opportunities to practise practical enquiry and rehearse and self, peer and teacher assess.
- Planning is monitored by the subject lead/ middle leader and her/his team, meeting with each year group to question, challenge and ensure teachers are ready to teach in line with the Science Curriculum Policy and the Long-Term Plan.

Pupils will be encouraged to develop skills, including:

Exploring and observing at first hand using all their senses.	Communicating scientific ideas orally, in writing and diagrammatically
Raising questions	Collecting data
Planning investigations	Interpreting scientific data
Predicting	Fair testing
Problem solving	Explain using scientific knowledge
Evaluating	Explaining and using scientific term
Estimating	Sorting and ordering
Accurate measuring	Drawing conclusions
	Challenge/ deeper thinking questions

Short Term Planning



- All teachers will use OneNote to produce their weekly science lessons, where whole class teaching will focus on using small steps in the LTP, other key questions. Opportunities for Assessment for Learning and key vocabulary will be modelled using the Trust Scheme of Work.
- At the start of a science lesson there should be pre-assessment using a Do now.
- These will be amended and updated based on assessment for learning and the needs of the class.
- Stimulating practical and scientific investigations should be purposeful and related to the real world.

Timetable

- Key Stage 1 and 2 plan for around 2 hours a week of science and additional time as well as through cross-curricular aspects of other lessons. This ensures specific skills and knowledge are taught discretely and mastered across contexts over time.
- EYFS plan for around 10-20 hours as part of well-planned child-initiated play as well as more discrete teaching opportunities and through cross-curricular approaches in other parts of the day.

Teaching a typical lesson will include:

- Providing the children with active and stimulating learning experiences, a variety of teaching and learning opportunities are adopted.
- Learning based on the carefully thought through Medium Term Plan.
- An engaging experience, a meaningful purpose/context, rooted in key learning – engaging with purposeful and rich scientific experiences and drawing on previous scientific knowledge and learning new scientific knowledge.
- A stimulating input where the teacher models or guides children, preparing them for a challenging and engaging use of scientific knowledge.
- Teachers use carefully planned questions throughout the lesson to meet the needs of all abilities.
- A challenging and inspiring practical or written activity that utilises the scientific knowledge to gain understanding and demonstrate it.
- Purposeful use of spaces in classrooms, outside areas, local community areas and on school trips. Use learning environments in new and purposeful ways to maximise learning.
- Key Scientific Vocabulary explicitly taught frequently used and linked to other words, root words, meanings, and contexts. Teachers insist children use this when speaking and writing throughout the lesson.
- Quality language throughout all aspects of the lesson so no learning time is wasted, but maximised.
- Teachers value pupils' oral contributions and create an ethos in which all children feel they can contribute.
- High expectations of literacy and numeracy skills, including presentation, handwriting, and spelling.
- Explicit links to how the child is being an effective learner (e.g., collaborating) or future citizen of our country (e.g., making a positive contribution to the local area through the care and understanding of plants and animals).
- Constant opportunities for children and adults to assess the learning and adapt the lesson accordingly.
- An element of scientific risk is provided in how children may respond to a practical to best suit their needs as well as the needs of the curriculum.



- In Year 1, to support transition from EYFS, a Continuous Provision approach to learning will take place.

Meeting the Needs of ALL Children

- Teachers to be knowledgeable about the child's needs in the science curriculum, the expectations for that year and strategies to get to that level.
- Teachers to be relentless in following through with high expectations for pupils working below or with SEN.
- Children working below or with SEN should still be challenged - The task can be broken down or started with more scaffolding or in a simpler form but must always lead and build to the point of cognitive struggle for learning to take place.
- Children working above should still be challenged and not be content with covering the learning objective. Instead, be satisfied only when they too have built to the point of cognitive struggle for learning to take place. Often this requires a greater amount of combined knowledge and skill applied to problems that are more sophisticated.
- We have designed the curriculum with a model of Learning and Remembering in mind so concepts and processes are meaningfully repeated with the aim to secure these in longer-term memory to be developed further each time it has revisited or built upon. This benefits all children.
- We recognise that some children working below or with SEN may require further repetition and practise to become fluent.
- Teachers must know the links they can help children make by learning the curriculum and long-term plan. Planning effectively from this is important, deliberately planning for and teaching links so concepts are woven together cohesively within the day and over the week as well as over the term and year.

Equal Opportunities

All pupils will have equal opportunity to reach their full potential across the foundation curriculum regardless of their race, gender, cultural background, ability, or physical ability. The school's equal opportunities policy applies to the teaching of science as to all other subjects.

Use of ICT

Pupils are taught to use a range of ICT equipment to enhance their scientific learning and all work for Year 2-6 children will be presented in their digital exercise book and in EYFS and Year 1 through Tapestry. Other IT equipment includes cameras to record investigations and data loggers for accurate measurements of temperature, light and sound.

Programs such as Forms, Excel and Purple Mash are used to create graphs and charts to record results. iPads are used, to record investigations and experiments. Children will use audio, text, or digital inking to record reflections in year groups where available, to support and enhance accessibility for all.



Impact

Assessment throughout lessons

- Teachers are required to develop a breadth of evidence relating to children's achievements. This is to be done through observation, quality questioning, children's explanations, children's demonstrations of knowledge and skills, listening in to conversations, comparing examples of children's work in science books, Tapestry or Class Notebooks, peer assessment and self-assessment.
- Marking should include positively phrased comments, including successes and next steps, where appropriate. Developmental marking strategies should be used in line with the Feedback & Marking policy.
- The use of video, photos and audio are vital for recording and measuring progress in practical elements of a lesson.

Assessment each term

- This is to be reviewed every term.
- Class teachers regularly update Sonar statements, assessing every pupil against the objectives from the National Curriculum.
- Progress against Sonar statements will be carefully monitored, alongside progress in learning in children's books or digital books.
- At the end of each term, class teachers will input a science level into Sonar.

An update of science attainment is provided annually to parents on the end of year report.

Monitoring & Supporting Science Teaching & Learning

- Each term the Headteacher will develop a monitoring schedule for the middle leadership team. Termly monitoring is carried out on One Note, assessment, Tapestry and pupil voice. In class monitoring takes place during Terms 2,4,6 to ensure opportunities for embedding feedback are provided. All monitoring is fed back to the Headteacher.
- Each year the school science leader will check that every class has covered the aspects of science as indicated in the long-term plan.
- The school science leader will monitor the use of science resources (things, people, places, and spaces, including appropriate use of ICT) throughout the year.
- The Trust science leader and school science leader, with support from all other staff, will ensure that there are adequate amounts of resources, and that all of these are stored in a manner that makes them easily accessible to all.
- The science leader will support colleagues with identifying ways to enrich the coverage of the science learning. This could include visits, visitors, and competitions.



Resources

- Class teachers are responsible for informing the school science leader of resources, which are required to deliver their planned topic.
- Resources are shared across the Trust.
- Information books on science topics are available in the school library and a range of non-fiction texts relating to science topics are available in classrooms and as part of the guided reading resources within the school.
- School visits and extra-curricular activities are planned to enhance learning and help the pupils to relate scientific enquiry to the real world.

Health & Safety

- The safe use of equipment and materials is always promoted.
- All offsite visits or activities will require a risk assessment to be completed.
- All accidents and incidents are reported to the Headteacher.
- Teachers are responsible for ensuring any investigations carried out are done so in a safe way for the protection of their class

The role of the School Science Leader

- To undertake monitoring of standards in science and use this to inform the school development plan.
- Provide leadership and management of their subject to secure high-quality teaching and learning.
- Attend termly Science leader meetings.
- Play a key role in motivating, supporting, and modelling good practice for all staff.
- Take a lead in policy development and review.
- To liaise with outside agencies and attend subject specific courses.
- To report to the Head teacher and Trust Science Lead on science related issues.
- To plan and organise the allocation and purchase of resources in accordance with available budget.

