

Clarice Cliff Guide to Science

Intent - The Why

Our curriculum has been designed to be an ambitious science curriculum, which covers the full scope of the National Curriculum. Our science curriculum is designed with the emphasis on pupils building their scientific knowledge sequentially, whilst also developing the skills of scientific enquiry. Our curriculum provides schools with a progression model so that teachers elicit and build on prior knowledge and connect this to what comes next. Key knowledge is revisited within and across units so that pupils can build a secure understanding of increasingly complex scientific concepts. These key concepts are revisited as pupils move through the academy. This, along with opportunities to work practically, contributes to the curriculum design for pupils with SEND.

Our science curriculum provides opportunities for pupils to consolidate and apply their knowledge from other curriculum areas, including mathematics, ICT/Computing and English. A heavy emphasis is placed on pupils' acquisition of language and vocabulary, including scientific words and more advanced high frequency words with multiple meanings. We promote careers in science, taking every opportunity to discuss and describe less well-known jobs. Our curriculum includes a focus on current, diverse (counter-stereotypical) scientists. This is in keeping with our Coop Values.

Each unit provides opportunities for pupils to work practically, giving them first-hand experiences of investigating and exploring safely. These experiences are designed to foster pupils' critical thinking as well as their reasoning and explanation skills. Key scientific knowledge is revisited, to support pupils in remembering more and assessments are in place to check they can apply their knowledge.

In line with our inclusive values, we support our pupils with SEND to acquire the core knowledge they need to unlock future learning. To this end, we use knowledge organisers to identify the vital knowledge pupils need to remember. Pupils, including disadvantaged pupils, also benefit from the emphasis on science careers, aimed at broadening pupils' horizons and keeping their aspirations on track.

Implementation – The How (**including how/when we assess*)

What do we use to support our curriculum delivery?

To support our curriculum delivery, we follow the White Rose Science scheme. The Science curriculum is carefully planned around disciplinary and substantive concepts that build upon each other throughout a child's journey from EYFS to Year 6. Disciplinary concepts support teachers in focusing on how we are teaching scientific knowledge. These are the skills children need to develop to become scientists.

Daily

Although Science is not taught every day, we experience science in daily school life. The playground is enhanced with growing areas and allotments. We have bird watching equipment and magnifying glasses for children to explore the natural world. We have a large polytunnel which children can access. Children can take part in growing fruits and vegetables, this allows children to see the process from start to finish. There are also high quality science texts in the classroom and library, some of the books have been shortlisted for the Royal Society of Science Young People's Book Prize. High quality texts have been provided for each topic, and the children can take these home to share with family. Children have the opportunity to explore Science in through an after school club along with visitors that put Science in real life (Severn Trent).

Weekly

Science is taught every week.

- Weekly whole class lessons
- Working scientifically skills planned into each lesson, giving scope for practical activities.
- Think back questions from previous units/years to engage the long term memory.
- Each lesson ends with a Check for Understanding question to assess children's understanding of the lesson.
- Assessment for learning is used to identify pupils who require additional support.

☐ Example Science slides

Half termly/Termly

- Children complete a TAPS lesson to assess their substantive knowledge. Links to this are shared by the Science leader and analysed.
- Children complete an end of unit assessment to assess their disciplinary knowledge - this is then analysed by the subject leader and gaps are addressed in pre-teach sessions or through flashbacks.
- Children are provided with STEM related learning outside of the usual learning, through a range of experiences such as SPACE camp, careers, and other outdoor agencies coming into school.

Assessment for Learning

- All lessons start with recall. 'Think back slides include a lesson/week/ term and year question to help bring prior knowledge back into children's working memory. Think back slides are rag rated green/amber/red to inform planning for future 'Think backs'. Amber and red concepts must be revisited.
- In lessons staff use a range of TLAC strategies to actively assess learning including cold calling, show me boards, think pair share and Everyone writes.
- Subject leader completes a learning walk once every term to ensure the curriculum is being taught in line with the medium term planning, is consistent across both year group classes and to give support to staff who may want to develop their understanding or delivery of Science. (Termly)
- Subject leader will RAG rate book responses in line with medium term planning to ensure high quality outcomes, quality resources, adaptive strategies are being used and children are being given opportunities to apply knowledge to longer written responses. (Termly)
- Subject leader will complete pupil voice interviews with a small group of children half termly from chosen year groups to assess understanding of concepts learnt, ability to orally talk about their Science learning journey, their enthusiasm for learning and to assess understanding of key vocabulary. (Termly)

What this looks like in Early Years

- Children explore their own bodies and their senses
- They learn to name the parts of the body and what we use them for.
- They learn about animals and their homes, including pets, farm animals and wild animals.
- Children observe change, the seasons changing, plants and flowers growing. They are supported to notice and talk about what is happening and why.
- They learn about being healthy, including eating a range of foods and taking part in exercise.
- They develop a sense of curiosity and exploration through a range of resources relating to our topics, e.g. magnets, magnifying glasses, things to smell and taste etc, and through the continuous provision areas such as sand, water, small world, construction etc.
- During topics such as polar regions in Spring 2 children explore hot and cold, freezing and melting and clothing for keeping warm in the Arctic.
- Opportunities in continuous provision include access to the workshop, malleable area,

mark-making area, construction, small world.

- Other enhancements based on children’s interests or a planned theme provide further opportunities for children to embed, develop and use their art skills.
- Evidence is recorded in topic floor books.
- Deeper learning focus lessons include links with science (through UW) and some tasks will be adult-led to support developments of particular skills.

Where will you see and find evidence of our learning?

- In EYFS, in floor books. Science is not taught as a standalone subject, but taught through UTW and provision.
- In Science, it is recorded in the yellow science books.
- In classrooms in Science topic displays.
- In the playground, polytunnel and secret garden.

What is our approach to SEND and Greater Depth?

SEND

Our provision for pupils with SEND in primary science involves adapting the implementation of the curriculum and classroom environment to ensure equal access and engagement for all, using a range of strategies such as visual aids, repetition of key words and concepts, multi-sensory activities and adaptive teaching strategies. Using the provision mapped out below, our science teaching ensures pupils with SEND access the same high quality, ambitious curriculum as their peers. Effective scaffolds and adaptations enable all children to access the rich challenges and deeper thinking opportunities sequenced within the curriculum offer.

Subject challenges for SEND	Provision for SEND
The ability to explain a scientific concept/provide reasoning to explain a thought or opinion.	Use stem sentences to provide subject specific language in a particular format – this will enable children to accurately communicate their thoughts and opinions. Use alternative recording devices e.g. whiteboards/iPads/talking tins to allow children the option of sharing thoughts and opinions in an alternative way. Allow children processing time when asking them a direct question - stop and jot to pose a question and pause for thinking time, write down ideas then share.
The ability to recall basic scientific information e.g. the five groups of animals (mammals, fish, birds, reptiles and amphibians).	Planned retrieval questions from previous topics are used at the beginning of each lesson. The use of further ‘think back’ or ‘re-cap’ of previous knowledge used at the beginning of lessons informed by previous gap analysis should revisit objectives children are not secure with.
Understanding of subject specific vocabulary.	Subject specific vocabulary and definitions are covered at the beginning of every lesson. Dual coded word banks used to demonstrate the meaning of a word in a scientific context.
Difficulty in producing accurate pieces of writing e.g. an explanatory text of a scientific concept.	Use writing frames, ‘fill in the blank’ sentences, sentence starters, dual coded vocabulary mats, visuals to sequence etc. Children who have difficulties structuring their writing/who have difficulties with short term memory could use semantic sentences to

	structure multiple given sentences independently. Use of 'true or false' activities to show learning whilst reducing demand for written sentences.
Understanding 'abstract' scientific concepts such as electricity/air resistance.	Where possible, begin the lesson by using concrete resources before you discuss the abstract scientific reasoning behind. For example, make a circuit with a bulb, battery and wires before you discuss the concept of electricity/drop different shapes objects before you discuss air resistance.
EAL pupils may find it difficult to access resources/learning.	Use a reduced number of simple instructions which are supported by visuals. Appropriate modelling to aid understanding. Dual coded word banks and resources to support understanding.
Acquiring, comprehending and using scientific language.	Allow children processing time when asking them a direct question. Use dual coded word banks as visuals to support children in using the correct scientific name for apparatus.
Sensory/physical difficulties accessing specific environments during scientific experiments.	Ensure any sensory difficulties are considered at the point of planning and appropriate alternative arrangements are made. For example, if a child will find the texture of certain materials e.g. cotton wool overwhelming, resource an alternative.

Greater Depth

Our curriculum design ensures pupil's knowledge in strands enables meaningful opportunities for deeper thinking and working scientifically that are sequenced and asking them to make connections with prior learning. To make this more explicit we have used Bloom's taxonomy to provide opportunities for a wide range of thinking skills.

For each lesson, a greater depth task is designed that pupils can access once they are secure in the knowledge for that lesson (remember and understand) .These are based on the skills of 'apply, analyse, evaluate, and create. For example; the statement "The girl can see the object because the light travels from her eyes to the object. Is this true or false? Can you explain your answer?"

At the end of each unit, children complete an end of unit assessment to ensure they are secure in their substantive knowledge for each unit. Within working scientifically, children complete a TAPS assessment to assess their disciplinary knowledge. Within these assessments, criteria for 'possible ways of going further' is evident within the planning.

Impact – The So What

At the end of their science learning journey, pupils will have built a wide variety of knowledge and working scientifically skills. They will explore famous scientists from different cultures and have an understanding of the achievements these figures have accomplished and the journey that led to their success. Our pupils will be able to construct well thought-out responses to each topic question, drawing upon their evidence from their research and key knowledge. Children's work will represent their ability to communicate their understanding through class discussions, oral and written presentations and high quality pieces of work. Above all, key knowledge and skills will be retained as children progress through the school, transferring these across topics and subjects .

Cultural Capital and Enrichment

Children are given opportunities to go on trips and to have visitors come into school to give children real life experiences and deepen their knowledge. Our school library is open to parents to borrow books for the children to widen their knowledge. Our wonderful library has a section dedicated to Science texts that children can explore. To raise the enthusiasm and interest of the subject a Science club is run for a term, once a week, in both Key Stages by the subject leader.

Throughout children's learning journey they will learn about a range of significant people from different backgrounds. Our 'Diverse voices' are planned throughout the curriculum and cover a range of past/present, male/ female and people from different ethnicities