

Science at Alexandra Park Junior School



Alexandra Park Junior School

Science Curriculum Offer



Alexandra Park Junior School

Science Curriculum Offer

Stage 1 - Quality First Teaching. Every child receives at least:

- Whole class science lessons done in afternoons, blocked for two to three weeks for five half terms.
- Whole school science share. Children choose a question to investigate and present their findings to the whole school and parents.
- Whole school opportunities to participate in science activities for science week. For example, we have done whole school investigations, had a scientist visit to do investigations, a workshop from the Royal Institute.
- The opportunity to attend an after-school science club.

Stage 2 - Additional Support

- In class focus group with adult giving additional feedback on learning.
- Use of Imprint to support reading with picture prompts.
- Adaptations to tasks and worksheets.
- Focus for children working below on Key Performance Indicators in learning.

Stage 3 - Intervention

- Rapid Response Intervention to address any misconceptions that have arisen in the lesson done on the day or following day.

Stage 4 - Further Support

If summative assessment does not show sufficient progress being made despite intervention, liaise with SENDCO.

Curriculum Intent



- At Alexandra Park Junior School, we aim to foster a natural curiosity and excitement about the world through a stimulating, engaging and challenging science curriculum. All children will be provided with a broad and balanced science curriculum in line with the National Curriculum 2014. Through this they will develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- Our science curriculum allows all children to obtain the knowledge and skills needed to help them to think like a scientist, developing an understanding of scientific processes and to understand the uses and implications of science both today and in the future.
- Our children will be immersed in a vocabulary rich environment using scientific language taught, built upon and revisited throughout the different Key Stages. They will develop and use a range of skills including observation, planning and investigation as well as being encouraged to question the world around them with the intention of becoming independent learners.

Intent – Long term plan



2024-25	A1	A2	Sp1	Sp2	Su 1	Su 2
Year 3	Animals <u>inc</u> humans (2 <u>wks</u>)		Rocks and soils (2 <u>wks</u>)	Forces and magnets (2 <u>wks</u>)	Plants (2 <u>wks</u>)	Light (3 <u>wks</u>) Science Share
Year 4	Living things and their habitats (3 <u>wks</u>)	States of matter (3 <u>wks</u>)	Sound (2 <u>wks</u>)	Electricity (2 <u>wks</u>)	Animals <u>inc</u> humans (2 <u>wks</u>)	Science Share
Year 5	Earth and Space (3 <u>wks</u>)	Properties and changes of materials (3 <u>wks</u>)	Forces (2 <u>wks</u>)	Living things and their habitats (2 <u>wks</u>)	Animals <u>inc</u> humans (2 <u>wks</u>)	Science Share
Year 6	Living things and their habitats (3 <u>wks</u>)	Electricity (3 <u>wks</u>)	Evolution and inheritance (2 <u>wks</u>)	Animals <u>inc</u> humans (3 <u>wks</u>)		Light (2 <u>wks</u>) Science Share

Intent – Cross curricular links



Thursday 14th October 2022
Healthy eating

Have you ever worried about being healthy? Eating healthy can make your muscles and bones strong so you should eat healthily. How do we make your body good?

What is a balanced diet? A balanced diet is eating the right amount of food from the food groups.

What are the different food groups? The different food groups are:

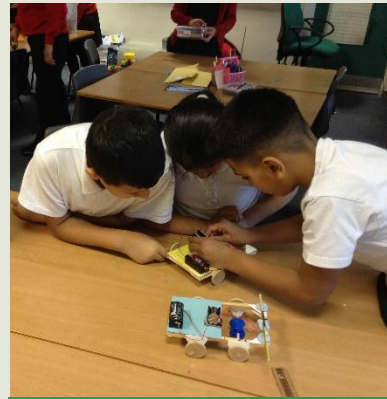
- carbohydrate
- protein
- fat and vegetable
- fat and sugar

Why do we need healthy food? We need to eat healthy food so our muscles and bones get stronger. We can make us grow and make us take different foods have vitamins and so we should eat them. We must not eat on other things.

Each year group writes non-chronological reports in English related to their science topics. To help secure learning and create purpose for writing.

Wednesday 3rd July 2024
What happens to food in your digestive system? Did you know it takes 5-8 seconds for food from the oesophagus to the stomach? How long does it take for your saliva to produce enzymes? How long does it take for you to break down the food so it can be used by the body? Read on to find out more about your amazing digestive system.

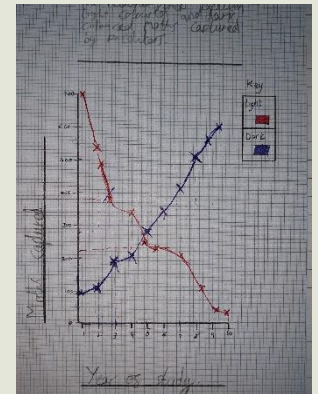
Teach your mouth: First, when you take the first bite of your food, your tongue moves to the roof of your mouth and your saliva tears it down. Then it goes into your muscular tube called the oesophagus. It takes food to your stomach. Your stomach is a organ in the digestive system where gastric broken down into acid and by using chemicals.



Year 5 used their knowledge of electrical circuits from Year 4 to make moon buggies in DT.



Links with geography- Y6 learning about rivers and river life at Castleshaw Outdoor Centre.



Year 6 graph work.

Tuesday 17th October 2023
All about veins

Have you ever wondered how dangerous veins are? Have you ever wondered how they work? We have read a lot about veins in our science lessons - a biological report to find out more!

The Solar System

Surprisingly, Venus is the closest planet to the sun but it's the hottest. It's the second planet away from the sun. Astronomers say it's the hottest planet. A day on Venus takes 243 Earth days. Venus has a little longer year than Earth. It doesn't have any moons. And anything with a moon is unusual because it's not the right direction of most planets. Also, its rotation is really slow.

Appearance

Venus has a thick atmosphere full of gas, carbon dioxide, and this makes the atmosphere so hot. The clouds are made of sulfuric acid and the heat is so intense that the top of the clouds is boiling. Venus is really hot. It has an atmosphere of carbon dioxide and they're covering the surface of the planet.

Wednesday 27th March 2024
How does the circulatory system work?

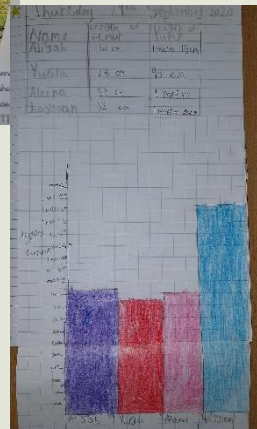
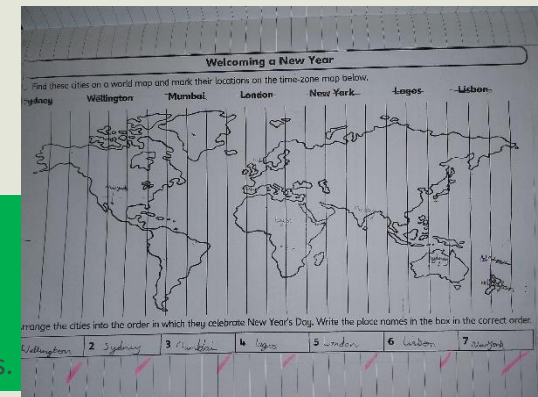
What is a group of highway that stretches across the body? It is our circulatory system, the most important system in the human body. If I were you, you'd want to know I should definitely read this factual text to find out more!

Why is the circulatory system important?

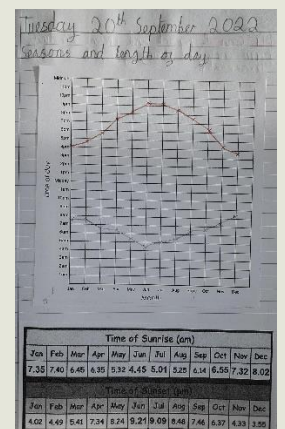
The circulatory system is a very crucial part of the body. In the process of the circulatory system, blood is pumped by the heart to all the muscles. The blood goes to the lungs and becomes oxygenated. Then it goes through the arteries. The arteries bring all the oxygenated blood to all the muscles in the body. After that, the blood goes to the heart and the oxygenated blood goes to the lungs and the process begins all over again. Without this amazing system, we wouldn't all die.

Blood vessels

Year 5 used their knowledge of why we have day and night to support work in geography on time zones.



Year 3 graph work.



Year 5 graph work.

Intent- Progression



Alexandra Park Junior School

At Alexandra Park, our curriculum ensures coverage of all aspects of substantive and disciplinary knowledge from the National Curriculum, as well as ensuring that children have the opportunity to experience each of the five types of scientific enquiry.

Working scientifically: Biology, Chemistry, Physics

STRAND	Y1	Y2	Y3	Y4	Y5	Y6	
Working scientifically	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: -Asking simple questions and recognising that they can be answered in different ways -Observing closely, using simple equipment -Performing simple tests -Identifying and classifying -Using their observations and ideas to suggest answers to questions -Gathering and recording data to help in answering questions	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: -Asking relevant questions and using different types of scientific enquiries to answer them -Setting up simple practical enquiries, comparative and fair tests -Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers -Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions -Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables -Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: -Asking relevant questions and using different types of scientific enquiries to answer them -Setting up simple practical enquiries, comparative and fair tests -Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers -Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions -Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables -Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: -Asking relevant questions and using different types of scientific enquiries to answer them -Setting up simple practical enquiries, comparative and fair tests -Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers -Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions -Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables -Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: -Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary -Taking measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate -Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs -Using test results to make predictions to set up further comparative and fair tests -Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations -Identifying scientific evidence that has been used to support or refute ideas or arguments	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: -Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary -Taking measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate -Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs -Using test results to make predictions to set up further comparative and fair tests -Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations -Identifying scientific evidence that has been used to support or refute ideas or arguments	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: -Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary -Taking measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate -Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs -Using test results to make predictions to set up further comparative and fair tests -Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations -Identifying scientific evidence that has been used to support or refute ideas or arguments

Y6 Electricity

Lesson	Substantive knowledge objective	Disciplinary knowledge objective	Enquiry type	Enquiry question
2	TLC: Can I use recognised symbols when representing a simple circuit diagram?	TLC: Can I draw results using scientific diagrams?		
3		TLC: Can I plan a scientific enquiry to answer a question, recognising and controlling variables?	Comparative and fair test	How could we change the brightness of a bulb in a circuit?
4	TLC: Can I show that the volume of a buzzer or the brightness of a bulb depends on the number and voltage of cells in circuits?	TLC: Can I report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations?	Pattern seeking	Will increasing the number of cells increase the brightness of a bulb or the volume of a buzzer?
5	Can I compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches?	Can I use test results to make predictions to set up further comparative and fair tests?		

Intent- Retrieval



Retrieval Topics

Y3

Half term	Topic taught	Retrieval topic
Autumn 1	Animals including humans	Y1 Seasonal changes
Spring 1	Rocks and soils	Y1 Materials
Spring 2	Magnets	Y1 Plants
Summer 1	Plants	Y1 Animals including humans
Summer 2	Light	Y2 Living things and their habitats

Y4

Half term	Topic taught	Retrieval topic
Autumn 1	Living things and their habitats	Y2 Materials
Autumn 2	States of matter	Y2 Plants
Spring 1	Sound	Y2 Animals including humans
Spring 2	Electricity	Y3 Animals including humans
Summer 1	Animals including humans	Working scientifically

Y5

Half term	Topic taught	Retrieval topic
Autumn 1	Space	Y4 States of matter
Autumn 2	Properties and changes of materials	Y3 Forces and magnets
Spring 1	Forces	Y3 Plants
Spring 2	Living things and their habitats	Y4 Sound
Summer 1	Animals including humans	Y4 Living things and their habitats

Y6

Half term	Topic taught	Retrieval topic
Autumn 1	Living things and their habitats	Y4 Electricity
Autumn 2	Electricity	Y3 Rocks and soils
Spring 1	Evolution and inheritance	Y4 Animals including humans
Spring 2	Animals including humans	Y3 Light
Summer 2	Light	Y5 Properties and changes of materials

Identify the different types of teeth in humans and their simple functions.

Can you remember the names of the different types of teeth we have?
Can you remember their function?

reversible ↔ irreversible →

Using the key above draw the correct arrow between the pictures. Write whether each change is a reversible or an irreversible.

Melting chocolate is a _____ change.

Freezing water is a _____ change.

Each unit of learning includes retrieval questions from a previous topic to re-ignite learning and knowledge and keep information in the working memory.

Where possible, a retrieval topic will be done before an associated topic to remind children of previous learning and allow teachers a formative assessment opportunity prior to the new topic being taught..

Curriculum Implementation



- All children are taught Science in blocked sessions. To ensure high standards of teaching and learning, we implement a curriculum that is progressive and that gives full coverage of the 2014 National Curriculum programmes of study for Science. Through teacher modelling and planned questioning, we want our children to be amazed by the world around them as we recognise that our children often lack experiences.
- At the start of each topic, teachers find out what the children already know/understand and use this to adapt the curriculum to the needs of the learners. Children reflect on their previous learning throughout, building on prior knowledge and linking ideas together, which enables them to ask questions and to become enquiry-based learners.
- Building a subject rich vocabulary is important and so there is an emphasis placed upon activities that will transfer information from the working memory into the long-term memory. This is achieved through the use of displays, knowledge mats and quizzes.

Curriculum implementation continued



- During each topic there are planned opportunities for children to develop their enquiry skills within the five types of scientific enquiry – observation over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing and research using secondary sources. This allows for a progression in skills as the children increase in age and ability and allow teachers to plan high quality science lessons.
- All children have access to a range of quality resources including science equipment, digital technology, practical experiences and photographs. They will also use a range of secondary resources to develop their knowledge and understanding. Where applicable, children will take part in off-site educational visits and also welcome science visitors into the classroom as a way to enhance their learning experiences.

Implementation-A scientist just like me



A Scientist just like me



Emma Dunne
Palaeobiologist



A Scientist just like me

Discussion time

- ✦ Would you like to be a mechanical engineer like Rafsan Chowdhury?
Why? Why not?
- ✦ What skills and interests do you already have that would help you become a mechanical engineer?
- ✦ What new skills and knowledge would you need to develop?



A Scientist just like me

Hi there! I am Tanesha Aleen – A zoologist



Where do I work?

I work at the University of Oxford. I have just finished my PhD which was about badgers and now I talk to students about how they can study wildlife.

What did I like doing when I was at school?

I always loved learning about animals. I really liked helping to take care of our class pet (two lizards!) and going to the zoo and aquarium.

What do I like doing in my spare time?

I like to do non-science things like knitting, listening to podcasts, and writing. I'm also trying to learn French and sign language.

A Scientist just like me



Dr Kelsey Byers
Evolutionary Biologist



Each unit of begins with the introduction of a real Life scientist whose work relates to the unit of learning.

The scientists represent a diverse range of people from different backgrounds and ethnicities.

The purpose of this is to show how the children's learning links to the real world and also hopefully encourage the idea that science is for everyone and that scientists are not typically older, white males, who wear lab coats.

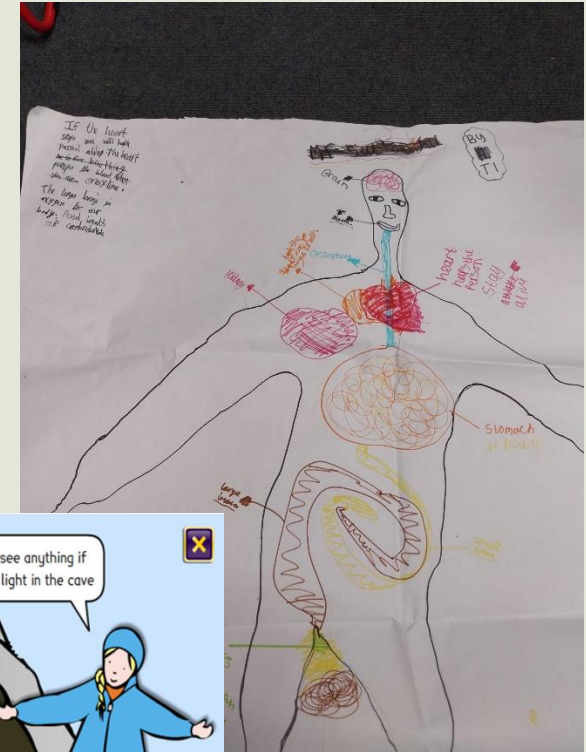
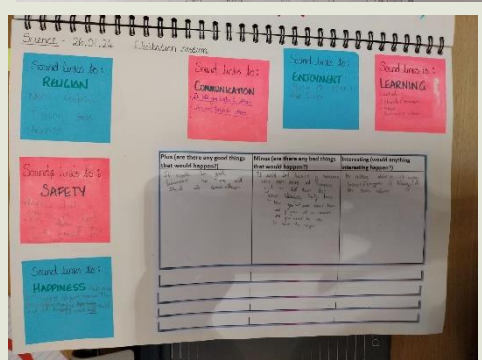
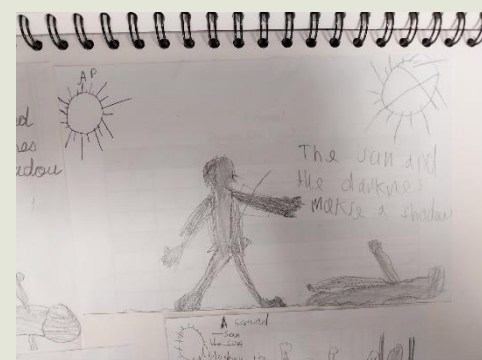
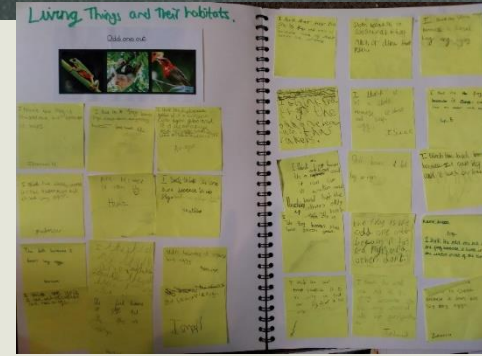
Implementation- elicitation of ideas



At the beginning of each unit of work the teachers elicit the children's ideas about the unit they are about to do. This allows the teachers to gauge the children's prior learning and knowledge, look out for misconceptions and Adapt their planning as a consequence.

A variety of engaging activities are used, including:

- Concept cartoons
- Odd one out discussions
- Labelled diagrams
- Practical challenges



Implementation –vocabulary development



Subject specific vocabulary has been developed using the Plan Progression in Vocabulary document.

This is included on the knowledge organisers for each unit and word aware activities in each lesson. Three key words are included on the steps to success in each lesson for the children to refer to.

Strands	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working scientifically	Question, enquiry, similar, different, change, observe, measure, equipment, test, plan, resource, predict, identify, classify, compare, sort, gather, record, data, diagram, table, pictogram, block graph, tally chart.		As for Year 1 and 2 plus secondary sources, accurate, systematic, thermometer, data logger, comparative, fair test, pattern seeking, observation over time, keys, bar charts, <u>venn</u> diagram, <u>carroll</u> diagram, conclusion, evidence, method, report, present, explain.		As for Year 1, 2, 3 and 4 plus control, variables, precision, repeat, classification key, line graph, scatter graph, support, refute, trust, causal.	
Plants	Leaf, flower, blossom, petal, fruit, berry, roots, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area Names of garden and wild flowering plants in the local area.	As for Year 1 plus light, shade, sun, warm, cool, water, grow, healthy.	Photosynthesis, pollen, insect/wind pollination, seed formation Seed dispersal (wind dispersal, animal dispersal, water disposal)		(Living things and their habitats) life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, bulbs, cuttings	

Alexandra Park Junior School Year 4 Unit of Learning: Electricity Knowledge Organiser

What have I previously learned?
 I can explain differences, similarities or changes related to simple scientific ideas and processes.
 I can use straightforward scientific evidence to answer questions or to support my findings.
 I can explain how things work.

Vocabulary – Goldlocks words

Word	Definition
Mass	It is the form of electrical power that is delivered to homes and businesses, and it is the form of electrical power that people use when they plug items such as domestic appliances such as televisions and kettles.
Electrical Circuit	A path for transmitting electric current, it is a closed loop that includes a source of energy or load, and connecting wires.
Component	Part of a circuit, such as wires, resistors, capacitors, and magnets.
Cell	Unit structure used to generate an electrical current by some means other than the motion of a conductor in a magnetic field.
conductor	a substance or material that allows the flow of charge or electric current in one or more directions.
Insulator	a material or device that does not allow electric current to flow freely.

Sticky Knowledge

- Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work.
- A switch can be added to the circuit to turn the component on and off.
- Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.

Prompts to help me in my learning

Useful links
<https://www.youtube.com/watch?v=0Blv-uh7EGU>
<https://www.youtube.com/watch?v=MqHhKZNuMAA>
https://www.bbc.com/uk/science/1/2014/04/140424_electricity_article.shtml#p1of6cc
 mcv

TLC: Can I use the idea that light travels in straight lines to explain that objects are seen because they give out, reflect light into the eye?
 TLC: Can I explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes?
 TLC: Can I use scientific language and ideas to explain, evaluate and communicate my methods and findings?

Steps To Success	Me	Teacher
I can explain how we see objects that are not sources of light.		
I can draw labelled diagrams to show how we see objects that are not sources of light.		
I can draw accurately labelled diagrams to show my investigations.		
I can write about my investigations.		
Standards		
Have I written the data correctly and underlined with a ruler?		
Have I presented my best work?		
Are all my capital letters and full stops correct?		
Have I copied words spell for me correctly?		

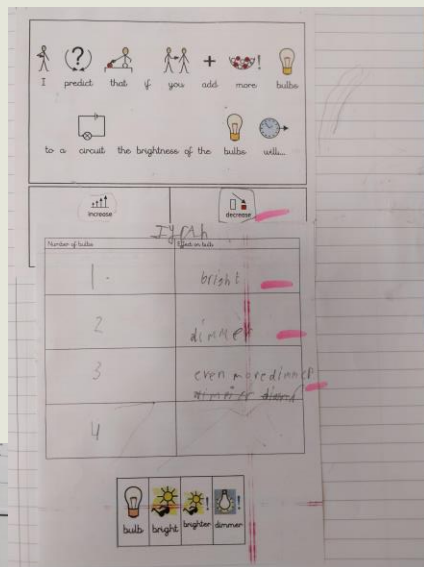
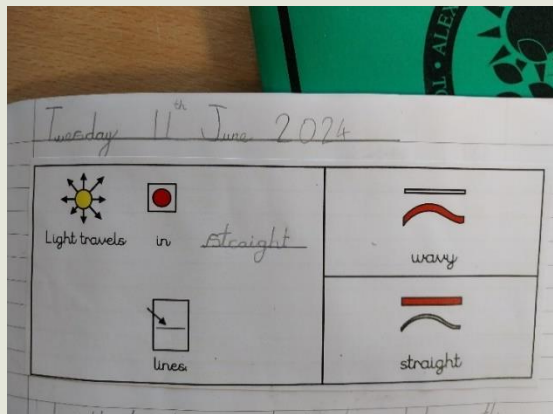
light rays straight reflect

A light ray represents the direction and movement of light.
 Not curved or bent.
 To throw back light.

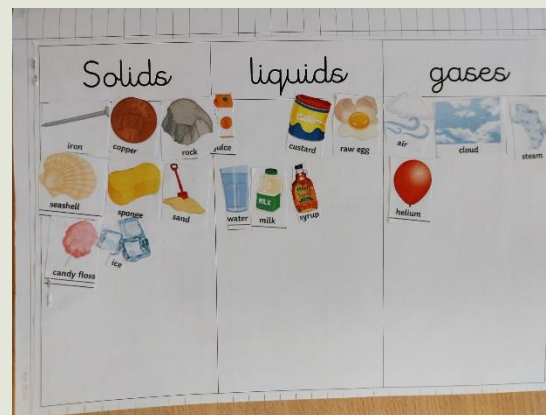
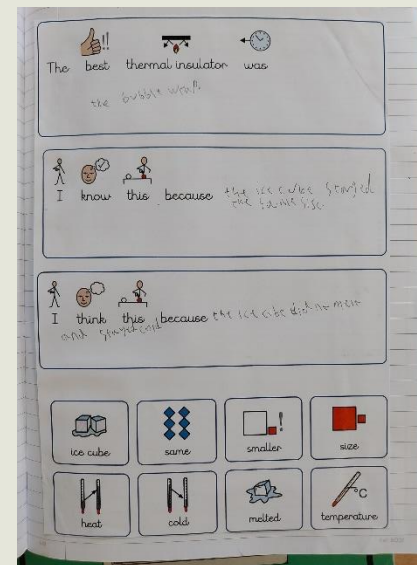
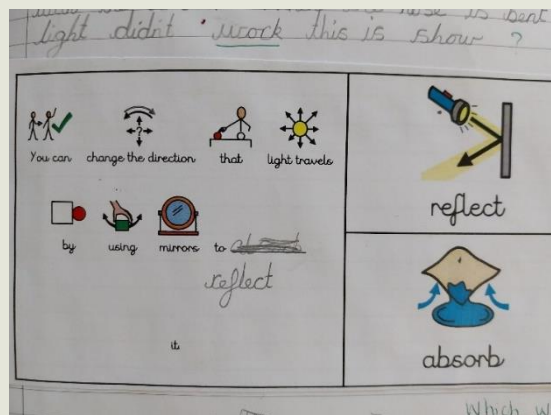
Implementation – Adaptation and vocabulary development



Alexandra Park Junior School



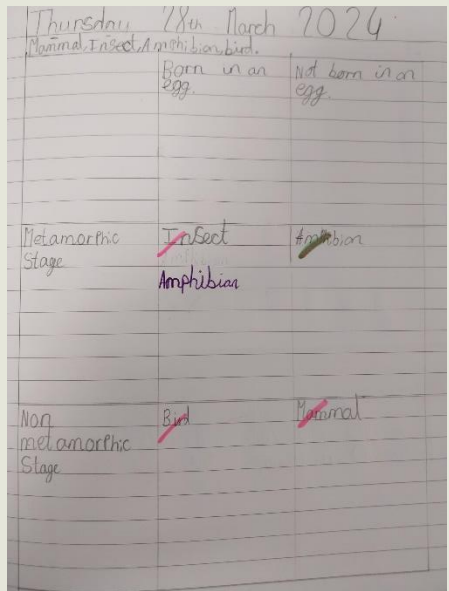
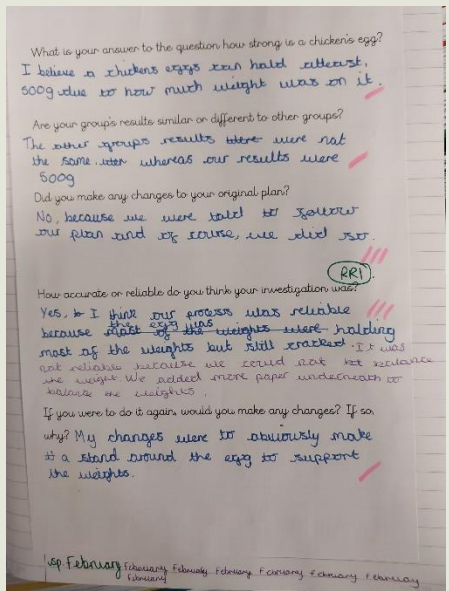
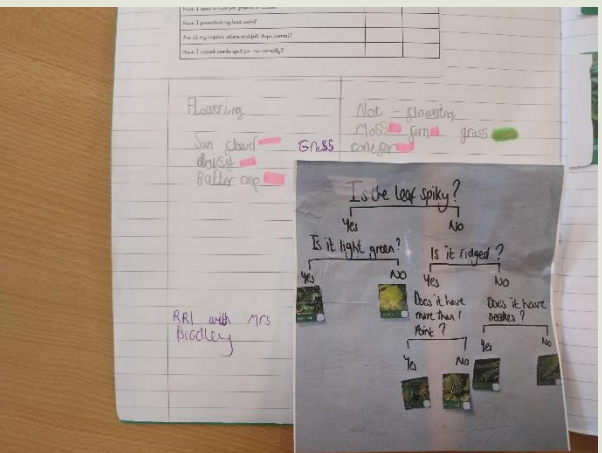
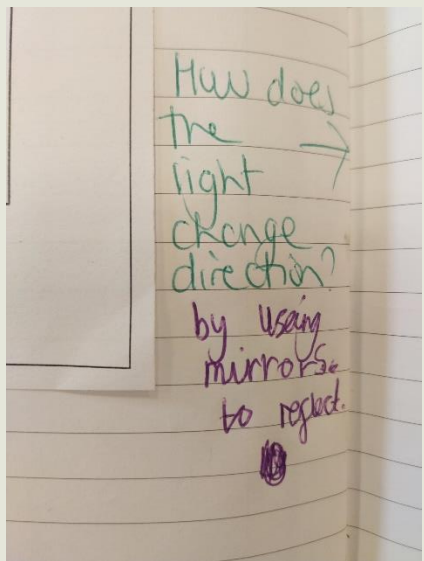
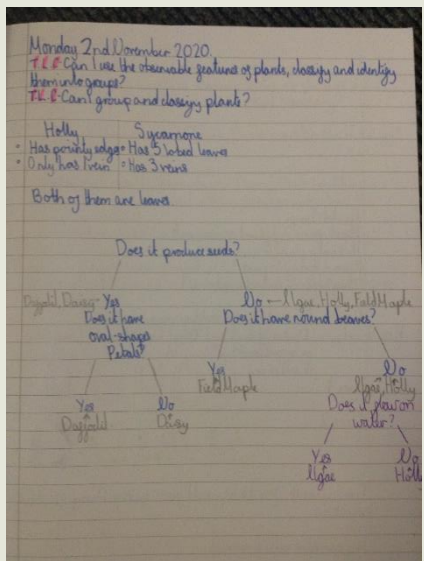
Work is adapted and additional vocabulary support is provided for children with special educational needs and international new arrivals.



Implementation – Feedback and rapid response intervention



Whenever possible, feedback is given in the lesson and acted upon by children using a purple pen. When additional support is still required, RRI (rapid response intervention) takes place to address any misconceptions.



Implementation- Enquiry types

Observation over time



Year 4 investigated the effect different liquids have on teeth (eggshells).



Year 3 investigated which conditions plants need for life.

Results

Distinction of size of bread the conditions it will be used	Observations of mould growing over time				
	Day 1	Day 2	Day 3	Day 4	Day 5
Size 1: moist					
Size 2: dry					

Conclusion: By looking at the results of our bread we found out that mould grows better and quicker in a moist condition rather than a dry condition.



Year 6 investigated the best conditions for mould to grow.

Implementation- Enquiry types

Pattern seeking



"We found out that people with longer femurs do not always jump further". (Y3 child)



Year 3 investigated whether people with longer femurs jump further.



"The more pulleys that you have the easier it is to lift the load." (Y5 child)

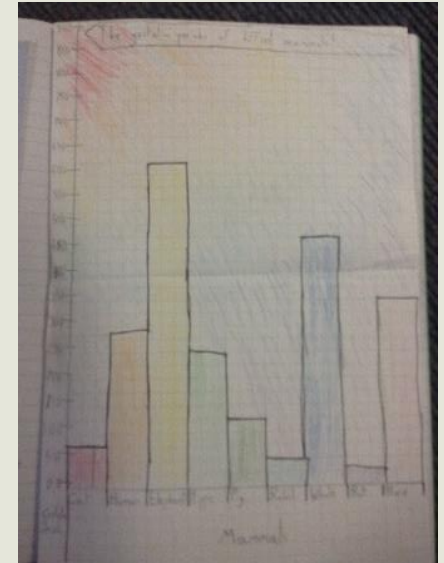
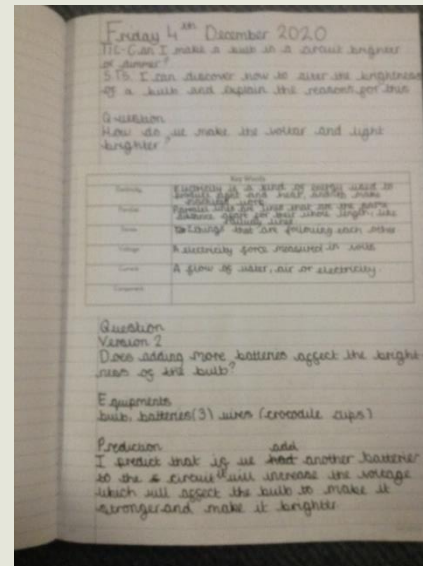
Year 5 investigated how mechanical devices can help us lift loads.

Thursday 11 September 2020
The Caravel

Equipment (draw if needed)	How is the sound made? (eg pluck hit...)	Which part of the equipment made the sound?
	Shake	bell
	Snap scrape it	Snapper
	Shake it	metal bar
	Hit it	bringle
	hand it	hand
	tap it	bar

Year 4 investigated how the pitch of an instrument could be changed.

Year 6 investigated how adding more batteries affected the brightness of a bulb.



Year 5 investigated the pattern between the size of a mammal and their gestation period.

Implementation- Enquiry types

Fair and comparative tests



Year 5 investigated how different materials insulated ice.



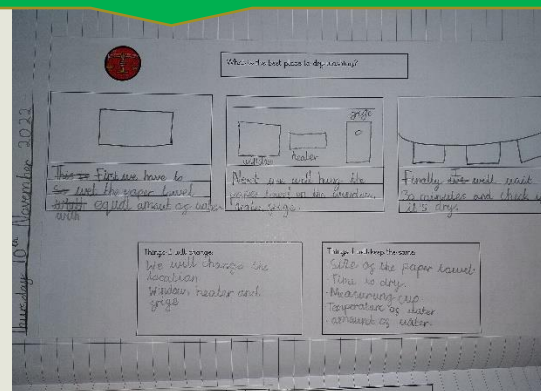
Year 3 investigated friction on different surfaces.

"The surface that caused the most friction was the carpet. We found out that the rougher the surface, the more friction was caused." (Y5 child)



Year 5 investigated the force needed to move objects on different surfaces.

"The best place to dry the paper towel was the radiator because the heat helped the water to evaporate." (Y4 child)



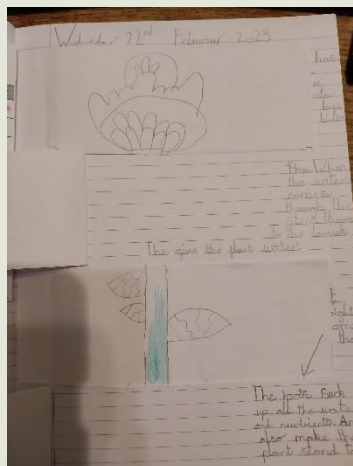
Year 4 investigated the best place to dry washing.

Implementation- Enquiry types

Research using secondary sources



Alexandra Park Junior School



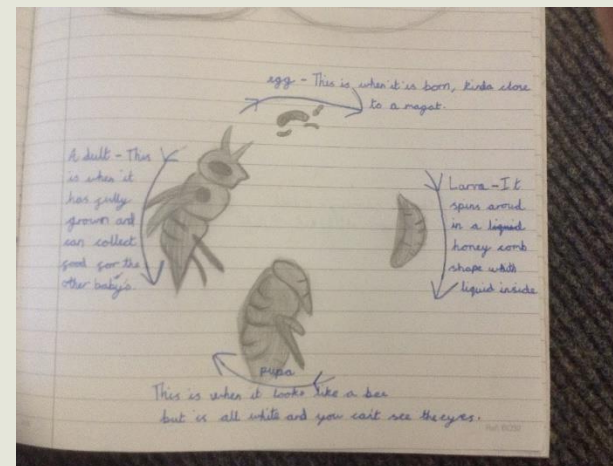
Year 3 used secondary sources to find out about the functioning parts of flowering plants.

Y4 researched if all solids and liquids change state at the same temperature

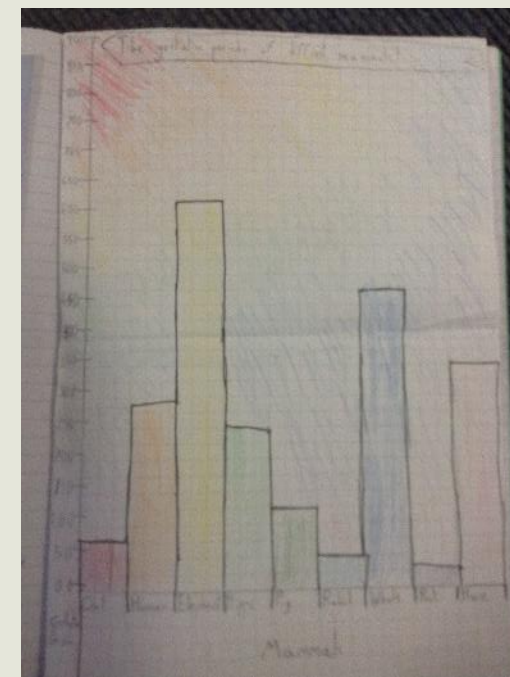
Materials	Melting point	Which material has the lowest melting point?
Water	0°C	Mercury
Mercury	-38.83°C	
Lead	327.5°C	Gold
Silver	961.8°C	
Gold	1064°C	
Olive oil	-6.0°C	
Milk	4.0°C	
Sea water	-2°C	

Y4-Do all solids and liquids change state at the same temperature?
"No different substances change state at different temperatures because their melting points are all different." ((Y4 child)

Materials	Melting point	Which material has the lowest melting point?
Water	0°C	Mercury
Mercury	-38.83°C	
Lead	327.5°C	Gold
Silver	961.8°C	
Gold	1064°C	
Olive oil	-6.0°C	
Milk	4.0°C	
Sea water	-2°C	



Year 5 researched the lifecycles of insects and amphibians.



Year 5 researched the gestation periods of different mammals.

Implementation- Enquiry types

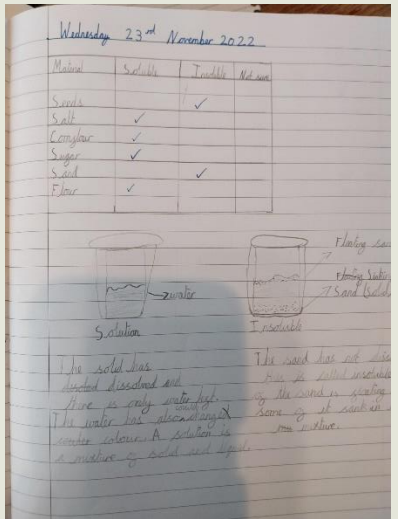
Identifying and classifying



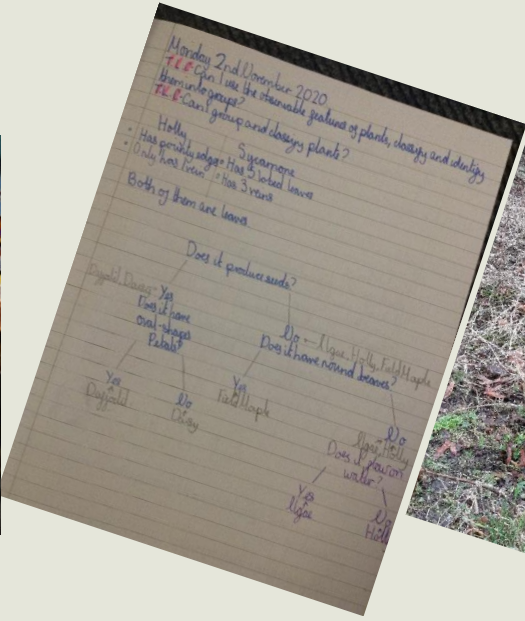
Alexandra Park Junior School



Year 3 which materials are magnetic?



Year 5 which solids are soluble?



Year 4



Implementation- Outdoor learning

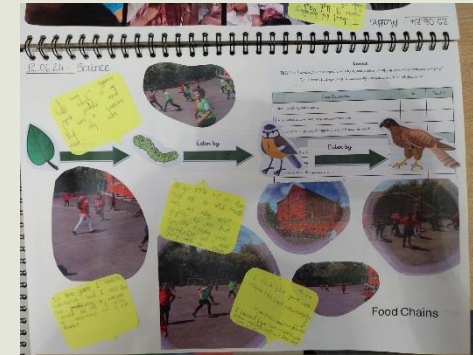


Alexandra Park Junior School

Outdoor learning is encouraged for number of reasons:

- allowing children to see how science relates to the world around them
- providing engaging, practical opportunities to collaborate
- research says outdoor learning can accelerate progress (EEF) and improve the performance of under achieving pupils (Hamilton Trust).

"Uranus was 29m away from the Sun in our model so we had to count 29 clicks on the trundle wheel." (Y5 child)

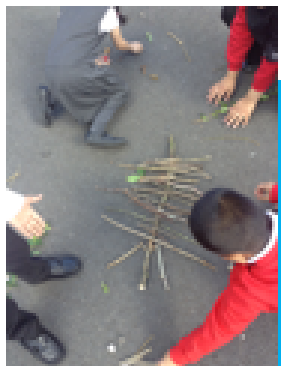


Year 4 playing a game to model food chains.



Year 6 photographing mini beasts to classify.

"If we have longer legs, could we run faster?" "If you have big hands, can you throw further?" (Y3 children)



Can I ask questions and use different types of scientific enquiries to answer them?
Children made skeletons using twigs etc then generated questions to investigate.

As a class they chose to investigate if children with longer femurs jumped further

Outdoor and active learning allows children the opportunity to use the vocabulary they have been taught in a meaningful way.

"We have taught science outdoors during our space topic. This supported the children's understanding of the movement of the planets and the scale of the solar system". (Year 5 teachers)



Year 6 modelling the circulatory system.

Curriculum Impact



Children should be able to show that they have met the steps to success for each lesson in a variety of ways. They may demonstrate this through independent differentiated work, group work (which could be recorded in the class active learning book), oral or visual presentations.

Children should self-assess their work using the steps to success at the end of each lesson. They will also be given the opportunity to use the learning line to show how confident they feel about their learning in the lesson,

Assessment

Teacher assessment is the primary method of assessment, this includes taking into account the discussions that children have in class with the teacher and their peers, written work in books, presentations etc as well as a Kahoot quiz end of a unit of work. Each unit also includes a TAPS focused assessment which targets specific working scientifically objectives.

Target Tracker assessments are used throughout the school to assess children's progress and attainment in science, ensuring that the attainment in both working scientifically and scientific knowledge targets are taken into account. Teachers judge which band to put children on by choosing the one that best fits a child's attainment within (where possible) their academic year.

Impact



Monitoring

The science subject leader will monitor the teaching of science throughout school during pop in observations and book scrutinies and will give feedback to class teachers about areas for praise and areas for development.

The science subject leader will monitor and analyse the data inputted onto Target Tracker, looking at children who are not on track to meet age related expectations. The subject leader will also analyse the data for boys vs girls, SEND, Pupil Premium and International New Arrivals and consider their performance compared to others and monitor where additional support may be needed. This will be fed back to SLT.

Impact



There is a clear expectation that all classes are making progress towards achieving age related expectations. All objectives used in TLCs must be taken from Target Tracker to support accurate assessment.

The progression of both knowledge and skills across the Key Stage secures pupils' understanding of the key objectives, as well as developing enquiring minds. We believe that our science curriculum lays solid foundations for our pupils to build on as they move into Key Stage 3 and a life-long love of learning about the world around us.

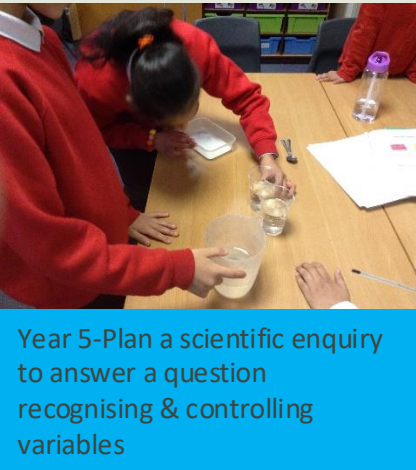
Impact will be measured through 'spotlights' three times a year which will include :

- book scrutinies
- planning scrutinies
- learning walks
- lesson observations and pop-ins
- staff and pupil voice
- data analysis

Impact – TAPS assessment



Wednesday 23rd November
 Will changing the temperature affect the speed of the
 I will change the temperature of water
 I will measure the time the sugar dissolves
 I will measure the amount of water, the way we stir, the length of staying the speed of stirring and the amount of sugar
 Conclusion
 When I measured the temperature I had one conclusion in this experiment, I found out the water is quicker the dissolving of the sugar
 * (37°)
 * (50°)



Year 5-Plan a scientific enquiry to answer a question recognising & controlling variables

Monday 26th September 2022
 I prepared all my equipment and materials for my experiment. I will use a digital scale to measure the amount of sugar.
 Variables: Food dye
 How can we test whether more dye is better? I'll use a digital scale to measure the amount of sugar and the amount of dye. I will use a digital scale to measure the amount of sugar and the amount of dye.
 I will use a digital scale to measure the amount of sugar and the amount of dye.
 I will use a digital scale to measure the amount of sugar and the amount of dye.
 I will use a digital scale to measure the amount of sugar and the amount of dye.

Year 5 -Report and present findings from enquiries using appropriate scientific language.

Assessment Indicators
Not yet met: Can identify some (not all) objects that allow/do not allow electricity to pass through them but does not yet make generalisations.
Meeting: Can describe the circuit and explain how their results (orally/written form) show that metals conduct electricity and most other materials do not.
Possible ways of going further: Can also suggest other items to fit into the pattern and explore exceptions to the rule. Can apply the terms conduct/insulate to explain safety rules, e.g. not putting knife in toaster.

Thursday 9th May 2022
 Types of rock: Marble, Chalk, Granite, Limestone
 Observations: Marble was shrunken because it did not react with acid. Chalk was shrunken because it reacted with acid. Granite was not shrunken because it was not reactive. Limestone was shrunken because it reacted with acid.
 I would tell Mrs Seabright that the best rock for our playground is granite because it is hard and it is durable.
 The worst rock for our playground is shale because it crumbles.

Year 3 -Report and present findings from enquiries.

Year 4- plan a fair test.

Wednesday 10th November 2022
 What will we do in the experiment?
 We will change the amount of water, the amount of sugar and the amount of sugar.
 Next we will keep the amount of water and the amount of sugar the same.
 Finally we will see how much sugar we can dissolve in the water.
 How will we do this?
 We will change the amount of water, the amount of sugar and the amount of sugar.
 We will use a digital scale to measure the amount of sugar and the amount of water.



Year 6-Report and present findings from enquiries and explain degree of trust in results.

Friday 24th February 2023
 What is your answer to the question how strong is a chicken's egg?
 I think the first egg was strong but not too strong but on one side of the yolk it did not break a breach at the yolk.
 Are your group's results similar or different to other groups?
 Different because none else class it would take over 4kg on breaking but on the first one it broke at 1kg which was similar to almost everyone.
 Did you make any changes to your original plan?
 Yes, we added a plate and kept changing the sides of the egg.
 How accurate or reliable do you think your investigation was?
 We think it was not accurate or reliable because on the first one it broke at 1kg and on the second one it broke a breach even after 4kg.
 If you were to do it again, would you make any changes? If so, why?
 Yes, because when we kept changing it gave us different results so next time.

Thursday 9th May 2022
 Types of rock: Marble, Chalk, Granite, Limestone
 Observations: Marble was shrunken because it did not react with acid. Chalk was shrunken because it reacted with acid. Granite was not shrunken because it was not reactive. Limestone was shrunken because it reacted with acid.
 I would tell Mrs Seabright that the best rock for our playground is granite because it is hard and it is durable.
 The worst rock for our playground is shale because it crumbles.

TAPS Plan for Focused Assessment of Science		
Topic: Electricity	Year 4 Age 8-9	Title: Does it Conduct Electricity?
Working Scientifically Review: Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.		Concept Content Recognise some common conductors and insulators, and associate metals with being good conductors. Construct a simple series electrical circuit.
Assessment Focus • Can children explain results and their conclusions? • Can children recognise common conductors and insulators?		
Activity: Today we are electrical engineers. Introduce the terms conductors and insulators. Example context: soldiers wear 'smart' clothing which conducts electricity: http://www.bbc.co.uk/news/technology-17590999 E.g. a soldier in the desert that has ripped part of 'smart' clothing losing part of the GPS circuit, so unable to provide location for rescue. Explain that the soldier has a pack containing a variety of objects which could be used to complete a circuit to activate the GPS? Provide each group with a 'soldier's backpack' containing a collection of objects/materials (including different metals and plastics). Discuss how to find out whether electricity can pass through the materials. Groups test by putting materials into a gap in a circuit with a bulb/buzzer. Focus: pupil recording/presenting on explaining what the results show. E.g. they could produce a radio or video message to send to the soldier explaining how to produce a working circuit and why they are confident that this will work, providing scientific evidence and a list of all possible conductors (in case some are damaged). Recap: on the terms insulators and conductors.		
Adapting the activity Support: Provide a table template to support children recording their results. Extension: Challenge with extra items to see if they fit the pattern (e.g. lemon, pencil lead, rusty nail.) Challenge children to apply their findings to explain safety rules.		
Questions to support discussion • Which objects completed the circuit? Does that make them conductors or insulators? • Which things conducted electricity? What materials were they made from? • Which did not conduct electricity? What materials were they made from? • Which objects will you advise the soldier to use to repair the circuit? Why? • Can you think of anything else that might/might not conduct electricity? Explain your choices.		
Assessment Indicators Not yet met: Can identify some (not all) objects that allow/do not allow electricity to pass through them but does not yet make generalisations. Meeting: Can describe the circuit and explain how their results (orally/written form) show that metals conduct electricity and most other materials do not. Possible ways of going further: Can also suggest other items to fit into the pattern and explore exceptions to the rule. Can apply the terms conduct/insulate to explain safety rules, e.g. not putting knife in toaster.		

TAPS focused assessments introduced to support the delivery and assessment of working scientific skills. They provide an explanation of the age-related expectation for each skill and are designed to focus on one skill at a time.

Impact- PLAN assessment



PLAN
Planning for assessment

Knowledge matrices Y1-6

“The PLAN resources show us what is expected from age related children and what the children’s outcomes should look like. It addresses misconceptions and common mistakes that could be made. The TAPS assessments allow us to focus on the specific skills required from the children.” (Y4 teacher –ECT)

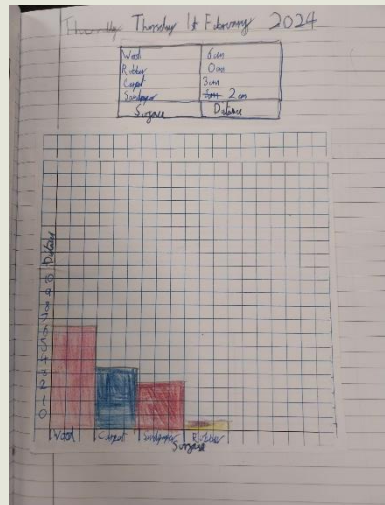
Examples of Work
Hadia
Animals, including humans - Year 4

We use PLAN documents to give examples of age-related work, which helps teachers with making accurate assessments. It also provides key vocabulary and potential misconceptions and makes the key learning points clear so teachers know the essential points which children must take away from a unit of learning.

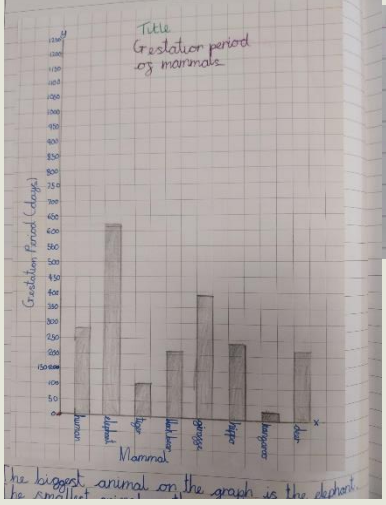
Key learning	Possible evidence
<p>A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound.</p> <p>The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively.</p> <p>Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.</p> <p>Key vocabulary Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation</p>	<ul style="list-style-type: none"> Can name sound sources and state that sounds are produced by the vibration of the object Can state that sounds travel through different mediums such as air, water, metal Can give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it Can give examples of how to change the volume of a sound e.g. Increase the size of vibrations by hitting or blowing harder Can give examples to demonstrate that sounds get fainter as the distance from the sound source increases
<p>Common misconceptions</p> <p>Pitch and volume are frequently confused, as both can be described as high or low.</p> <p>Some children may think:</p> <ul style="list-style-type: none"> sound is only heard by the listener sound only travels in one direction from the source sound can't travel through solids and liquids high sounds are loud and low sounds are quiet. 	

EVIDENCE OF LEARNING		Assessment
Oral evidence	Examples of work	Knowledge
<p>“When we plucked the guitar, we noticed that the thicker strings made the lower-pitched sound and the thinner strings made the higher-pitched sound. I think it also depends how tight the strings are.”</p>		<p>Hamza identifies patterns between the pitch of the sound and the features of the object.</p>
<p>Teacher observations</p>		<p>Working scientifically</p> <p>Hamza consistently uses comparative language to link cause and effect.</p>

Impact-Progress across the key stage



Year 3



Year 5

I would tell Mrs. Seabright that the best rock for our playground is granite because it is porous and it was durable. The worst rock for our playground is chalk because it crumbles.

Year 3

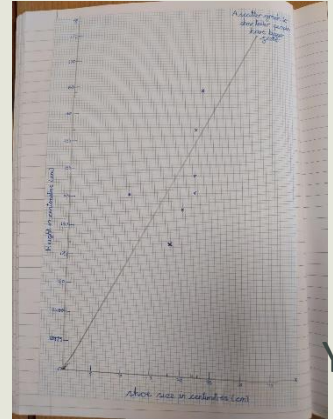
- Graphs
- Explanations
- Labelled diagrams

Friday 7th June 2024 (Prediction)
 I predict that for a soda will do the most damage to the appal because it has the most sugar and it has a lot of sugar, making it a fizzy drink or a bad drink.
 I predict that water will do the most damage because it has no sugar and no sugar.
 Results: Which liquids are good/bad?
 1. Water (very good) 2. Milk (good) 3. Juice (bad) 4. Fizzy drink (very bad)
 Conclusion:
 Our investigation showed that the liquid that is best for teeth is water and the worst is fizzy drink.
 Make sure you don't eat a lot of sugary things that can include in sugar but try to make sure you brush your teeth twice a day.
 Or else your teeth will rot and you'll probably depend on a dentist.
 We can predict that the soda will do the most damage to the teeth and the water will do the least damage to the teeth.

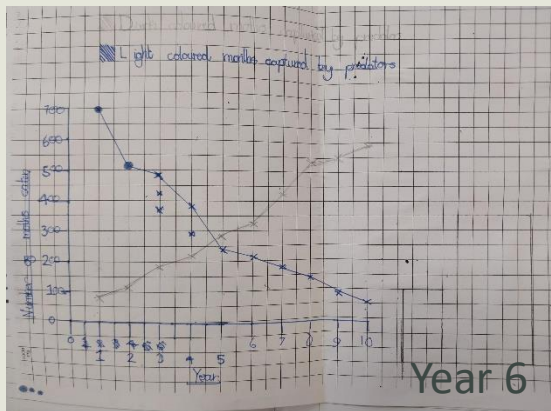
Year 4

Greeting, yellow life, on planet 3, from earth. You have been detected as light has been reflected on your planet using the Sun. We have managed as we want to contact outer life, an example of the method we used to find you is when the Sun reflects on earth's moon, giving it a glowing effect. This means it light is able to be seen on it using our eyes, which the real moon reflects on it's bright side. As well as that, light only travels in a straight line, meaning sometimes only part of the moon is visible due to earth blocking it. It is also...

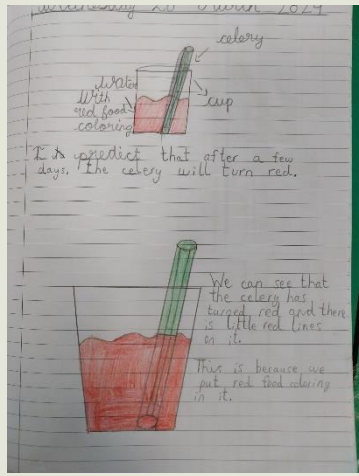
Year 6



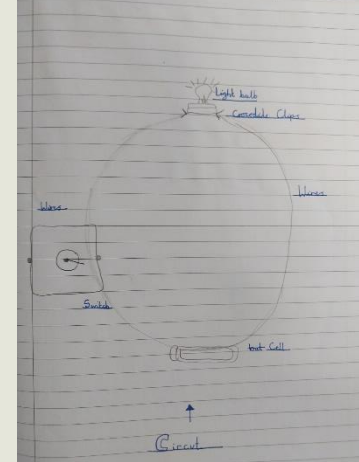
Year 5



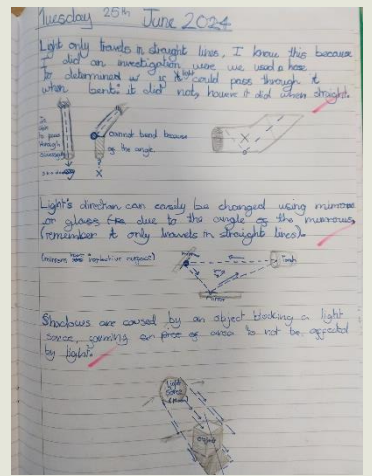
Year 6



Year 3



Year 4



Year 6

Impact-Progress across the key stage



Wednesday 31st January 2024

Surface	Distance travelled (cm)
Wood	78cm
Sandpaper	8cm
Carpet	54cm
Cardboard	81cm
Plastic	90cm

What were we measuring? Temperature °C

My feet!	30.1°C
Air In Room!	33°C
Hot Tap Water!	49°C
Cold Water!	7°C
Warm Water!	37°C

Question
How does our heart rate change after a stationary exercise?

Equipment
• Oximeter
• Stopwatch

Prediction
I predict that my heart rate will increase when we do a ~~short~~ stationary exercise because although we are ~~not~~ still ~~standing~~ still we are working ~~harder~~ ~~harder~~ which causes ~~this~~ our body to use more energy.

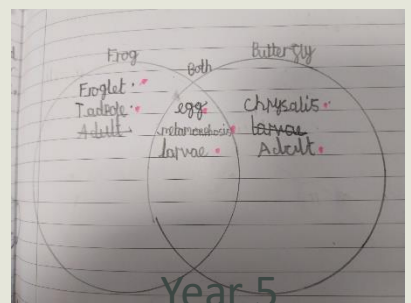
Results

Name	Resting heart rate (BPM)	Heart rate after stationary exercise for 30 seconds (BPM)
Plank	97	84
Anissa	77	99
Dua	114	90
Ummama	99	130
Jahmid	78	100
Rohan	98	159

Conclusion
For most people our heart rate increased when we did a stationary exercise but others decreased for some reason it means they weren't doing the exercise properly or because the oximeter didn't work. In the last experiment our heart rate increased because our body was moving faster.

Measuring
Planning
Classifying

Object	Magnetic	Not magnetic
Wood table		✓
Table leg	✓	
metal		✓
paper clip	✓	
metal bar	✓	



Year 3

Object	Force
Packed Lunch	2N
School bag	9N
Pad	6N
School Pump	2.3N
Stapler	3N

Year 4

What I will need (Equipment): Motor, Scales

The scientific enquiry skill I am using is... Pattern, Safety

What I am going to do (Method): Measure the length of the funnel and count the drops.

How will I record my results? Table

Our question is... Can you get the longest garden hose the longest?

What actually happened (Conclusion): The child that did not have the longest garden hose will be the person that...

Who I think will happen (Prediction): I predict the child with the longest garden hose will be the person that...

Year 5

What is the best about...?

Draw out the paper... What are the...? What are the...? What are the...?

What are the...? What are the...? What are the...?

What are the...? What are the...? What are the...?

Year 3

Does it...? Yes/No

Does it...? Yes/No

Does it...? Yes/No

Year 6

Does it...? Yes/No

Does it...? Yes/No

Does it...? Yes/No

Year 6

Does it...? Yes/No

Does it...? Yes/No

Does it...? Yes/No

Year 6

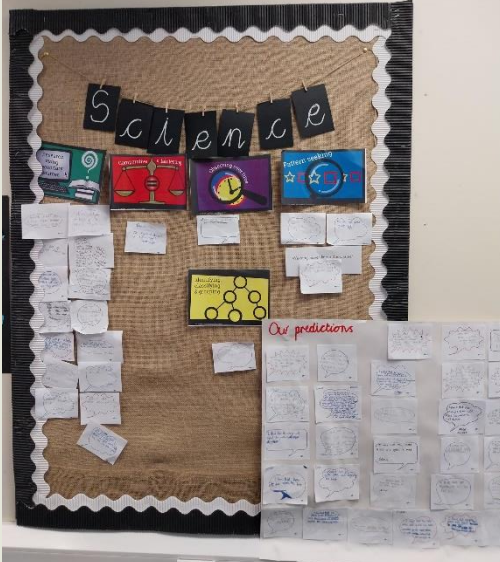
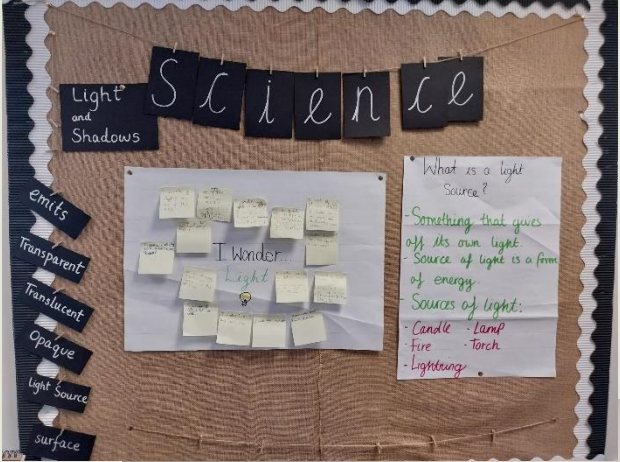
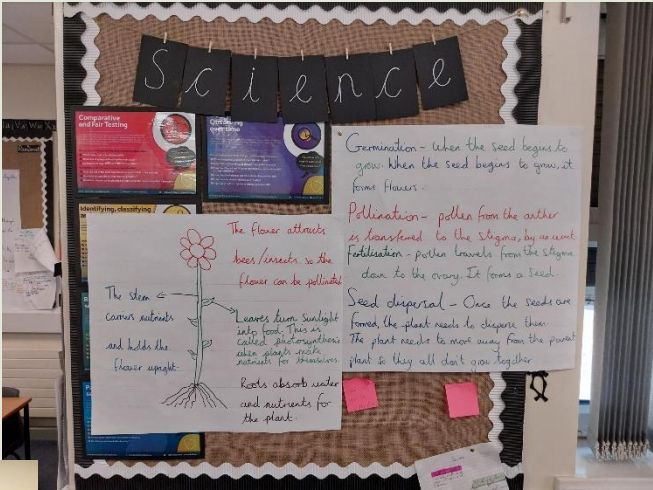
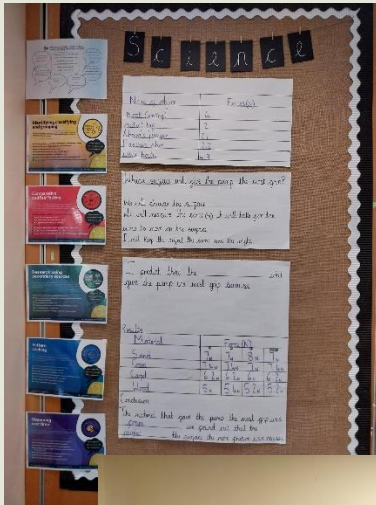
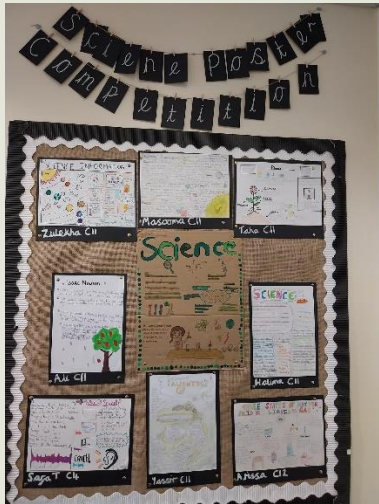
Is it dark green? Yes/No

Does it have holes? Yes/No

Is it...? Yes/No

Is it...? Yes/No

Displays



We held a science poster competition and some of the entries are displayed to celebrate the children's effort and independent learning.

Each class has a science working wall. Prompts, vocabulary boards and whole class work is added throughout the teaching of a unit for the children to refer to support their learning, Posters of the five types of scientific enquiry are also available to refer to.

Enrichment



Alexandra Park Junior School

"We did exercise with Freddie Fit and I learned all about our bodies and muscles."
(Y3 child)



Freddie Fit- helping with Year 3's healthy me topic.

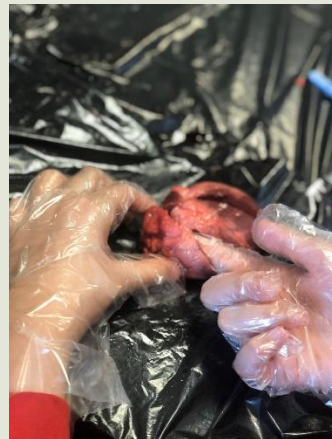


Year 4-Visit from sound man.

"The planetarium was great, it was like really being in space."
(Y5 child)



Year 5 Wonderdome planetarium.



Year 6- Heart dissection

"I loved finding out how sound is made and making the cool instruments."
(Y4 child)



Enrichment – Castleshaw –



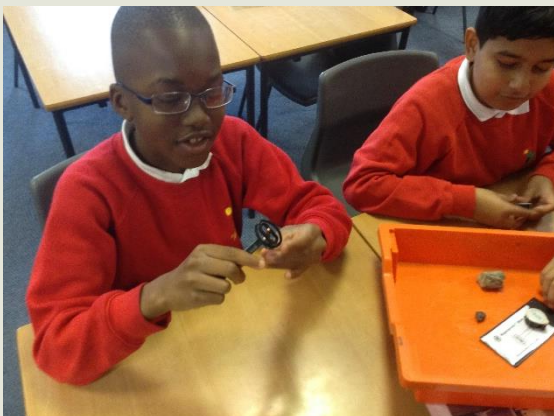
Year 6 went to a local outdoor centre primarily related to their geography topic about rivers. They did some identifying and classifying of creatures found in the river.
 "There was a lot of life in the river which must mean it doesn't have a lot of pollution." (Y6 child)



Enrichment – Borrow the Moon – Moon rock exploration



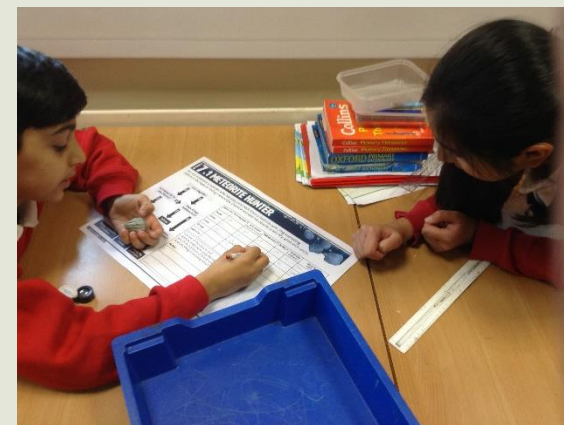
Alexandra Park Junior School



“When I held the moon rocks, I was so excited because they had come all the way from the Moon!” (Y5 child)



“It is essential that we provide these experiences for our children as these may be the only opportunities they have. They really help with children’s understanding and aspirations.” (Year 5 teacher)

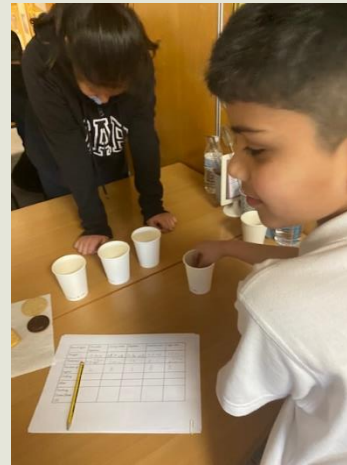


Enrichment – British Science Week 2022

Biscuit dunking experiments



Alexandra Park Junior School



Enrichment – British Science Week 2023

Visit from scientist



"I would like to be a scientist when I am older so I can find out why things happen because I find it really interesting." (Y6 child)



"The popping candy popped in water and vinegar, but not in oil because it was too sticky." (Y4 child)



"I learnt that adding solids like sugar to water makes it more dense and this makes it harder for the bead to sink." (Y6 child)

	float	sink
water	✓	
sugar		✓
salt	✓	
baking powder		✓

Enrichment – British Science Week 2024

Visit from The Royal Institution



Alexandra Park Junior School

I also applied for and received a grant, which enabled me to organise a visit from the Royal Institution. They did student workshops, a family event and a staff training session. The feedback from the adults, who attended, was very positive and it was a great way to improve parental involvement.



“It was an amazing performance- a great opportunity to appreciate it with our children.”

Parent

“It helps children learn about real life things”

Parent



Enrichment – Science club



“I would recommend science club because it is a great a great opportunity to have fun and learn at the same time.” (Y6 child)



“The things that I enjoyed about science club were making slime, making and eating our own butter and learning about different birds that we can see in the park.” (Y4 child)



Enrichment and oracy –The Great Science Share



Children were invited to share their science learning with peers and adults.

Everyone was really engaged and enthusiastic to share what they have found out.

Approximately 30 adults came after school as well.



PSQM



Alexandra Park Junior School

In 2023 we were awarded the Primary Science Quality Mark.



Primary Science Quality Mark

The Primary Science Quality Mark (PSQM) is designed to set every child on a path to a life filled with exciting opportunities, by giving them access to high quality primary science education.

The PSQM is enabling a world of possibilities for all children.

Since 2011, our comprehensive, one-year, evidence-informed, professional development and school improvement programme has equipped primary science subject leaders with the knowledge, confidence, and expert support they need to transform the quality and profile of science education in their schools. The PSQM empowers science subject leaders to make a positive and lasting impact on science teaching and learning.

Science subject leaders who successfully complete the programme receive recognition for their school through the accreditation of a highly-regarded Primary Science Quality Mark.