

KEY NEED 1 and 2

A science curriculum was in place and updated every two years. The National Curriculum was used to inform planning and a formal assessment every half term was used to assess children's progress.

Science works well when....

- We plan our own investigations
- We work scientifically by asking and answering questions.
- We take part in practical activities that require teamwork.
- We research using secondary sources.
- The vision is shared with teachers, parents and governors.

Key principles and our science curriculum were updated based on a staff meeting about 'Science works well when...' and shared on our school website for parents to see. This vision was then shared with governors during a termly meeting.

Teaching staff are clear about the vision and use it to support teaching and learning by making reference to our key principles. Agreeing principles together ensured that everyone was accountable. A range of well planned investigations are evident in the planning and teaching.

WALT investigate air resistance
Working Scientifically – Is there a difference between falling and flying?

What does 'resistance' mean?

Air resistance pushes up on the parachute, opposing the force of gravity and making the parachute and the person fall more slowly. This is a **useful effect**.

But air resistance pushes the cyclist back, opposing the cyclist's force from them pedalling the bicycle and making the bicycle travel more slowly. This is an **unhelpful effect**.

Graffiti wall! 60 seconds: how many things that can fly can you think of? Through investigation, children should be able to appreciate that gravity is a force.

If gravity pulls everything to the Earth, how do things fly?

Explain to the children they are going to make paper helicopter using some templates.

On their graffiti wall, children can write down what they noticed about how the spinners fall.

Explain and discuss the process of air resistance with the children. Ask them to write a definition and draw a labelled diagram explaining air resistance.

Can the children make the spinners fall at a slower rate? (take photos). Would the size or shape of the rotor blades affect the way it spins?

Biogenecy
 Dense
 Displace
 Force
 Motion
 Push
 Pull
 Float
 Gravity
 Surface area
 Friction
 Air resistance
 Fulcrum
 pulley

I can identify the effects of air resistance, water resistance and friction that act between moving surfaces.

I know that air resistance can be both helpful and unhelpful.

I can explain that unsupported objects fall towards the Earth because of the force of gravity.

Paper helicopter templates (see Zainab)
 Paper clips
 Stop watches

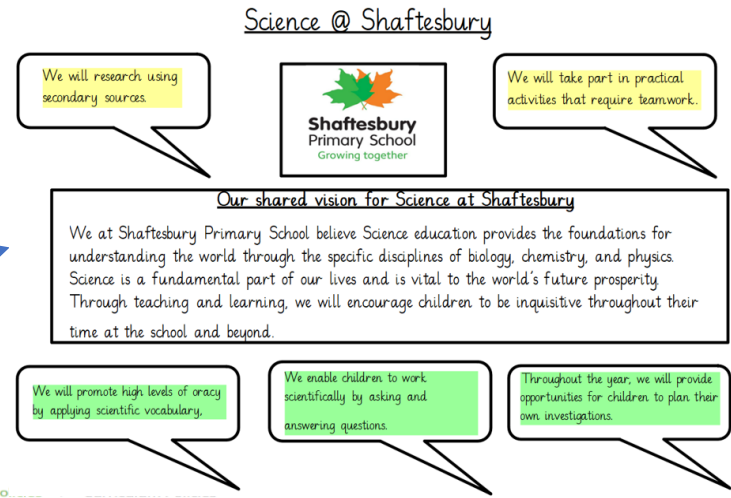
Geography link- climate change, renewable energy, cleaner travel

Pre - PSQM

During PSQM

Impact

Shared on the school website



Policy title	: Science Curriculum Policy
Date approved	: September 2023
Review date*	: September 2024

*Please note that should any further national guidance be issued by external agencies that are relevant to this policy, it will be updated accordingly prior to the review date shown above and re-circulated.

Intent

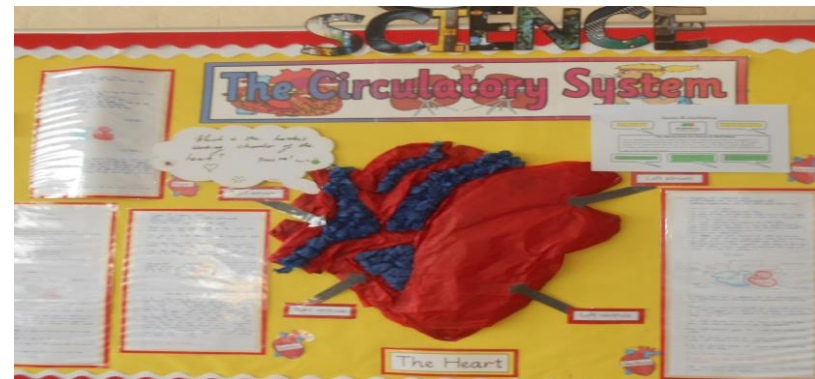
We at Shaftesbury Primary School believe science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry, and physics. Science is a fundamental part of our lives and is vital to the world's future prosperity. Through teaching and learning, we will encourage children to be inquisitive throughout their time at the school and beyond. The science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and nonliving. We believe science encompasses the acquisition of knowledge, concepts, skills, and positive attitudes. Throughout the schemes of work, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills. We ensure that the Working Scientifically skills are built-on and developed throughout children's time at the school so that they can apply their knowledge of science when using equipment, conducting investigations, building arguments, and explaining concepts confidently. Through an appreciation of our setting and demographic, Shaftesbury places an emphasis on providing children with the opportunity, both remotely and during educational visits, to experience and immerse themselves in natural phenomena from EYFS up to Year Six.

Home > Po... Curriculum Policies

- Art and Design Policy 2021-2023 DOCX
- Calculation Policy 2021-2022 PDF
- Computing Policy 2021-2023 DOCX
- Design and Technology Policy 2021-2023 DOCX
- Science Policy 2021-2023 DOCX

Parents are clear about the school's vision in teaching science.

This is a screenshot taken from the school website showing the science tab sharing the vision



Staff have a clear understanding of the vision and key principles.

'The key principles ensure there is continuity across the school. It makes the vision clear'. Y3 teacher

Pre - PSQM

During PSQM

Impact

SLA

KEY NEED 1

Subject Leader has been in role for five years and has established non-negotiables that are being delivered across the current practice in Science teaching and learning.

Non negotiables

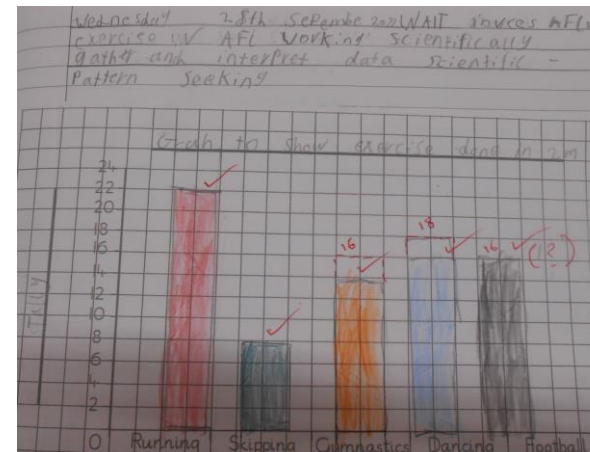
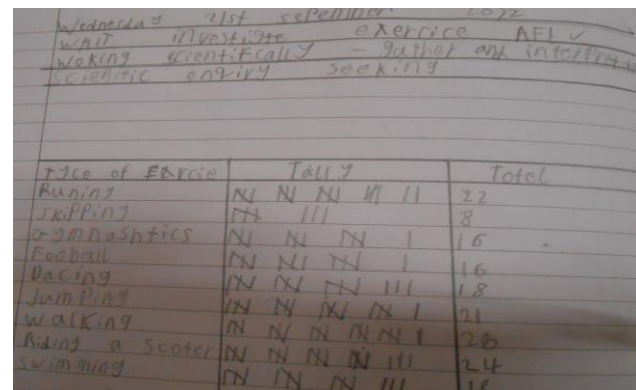
Science works well if children are able to....



Working scientifically skills

- To ask scientific questions
- To plan an enquiry
- To observe closely
- To measure accurately
- To gather/record results
- To present results
- To interpret results

JANUARY 2022
INSET



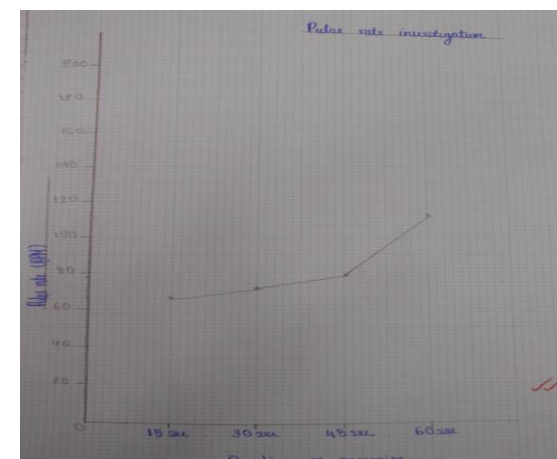
Animals Including Humans – Gathering data and recording results in Year Two.

Instead of just writing I can make a graph or table. Graphs and tables are used in math and science so I can practise. Year Two child.

Wednesday 7th December 2021
WAIT understand that living things produce offspring of the same kind.
Working Scientifically - What happens to offspring that are born at the same time?
Did you know?
All dogs descended from grey wolves
Different characteristics have been developed to produce the wide range of dogs.
For centuries humans have been breeding dogs for specific traits.
Terriers were originally bred to search for and destroy vermin.
Most terriers hunt rats, mice and other rodents.
Terriers dig ground

Evolution – Year Six children
Asking and answering questions.

When we assess the children in science I can see what they need to work on. It can inform my planning going forward. Year Six teacher.



The Respiratory System – Year Six presenting results after observing pulse rates.

The children are becoming familiar with the skills and enjoy setting up their own enquiries. Year Six teacher.

Curriculum statement	Autumn 1	Action
I can identify and name the main parts of the human circulatory system.	✓	
I can explain the functions of the heart and blood around the body.	✓	
I can recognise the impact of diet on the body.	✓	
I can recognise the impact of exercise on the body.	✓	
I can recognise the impact of drugs and lifestyle on the body.	✓	
Planning		
I can adjust my plans where necessary.	○	
I can predict what will happen or work by using my own experiences of a topic.	✓	

Half termly assessments allow teachers to understand the strengths and areas for development with scientific skills.

SL B
KEY NEED 2

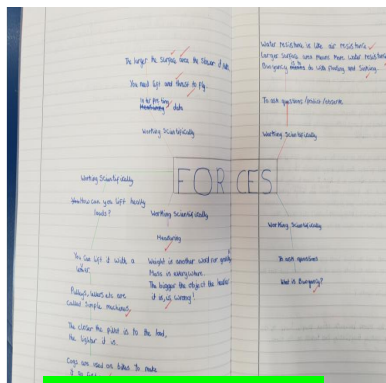
Pre - PSQM

During PSQM

Impact

The curriculum map states opportunities for cross curricular link during units of work. Release time is allocated for the SL to strengthen cross curricular links. Furthermore, enrichment through educational visits is provided to promote 'science capital' beyond the classroom. A Year One example is shown below.

<p>Science Humans Pupils learn to name, draw and label the basic parts of the human body.</p> <p>(P.S.H.E link, human body parts-all about me, PANTS)</p> <p>EDUCATIONAL VISIT Mudchute Farm</p>	<p>Science Animals including humans Pupils learn to identify and name a variety of common animals.</p> <p>(reception curriculum link, animals and habitats)</p> <p>VIRTUAL VISIT -Poppie's Farm - See John</p>	<p>Science Seasonal changes Pupils learn to observe changes across the four seasons.</p> <p>(Geography link, seasonal weather changes)</p>	<p>Science Plants (indoor gardens) Pupils learn to identify and name a variety of common wild and garden plants.</p> <p>(English link, grow your own pumpkin)</p>	<p>Science Light Pupils learn to recognise that they need light in order to see things and that dark is the absence of light.</p> <p>(geography link, seasons and daylight changes)</p> <p>EDUCATIONAL VISIT Science - West Ham Park/Botanical Gardens (Plants) - DT/ART</p>	<p>Science Everyday materials Pupils learn to distinguish between an object and the material from which it is made.</p> <p>(DT and art link, materials and structures. Choosing the correct materials for different jobs.)</p>
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The focus on 'Forces' during The 'No Pens Day' has helped to support the Year Five unit of work on the same topic in the Autumn term.

We will take part in practical activities that require teamwork.

During the 'No Pens Day' initiative run by the school every half term, the SL has used the opportunity to use STEM activities across the school. This has allowed children to engage with practical investigations and use elements of DT, math and engineering. The children's work was showcased on the weekly school newsletter - 'Heads Up'.

W1 T name the body parts
Working across/fluently - Can you name your body parts?
Can you label body parts to your senses?

C task
Stick your body in and then label it.
I have ___ head
I have ___ eyes
I have ___ mouth
I have ___ fingers
I have ___ arms
I have ___ ears
I have ___ toes
I have ___ knees

C+ label your body parts to your senses.

W1 T understand the features of Winter
Classifying and grouping - Venn diagram

I can talk about seasonal changes.
I can identify the four seasons.
I can describe the features of different seasons.
I can compare the seasons.

W1 T understand the features of Winter
Classifying and grouping - Venn diagram

It is rainy
It is sunny
It is windy
It is foggy
It is cloudy
It is snowy

Steps to success:
I can talk about seasonal changes.
I can identify the four seasons.
I can compare the seasons and make links to geography from the Autumn term (seasonal change).

'Sometimes I forget what I have learnt before but my teacher helps me remember.' Year One child.

Reference to prior learning on the MTPs ensures teachers can design lessons that incorporate other subjects. This allows a chance for children to discuss what they already know and help them to deepen their understanding of scientific processes.

Prior learning
Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
PS - Unit of everyday materials

Future learning
Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. PS - Forces
Identify the effects of air resistance, water resistance and friction that act between moving surfaces. PS - Forces
Recognise that some mechanisms, including levers, pulleys and gears allow a smaller force to have a greater effect. PS - Forces

In Year Two, you would have learnt about objects being made from certain materials.
Moving on to Year Five, the learning of forces will focus on air and water resistance, as well as friction.

Note: If you are in Year Six or Year Five this might not be future learning now.

Engineering - STEM links

The engine in a car helps it to move. Our balloon will have an equivalent job.

equivalent = same

The air in the balloon acts as the ___ in a car.

The sides help to ___ the wheels.

FORCE (ENGINE)
AXLE

In my opinion, if an engine was compared to a body part it would be....

Structured STEM lessons have been created to accompany the practical activities meaning children are learning about the four disciplines of STEM and how they can overlap. It is also another opportunity to sequence knowledge and discuss prior and future learning.

SL A link

I know that an engineer can plan and design structures like a car. I didn't know that was science before. Year Four child.

Through monitoring cycles of planning and pupil voice, the SL has been able to ensure cross curricular opportunities are explored and reinforced in the teaching of science across the school.

SL B
KEY NEED 3

Pre - PSQM

During PSQM

Impact

Science formed an important part of the School Development Plan for the previous five years. Science is seen as a core subject at Shaftesbury and is allocated a budget on par with English and math. Science leader met termly with SLT to share progress towards the development plan.

SDP targets are explicitly linked to the new vision and principles for science at Shaftesbury.

Network meetings hosted by a local STEM ambassador (Naomi Hiscock) discussed the benefits of making enquiry skills more explicit for teachers and children to fully understand. This helped to add an objective to the science action plan and design lessons that were centred around these skills. Enquiry skills are now explicitly stated on the MTPs and help the pedagogy of our teaching staff.

Prior learning	Future learning
<ul style="list-style-type: none"> Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) Identify and name a variety of everyday materials including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Use of everyday materials) Find out how the shapes of solid objects made from some materials can be changed by crushing, bending, twisting and stretching. (Y2 - Use of everyday materials) 	<ul style="list-style-type: none"> Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (Y5 - Properties and changes of materials) Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. (Y5 - Properties and changes of materials) Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. (Y5 - Properties and changes of materials) Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. (Y5 - Properties and changes of materials) Demonstrate that dissolving, mixing and changes of state are reversible changes. (Y5 - Properties and changes of materials) Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. (Y5 - Properties and changes of materials)
What children need to be secure	Common misconceptions
<p>A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space, it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid.</p> <p>Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0°C. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100°C. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens</p>	<p>Some children may think:</p> <ul style="list-style-type: none"> 'solid' is another word for hard or opaque solids are hard and cannot break or change shape easily and are often in one piece substances made of very small particles like sugar or sand cannot be solids particles in liquids are further apart than in solids and they take up more space when air is pumped into balloons, they become lighter water in different forms - steam, water, ice - are all different substances all liquids boil at the same temperature as water (100 degrees) melting, as a change of state, is the same as dissolving steam is visible water vapour (only the condensing water droplets can be seen) clouds are made of water vapour or steam the substance on windows etc. is condensation rather than water

ACTION PLAN - Academic Year: 2022/2023				
Subject Area: Science				
Plan completed by: John Everard		Role: Science Lead		
Autumn 2021				
Objective				
SDP1				
Success Criteria	Action to be Taken	Led By	Resource Costing/Expenditure	Monitoring/CPD Actions
To maintain exceptional provision across all year groups	(C2/C4) Through half termly learning walks, I will ensure that there is a continuity amongst the explicit skills being taught (Scientific Enquiry or Working Scientifically). Furthermore, I will monitor the teaching of prior knowledge by speaking to the children and asking them about their learning in context (especially KS2). As a result, I can identify areas for development within the curriculum or from a teaching and learning aspect.	JE	N/A	(C6) Learning walks will form the basis of my monitoring - CPD for myself will be gained by providing feedback, advice or mentoring to certain colleagues who need support with the teaching of the science MTPs. As phase leader in Year 5 and 6, I will make a point of observing science lessons, as part of appraisals. Due to my own experiences of mentoring and tutoring trainee teachers, I will ensure that my feedback links to the teaching standards, so I can offer rigorous and constructive advice. (C7) With further reference to my own CPD, the assessment of children's responses during learning walks/appraisals, will assist me in adjusting the sequence of study or the progression of skills for science, where applicable. In order to support certain teachers, I will offer my time to help plan lessons in that year group
Ensure that lessons across the school maintain the vision and principles set out in the science INSET (September 2022).				
Particular focus will be given to enquiry skills and the evidence of planning investigations taking place in the classroom.				
(C7) Once established, I can refine my planning and/or help to assist colleagues. In addition, I will provide all the physical resources required for my colleagues to carry out the				

I can identify, name, draw and label the basic parts of the human body

I can begin to test ideas suggested to me

I can begin to collect evidence to test an idea

I can begin to describe what happened

I can begin to make a simple record of what I see by drawing or describing orally

I can begin to talk about my results

I can begin to make simple comparisons

WALT: investigate growth. (use TWO lessons to record and interpret data)
Scientific Enquiry - pattern seeking
 Recall lesson: measuring hands - were everyone's hands the same size? Do you think the same applies to feet?
 How do you think foot measurements will change across the school - Rec - year 6? Discuss.
 Plan and carry out an investigation - groups of children visit a child in each year group and measure and record their foot size with support.
 Back in class, order them in terms of years and discuss variations.

Children record the sizes in their books and write a simple sentence to explain what happens to feet as people get older. The results can be recorded in a table.

E.g.

Year group	Measurements (length)
Reception	6cm
1	8cm
2	9cm
3	10cm
4	
5	

CPD children could record the results as a bar graph and discuss the results by making observations through simple comparisons.

Monday 14th November 2022

WALT understand how sound travels through materials.

Working Scientifically - can sound travel through solids?

GO - Can you hear sound underwater?

Can sound travel along a piece of string?

prediction:
I predict that sound will travel through a piece of string.
I predict this because the string is very firm and solid. As it can travel through air as it can let sound through the other side.

Wednesday 28th September 2022

WALT investigate growth.

Scientific enquiry-pattern seeking

Nursery/Reception/Year 1	Measurement
Nursery	7cm
Reception	8cm
Year 1	10cm

During weekly release time, the design of the curriculum was reviewed and using the PLAN Assessment website a prior and future learning page was designed to show teachers the knowledge children should have and where it will take them next.

A sample from the SDP expectations.

- To maintain exceptional provision across all year groups.
- C.1: All staff understand that at Shaftesbury Primary School we run a mastery curriculum that is built, sequenced and assessed using components and composite goals.
 - C.2: All curriculum areas to be sequenced logically and progressively building on prior learning.
 - C.3: All Leaders speak the narrative of each curriculum area and can explain how and why the curriculum is sequenced to meet the needs of the pupils.
 - C.4: Each subject area is written so that teaching builds on previous learning. Skills and knowledge are repeated and rehearsed - A progression model curriculum ensuring knowledge and skills build and enter into long term memory through automaticity. (Through Medium Term Plans and curriculum maps).
 - C.5: Children are able to rehearse key knowledge and skills and facts and apply them to future learning in a variety of meaningful contexts.
 - C.6: All subjects are monitored rigorously and robustly by undertaking work and planning scrutiny, lesson visits and most importantly discussions with children.
 - C.7: Lessons and planning are monitored carefully, pupils know more and remember more through rehearsal.
 - C.8: CPD builds and secures teachers' subject leaders knowledge and pedagogy to sustain Quality First Teaching that ensures high standards in progression in learning for all pupils and gaps in learning are diminished.

'Having only worked in Year 4 the prior and future learning helps me formatively assess the children during a unit of work.' Y4 teacher

'As an ECT, it has given me more confidence knowing that the plans will tell me the types of skills the children are learning in each lesson'. Y1 teacher

Pre - PSQM

During PSQM

Impact

SLT provide management time on a weekly basis, so that I can refine/adapt MTPs, complete monitoring cycles, organise resources and collaborate with colleagues on the teaching and learning of science.

During management time, science lead completes learning walks that focus on particular aspects of the subject. These include: assessment Continuity of evidence, application of enquiry skills and delivery of MTPs.

Management time was used to devise and deliver a staff questionnaire to identify the confidence teachers had around the planning and resourcing of lessons. Team teaching was identified as an area where staff felt they could learn from their colleagues.

6. Do you feel supported in the teaching of science at Shaftesbury?

- The CPD offered either during phase meetings or INSETs makes me feel confident that I know the expectations for science.
- The science lead shares ways that you can teach science to all learners in the classroom.
- The MTPs are clear and easily explain the activities, key vocabulary and type of skills the children are learning.
- He is always available to talk to about the subject and offers advice or tips.
- The resources cupboard is well stocked and it is easy to locate the equipment needed to deliver effective lessons.

- I think team teaching might help me improve my pedagogy.

Science - Management Time		Shafesbury Primary School Growing together		Academic Year - 2022/23			
Subject Area: Science		Plan completed by: John Everard		Role: Coordinator			
Objectives	Success Criteria	Action to be Taken	Led By	Costing	Resource Type	Monitoring	
1. Ensure that target cards are filled out competently.	Provide assessment papers for teachers to complete during Progress Weeks. As a result, this will inform teachers' formative assessments and then allow them to provide action points that are fit for purpose.	Create assessment papers that will combine summative and formative assessment of a unit of work. Explain to teachers (via email) that it will allow them, and the children to see their strengths and weaknesses on a topic before using the target cards to self-assess.	JE	N/A	Revised target cards.	Through book looks and pupil voice it will be clear if assessment papers have been used precisely to inform planning and give true reflections of children's understanding. Consistency of filling out target cards and action points across the school is the objective.	
2. Enrichment opportunities	Apply for grants that will help resource events such as Science Week. Consider opportunities that focus on: 'Cultural Capital'. Ensure funding is spent to impact the school and not just a phase.	Apply for a 'Kick start' loan that will help provide resources that can be used across key stages and therefore provide a whole school impact. The eco garden is an area where the money can be spent, so that all children can feel the benefits. The science units of work across the school all provide opportunities to utilise the garden at certain points in the academic year.	JE	£400	Resources will be purchased through the Science budget and hopefully the 'Kick Start' scheme.	The funding decision will be made in December. Once I am notified, I can make provisions accordingly.	

'Team teaching opportunities have allowed me to improve my questioning.' Year Three teacher

Going beyond book scrutinies allowed me to identify and discuss how specific year group colleagues could support each other.

Year Group	Are mind maps and action points filled out?	Are the demands for improvement fit for purpose?	Is scientific vocabulary being used correctly by the children?	Is higher attainment being encouraged through 'GD' questioning?	Are there any areas for development?
Three	Yes. The mind maps have been filled out and show a progression of ideas across a topic. Action points are filled out across the year group. All three classes have impressively shown variation through their action points and links to other subjects (PSHE links were made). As ever, 3B has a wide and varied range of relevant action points. Well done!	Yes. The demands relate to the topic and offer an extension of the concepts they have been taught. Some demands for improvement have been corrected (3P) if errors were evident.	Scientific vocabulary is applied and spelled very well in accordance with the lesson. 3P demonstrated this regularly. The books in 3A showed how key spellings are reinforced through the marking. Spellings were highlighted regularly, if spelled incorrectly. Excellent!	Going forward, offer the GD children a variation on the 'Working Scientifically' question to ensure they are being extended. This could be just two or three children per lesson.	Going forward, keep recording 'Scientific Enquiry' or 'Working Scientifically' at the beginning of each lesson. Please look at the MTPs and use the GD questions from each lesson for two or three pupils to answer instead of the 'Working Scientifically' question given to the rest of the class. This helps extend our higher achievers. Ms Bokku to observe Ms Writer and then team teach with her in the Spring term.

4	Collaborate with other year groups and ensure they are familiar with any changes made to the medium term plans (particularly 'Title pages'). Place a particular emphasis on supporting new teachers with planning for the subject.	Enquiry allows the children to develop a greater understanding of the applications of science. End of year expectation cards will gauge where the children are and how they are progressing through the term, identifying any areas for improvement.	During the Summer break, I revised the MTPs, so I need to ensure that teachers are familiar with those changes and organise science resources accordingly. I will ensure that planning reflects links to prior and future learning.	JE	N/A	N/A	Book looks will ensure the plans are being carried out effectively and in accordance with the revised MTPs. Furthermore, regular conversations to support and even mentor some teachers will help ensure that expectations are clear.
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Teaching Activities	Resources	Cross-Curricular Links
<p>WALT explore healthy eating (OVER TWO LESSONS)</p> <p>SCIENTIFIC ENQUIRY - Research using secondary sources</p> <p>Compare the needs of animals and humans</p> <p>Recall previous learning – what do humans need to have in their diet to be healthy?</p> <p>Do you think it's the same for all animals? Discuss what a dog needs - dog's diet needs to achieve the right balance of the six major groups of nutrients: water, protein, fats/oils, vitamins, minerals and carbohydrates. How can you make sure a dog gets these? What should you NOT feed your dog? Why not?</p> <p>What about other animals – carnivores, herbivores, omnivores?</p> <p>In the first lesson, children research an animal each, ensuring across the class covers a range of animals - carnivores, herbivores, omnivores including mammals, reptiles, birds, water and land animals, insects, vertebrates, <u>invertebrates</u></p> <p>Using ICT and other sources, children research and create a report (second lesson) on what their chosen/allocated animal needs to eat <u>healthily</u></p> <p>How can animals be mistreated through not providing the right food? What about pet shops? How are they accountable? What groups take action against this? How can we help?</p>	<p>http://www.purin.co.uk/content/your-dog/feeding-your-dog/balancing-your-dogs-diet/a-healthy-balanced-diet-for-dogs</p>	<p>English – make notes (research), report writing</p> <p>PSHCE – caring for others- domesticated animals</p>

After team teaching, additional questioning was added to the MTPs in Year Three.

Through year group moderations, the Science Lead gains a clear picture of the school and can provide bespoke feedback to SLT. It helps the SL to know which teaching staff need further support. As a result, team teaching opportunities can be organised to promote good practice and consistency across certain year groups.

Monitoring cycles take place on a half termly basis and verbal feedback is provided for each teacher to help personalise the process.

Good practice, reflections and areas for development were recorded in the school CPD folder and shared with staff after a mock 'deep dive' was carried out by an external consultant. During an INSET in December '22, these findings were explained, and the strengths were celebrated, while targets for the rest of the academic year were established and added to the SDP.

1. Consider further the entry points to lessons for SEND pupils, ensuring all pupils can make progress through the curriculum.
2. Support and train staff to identify pupils' misunderstandings and to remediate them immediately.
3. Leaders should develop further teachers' understanding of when scaffold to learning through the use of worksheets is beneficial and when it limits the ambition of the curriculum and therefore pupils' achievement.

Through regular monitoring, which has included external support it has allowed the Science Lead to share good practice and boost confidence amongst staff. In addition, it has identified gaps in teaching and learning which link to attainment of all children.

Strengths	Areas for development
<ul style="list-style-type: none"> • Progression of skills is shown through following the MTPs. • Evidence of children using enquiry skills. • Evidence of children asking and answering questions • Key vocabulary being used by staff and children in the correct context. • Differentiated outcomes. • Practical elements to most lessons. • A clear link with other areas of the curriculum (math, DT and geography). • Educational visits with a science focus have increased during this academic year. Children could talk about visits and how it reinforced their classroom learning. 	<ul style="list-style-type: none"> • Expectations around presentation (not subject specific but still a target). • Inconsistency of making and picking up on inaccurate spelling of key vocabulary. • Ensuring provisions are established for EAL and SEND learners so that all children can access the learning. • Homework – a need to set science work as part of homework packs that reinforces the classroom learning (pupil voice outcome). • More opportunities to research using secondary sources without teachers guiding the research (upper KS2).

Reflections

From the observations I have made, the vision and principles I outlined at the beginning of the academic year are being adhered to and delivered. The children are asking and answering questions on a regular basis. This is allowing them to lead investigations and take more autonomy over their learning by guiding their own investigations rather than being told what to expect or how something happened. Scientific Enquiry skills are clearly explained to children and now there is a clearer understanding of the five strands. Tweaks made to the MTPs have been picked up on by the teaching staff and the content of the lessons observed show that the SLs vision is carefully carried out in the classroom.

Going forward, it is clear that more though needs to be put in place to cater for our EAL and SEND children to ensure they can meet some of the outcomes expected from a lesson and ultimately a unit of work.

I think it is important that any findings from observations are shared so achievements can be recognised and celebrated but any issues can be addresses. Year Three teacher.

As a leader, having the opportunity to observe lessons alongside Sir Robin gave me a valuable insight into allow how the subject is viewed from the perspective of an ex OFSTED Inspector. Science Lead

Pupils are starting to remember the content that has been taught in science topics over the longer-term; this is because building specific knowledge over time leads to pupils remembering more and knowing more. In Year 6, pupils were studying evolution and similarities and differences between the red, desert and arctic fox. Pupils could say how their learning about animals in Year 4 helped them to understand the knowledge and understanding in this lesson. In Year 2, the topic was Materials. Teachers planned key links to real life and focused on scientific language. The quality of questioning and discussion was exemplary

Leaders have established the high quality science curriculum. The science leader makes sure that curriculum planning starts from the early years by introducing pupils to a wide-range of vocabulary that describes the natural and scientific world. Cross subject links are being

The Science Lead worked alongside Sir Robin Boshier (Boleyn Trust Consultant) who completed a 'deep dive' into the subject in November '22. Sir Robin Boshier sample (see right).

KEY NEED 1

For the past six years, we have had a programme of science CPD for staff including termly science slots in staff meetings. This is a one hour time slot.



CPD/Monitoring Schedule Autumn 2 - 2022

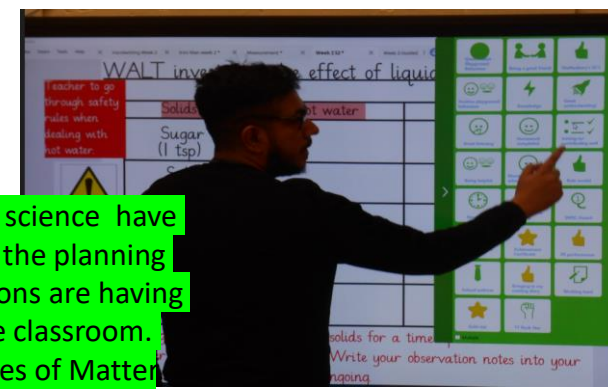
	Phase/Whole school meetings		SLT monitoring, appraisals, PDI's meetings and events. G.H./J.O./A.B.	Achievement Assemblies Alternative Fridays 1.2.3&4.5.6 G.H. Support Staff training - Wednesday
Week begins	Monday Inset 3.30pm - 4.30pm Whole School	Thursday 3.30pm - 4.30pm Phase meeting/Planning	Wednesday/Thursday follow up learning walks - subject leaders	Support staff will go to KS2 when their year groups are in assemblies to listen to reading. Support staff meetings and training after school on Wednesday
7.11.22 SLT - Monday 1.50pm - CR	English AB/KK	Moderation/Planning time	Wednesday - Learning Walk English-AB/KK Book Look- RE-GH	Years 1,2,3 2pm - achievement assembly - GH
14.11.22 SLT - Monday 1.50pm - CR	Science JE and ZK	Moderation/Planning time with ECTs and HLTAs	Wednesday - Learning Walk Science- JE and ZK	Years 4,5,6 2pm - achievement assembly - GH

Achievement assemblies have been used as a way of recognising the work of the children in science. The moderations have highlighted hard work and then the children are praised.



like having my work read out in assembly. It makes science feel important. Year One child

Observations in science have helped to see if the planning time conversations are having an impact in the classroom. Year Four - States of Matter



Talking through planning has helped me feel more confident when covering science lessons. Understanding the meaning of the 'Steps to success' makes it easier for me to assess the children's understanding. Year Six HLTA.

The half termly planning time has focussed on structuring lessons starting with clear learning objectives that teachers can explain and refer back to during the course of a lesson.

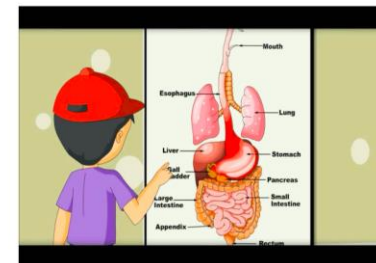
WALT label the parts of the digestive system

Working scientifically - Why do we eat?

GD - What does 'indigestion' mean?

Steps to success:

- I know what the **digestive system** is.
- I can **label** the **parts** of the digestive system.
- I can **describe** the simple **functions** of the basic parts of the digestive system in humans.



The deputy SL has had half termly release time from class to actively participate in INSETs and learning walks. This has helped her to gain an insight into the coverage of the curriculum, the standard of bookwork and the commitment to the vision and principles for science at Shaftesbury. Planning time (one Thursday each half-term) has helped the SL and deputy SL provide ECTs and HLTAs with additional support around units of work.

This has given me a greater understanding of science across the school. The strengths but also things to develop. It helps me and the SL think about how we need to action certain targets. Deputy SL.

There has been a lot to think about in my first year of teaching, so having the opportunity to discuss the science planning and ask for help makes life easier. Year Four ECT

Pre - PSQM **During PSQM** **Impact**

TB and SLB
KEY NEED 2

NOWPRESSPLAY is fun and it helps me remember words from our science lessons. I like acting! Year One child.



Year One – NOWPRESSPLAY – ‘Plants’

The SL discussed with SLT the possibility of using the NOWPRESSPLAY software as part of the science curriculum. This new approach has particularly helped our ‘New to English children act out the scenarios and build their own vocabulary.

<p>Key Skills</p> <p>& Key Vocabulary</p> <p>I know the essential components of a circuit: battery, bulb (in this case), conductive wire.</p> <p>I can discuss ways to increase/decrease the power of a circuit.</p> <p>I can appreciate the importance of electricity in our daily lives.</p> <p>I can recognise Renewable and non-renewable energy sources.</p> <p>Glossary</p> <p>Circuit, switch, turbine, renewable energy, dialysis machine, positive, negative, conductor, voltage.</p>	<p>Teaching Activities</p> <p>WALT retrieve information through an audio experience – UNRECORDED</p> <p>NOW>PRESS>PLAY</p> <p>Scenario</p> <p>There's a power cut and you need to get your town's electricity back on to save your cousin Thalia who is on dialysis. But you discover that the local power station has been overtaken by protestors. Will you be able to find a solution for everyone?</p> <p>Locations:</p> <p>Home – UK homes average 4.6-8 kWh per year (sixth in the world for household electricity use)</p> <p>Hospital – electricity powers life-saving equipment in hospitals, so they have back-up systems</p> <p>Power Station – places where electric power is generated</p> <p>Wind Turbine – devices that turn kinetic (movement) energy generated by wind into electrical power</p> <p>Questions to consider: Why did you choose the guitar string for your circuit? Would normal string have worked? Could your circuit have involved just the guitar string and the bulb? Why not? What two things did you do to make your torch brighter? Explain how they worked (the extra battery added more current; cutting the wire lessened resistance) Name two important differences between coal and wind energy. Name other renewable and non-renewable energy sources.</p>	<p>Resources</p> <p>now press play</p> <p>NOV>PRESS>PLAY headphones and IPAD tablet</p> <p>Photo Storyboard – order the images from the story (see Year Six Summer One folder)</p>	<p>Cross-Curricular Links</p> <p>PSHE BIG QUESTION - Why do you think Danny decided to break the law in order to switch power source?</p> <p>English – Speaking and listening skills</p> <p>Reading comprehension skills</p> <p>Drama – acting out new vocabulary (particularly verbs)</p>
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Year Group:	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
1	<p>Humans</p> <p>Children should name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. As well as this, there should be plenty of opportunities to learn the names of the main body parts (including hand, neck, arms, elbow, leg, knee, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes. GCSE link: human body parts-all about me, PSHE11</p> <p>Art – ‘All about myself’ Drawing self-portraits.</p>	<p>Animals including humans</p> <p>Pupils should be taught to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Earthshakes They should identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Inception curriculum link, animals and habitats)</p>	<p>Seasonal changes</p> <p>Shakespeare pupils will be taught to observe changes across the four seasons.</p> <p>There should also be opportunities to observe and describe weather associated with the seasons and how day length varies.</p> <p>(Geography link, seasonal weather changes)</p>	<p>Plants (indoor gardens)</p> <p>Pupils should be taught to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. In addition, observe and describe the basic structure of a variety of common flowering plants, including trees.</p> <p>(English link, grow your own pumpkin – procedural text)</p> <p>(English link, grow your own pumpkin – procedural text)</p> <p>GCSE link: plants, photosynthesis, food chains, food webs, food chains, food chains</p> <p>NOW PRESS PLAY increase seed retention base</p>	<p>Light</p> <p>With support, pupils should be taught to recognise that they need light in order to see things and that dark is the absence of light.</p> <p>(Geography link, seasons and daylight change)</p>	<p>Everyday materials</p> <p>Pupils should be taught to distinguish between an object and the material from which it is made. Additionally, describe the simple physical properties of a variety of everyday materials.</p> <p>(IT and art link, materials and structures. Choosing the correct materials for different jobs.)</p>

NOWPRESSPLAY has been explicitly linked to the science curriculum map to remind teachers that it should be planned and delivered during a particular unit of work

I now know what the word crouched means because I saw my teacher do it. Year One child

The SL has designed plans that the teachers have used to produce flipchart presentations. This has helped teachers to set up the scenarios and reinforce key vocabulary before starting the audio experience.

NOWPRESSPLAY in science has been a memorable way for children to apply key vocabulary in context. English Lead

now > press > play

WALT retrieve information through an audio experience



Steps to success

I can follow instructions when being guided by the audio experience.

I can listen carefully and answer questions to check my comprehension of the activity.

There's a power cut and you need to get your town's electricity back on to save your cousin Thalia who is on dialysis. But you discover that the local power station has been overtaken by protestors. Will you be able to find a solution for everyone?



Dialysis is a procedure to remove waste products and excess fluid from the blood when the kidneys stop working properly.



power station

protestors

kidneys

Glossary

circuit

turbine/s

renewable energy

switch/es

voltage

conductor/s

Danger High voltage

silver

gold

copper

steel

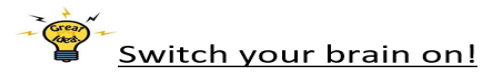
Pre - PSQM

During PSQM

Impact



Termly homework projects were also identified as a way to reinforce the classroom learning. Classes with the highest turnout of entries were always acknowledged in staff meetings. It was a way of increasing the profile of science without increasing teacher workload.



Get creative and enter the Shaftesbury Primary School Science poster competition, on the theme of **Earth and Space**. The ten best posters from KS2 will stand the **chance to win fantastic prizes!**

The final entry date for the competition is **Wednesday 23rd November 2022**.

Yours sincerely,
Mr Everard
Science Lead



Through embedding the science vision and principles, teachers are becoming aware of 'Scientific Enquiry' and 'Working Scientifically' skills but other strategies were needed to support all learners and celebrate their efforts.

Strengths	Areas for development
<ul style="list-style-type: none"> Progression of skills is shown through following the MTPs. Evidence of children using enquiry skills. Evidence of children asking and answering questions Key vocabulary being used by staff and children in the correct context. Differentiated outcomes. Practical elements to most lessons. A clear link with other areas of the curriculum (math, DT and geography). Educational visits with a science focus have increased during this academic year. Children could talk about visits and how it reinforced their classroom learning. 	<ul style="list-style-type: none"> Expectations around presentation (not subject specific but still a target). Inconsistency of marking and picking up on inaccurate spelling of key vocabulary. Ensuring provisions are established for EAL and SEND learners so that all children can access the learning! Homework – a need to set science work as part of homework packs that reinforces the classroom learning (pupil voice outcome). More opportunities to research using secondary sources without teachers guiding the research (upper KS2).



PSQM Spotlight: Leading Change

Christina Whittaker
PSQM SRHL

You will need access to criterion activities SLbi and Sbil during this session.
(A printed copy of each activity may be beneficial but not essential)






Engaging with the Spotlight video 'Leading change' made me aware of when and how to demonstrate different leaderships styles. During INSETs, staff meetings and learning walks, I would look to adopt a transformational style – 'what can we do together to improve science?' This type of approach helped staff to realise that ever success in science should be shared because of a collective effort. Also, it helped to support members of staff who needed to raise their own expectations and follow the values and principles of science.

My books were not always consistent with my colleagues but the approach of the SL was to support and offer solutions rather than criticise. Year Three teacher.

After learning walks, the SL realises that provisions for EAL/SEND children needed to be strengthened in science.

Vocabulary

air	sharks		marine animals
gills (x2)	legs		
marine	fins (x2)		gills
fish	hair/fur		

interpret = to understand and explain your findings.

Interpreting our data

If I look at my Venn diagram, it shows that not all _____ life have _____ because some breathe _____. When looking at whales, they have similar features to _____ and _____ because they have _____ but interestingly they do not breathe through _____.

Mammals can be diverse due to the fact that some can have _____ or _____ but they all have _____.

An example of a toolbox from Year Six.



Examples from the homework task are hung in the parents lobby.

When explaining the 'Science Toolbox' for our SEND/New to English children the SL would always lead by example and show us how it helps children access the learning He always uses 'we' when talking about progress. Year Six teacher.

Science feels important because everybody gets a certificate and sometimes a prize if they join in with the homework. Year Five child.

Pre - PSQM

During PSQM

Impact

TB

KEY NEED 3

Key vocabulary/sentence starters (referred to as a toolbox) help our lowest 20% of pupils to access the learning.

toolbox

Conclusion

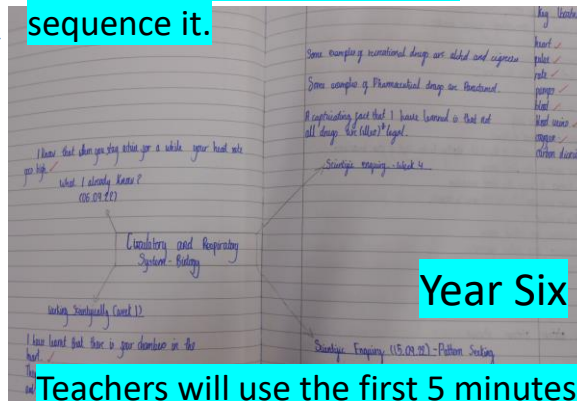
With regards to the question, light appears to _____ in a _____ line. I know this because when we _____ the cards, the light could not _____ around the _____ object. Our eyes are able to see because _____ reflects from an object and is received by our _____. For light to _____ (change direction) it needs to hit a rough surface first.

Vocabulary

- refract bend
- eyes opaque
- light straight
- travel moved

An example from Year Six – Light.

Across the school, assessment pages are being used for each scheme of work. These are added to by the children each week and help them to reflect on their learning and sequence it.



Year Six

Teachers will use the first 5 minutes of a lesson asking the children to look at their assessment page and recall prior learning.

My assessment page helps me remember everything I have learnt. It's like a revision guide. Year Six child.

An example from the Year Six planning.

This page will be built upon over the half term.

What I already know - Week 1

Previously, I have learnt that... Eliciting from my prior knowledge... An interesting fact about the circulatory/respiratory system is...

Circulatory and respiratory system - Biology

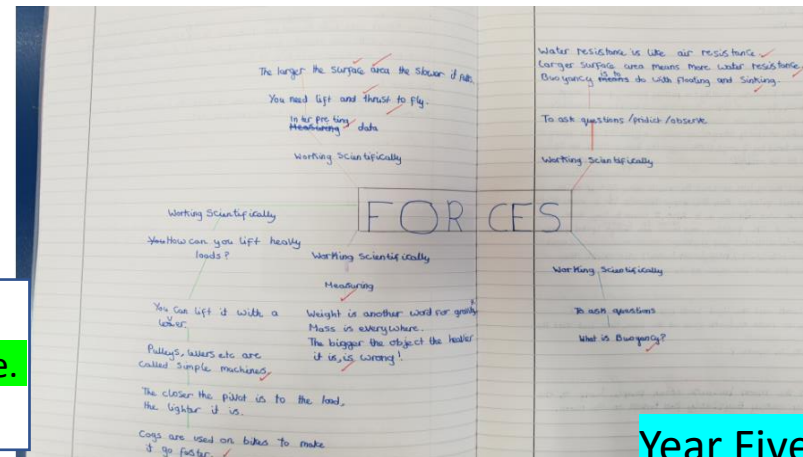
Working Scientifically - Week 1

Prompt questions: What facts have you learnt about the heart this week? What is the difference between oxygenated (oxygen-rich) and deoxygenated (oxygen-poor) blood? How does blood flow around the body?

Vocabulary

- heart
- pulse
- rate
- pumps
- blood
- blood vessels
- oxygen
- carbon dioxide

We will add to this list.



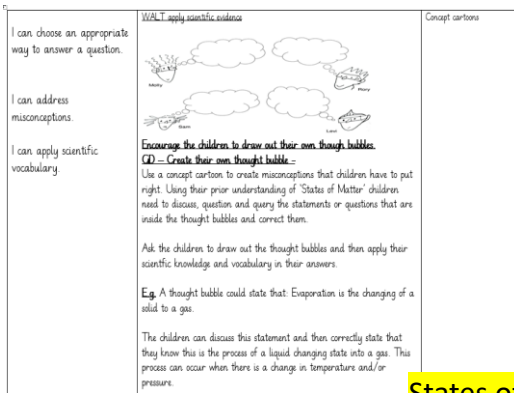
Year Five

Because I add my own information to the assessment page, it helps me to see what I can remember. Year Five Child.

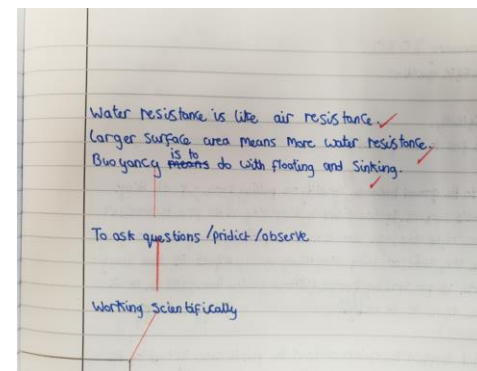
Concept cartoons are applied to engage and discuss scientific concepts at the beginning and end of schemes of work to generate discussion, inform planning and address misconceptions.



Seasonal change - Year One



States of matter - Year Four





The SL liaised with the school librarian and reviewed and reorganised books based on appropriate topics and age groups.

Book Review **record**

Name of the book: You wouldn't want to live without Electricity
 Written by Ian Graham
 Illustrated by Rory Walker

Word bank
 colourful/visually supportive illustrations
 interesting facts about scientific processes like controlling electricity
 funny moments
 I have learnt something new about how cars operate
 it was not very interesting because I have no interest in cars

In my opinion, I enjoyed the book because...and.....
 In my opinion, I did not enjoy the book because....and.....

Handwritten book review for 'You Wouldn't Want to Live Without Electricity!'

Title: You Wouldn't Want to Live Without Electricity!
 Author: Ian Graham
 Illustrator: Rory Walker

You Wouldn't Want to Live Without Electricity is a engaging non-fiction text, which tells us all about Electricity and electrical appliances. It also tells us to be safe when near electrical appliances. The illustrations help to give the reader a image in head of how the appliance looks like.

In my opinion, I enjoyed the book because it was very interesting and engaging and I learnt a lot from it. I would recommend this book to people who like Science. It would be useful to scientists.

A fun fact that I've learnt from the book is the light bulb was made by Thomas Edison in 1870s.

Rating for this book: ★★★★★

Reorganising science books has meant they can be distributed across year groups. They have become the focus of guided reading sessions in English thus strengthening cross curricular links.

Research and explain how and why materials are used for certain jobs.
 I can use scientific vocabulary words to support what I think.
 I can ask questions using the language why, how, what will happen if...?

LESSON 7
Research using secondary sources
WALT research an inventor

Children learn about one of three inventors of new materials - John Dunlop, John MacAdam, and Charles Macintosh.

Charles Macintosh
 The clothes that people wear to protect them from the rain are waterproof. Waterproof fabric was invented by a scientist called Charles Macintosh. His invention was so important that raincoats are named after him!

Wet Weather Wear
 When it is raining, people wear special wet weather clothes. Which of these items would you use or wear in the rain? Think about the things they are made from. What do they have in common?

Raincoats are called Macintoshes, or macs.

Whole Class Teaching, including Key Questions:
 Explain to the children that they will be researching a famous inventor using an iPad (or the computer suite) and books taken from the library. Discuss with the class that the suitability of material doesn't just happen and that some people have been responsible with using particular materials for particular jobs. E.g. Charles Macintosh was responsible for developing waterproof plastic.

Children will use the iPads and research an inventor under the guidance of the teacher. Use the websites provided and ask the children to take some notes based off some questions they need to answer. When were they born? What did they invent? How is it useful? Is it still used today?

The children can create a biography based on their findings.

Plenary
 Why are new inventions important?

List of statements
 Word bank
 iPads/Chrome books
 English: features of a Biography

http://encyclopedia.kids.net.au/page/j/John_MacAdam
https://academichide.com/encyclopedia/index.php/John_Louison_McAdam
<http://primafacts.com/8479/john-bogal-dunlop-facts-and-information/>
<https://kids.britannica.com/scholars/article/542525/49799>

Charles Macintosh PPT (Autism 2 folder)
 Use the Charles Macintosh biography books (set of 15) found in the library in the Year Two area.

Once the books had been organised and reviewed they were added to the MTPs to ensure teachers knew they could be used as a secondary source during research lessons.

Now that we have reorganised the science books, I am encouraging other subject leads to review the books they have in the library. It helps us to organise resources School Librarian.

Handwritten research notes on Charles Macintosh

Charles Macintosh
 He was born in Scotland in the year 1766. He worked as a clerk. He left his job so he left when he was the age of 14 and he worked in manufacturing chemicals. He used chemicals to make waterproof clothes. Charles Macintosh made a material like rubber and melted the rubber and put it in liquid and used the liquid to make the cloth men put under their feet.

I like to read and these science books help me to learn about famous inventors. It is better than a worksheet. Year Two child.

Using books during research lessons in science has helped the children to find things out for themselves rather than me just giving them a printed out biography for them to read through. Year Two teacher.

LA
Key need 1

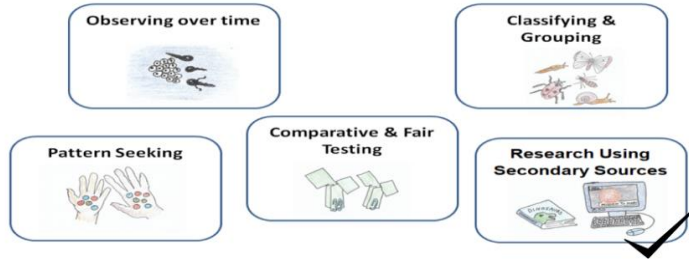
Support teachers to lead enquiry-based lessons with progression in working scientifically skills

Science enquiry types were not explicitly taught or recorded in our curriculum at Shaftesbury and only mentioned by some teachers and not all. Teaching staff were unfamiliar with the skills and also spoke in terms of 'experiments' or 'investigations' for all lessons. As a result, children could not speak articulately or in great depth about their learning

Scientific enquiry - Research using secondary sources

record

Types of enquiry



Displaying the types of enquiry types on our flipcharts is a non-negotiable across the school and has helped children to become familiar with the scientific vocabulary they need to better understand their learning. By recording it into their books, it further reinforced the skills they were being taught.

To be completed over two lessons.

WALT research light

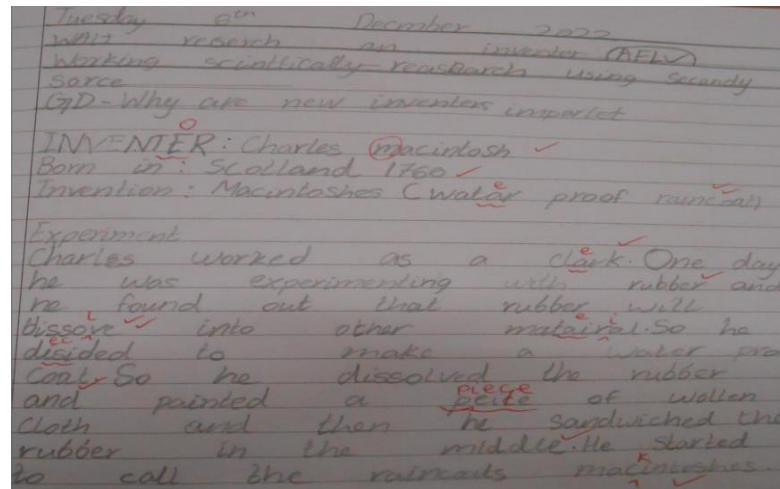
Steps to success

I can discuss the differences between enquiry skills.

I know why research is crucial to developing an understanding of a topic.

I can understand research can prove and disprove theories.

During the year, I have used a variety of scientific skills to help my class. Now, they are quite clear on the names of each of the enquiry types because we display them and discuss them. We sometimes perform this as a quiz to test their knowledge. Year 6 teacher.

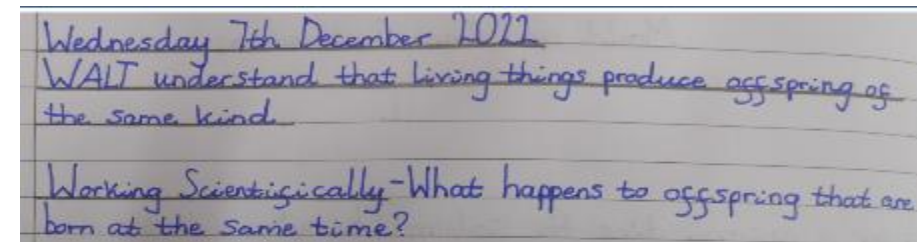


In a staff meeting, I discussed and introduced the enquiry types. This helps the Science Lead to monitor the progression of skills. Skills are now clearly visible on MTPs and supplementary documents (see left) are used to help the teaching staff and children generate questions that can be investigated during lessons.

<p>I can identify which home appliances use electricity.</p> <p>+ I can create a poster to show my understanding of what electricity is.</p> <p>+ I can include the appropriate technical vocabulary.</p>	<p>WALT understand electricity (OVER TWO LESSONS) Scientific Enquiry - Research using secondary sources</p> <p>Explain to the children what electricity is and the different types of electricity we can experience.</p> <p>To initially engage the children you could use balloons to generate static electricity – ask them to rub their balloons against their jumpers. Have they ever received an electric shock before? This friction creates a positive charge. Cut small pieces of paper and put them on the table. Can the balloon attract the paper with its static charge?</p>  	<p>Balloons Small pieces of paper</p> <p>Google chrome books Books Hand outs/Print outs</p> <p>https://www.youtube.com/watch?v=Pr9Ynt07V1U (safety video)</p> <p>Explain to the kids that in the USA and mainland Europe they use a two-point plug system.</p>
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MTPs now explicitly state 'Enquiry Skills' to give teachers an understanding of the strand they are teaching.

Children record down 'Enquiry Skills' and 'Working Scientifically' into their books to help build their comprehension.



Pre - PSQM During PSQM Impact

LA
Key need 1

Support teachers to lead enquiry-based lessons with progression in working scientifically skills

Through lesson planning, teachers are familiar with 'enquiry skill' and 'working scientifically'. This is explained to the children at the beginning of lessons (EYFS/KS1) and embedded during KS2. As a result, children can discuss skills and independently plan their own investigations, as they progress through the school.



In EYFS, children become familiar with scientific vocabulary and practical enquiry based investigations.

Working Scientifically
Does natural selection depend on the environment?

The environment has a huge impact on animals, as if they don't change they could be hunted like the beetles. The green beetle was not camouflaged so it was eaten. They could have camouflaged themselves in the bushy green area but not, that is why they are extinct!
 (1) Wonderful Mahiro!
 How might a green beetle attempt to adapt?
 The green beetle could adapt by camouflaging itself in greenery such as bushes, trees and...

WALT investigate materials
Comparative and Fair testing
We are looking at the differences between materials.

In upper KS2, children are planning their own investigations.

With 'research using secondary sources' being a key principle, the SL decided to make sure the start of each new unit of work began with an enquiry based research lesson. This has been piloted in Year Six initially. The SL will continue to gauge feedback from Year Six colleagues with a view to introducing this initiative across the school.

We will research using secondary sources.

Finding out about a scientist at the beginning of a topic makes me interested in learning more. I enjoy researching for myself. Year Six child.

The children seem to enjoy researching the profile of a pioneering scientist at the start of a new unit of work. It gives them a good starting point before learning more about how a scientific process or invention evolved over time. Year Six teacher

Thursday 5th January 2023

WALT research a scientist.

Scientific Enquiry – Research using secondary sources

Steps to success

- + I understand what makes a scientist.
- + I understand the importance of scientists and the role they play in our wider world.
- + I can explain the features of a factfile and produce my own factfile.

Thursday 5th January 2023
WALT research a scientist

Working Scientifically - Scientific Enquiry - Research using secondary sources

A scientist is a person who studies or has expertise in science.
 Thomas Edison improved the original design of the lightbulb by creating it to stay lit for 1321.4 hours.

Early life

Thomas Edison was born on February 11th 1847.
 The majority of his schooling was at home.
 He was very fond of chemistry and electronics so his mother bought him books on these topics.
 Thomas Edison's first job was a telegraph and he got this by saving his son from being hit by a train.
 He worked eight shifts so he could continue his experiments.
 The last job when he spilled acid onto the floor leading through to his boss's desk.

Inventions

In 1877, Thomas invented the phonograph which was a machine that could record and play sound.
 In 1879, Thomas invented a cheap practical and long lasting lightbulb which would stay alight for 14.5 hours.

Legacy

Thomas Edison died in 1931 from problems with diabetes. He was 84 years old. Despite passing away, we still use his invention of the lightbulb to this day.

Thomas Edison (1847-1931)

Early life

Thomas Edison was born on February 11th 1847 in Ohio. He spent most of his early years in formal schooling but he rebelled. In 1879, Thomas invented a cheap, practical and long lasting lightbulb which would stay alight for 14.5 hours. The electric and electronics so his mother bought him books on these topics early 19th century but they were difficult and short-lived due to their filaments.
 Thomas Edison's first job was a telegraph and he got this by saving the boss's son from being hit by a train. He worked eight shifts so he could continue his experiments. The last job when he spilled acid onto the floor leading through to his boss's desk.

Most famous invention

Thomas Edison's first job was a telegraph and he got this by saving the boss's son from being hit by a train. He worked eight shifts so he could continue his experiments. The last job when he spilled acid onto the floor leading through to his boss's desk.

First invention

In 1877, Thomas invented the phonograph which was a machine that could record and play sound. Edison spoke the first two lines of "Mary had a little lamb" into the device and played it back using a hand crank. The same year, Edison developed an improved lightbulb which was a machine that could record and play sound. Edison spoke the first two lines of "Mary had a little lamb" into the device and played it back using a hand crank. The same year, Edison developed an improved lightbulb which was a machine that could record and play sound.

Thomas Edison died in 1931 from problems with diabetes and he was 84 years old. Despite passing away, we still use his invention of the lightbulb today. 100 years on, almost everyone in the world has used one of his inventions that had been helpful.

Great work!
 WALT investigate materials

LA Key need 2 Evaluate effectiveness of the assessment procedures introduced last year.



Which is the odd one out and why?

Teaching staff have used Explorify and the 'odd one out' feature as a formative assessment tool to check prior knowledge but also to address misconceptions that may have been identified during the last half term in science.

I can use Explorify as a way of formatively assessing the children. It has worked well as an Ice Breaker activity. Year Four teacher.

Science target cards are used in the children's books for them to evaluate their own progress in science. The assessment criteria is linked to the learning objectives from each lesson in a unit of work.

Curriculum statement	Autumn 1	Action
I can identify and name the main parts of the human circulatory system.	✓	
I can explain the functions of the heart and blood around the body.	✓	
I can recognise the impact of diet on the body.	✓	
I can recognise the impact of exercise on the body.	✓	
I can recognise the impact of drugs and lifestyle on the body.	✓	
Planning		
I can adjust my plans where necessary.	○	
I can predict what will happen or work by using my own experiences of a topic.	✓	

Curriculum Statement	Action
T3	- BASIC needs starter. - Aquarium EV
T4	- PSHE link - Importance of exercise starter
T8	- Scientific enquiry, investigation homework.

Action points

My target card tells me where I am strong in science but I can also see where I need to improve. My teacher tells me how I can do this. Year Four child.

1 know that when you stay active for a while your heart rate goes high. What I already know? (06.09.22)

Circulatory and Respiratory System - Biology

working Scientifically Week 12

I have learnt that there is four chambers in the heart. They are the left atrium, right atrium, left ventricle and right ventricle.

*Some examples of recreational drugs are alcohol and excess. Some examples of Pharmaceutical drugs are Paracetamol. A capitalising fact that I have learned is that not all drugs are illegal. *legal.*

Scientific Enquiry - Week 4

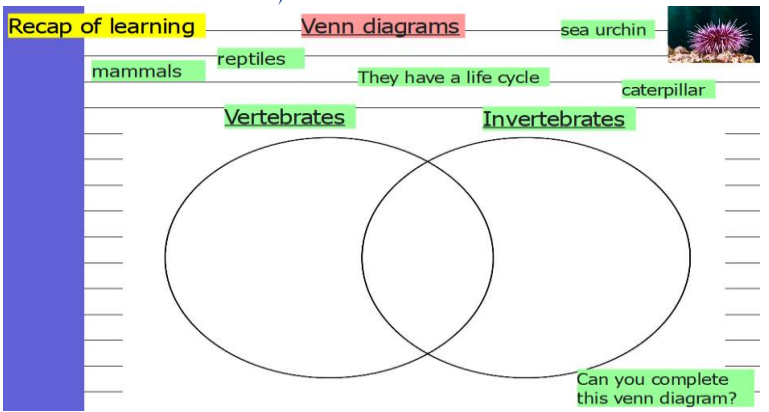
Scientific Enquiry (15.09.22) - Pattern Seeking

A pulse rate is how many times your heart beats. Your arteries take messages. After...

Key Vocabulary

- heart ✓
- pulse ✓
- rate ✓
- pumps ✓
- blood ✓
- veins ✓
- oxygen ✓
- carbon dioxide ✓

Children have built an assessment page over the course of each half term to show their learning during each lesson. This is used as a knowledge mat that they can refer to during a unit of work.



Assessment outcomes inform planning for future lessons and allow teachers to 'recap' learning.

Teaching staff give children 'action points' at the end of a half term to explain how they will fill any gaps in their knowledge from a topic in the next half term. This helps to inform planning and give children an opportunity to correct any misconceptions they may have. Teachers will 'recap' learning as a starter activity based off the outcomes of the target cards. As agreed with SLT, these action points will be used by teachers to consider one definitive target for the end of year reports

LA
Key need 2

Evaluate effectiveness of the assessment procedures introduced last year.

Year Four – Animals including Humans

WALT assess our progress.

T2- I can identify the different types of teeth

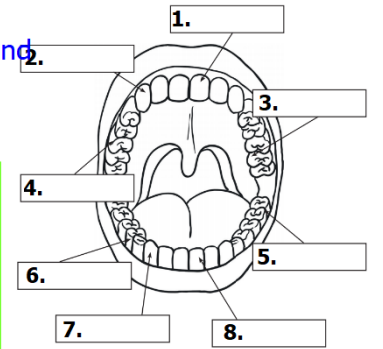
I can identify the different types of teeth in animals including humans.

A-Label four types of teeth.
B-Label six types of teeth.
C-Label eight types of teeth

1. Look at this diagram and label the types of teeth:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

Uncover to see if we did the right thing.



Summative - end of unit target cards are used by the children (each has a copy), so that they can self-assess their progress against each descriptor. These target cards allow children to have more autonomy over their learning, as they know what they are expected to learn by the end of each topic. The SL needed to think how gaps could be addressed during the PSQM.

An example of a target card From Year Six.

Curriculum statement	Autumn 1	Action
I can identify and name the main parts of the human circulatory system.	✓	
I can explain the functions of the heart and blood around the body.	✓	
I can recognise the impact of diet on the body.	✓	
I can recognise the impact of exercise on the body.	✓	
I can recognise the impact of drugs and lifestyle on the body.	✓	
Planning		
I can adjust my plans where necessary.	○	
I can predict what will happen or work by using my own experiences of a topic.	✓	

Curriculum Statement	Action
Impact of drugs	Provide revision mats relating to the unit in homework packs. Make links to prior learning (Yr 4) - alcohol.
Planning	Tie in with British Science Week experiments.

Curriculum Statement	Action
Senses to be covered again in Autumn 2 Animals including humans.	
Body part comparisons during Autumn 2. Comparing with other animals.	
Ruhee is not following the entire curriculum. Ruhee can name a few common animals but is mostly non-	

Action points were created to help address any gaps in a child's learning. The teacher would provide evidence of how they would support that child with a particular target.

What I need to learn is put on my target card by my teacher and then I know what I need to work on. I can look at it in each lesson. Year Six child.

Introducing a 'progress week' in science for each unit of work helps to inform planning, so that we can identify the strengths and areas for development of our pupils. Year Five teacher.

Each half term, assessment lesson are now planned by teachers to check children's progress against their targets. It is designed as a quiz to test their knowledge and identify gaps. Then, action points can be considered to help the children.

Year Six – Evolution

Tuesday 13th December 2022
WALT assess our progress

Evolution

T8

1. Evolution means when a living thing changes over a long period of time. It can help a animal to stay alive instead of becoming extinct. ✓
2. Dogs have evolved from the grey wolf. The grey wolf is the ancestor of all modern dog species. ✓
3. Dogs were bred into different types because each dog characteristic might get for a certain dog breed. Eg. a farm dog needs athletic skills. Humans wanted to get a special dog characteristic to another breed. ✓

Pre - PSQM During PSQM Impact

LC
Key need 3

Introduce science capital to staff and develop science capital activities

The SL collaborates with the History Lead and produces science related activities based around a particular scientist.



EV curriculum map

Year 2	Science Museum	Science – Sound	Spring 2
Year 2	Sea life Centre Pay 2	Science – Living things and their habitats Art – Sculpture (sea creatures)	Spring 1
Year 2	Visit a place of Worship Church	RE	Autumn 2
Year 2	Park		Summer 2
Year 3	Museum of London	History – The Stone Age	Autumn 2
Year 3	Science Museum Pay 1 if workshop	Science – Forces and magnets (The wonder lab)	Spring 2
Year 3	West Ham Park	Science – Plants	Summer 2
Year 3	Visit a place of Worship Gurdwara	RE	Spring 1
Year 3	Bethnal Green Toy Museum	DT – Moving monsters (Moving toys workshop)	Summer 2
Year 4	London Zoo (pay 1)	Science – Animals including humans	Autumn 1

Working in collaboration with the EV Lead, the SL has ensured visits for science are purposeful and link to units of work throughout the year.

Year Two – The Sea Life Centre

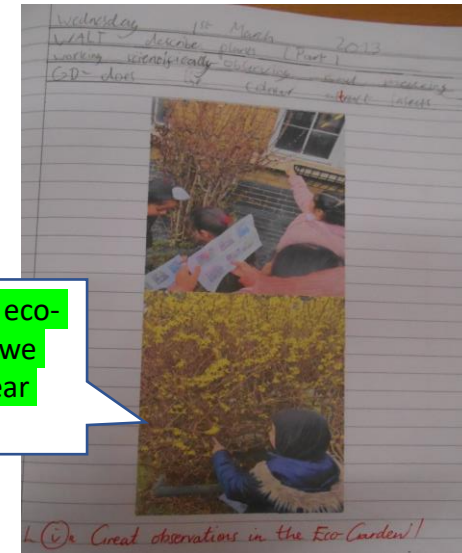


Year Four – The London Zoo

Getting to go on science trips means it's easier to understand what we learn about in class.
Year Four child.

I now know that Lewis Latimer helped make the filament inside a bulb. Learning about him during BHM helped me learn more about electrical circuits.
Year Five child

I like visiting the eco-garden because we learn outside.
Year Two child.



Year Two – The Shaftesbury Eco-garden

Our eco-garden is a nice environment to teach children about living things. It has really supported the children in Year Two with their understanding of how plants grow.
Year Two teacher.

BHM lessons are now more structured with a 'working scientifically' question for the children to consider and then answer. Howard Lewis Latimer was the focus in Year Five.

WVALI investigate conductors.

Working Scientifically - Do wires need to touch to conduct electricity?

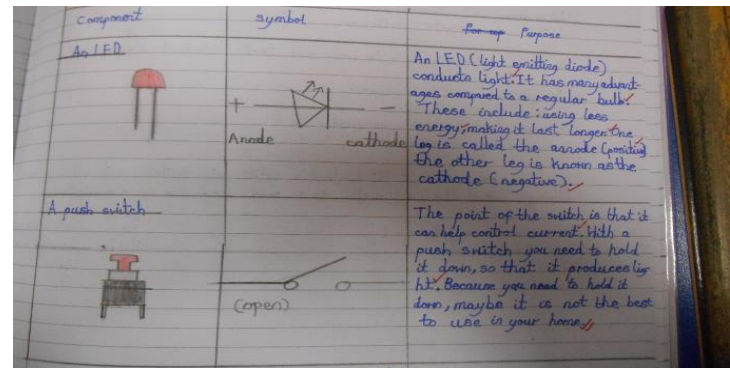
Steps to success

I know the impact Lewis Howard Latimer made.

I can follow instructions and construct certain circuits.

I can explain the outcomes using scientific vocabulary.

Having a question to think about helps me to focus on the investigations we do.
Year Five child.



Pre - PSQM

During PSQM

Impact

LC
Key need 3

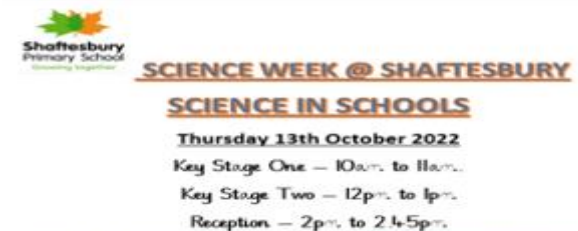


I know more about about Electricity now. An assembly makes science feel special. Year One child.



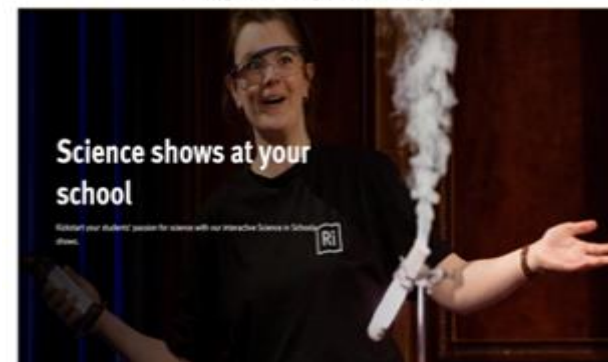
Promotional posters were used around the school and the website to build awareness around the Royal Institute's visit.

The Royal Institute for Science make an annual visit to deliver workshops for children, a community show for parents and CPD for staff.



The SL was able to secure a grant which funded the visit for October 2022. Budget constraints have meant that the SL is looking for alternative ways to finance enrichment opportunities.

The CPD gives us more confidence because the presenter explains how simple resources can be best utilised. I benefit from having ideas modelled. Year Three



Dear John,

Many thanks for taking part in this year's Royal Institution Science in Schools grant scheme, I hope that you and your students enjoyed the recent visit from one of our presenters.

Feedback from grant recipients is vital in securing funding to continue the programme, so I would really appreciate your help in filling out our short (<5 minute) [feedback survey](#). If there were any issues on the day, I would also be grateful to hear how we could improve our school visits in future.

If there is anything else I can help with, please do not hesitate to get in touch at schools@ri.ac.uk, and we hope to be able to visit your school again soon.

Pre - PSQM

During PSQM

Impact

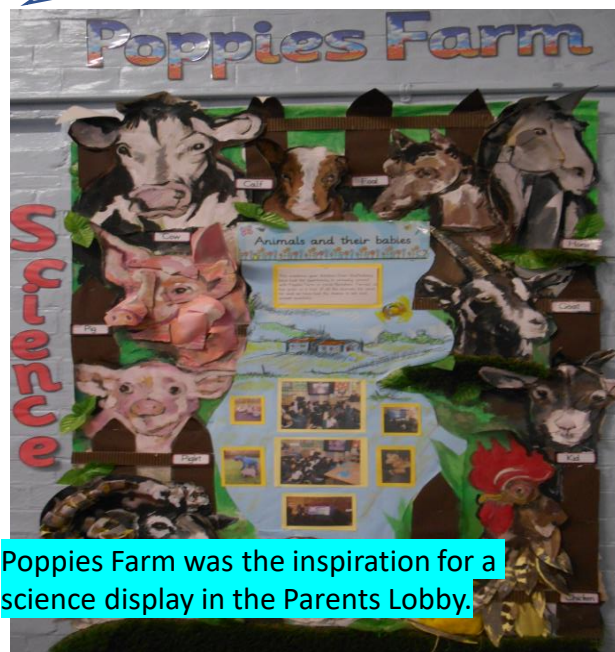
WO A
Key need

There are regular links with other organisations to enhance/enrich science learning.

'Farmer Time' is an initiative (via zoom) that pairs KS1 Shaftesbury children with a farmer who speaks to the children about rural life. This includes: life cycles, seasonal change and offspring (Animals inc Humans link).

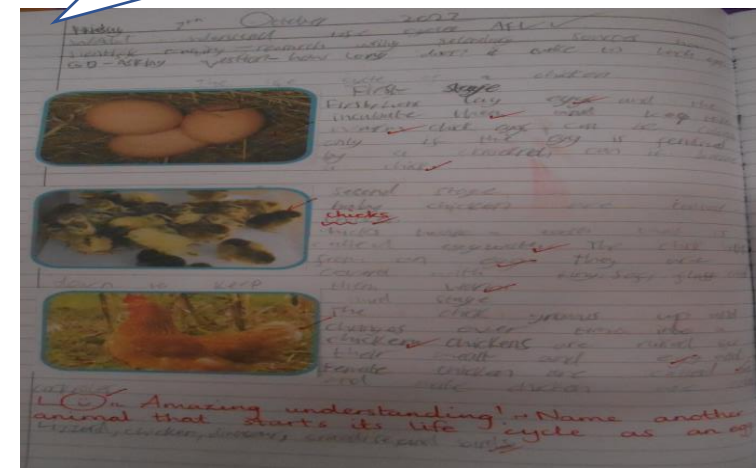


The displays are a good way of seeing what the children are studying in science. Year One parent



Poppies Farm was the inspiration for a science display in the Parents Lobby.

Children have had the chance to see farmyard animals in their natural setting. This is something that they do not have the opportunity to see in an inner city area. It has made it easier for me to teach life cycles knowing that Farmer Joe was available to answer the children's questions. Year Two teacher.



Skills & Key Vocabulary	Teaching Activities	Resources	Cross-Curricular Links
<p>identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates</p> <p>describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, and including pets)</p> <p>I can begin to ask questions about what I see</p> <p>I can begin to talk about living things, familiar materials and events</p> <p>I can begin to make simple comparisons between groups and results</p>	<p>LESSON 2 WALT group types of animals Tell children there are at least thirty mammals in the classroom? Who are they?</p> <p>Scientific Enquiry - Classifying and grouping QD - Do all mammals eat the same food? Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them. Then, they can look to answer the questions they have been asking.</p> <p>Whole Class Teaching, including Key Questions:</p> <p>Reptiles: crocodile, turtle, alligator, snake Mammals: mouse, lion, dog, deer, human, cows, sheep (Poppies Farm link)</p> <p>Show pictures of reptiles / mammal. Encourage children to think of enquiry questions. How do you know they are all reptiles / mammal? What do they have in common? What is the same about them? Can they explain any differences? How do they compare? You can use an odd one out activity to ensure comprehension. Ensure children are clear regarding technical vocabulary = etc. Children can begin to answer their own questions:</p> <p>Reptiles include animals such as ... Mammals include animals such as ... The features of a reptile include ... The features of a mammal include ... A difference between mammals and reptiles is ...</p> <p>Plenary: What do reptiles eat? Are they herbivores, carnivores or omnivores?</p>	<p>Pictures of reptiles and mammals</p> <p>Word bank</p> <p>Sentence starters</p> <p>https://www.bbc.co.uk/1/health/topics/z6882zhv</p> <p>FARMER TIME - booked in for Tuesday with Poppies Farm.</p>	<p>English: vocabulary building</p> <p>FARMER TIME - booked in for Tuesday with Poppies Farm.</p>

This academic year, the SL has made sure Farmer Time sessions are held to support particular units of work. The zoom sessions have helped children understand different types of mammals and birds.

I don't see many animals in the city. Poppies Farm shows me how they live. Year Two child.

Year Group:	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
1	<p>Humans - Children should name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. As well as this, there should be plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes. ESSE link: human body parts - all about me, PANTS!</p> <p>Art - 'All about myself'. Drawing self-portraits</p>	<p>Animals including humans - Pupils should be taught to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Essex link: human body parts - all about me, PANTS!</p> <p>VIRTUAL VISIT Poppies Farm - See link</p>	<p>Seasonal changes - Shaftesbury pupils will be taught to observe changes across the four seasons.</p> <p>There should also be opportunities to observe and describe weather associated with the seasons and how day length varies.</p> <p>Geography link: seasonal weather changes!</p> <p>EDUCATIONAL VISIT West Ham Park to look at signs of seasonal change - tree waking trees</p>	<p>Plants (indoor gardens) - Pupils should be taught to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. In addition, observe and describe the basic structure of a variety of common flowering plants, including trees.</p> <p>English link, grow your own pumpkin - procedural text!</p> <p>EDUCATIONAL VISIT Science - West Ham Park/Botanical Gardens (Plants)</p> <p>NOW PRESS PLAY tomorrow's audio experience basis</p>	<p>Light - With support, pupils should be taught to recognise that they need light in order to see things and that dark is the absence of light.</p> <p>Geography link: seasons and daylight changes!</p>	<p>Everyday materials - Pupils should be taught to distinguish between an object and the material from which it is made. Additionally, describe the simple physical properties of a variety of everyday materials.</p> <p>ICT and art link, materials and structures. Choosing the correct materials for different jobs!</p>

Pre - PSQM

During PSQM

Impact

Cross-curricular links are made with other subjects on the science curriculum map.

WO A
Key need
Literacy and numeracy strategies are embedded in science lessons.

Science supports and links with other curriculum areas and contributes to maximising whole school initiatives while retaining its unique status as a core subject. Science lessons refer to other subject areas (explicitly labelled on our curriculum map).

<p>Science Humans Pupils learn to name, draw and label the basic parts of the human body.</p> <p>(PSHE link, human body parts-all about me, PANTS)</p> <p>EDUCATIONAL VISIT Mudchute Farm</p>	<p>Science Animals including humans Pupils learn to identify and name a variety of common animals.</p> <p>(reception curriculum link, animals and habitats)</p> <p>VIRTUAL VISIT -Poppie's Farm - See John</p>	<p>Science Seasonal changes Pupils learn to observe changes across the four seasons.</p> <p>(Geography link, seasonal weather changes)</p>	<p>Science Plants (indoor gardens) Pupils learn to identify and name a variety of common wild and garden plants.</p> <p>(English link, grow your own pumpkin)</p>	<p>Science Light Pupils learn to recognise that they need light in order to see things and that dark is the absence of light.</p> <p>(geography link, seasons and daylight changes)</p> <p>EDUCATIONAL VISIT Science - West Ham Park/Botanical Gardens (Plants) - DT/ART</p>	<p>Science Everyday materials Pupils learn to distinguish between an object and the material from which it is made.</p> <p>(DT and art link, materials and structures. Choosing the correct materials for different jobs.)</p>
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The SL collaborated with the Math Lead to ensure there were opportunities across both subjects to strengthen cross curricular links. Links to science are now explicitly made on the math MTPs to direct teachers to include this in their planning.

Links were explicitly made with English during 'Assessment Weeks'. This allowed children to practice their spelling of key scientific vocabulary across English lessons.

Shaftesbury Primary School Curriculum Overview Year 6 Spring 1

Topic	Week 1	Week 2	Week 3
	<p>Week 1 - Make links with science. Use the opportunity to refer back to temperature and seasonal change. Also, freezing points and states of matter.</p>		
Number	<p>I can use negative numbers in context, and calculate intervals across zero. TYM P.8</p> <p>I can solve number and practical problems that involve all four of the above. TYM P.9</p> <p>I can identify the value of each digit in numbers given to three decimal places. (reading and writing numbers) - move on to word problems.- Incorporate into lessons- recap</p>	<p>Calculation</p> <p>I can multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication, include decimal examples. TYM P.14</p> <p>I can divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division. TYM P.19</p> <p>I can use estimation to check answers to calculations and determine, in the context of the problem, an appropriate degree of accuracy. TYM P.23</p> <p>I can use my knowledge of the order of operations to carry out calculations. TYM P.36</p> <p>I can perform mental calculations, including with mixed operations and large numbers. (I can use mental strategies to calculate). TYM P.30/31</p>	<p>Algebra</p> <p>I can use BODMAS to solve algebraic problems. TYM P.37 (BODMAS resource available Curriculum-maths- spring 1- Y6)</p> <p>I can express missing number problems algebraically. TYM P.78</p> <p>I can use formulae expressed in words and algebraically. TYM P.82/83</p> <p>I can find pairs of numbers that satisfy an equation with two unknowns. TYM P.84</p> <p>SMSC - Spiritual To foster feelings such as awe, wonder, thankfulness, mystery and joy.</p>



Shaftesbury Primary School Curriculum Overview Year 5 Spring 2

Topic	Week 1	Week 2	Week 3
		<p>Week 2 - Ensure that links are made between science and mathematics - reading scale, volume and capacity</p>	
Fractions/Decimals/ Percentages	<p>Real life link-</p> <p>I can solve problems involving finding fractions of numbers and quantities. TYM P. 62</p> <p>I can order decimals with up to three decimal places. TYM P. 70</p> <p>I can add and subtract decimals mentally. TYM P.71</p> <p>I can count on and back in decimals. TYM P.73</p>	<p>Measurement</p> <p>I can calculate the area and perimeter of shapes. TYM P. 91</p> <p>I can calculate and compare the area of rectangles (including squares), and including using standard units, square cm and square m and estimate the area of a shape. TYM P.94</p> <p>I can understand/recognise volume. TYM P. 98/99</p> <p>I can estimate volume and capacity. Resources on flip</p>	<p>Measurement</p> <p>I can convert between different units of metric measures. TYM P. 85</p> <p>I can understand imperial measures. TYM P. 86</p> <p>I can understand imperial measures and their metric equivalents. TYM P. 87</p> <p>I can use all four operations to solve problems involving measure (length, mass, volume, money) using decimal notation, including scaling. TYM P. 88/ 89 (over 2 days)</p> <p><i>Revise metric units of weight, capacity and length; understand that we can measure in imperial units and relate these to their instances in daily life.</i></p>

Shaftesbury Primary School Curriculum Overview Year 6 English Autumn 1

	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
						<p>Assessment Week - Science focus for spellings</p>
Text	Skellig by David Almond	Skellig by David Almond	Skellig by David Almond	Skellig by David Almond	The Arrival by Shaun Tan	The Arrival by Shaun Tan
Grammar	Nouns/noun phrases	Verb tenses	Subordinating conjunctions	Relative clauses	Punctuation: dashes, brackets, commas	Punctuation: colon, semi-colon
Spellings	<p>Root words</p> <p>asking jumped fastest hunter shouted neater lighter lightest yawning</p>	<p>ough</p> <p>thoroughly plough borough drought although boughs doughnut</p>	<p>Suffixes</p> <p>nicest sensible cycling tasted silly joker famous observant</p>	<p>-ing/-ed</p> <p>making grimy creating persuading grizzling observing appreciating</p>	<p>Root words</p> <p>observe observing observant create creating creation fame famous</p>	<p>Circulatory system</p> <p>Respiratory system oxygen oxygenated veins arteries heart lung/s chamber/s atrium ventricle</p>

Year 6 English MTPs.

Year 5 and 6 math MTPs.

It was easy to modify the plans and make links with science. It is just another opportunity to revisit the prior and sometimes future learning in science. Maths and science link so closely through STEM Math Lead

As a new middle leader, it has given me a better idea of how I can thread other subjects, like science, through the English curriculum. English Lead.