



Science

at Bank Lane Infant and Nursery School
Working together, nurturing excellence.

Subject Lead – Nicole Bailey

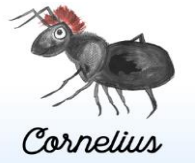
Under Construction – Nov 23

We judge our Science curriculum to be
Gold Standard

Effort



Collaboration



Excellence



Respect



Our Intent

Science teaches us about the wonder of the world and helps us to explain what happens, how things behave and to analyse reasons. By learning about the work of scientists, we can recognise our values in their work and understand that we can make a difference to our world.

Effort



Ethel

Collaboration



Cornelius

Excellence



Eberhardt

Respect



Radmilla

External Accreditation



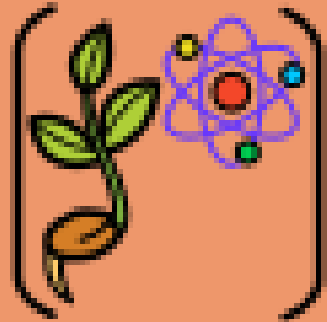
Feedback:

Thank you for all the work that has gone into this submission, all the documents were carefully put together and the portfolio and reflections helped to show not just what happened across this year but the impact. A very successful year as SL, well done, because you have worked with the existing good practice and then moved science forward across the school. Staff and children have obviously worked with you during the year to ensure that the quality of science has continued to improve and hence 'Children have a real 'buzz' for science this year' - I am sure that you will continue to develop and your confidence grow as SL and I have no doubt that this will continue under your leadership and the continued support and enthusiasm of staff, pupils and their families. **Rosemary Feasey**

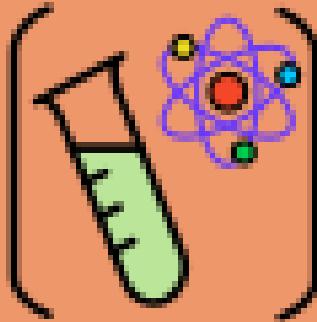
Nicole has clearly worked incredibly hard this year to develop the quality of science teaching and learning at Banks Lane Infant and Nursery School. From an already-high starting point, it is clear that significant progress has been made against each one of the PSQM criteria – well done.

Congratulations to all at the school – you should be very proud of all that has been accomplished. **Helen Spring, PSQM Hub Leader and Reviewer**

Key Concepts in Science



Biology



Chemistry



Physics

Substantive Concepts in Science

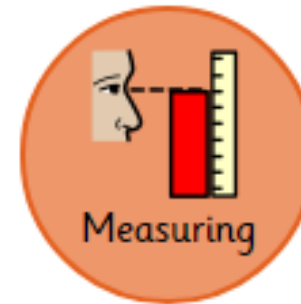
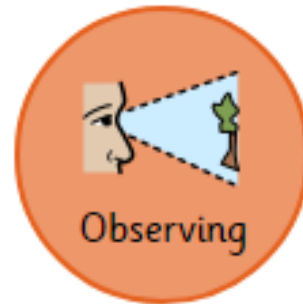
Substantive Concepts are concepts concerned with the subject matter of science, such as **animals including humans***, **plants***, **materials***, **seasonal changes***, **living things and their habitats***, **forces and magnets**, **states of matter**, **light**, **sound**, **rocks**, **Earth and space**, **electricity** and **evolution and inheritance**. They are embedded throughout the curriculum so that each one is planned to be encountered multiple times. Substantive concepts are best understood with repeated encounters in specific, meaningful contexts, rather than being taught in an abstract way.

* - concepts covered in KS1



Disciplinary Concepts in Science

Disciplinary concepts are concerned with developing scientific rational and critical thinking within enquiry, and can be categorised into 6 disciplinary concepts that are systematically developed in our science curriculum, which are often referred to as 'Working Scientifically' in the National Curriculum.



Curriculum Plans

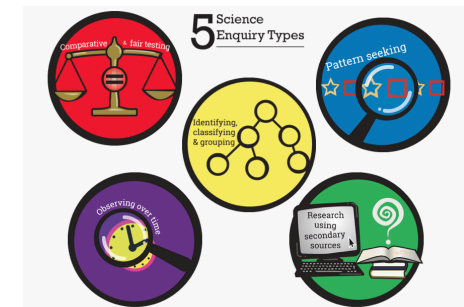
Sequencing across school

- EYFS – PLAN
 - Activities and challenges planned from our Narrative Immersion (Magic Story Box – Rebecca Bell) planning
 - We ensure our challenges fit in to our Reception progress descriptors to ensure progression
 - Linked to the 7 areas of learning including Understanding the World
 - Teachers know where the EYFS feeds into the Science National Curriculum (particularly C&L, PSED and UtW at ELG)
- Whole School – PLAN
 - Learning in Science is planned around our themes throughout the year and projects take place in themes that lend themselves to good quality Science learning.
 - Teachers use PLAN to underpin their planning and support them with progression (including prior and future learning), potential misconceptions and key vocabulary.
 - Children revisit and review previously taught learning throughout their science education.
- Disciplinary Knowledge
 - In the EYFS children use a range of ‘Characteristics of Effective Learning’ in their independent learning. These can be seen as complementing ‘Working Scientifically’.
 - Working Scientifically skills are taught alongside all units of substantive science in KS1.
 - We use enquiry-led learning to support the teaching of these skills.

Curriculum Plans

Building Knowledge and Skills


- PLAN Progression (Substantive Knowledge)
 - PLAN allows for us to plan a progressive curriculum for our children, taking into consideration the prior and future learning of our children and plugging the gaps if necessary.
 - Children revisit and review previous learning throughout their Science education, allowing them to build on their prior learning.
- Working Scientifically (Disciplinary Knowledge)
 - Skills are progressively developed from EYFS (Characteristics of Effective Learning) through to KS1 (Working Scientifically).
 - SEERIH Enquiry Types are used to enhance children's learning in KS1; they are also displayed on classroom working walls to support retention.




Curriculum Plans

Building Knowledge and Skills


A PLAN example of progression through EYFS and KS1:

	Year	Nursery (3 & 4-year-olds)	Topic	Animals, excluding humans
	Understanding the World			
	<ul style="list-style-type: none"> Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. 			
	Links with other areas of learning			
Mathematics				
<ul style="list-style-type: none"> Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc. 				
Expressive Arts and Design				
<ul style="list-style-type: none"> Create closed shapes with continuous lines, and begin to use these shapes to represent objects. Draw with increasing complexity and detail, such as representing a face with a circle and including details. 				


Prior learning	Future learning
<ul style="list-style-type: none"> Explore natural materials, indoors and outside. (Birth to three) 	<ul style="list-style-type: none"> Recognise some environments that are different to the one in which they live. (Reception) Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 – Animals, including humans) Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 – Animals, including humans) Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans)

	Year	Reception	Topic	Animals, excluding humans
	Understanding the World			
	<ul style="list-style-type: none"> Recognise some environments that are different to the one in which they live. 			
	Links with other areas of learning			
Physical Development				
<ul style="list-style-type: none"> Revise and refine the fundamental movement skills they have already acquired: rolling; crawling; walking; jumping; running; hopping; skipping; climbing. 				

Prior learning	Future learning
<ul style="list-style-type: none"> Understand the key features of the life cycle of a plant and an animal. (Nursery) Begin to understand the need to respect and care for the natural environment and all living things. (Nursery) 	<ul style="list-style-type: none"> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 – Animals, including humans) Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 – Animals, including humans) Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans)

	Year	1	Topic	Animals, including humans
	<ul style="list-style-type: none"> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 			

Prior learning	Future learning
<ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. (Nursery - Humans) Name and describe people who are familiar to them. (Reception - Humans) 	<ul style="list-style-type: none"> Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. (Y2 - Living things and their habitats) Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. (Y6 - Living things and their habitats) Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)

	Year	2	Topic	Animals, including humans
	<ul style="list-style-type: none"> Notice that animals, including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 			

Prior learning	Future learning
<ul style="list-style-type: none"> Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) 	<ul style="list-style-type: none"> Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. (Y3 - Animals, including humans) Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6 - Animals, including humans)

Curriculum Plans

Vocabulary

Key vocabulary is planned into each lesson

- appropriate for lesson and age group
- progressive across school
- taught alongside Widgit visual aid
- co-constructed with the children

Revisited in future lessons

- new vocabulary is revisited in future lessons to support retention
- links are made across lessons, and year groups

Embedded by use across the curriculum

- valuable cross-curricular links are made
- e.g. recording of data in Maths; environments and seasons in Geography

Curriculum Plans

Curriculum Coverage

	Nursery	Reception	Year 1	Year 2
Autumn	<p>How marvellous am I? / Why do leaves turn crispy?</p> <p>Animals, excluding Humans</p> <p>Living things and their Habitats</p> <p>Sound</p> <p>Materials, including changing materials</p>	<p>Adventure Awaits! / It's Not Just a Toy!</p> <p>Seasonal Changes</p> <p>Humans</p> <p>Forces</p>	<p>The Land Before Time / Into the Woods</p> <p>Plants</p> <p>Animals including Humans</p> <p>Seasonal Changes</p>	<p>London's Burning! / What the Dickens?</p> <p>Plants</p> <p>Uses of Everyday Materials</p>
Spring	<p>Where does the snow go? / How does that building stay up?</p> <p>Humans</p> <p>Electricity</p> <p>Materials, including changing materials</p> <p>Sound</p>	<p>...To the Rescue! / I Can Sing a Rainbow</p> <p>Seasonal Changes</p> <p>Materials, including changing materials</p> <p>Earth and Space</p> <p>Humans</p> <p>Animals, excluding Humans</p> <p>Living things and their Habitats</p> <p>Light</p>	<p>Once Upon a Time / Marvellous Monarchs</p> <p>Plants</p> <p>Animals including Humans</p> <p>Seasonal Changes</p> <p>Materials</p>	<p>Where the Dragons Dance / Into the Wild</p> <p>Plants</p> <p>Living Things and their Habitats</p> <p>Animals including Humans</p>
Summer	<p>How does your garden grow? / Where does the sun go at night?</p> <p>Plants</p> <p>Light</p> <p>Forces</p> <p>Living things and their Habitats</p>	<p>Shiver Me Timbers! / 3, 2, 1, Blast Off!</p> <p>Seasonal Changes</p> <p>Materials, including changing materials</p> <p>Forces</p> <p>Earth and Space</p>	<p>There's No Place Like Home / What a Wonderful World!</p> <p>Animals including Humans</p> <p>Seasonal Changes</p> <p>Materials</p>	<p>Into the Wild / It's a Bugs Life!</p> <p>Plants</p> <p>Living Things and their Habitats</p> <p>Animals including Humans</p>

Curriculum Plans

Strategies for Retention

Speak
Like a
Scientist

Vocabulary
Cards

Can You
Still...?

Concept
Cartoons

Enquiry
Type
Logos

Working
Walls

Elicitation
Activities
e.g
Explorify

Pedagogy

Structure of Lessons

Practical,
hands-on
exploration

Enquiry-
led; think
like
scientists

What do they know already?

- Generate discussion
- Identifying, classifying and grouping
 - Odd one out – Explorify
 - Concept cartoons

Vocabulary

Give them the vocab and expect them to use it all the time.
Vocab cards in books and on walls.

What are we wanting to achieve / find out?

- End points
- Big question

How are you going to find out?

- Research using secondary sources
- Investigate

Challenge

- Check what they know and address misconceptions
- Concept cartoons
 - Odd one out
 - True or false etc.

Results

Discuss as class
How should we record them?

Investigate

Allow the children to make mistakes – address misconceptions

Predictions

Using prior learning, allow children to predict what they think might happen.

Assessment

Measuring progress, knowledge, skills and challenge

- EYFS – Development Matters / ELG's
 - Teachers in the Early Years use Teacher Assessment to assess whether children are meeting expected levels in Listening, Attention and Understanding (ELG), Managing Self (ELG) and The Natural World (ELG).
 - Teachers use Development Matters to support assessment and coverage in the relevant areas to Science of the EYFS (C&L, PSED and UtW).
 - PLAN progression supports teachers to make accurate judgements, based on observations of the children
- KS1 – End-Points taken from the NC
 - We have taken the end-points of learning from the KS1 Science National Curriculum which teachers assess against throughout the year to establish if a child is working at or below expected level.
 - We use this analysis to form focus groups and plug gaps if necessary.
 - These grids follow the children through school so their next teacher will know if a child has certain gaps in their prior learning that need to be pre-taught before a new unit is begun.

Assessment

Measuring progress, knowledge, skills and challenge



PLAN supports teachers to make accurate judgements, based on observations of the children and from the work that they are producing in lessons.



TAPS focused assessments support teachers to assess children's disciplinary knowledge explicitly, through an observational and targeted approach.

Assessment

Measuring progress, knowledge, skills and challenge

Banks Lane Infant & Nursery School | Year 1 Science Assessment

Year 1	Plants	Animals Including Humans	Everyday Materials	Seasonal Changes	Working Scientifically
Name	Identify and name a variety of common plants.	Identify and name a variety of common animals including fish, amphibians, birds and mammals.	Identify and compare the structure of a variety of everyday materials including wood, plastic, glass, metal, water and rock.	Describe the simple physical properties of everyday materials.	Compare and group together a variety of everyday materials on the basis of their properties.
	Identify and name the basic structure of a variety of common flowering plants.	Identify and name a variety of common animals that are common, herbivores and omnivores.	Describe the simple physical properties of everyday materials.	Observe changes across the four seasons.	Observe and describe weather associated with the seasons and how it might change them and vice versa.
	Identify and name a variety of common plants including ferns, angiosperms, biots and gymnosperms.	Identify and compare the structure of a variety of common animals including amphibians, reptiles, birds and mammals including birds.	Describe the simple physical properties of everyday materials.	Observe and describe weather associated with the seasons and how it might change them and vice versa.	Use simple measurements and equipment to gather data.
	Identify and name the basic structure of a variety of common flowering plants.	Identify and name a variety of common animals that are common, herbivores and omnivores.	Describe the simple physical properties of everyday materials.	Observe and describe weather associated with the seasons and how it might change them and vice versa.	Use their observations and data to suggest answers to questions. This does not mean they have found out and how they found it out.
	Identify and name a variety of common plants including ferns, angiosperms, biots and gymnosperms.	Identify and compare the structure of a variety of common animals including amphibians, reptiles, birds and mammals including birds.	Describe the simple physical properties of everyday materials.	Observe and describe weather associated with the seasons and how it might change them and vice versa.	Use simple measurements and equipment to gather data.
	Identify and name the basic structure of a variety of common flowering plants.	Identify and name a variety of common animals that are common, herbivores and omnivores.	Describe the simple physical properties of everyday materials.	Observe and describe weather associated with the seasons and how it might change them and vice versa.	Use their observations and data to suggest answers to questions. This does not mean they have found out and how they found it out.

Banks Lane Infant & Nursery School | Year 2 Science Assessment

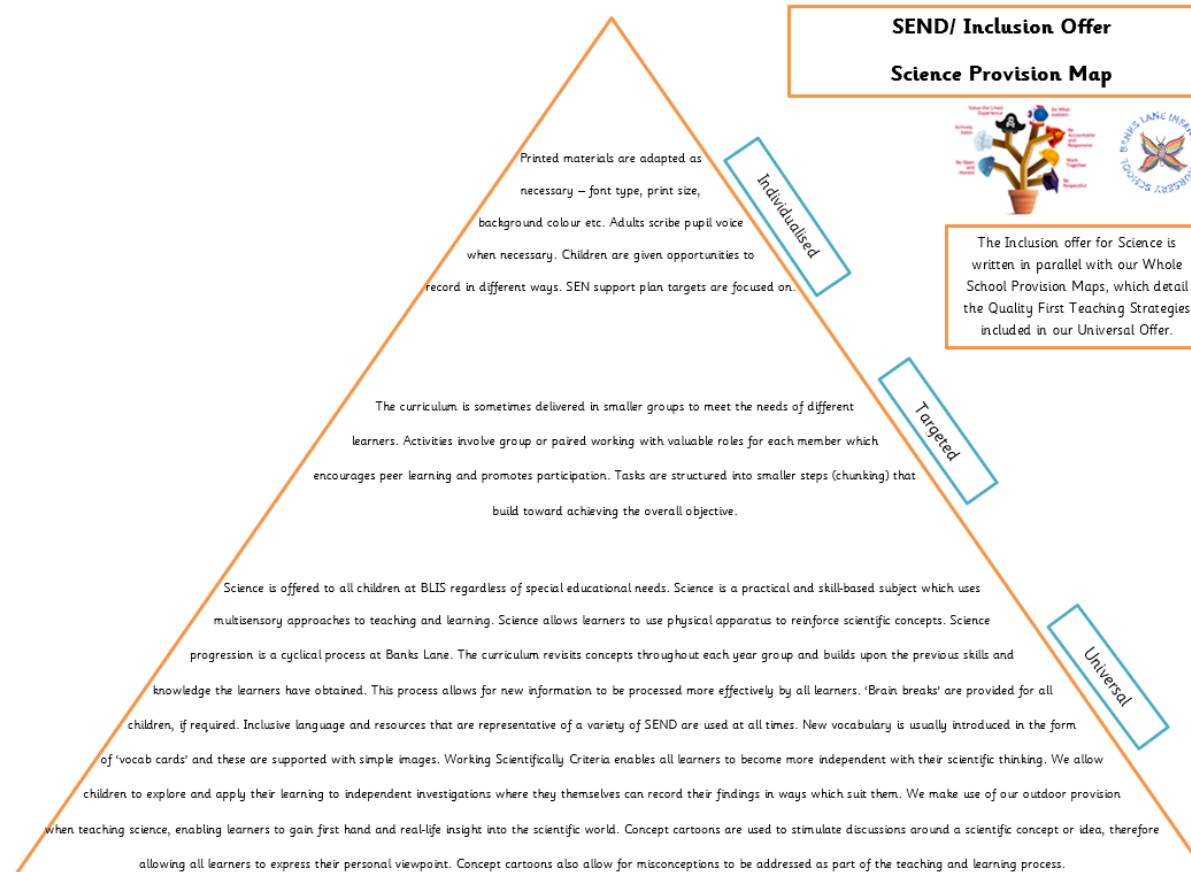
Year 2	Plants	Living Things and their Habitats	Animals Including Humans	Uses of Everyday Materials	Working Scientifically
Name	Observe and describe how seeds and bulbs grow into mature plants.	Identify and compare the differences between plants that are living, dead and things that have never been alive.	Identify and name a variety of plants and animals in their habitats including microhabitats.	Describe how animals obtain their food from plants and other animals using the uses of a simple food chain and name different sources of food which grow into adults.	Plan out about and describe the basic needs of animals including humans for survival (Water, food and air).
	Plan out and describe how plants need water, light and a suitable temperature to grow and try planting plants.	Identify and compare the differences between plants that are living, dead and things that have never been alive.	Identify and name a variety of plants and animals in their habitats including microhabitats.	Describe how animals obtain their food from plants and other animals using the uses of a simple food chain and name different sources of food which grow into adults.	Plan out about and describe the basic needs of animals including humans for survival (Water, food and air).
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	Plan out and describe how plants need water, light and a suitable temperature to grow and try planting plants.	Identify and compare the differences between plants that are living, dead and things that have never been alive.	Identify and name a variety of plants and animals in their habitats including microhabitats.	Describe how animals obtain their food from plants and other animals using the uses of a simple food chain and name different sources of food which grow into adults.	Plan out about and describe the basic needs of animals including humans for survival (Water, food and air).

Progression Models

Used to track progress for each class

Inclusion

Challenge and Adaptation



Science in our Wider Curriculum

'Potty Science' Club



We host 'Potty Science' Club for our KS1 pupils throughout the year. The club is provided by The Education Factory.

"[Child] has absolutely loved the Science club - so much so that he insisted he did it twice! He always comes home full of enthusiasm and new knowledge from the session and enjoys doing the take away home sheets with quizzes and activities on. There has been a good mix of content and themes. I was especially impressed with the care and support from the club (and staff) when it was a topic (volcanoes) that [Child] was wary of. He's hoping he can do it again next year!"

Year 1 Parent

"We get to do fun science and get to take experiments home too."

Year 2 PP Child (partially funded)

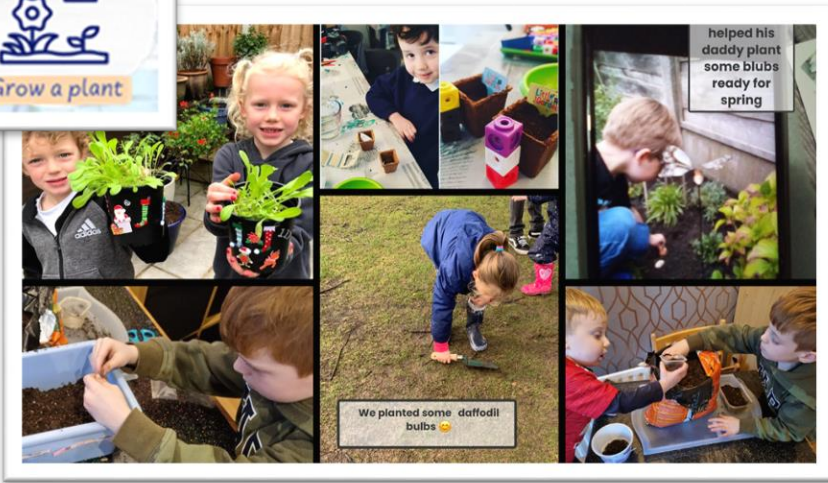
"[Child] came home so enthused and inspired by his time at science club. He learnt so much whilst having so much fun."

Year 2 Parent

Science in our Wider Curriculum

The Banks Lane Experience

Children have the opportunity to complete 'Banks Lane Experiences' at home. We have included experiences with science links into the award challenge.



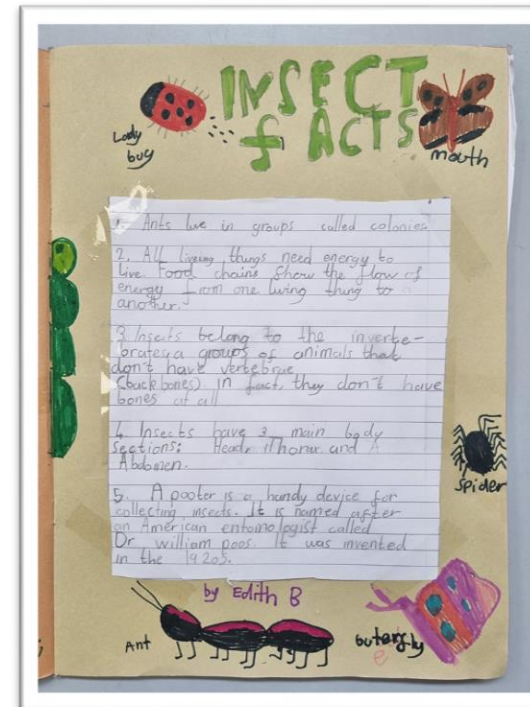
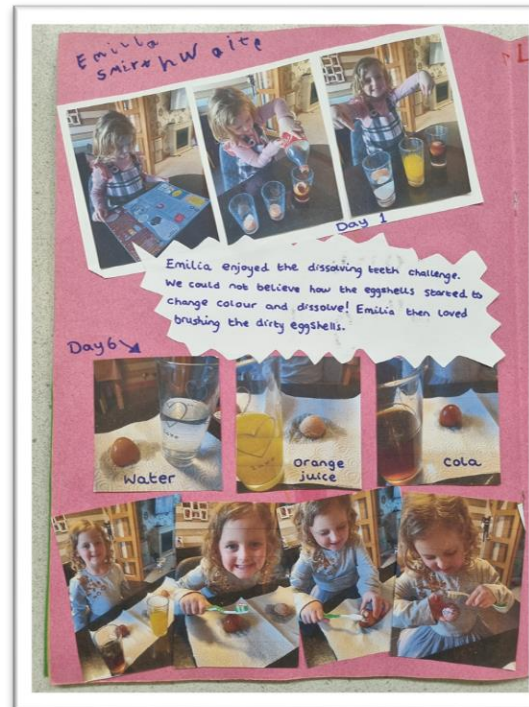
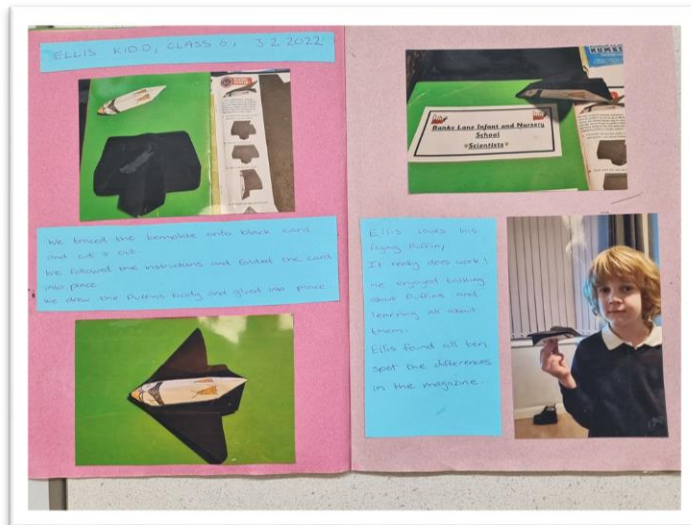
Science in our Wider Curriculum

'Whizz Pop Bang!' Home Learning

"It's so exciting when it's my turn to take the book!"
Reception Child

"[Child] loves having his turn with the science magazine and we enjoy doing it together at the weekend. [Child] loves showing his younger brother the magazine and teaching him about science."
Year 2 Parent

A 'Whizz Pop Bang!' magazine is sent home to a child in each class from Reception to Year 2 each week. This gives each child the opportunity to complete science activities with their families at home.



Monitoring and Evaluation

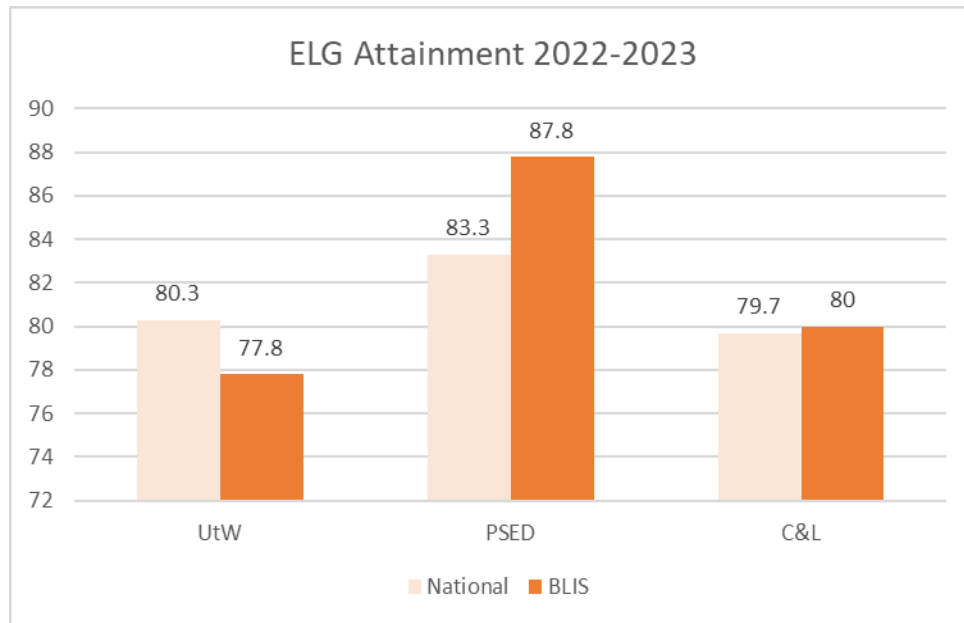
- Learning Walks **Environment Walk undertaken in October 2023**
 - Are Science Working Walls up to date (including enquiry logos and the enquiry process)?
 - Are children engaged in their learning?
 - Are the needs of all learners being met?
 - Is the teacher using a Science specific, language-rich environment?
 - Are children given the opportunity to engage with scientific dialogue?
- Book Looks **undertaken in October 2023**
 - Is there evidence of an enquiry-led curriculum?
 - Have children used correct vocabulary?
 - Is learning progressive?
- Pupil Voice
 - Can children articulate their learning?
 - Using their book as a prompt, can they talk about their learning in previous units, using the correct terminology?
 - Can children use and understand scientific vocabulary in the correct context?

Key Findings

2022-2023

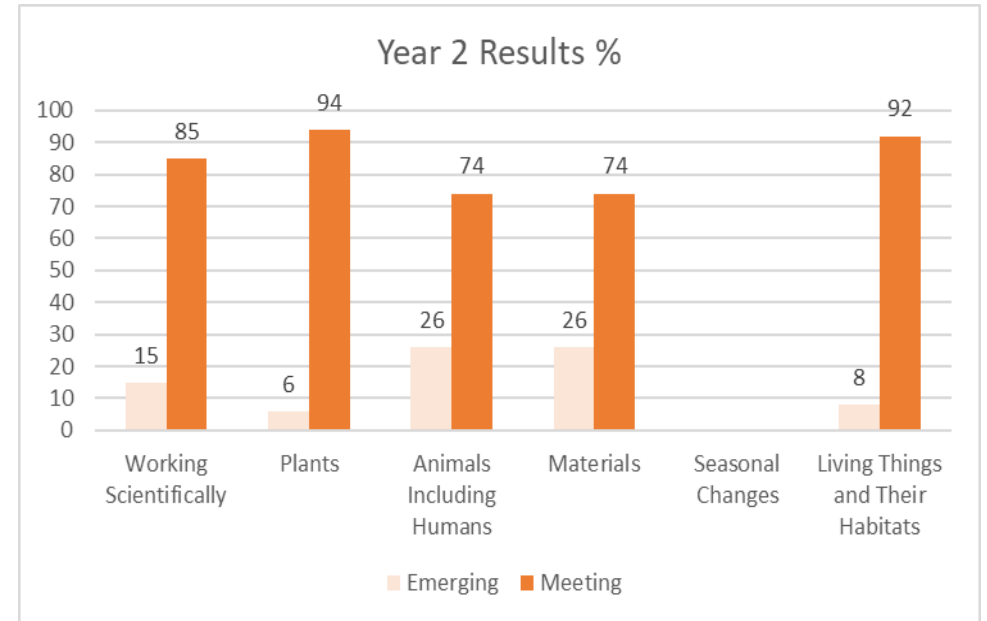
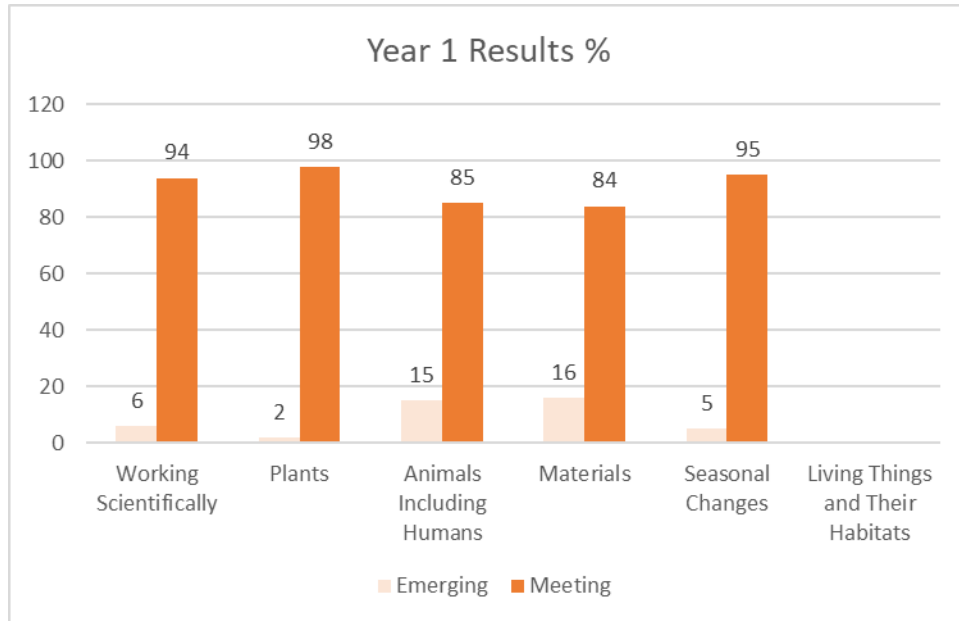
EYFS Strengths:

- EYFS PSED - outperforming both locally and nationally.
- EYFS - FSM/PP outperforming both locally and nationally across C&L, PSED and UtW.



Key Findings

2022-2023



Next Steps



- Pupil Voice Forums
 - Pupil Voice circle times will continue across the year in order to track progress, embed learning and identify any areas for support
- Embed assessment strategies
 - We will continue to embed TAPS Assessments (recently introduced in 2023) to further support teacher judgements, especially in Working Scientifically.
 - We will use assessment trackers across KS1 half-termly to ensure that progress is being made by all pupils.