

# Bonneygrove and Millbrook Federation Curriculum Guidance



## Science

Our Science curriculum is based on the objectives of the National Curriculum, we aim to give all children the opportunity to explore, question and understand the world in which they live. Through a learning environment which encourages curiosity, perseverance, open-mindedness, critical thinking and collaboration, we strive to develop their knowledge and understanding of important scientific ideas, processes and skills through the specific disciplines of biology, chemistry and physics.

### **Aims**

- To stimulate interest, curiosity and enjoyment in the subject
- To create enthusiasm and wonder about the world
- To equip children with the scientific knowledge required to understand the uses and implications of science, today and for the future.
- To develop the skills of enquiry
- To enable children to investigate and explore theories by developing the skills of investigation – observation over time, prediction, pattern seeking, measuring, interpretation, communication, questioning, explanation and evaluation.
- To develop co-operation and the sharing of ideas through collaborative working.
- To enable children to become effective communicators of scientific ideas, facts and data.
- To ensure children become responsible for their own health and safety and that of others when undertaking scientific activities
- To understand and care for the world in which they live.

### **Pupil Voice**

***“Science is finding out how things work.”***

***Eren- Year Two***

***“Science is where we test things to see how they work.”***

***Ronnie – Year Four***

## **IMPLEMENTATION**

### **High Expectations**

Our curriculum offers challenging and differentiated ideas for our science topics. Experiments are woven into our curriculum to allow teachers the opportunity to model scientific skills in order to provide children a suitable challenge.

### **Checking for Understanding (AfL)**

At the start and end of each topic, children complete an assessment tailor made for each topic, teachers use this to support their end of topic judgements.

With children learning and applying scientific skills, it is vital to check children’s understanding to ensure progress. Our use of the self-assessment grids provides children with the opportunity to evaluate their own learning against the success criteria and allows teachers to address misconceptions whilst the lesson is fresh in children’s minds.

### **Sticky Learning**

Our curriculum ensures that all new learning is linked to previously learned concepts. This helps to embed new knowledge and ensures new learning is cumulative and built on firm foundations. The curriculum also encourages frequent revisiting, reviewing and consolidation of information throughout the unit and subsequent units as well as building on prior learning year after year.

Teachers make sure learning is meaningful and purposeful to children's lives by making topics relatable to the world outside our window. We encourage children to stop and think about why things are the way they are. Why are things cold? What is the coldest temperature ever recorded? In Science lessons, children are taught strategies to help them to remember, for example, classifying and grouping information as well as verbal rehearsal. Learning is presented in a variety of ways with the use of visual aids, modelling, active learning, discussion, role play and use of concrete resources.

### **Oracy**

Science is a core subject that relies heavily on students' ability to understand new terms and concepts. Children are encouraged to 'talk like scientists' - discussing their ideas and explaining their thinking which aids with understanding and embeds learning.

A strong focus on vocabulary helps children understand and communicate using appropriate terminology, and the incorporation of visual aids makes learning stick. Teachers expose children to new terminology at the start of a topic and continually refer to vocabulary throughout the unit. Working walls display vocabulary cards with pictures to support meaning; speaking frames are used to support children with articulating their ideas and Kahoot quizzes are used to reinforce vocabulary and concepts as well as to assess learning.

### **Learning Powers**

Our use of self-assessment tools promote independence and encourage a growth mindset within Science. By encouraging children to reflect, it allows them to take responsibility for their learning. Self-assessment lets our students consider their decisions, reflect on actions, and consider/plan future processes. We encourage children to explore their own ideas, which will naturally lead to new discoveries. Children are taught to see 'mistakes' as learning opportunities which foster qualities like resilience and perseverance. We encourage a supportive science classroom where everyone is responsible for helping each other learn, for example, through partner talk and peer support.

### **Cultural Capital**

Our curriculum engages with cultural capital by drawing on students' diverse backgrounds, experiences, and knowledge to enrich their learning. By incorporating local, global, and community-based contexts into scientific concepts, it connects students' cultural experiences with scientific enquiry, fostering a deeper understanding and appreciation of science in everyday life.

### **Cross Curricular skills links**

Children are expected to use their English skills, reading, writing and speaking and listening during science lessons. Children apply their mathematical knowledge to their understanding of science, through working on investigations where they learn to estimate and predict, collect, compare and record data as well as analyse results and draw conclusions. Science also makes a contribution to the teaching of PSHE. For example, teaching the children about keeping healthy and staying safe, along with teaching them collaborative skills.

## Continuity and Progression

Science covers all areas of national curriculum. The table below gives an overview of our curriculum map and the topics that are taught in each year group.

	Autumn One	Autumn Two	A Victorian Christmas (2 weeks)	Spring One	Spring Two	Summer One	Summer Two
EYFS	Autumn – Changing state – ice (seasons)		A Victorian Christmas (2 weeks)	Spring – Space – forces (Gravity) Push and pull toys, habitats (farm), <u>lifecycles</u> , growing plants		Summer – <u>Floating</u> and sinking - which material will create the best boat? (Everyday materials), growing - lifecycles and body parts (PSE link) dinosaur poo investigation - meat/plant waters	
Year 1 Science	<u>Every day</u> materials	Seasonal changes (Autumn and Winter)	A Victorian Christmas (2 weeks)	Animals <u>joC</u> humans (Animals)	Plants	Seasonal changes (Spring and Summer)	Animals <u>joC</u> humans (Five Senses)
Year 2 Science	Materials	Living things and their habitats – Life processes	A Victorian Christmas (2 weeks)	Animals including humans – healthy living	Animals including humans - ponds	Plants	Animals including humans – Growing and changing
Year 3 Science	Rocks	Light	A Victorian Christmas (2 weeks)	Animals Including Humans (skeletons and movement)	Forces and magnets	Plants	
Year 4 Science	Animals Including Humans - Teeth	Sound	A Victorian Christmas (2 weeks)	States Of Matter	Living Things and Their Habitats	Electricity	Animals Including Humans - Digestion
Year 5 Science	Living Things and Their Habitats	Materials – Testing Materials	A Victorian Christmas (2 weeks)	Earth in space	Materials – Changing Materials	Forces	Animals Including Humans
Year 6 Science	Light	Living things and their habitats	A Victorian Christmas (2 weeks)	Evolution & Inheritance		Animals including humans	Electricity

## Outdoor Learning

Every year group is given the opportunity to engage with outdoor learning for example, observing plants, studying consumers and producers in our woods, creating wildlife documentaries.

## Philosophy for Children

Science topics allow for big questions to be posed to the children which develops their critical thinking. For example: Should animals be taken from their natural habitat? Why are chimpanzees endangered?

## Mindfulness

Mindfulness means paying full attention to something. It means slowing down to really notice what you're doing. Being mindful is the opposite of rushing or multitasking. We encourage children to be mindful when setting up experiments and to conduct research so that they can focus on their projects.

## Growth Mindset

We believe that a growth mindset can be fostered in any child. Our Science curriculum introduces famous scientists who have had to overcome huge challenges in their lives, for example , Stephen Hawking.

## **Ethics**

By the time children leave Bonneygrove, we want them to be blossoming into responsible citizens with the real potential of making the world a better place. In Science, children study important current world topics, for example, recycling, deforestation and its impact.

## **Sportsmanship**

Science teaches children the concept of 'Fair Play' through fair tests in investigations.

## **Pupil Voice**

*'Science is where things can go kaboom! And that's okay.'*

*Harrison – Year Six*

## **IMPACT**

By the end of Year Six, we want the children to have developed a deeper understanding of a wide range of scientific ideas and begin to recognise how these ideas help them to understand and predict how the world operates. Children will also have begun to recognise that scientific ideas change and develop over time.

Throughout their time at Bonneygrove, the children will be able to select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Children should be able to draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. Children will be able to work collaboratively and practically to investigate and experiment. We want the children to be able to explore and talk about their ideas; ask their own questions about scientific phenomena, reflecting on prior taught knowledge and explain processes they have taken and be able to reason scientifically.

Children should also be able to read, spell and pronounce scientific vocabulary correctly and spelling of key vocabulary is introduced in each topic and monitored closely to ensure its engagement and understanding.

## **Role of the Subject Leader**

The subject leader of science in a primary school is responsible for overseeing the development and delivery of the science curriculum, ensuring it aligns with educational standards and promotes student engagement.

- Planning and delivering engaging lessons
- Assessing student progress
- Creating a safe and stimulating learning environment
- Encouraging inquiry and critical thinking

## EYFS

Children begin their science journey in the Early Years Foundation Stage where they start to make sense of their physical world through exploring, observing and finding out about technology and the environment. Children learn about similarities and differences in relation to places, objects, materials and living things. They are given opportunities to talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and they talk about changes.

## SEND

At Bonneygrove Primary School, we make reasonable adjustments for all our children (including those with SEND). In our school, we ensure that all of our children registered as SEND are not at a substantial disadvantage compared with their peers.

At Bonneygrove, we are guided by the SEND Code of Practice - Right Support, Right Place, Right Time March 2023. We recognise that each child has a specific need, including:

- Communication and interaction
- Cognition and learning
- Social, emotional, and health difficulties
- Sensory and/or physical needs

The above needs will be addressed through quality first teaching, effective differentiation, use of resources (primary and secondary), individual interventions, small group interventions, specialist provision and other supporting agencies.

Here at Bonneygrove, we ensure children with SEND have every opportunity to succeed and recognise that additional support may be required to ensure they progress and attain in line with their peers. We do this by utilising various strategies- e.g.

SEND area of need	Barrier to learning	Strategies
<ul style="list-style-type: none"><li>• Hearing Impairment</li></ul>	<ul style="list-style-type: none"><li>• Difficulty in hearing instructions</li><li>• Vocab</li><li>• Managing practical investigations/ interactions</li><li>• Filtering noise to hear what is important</li><li>• Low self esteem</li><li>• Difficulty with vocabulary.</li><li>• Awareness of safety</li></ul>	<ul style="list-style-type: none"><li>• Positioning in classroom</li><li>• Visuals Pictorial representations</li><li>• Video</li><li>• Vocab lists and explanations/dictionaries so words can be revised</li><li>• Position with role model for safety</li><li>• Task planners</li><li>• Use of signing of needed</li><li>• Ensure mini- mic is working and check hearing aids daily</li></ul>

<ul style="list-style-type: none"> <li>• Visual Impairment</li> </ul>	<ul style="list-style-type: none"> <li>• Reading</li> <li>• Navigating classroom</li> <li>• Managing resources and equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Positioning in classroom</li> <li>• Visuals Pictorial representations</li> <li>• Video</li> <li>• Vocab lists and explanations/dictionaries so words can be revised</li> <li>• Position with role model for safety</li> <li>• Task planners</li> <li>• Use of signing of needed</li> <li>• Ensure mini- mic is working and check hearing aids daily</li> </ul>
<ul style="list-style-type: none"> <li>• Dyspraxia (fine/ gross motor)</li> </ul>	<ul style="list-style-type: none"> <li>• Managing physical resources particularly “fiddly bits” such as crocodile clips in circuits</li> <li>Difficulty recording</li> </ul>	<ul style="list-style-type: none"> <li>• Adapted equipment</li> <li>Alternative ways of recording</li> </ul>
<ul style="list-style-type: none"> <li>• Memory/ processing</li> </ul>	<ul style="list-style-type: none"> <li>• Recall of instructions</li> <li>• Remembering key facts and vocab</li> <li>• Retaining focus</li> </ul>	<ul style="list-style-type: none"> <li>• Adapted equipment</li> <li>Alternative ways of recording</li> </ul>
<ul style="list-style-type: none"> <li>• ASC</li> </ul>	<ul style="list-style-type: none"> <li>• Specific interests</li> <li>• Attention span</li> <li>• Fine motor skills</li> <li>• Managing physical resources particularly “fiddly bits” such as crocodile clips in circuits</li> <li>• Difficulty recording</li> </ul>	<ul style="list-style-type: none"> <li>• Adapted equipment</li> <li>Alternative ways of recording</li> </ul>
<ul style="list-style-type: none"> <li>• ADHD</li> </ul>	<ul style="list-style-type: none"> <li>• Concentration span</li> <li>• Safety regarding impulsive behaviour</li> </ul>	<ul style="list-style-type: none"> <li>• Adapted equipment</li> <li>Alternative ways of recording</li> </ul>
<ul style="list-style-type: none"> <li>• Cognition</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding</li> <li>• Recording</li> </ul>	<ul style="list-style-type: none"> <li>• Revisit prior learning</li> <li>• Pre-teach and post teach</li> <li>• Ways of recording – cloze label diagrams, record, pictures</li> <li>Knowledge organisers</li> </ul>
<ul style="list-style-type: none"> <li>• SEMH</li> </ul>	<ul style="list-style-type: none"> <li>• Making links to prior learning</li> <li>• Resilience/fear of failure.</li> </ul>	<ul style="list-style-type: none"> <li>• Revisit prior learning</li> <li>• Pre-teach and post teach</li> <li>• Ways of recording – cloze label diagrams, record, pictures</li> <li>Knowledge organisers</li> </ul>

## **Pupil Voice**

***“Science is fun because we do new things.”***

***Year Three***

### **Supporting children with EAL**

Children with English as an additional language need to hear English spoken by the adults in the setting in as many different contexts as possible. When the context has meaning for the child, they are more able to learn spoken English from the adult.

Our role is crucial in modelling the accurate use of English, noting the child’s spoken vocabulary, and building on what the child already knows.

Some children go through a silent period. This can be for as long as six months. When they start to speak in English it will be more proficiently than you may expect, even in full sentences. The child will have been listening intently to adults and children in the setting and once they are confident with their initial speech, they will speak far more.

It is good for children with English as an additional language to be able to speak their home language in the setting and talk to providers who speak the same language if there are any. This will further aid them in learning English. Most children adapt to speaking more than one language. The security of knowing what resources will be available in each area, each day supports children’s wellbeing and achievements in learning. Keep the provision consistent. Observing how the children respond will inform you when a change is needed. This may be to add something more, or a specific enrichment to extend the children’s learning. Consider whether the home area, images displayed and books in the setting, reflect the child’s home environment. Include books, songs and counting in home languages. Take sequences of photographs to show the child specific routines, such as, what happens at the snack table, how to tidy away the construction toys and a visual timetable of the session. Over time the setting becomes a secure place for the child, and they gain confidence in their play and interactions. Revisiting and re-proposing are beneficial for all children but especially for those acquiring English. Revisiting means you draw the child’s attention to previous activities and learning where they have achieved. A prompt could be a photograph or video of them playing. It could be a sample of their mark making, a painting or a collage picture. The child can revisit by drawing over the top, and the adult sensitively describes their actions as they do this. In this way the child hears spoken language directly connected to their actions. Re-proposing is when you scribe a child’s spoken dialogue and on the following day remind the child of their words. This is a launchpad for the child to either repeat what they said before or to extend what was said on the previous day. When exploring rhymes and songs make comparisons between words in English and in other languages. Older children who have grasped more than one language enjoy these opportunities. They love to play with words and translate from one language to another.

Helping children understand the setting

Consider having:

- a visual timetable introduced as it is happening
- feelings or emotions picture cards so children can label their own and others’ emotions
- photographs of areas, resources, peers and staff to support children to plan their session with an adult
- story and song props used as often as possible
- phonetically spelt key words in home languages to help you



## Pupil Voice

*"In Science, we do experiments which is different from other lessons."*

*Lady – Year Three*

## SUPPORTING PUPIL PREMIUM CHILDREN

What is the most effective way to support disadvantaged pupils' achievement? Based on interviews with senior leaders, the NFER research found that schools which are more successful in promoting high attainment have a various things in common. It identified seven building blocks of success.

- 1) Whole School ethos of attainment for all
- 2) Addressing behaviour and attendance
- 3) High quality teaching for all
- 4) Meeting individual learning needs
- 5) Deploying staff effectively
- 6) Data driven and responding to evidence
- 7) Clear, responsive leadership

**Table 1: Support strategies for schools**

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Small group additional teaching	
Less successful school	More successful school
Struggling pupils are taken out of English lessons to work on an online literacy programme, supervised by a TA who has received no specific training.	Pupils with similar needs are withdrawn from alternating non-core curriculum lessons for tailored support from a TA trained in literacy interventions.
Parental involvement	
Less successful school	More successful school
Staff provide pupils with homework books showing the day's assignments. Pupils take the books home. There is space for teachers and parents to leave comments about pupils' progress.	Higher level teaching assistants (HLTAs) visit community centres to talk to parents about the importance of learning. They show parents the curriculum pupils are covering and explain how parents can support their child to achieve.
Improving feedback between teachers and pupils	
Less successful school	More successful school
Teachers give pupils grades for their work.	The school has developed marking schemes which identify each pupil's strengths, areas to focus on and next steps. Pupils have time allotted during the lesson or tutor time to respond to the feedback and discuss it with teachers.

## Pupil Voice

*"I like Science, each lesson is different."*

*Year One*