"I love everything about science"

Westhouses Primary School PSQM Portfolio

"I like the fact that more and more lessons are outside"

"I like how we link science to gardening now"

Science Leadership: A

Key Need: Establish a clear vision for science teaching and learning

Impact: From the staff and pupil voice, the vision and principles document was created. This is shared in multiple places to enable all visitors/parents/staff the opportunity to see what we value most about our teaching and learning of science.

Westhouses Primary School –

Our Visions and Principles

Vision:

All children will become scientifically literate, through a practical, relatable, enquiry based approach to science which will encourage children to be inquisitive and curious about the world that surrounds them.

- Children ask questions and think of ways to answer them
- Children are interested in their learning
- Children consider why or how something happens
- Children are learning firsthand in a practical way
- Children see science as being real to them

Science teaching and learning in our school is good when...

How do we know what good science teaching and learning looks like in our school?

- Quality first teaching
- Sharing good practice
- Relatable experiences
- School Development plans
- CPD
- Pupil Voice
- Curriculum
- Monitoring

Vision and Principles document

Impact: I adapted the key 5 principles into little logos that could then be used within lessons or on displays. The children recognise these as they are displayed around school and in their books.

Visions and Principles

Children at Westhouses Primary helped to create our Science School Vision. This showcases what children believe our science strengths are and what aspects of science children enjoy. We use these as a reflection point at the end of every science lesson to see which school principle we have been working on.

Science Vision and Principles

Visions and Principles Poster.pdf

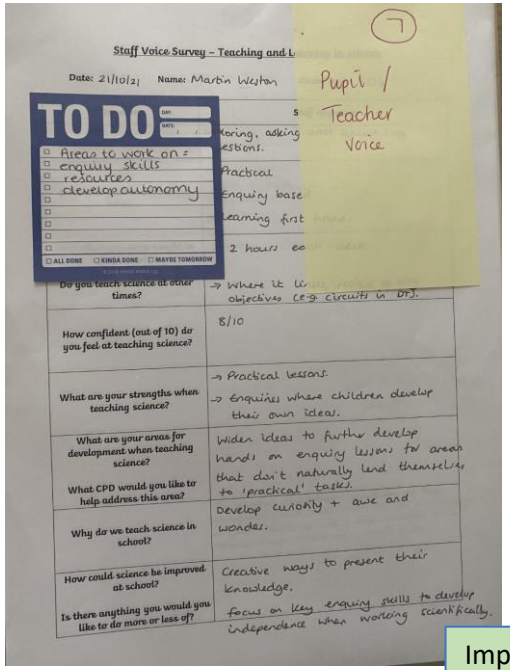
Link on our school website

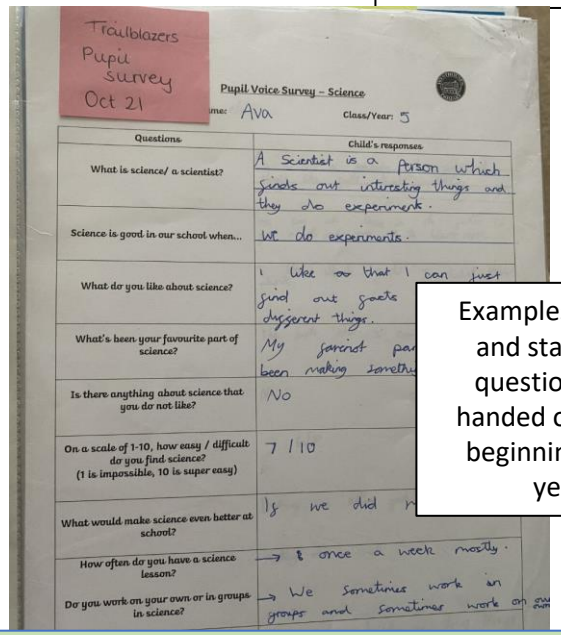
Science Policy

WESTHOUSES PRIMARY SCHOOL

Record of Policy Amendment / History

Included in our school policy





Examples of pupil and staff voice questionnaires handed out at the beginning of the year.

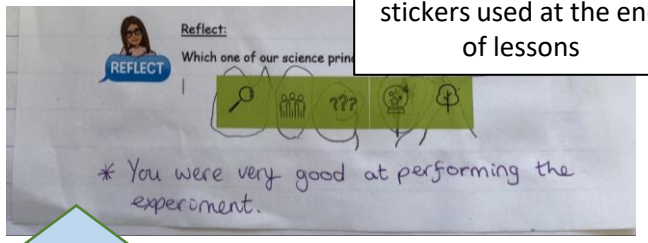
Next Steps:
Re-evaluate the principles yearly with each new cohort of children to ensure that pupils continue to relate and value the principles they put forward.

Impact: As a new subject lead, I could see what the school community thought was working well and what areas could be improved. Our 5 key principles were either based on what we were already doing well (questioning, group) and what we would like to focus more on throughout the year (outdoor, investigating, future).

Science Leadership: A

Key Need: Ensure our vision is valued

Key Need Links – Teaching and Learning strategies



Principle reflection stickers used at the end of lessons

Impact: Children will use these principles as a reflection point at the end of the lesson to show that we are always referring to our core values.

Our whole school science display

Impact: Staff are asked to share examples of science activities/work that children have enjoyed and which reflect our key principles. On some of the photos, I add a clip of the principle it is representing to make it clear.

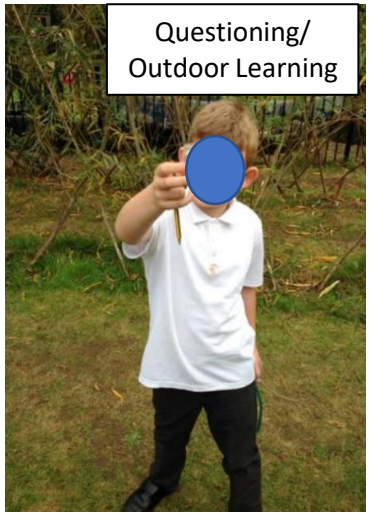
Impact: Our science curriculum page is updated with our policies, documents and photos of science from across the school. This allows visitors to see a clear vision of what science continues to look like in our school.

Pupil Voice - "These pictures here show what is good about science at our school"
Y3 Child

Groups/Outdoor Learning

Investigating

Questioning/ Outdoor Learning



Impact: Staff can create activities that are based around our key principles to ensure that good science practice is being achieved. This enables children to see our principles in action and find it easier to talk about them with visitors.

Parent Voice - "*** couldn't wait to tell me what he had been doing during that week of science, he rushed out to tell me what you'd been doing every day"

Impact: Key science events are shared on our website calendar and on our social media platforms such as Facebook. This allows parents the opportunity to involve themselves in their child's school experiences and raises the profile of science even further.

Next Steps:
Explore other science events that are more than just science week and look at how parental involvement can be linked.

Science Leadership: B

Key Need: Developing a confident subject leader

Limited knowledge of leading the area of science, in need of support and direction for where and how to improve science.

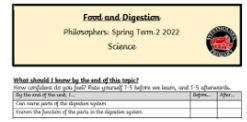
A science expectations document was created after a triad 'mocksted'.

Science Expectations:

Developing Experts scheme supplemented by further resources when appropriate to support the needs of the learners.

Beginning of each unit:

- Self-assessment front cover sheet per unit *See example below.*
  - List the key objectives that should be achieved by the end of the lessons 'I can statements' (Take these from Developing Experts unit)
  - Key vocab (taken from the vocab pyramid on knowledge organizer)
- Pre-Assessment task from Developing Experts
  - Print off and make into a booklet with the self-assessment sheet at the front.
- Introduce the Knowledge Mat and display on working wall.

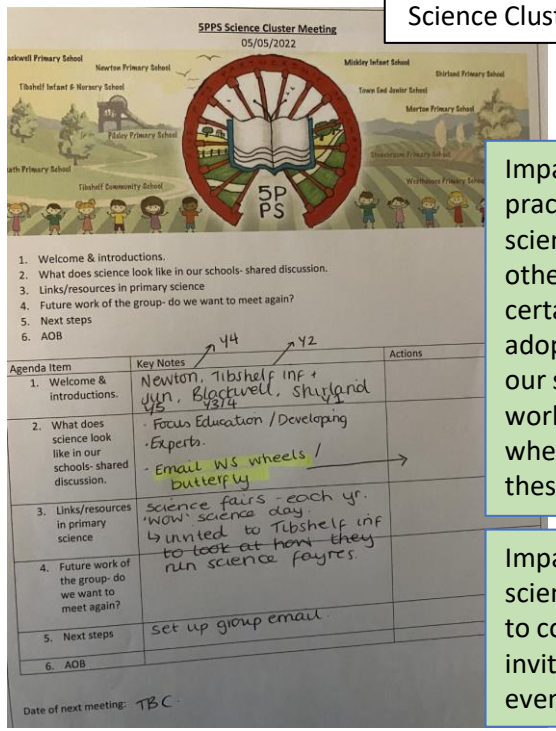


Impact: Current staff and new staff can use this document to support their teaching of science. This has been agreed by all staff.

CPD certificate on a chosen area of development

Impact: Opportunities for CPD are available to support me as a subject leader. It gives me flexibility to develop specific areas.

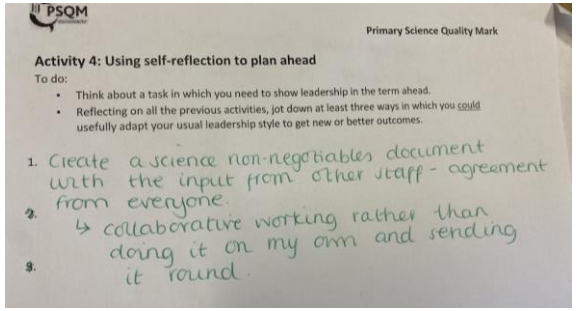
Science Cluster Meeting



Impact: Shared good practice amongst other science leads. Pointed other teachers towards certain things we have adopted and use within our school (TAPS working scientifically wheel being one of these).

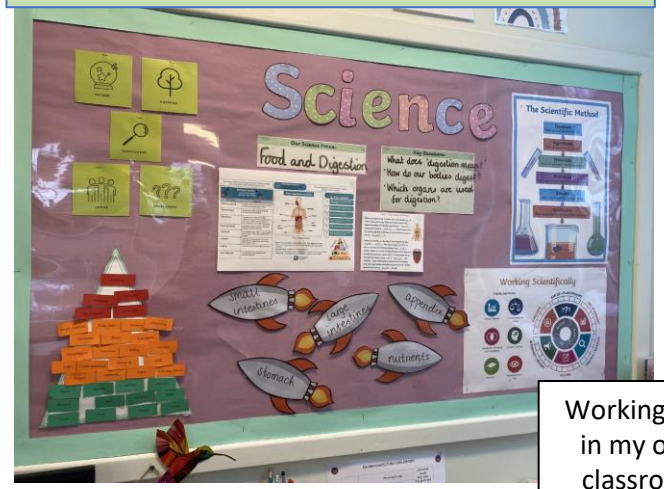
Impact: An email group of science leads has been created to continue discussions and send invites to any science themed events schools may have.

Teacher Voice - "The expectations document is a helpful reminder. There is a consistency across school now" Y5/6 teacher



Impact: Accessing the PSQM reading links on a regular basis has supported my knowledge around leading science as well as my own subject knowledge. It has given me the opportunity to reflect on my practice.

Impact: Staff had a clear vision of what their working walls could look like in their classrooms, with certain elements (principal logos) provided to them in preparation. This enabled them to see my vision and create that consistent approach to science that we have been aiming to achieve.



Working wall in my own classroom

Governors do not undertake lesson observations but visit classrooms to understand the working of the school. Feedback must not contain evaluative or judgemental comments about the quality of teaching and learning. This is not the purpose of any visit to school.

Name of Governor:	**Simon Taylor**	**Date of visit:**
		15/03/22

Purpose of visit

Previously agreed to attend science ciriculum update review meeting with science lead.

Links with the School Improvement Plan

Science development as part pf sip the visit will monitor progress on this development area

Governor comments

e.g. Was the purpose of the visit achieved? What did you learn? How long did the visit last?

Meeting held with Science Lead Katie Briggs. Reviewed the quality mark process and impact on the science curriculum, teaching and children's progress.

Impact: Visits throughout the year with the science governor has allowed me to update him with the progress we are making towards the PSQM and a learning walk has enabled him to see this improvement in action. We have been able to discuss further next steps for science (introducing key science figures, community involvement, ways to increase girls' interest)

Next Steps:
Share the development journey with the rest of the staff and our make next steps clear to ensure that all staff (new staff included) are aware of this.

Science Leadership: C

Key Need: Follow a monitoring cycle that feeds development back

Key Need Links – Enquiry Skills Focus

Areas for Development/ Training Needs:	• Separate the science vocabulary to make the learning explicit • Develop Y2 on Sticky knowledge question – E.g. why do they think that chosen one is the odd one out? • Wider working scientifically coverage • More opportunities/evidence for asking questions and recording

Reviewer Name: K.Briggs **Date: 14.12.21**

The focus on science seems to have embedded a broader consistency with the science curriculum and also means that the topic is clearly identified separately from other topics by children and by staff. Staff's confidence is growing in the use of developing experts, so this is likely to improve with its consistent use as both children come through from that system and stuff become more adept at using it within classrooms.

A quote from the science governor's report after a learning walk with myself as science lead.

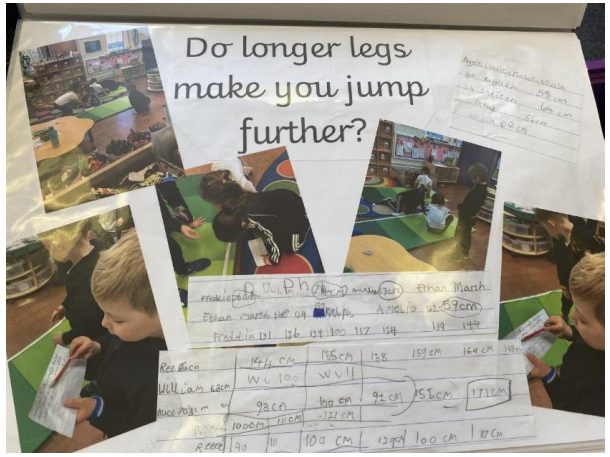
Monitoring activity addressed a lack of WS coverage (specifically in KS1).

Impact: Book scrutinies and learning walks have enabled me to gather a clear understanding of what science looks like in our school and what areas we still need to work on.

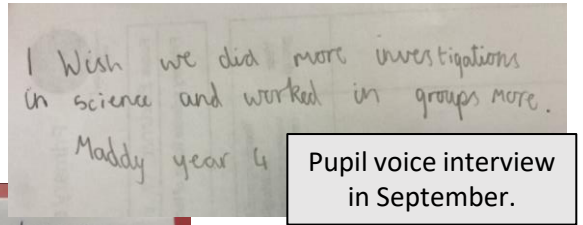
Impact: Staff have an understanding that science needs to be taught through the scientific enquiry types which then support the working scientifically objectives.

Evidence of enquiry approaches	Reception – • Pattern Seeking - Exploring different seeds in fruit • Observation - Planting seeds • Grouping and classifying - materials Y1/2 – • Fair Test - Crisp investigation • Grouping - Floating and sinking • Pattern Seeking – Do longer legs make you jump further? Y3/4 – • Comparative – Effect of substances on teeth • Pattern Seeking – Do longer legs make you jump further? • Problem Solving – Is growth a problem? Y5/6 – • Problem Solving – Electrical Conductors • Research – Heliocentric and geocentric model • Observation – Thermal conductors/snow activity

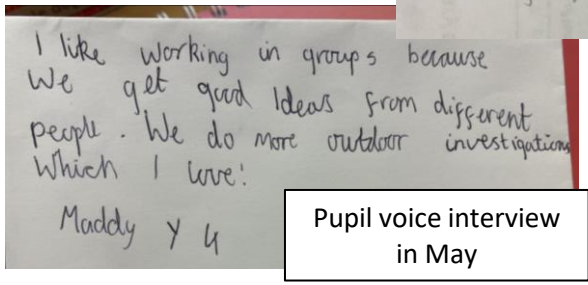
A selection of working scientifically evidence from a science book scrutiny report from a staff meeting.



Impact: Floorbooks implemented in Year 1 to collect evidence for working scientifically skills.

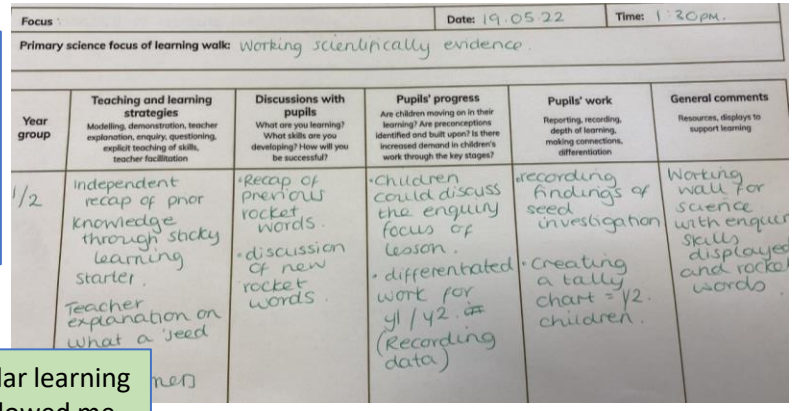


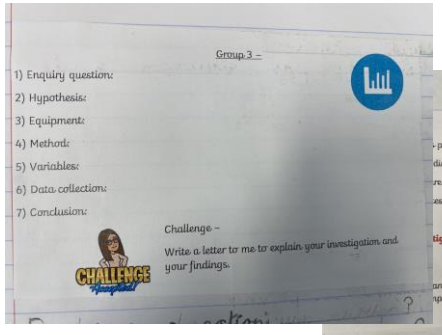
Pupil voice interview in September.

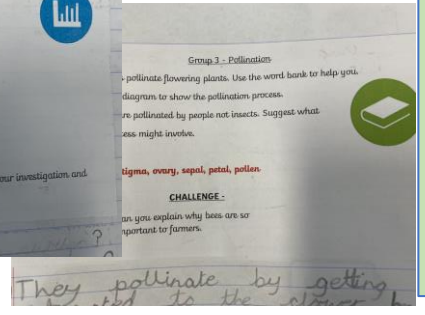


Pupil voice interview in May

Impact: Pupil voice interviews have allowed me to monitor progress from their perspective and see what areas of science they enjoy. It gives me an insight into which strategies of teaching are having an impact.







Impact: As a school, we were aware that working scientifically was an area of focus. We now use the enquiry symbols to clearly identify where we have been working scientifically which in turn supports with monitoring activities.

Teacher Voice - "the extra support we have had around science teaching has meant that I now feel much more confident, I know what is expected"
Y1/2 teacher

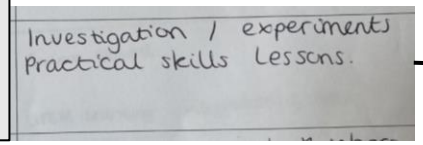
Impact: Regular learning walks have allowed me to access the impact of embedding Developing Experts throughout school.

Next Steps:
Carry out a new pupil voice at the end of July and use this to inform developments in science for 2022/2023.

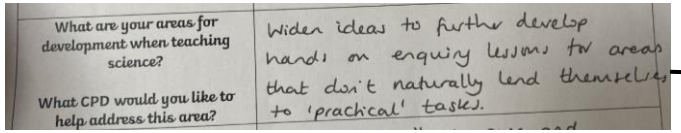
Science Teaching: A

Key Need: Developing staff confidence with science teaching

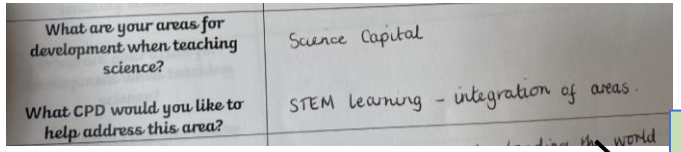
Taken from staff questionnaire at start of PSQM journey.



Impact: Collaborative planning to explore possible opportunities for investigations/skills-based learning.



Impact: Introducing 'enquiry' types through staff meeting to show that we can develop a range of skills even when it might not seem practical.



Impact: Science capital staff meeting. RAF space challenge workshop to introduce concept of STEM.

Impact: Staff have access to CPD opportunities if they feel like they need it. They have the option to chose what the require support in and receives certificates to show their development.

tigtag | Imperial College London

ReachOut CPD

Congratulations to:

Nicola Davey

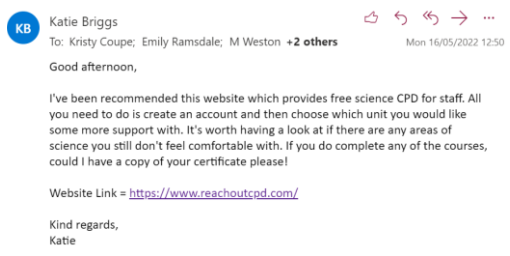
from

Westhouses Primary School

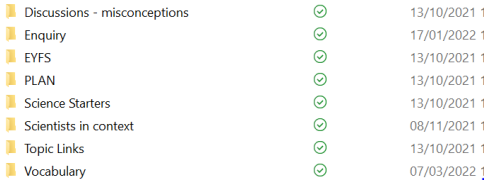
for completing the following primary school science CPD courses:

Working Scientifically (26/05/2022)

An email informing staff of the CPD opportunities available.

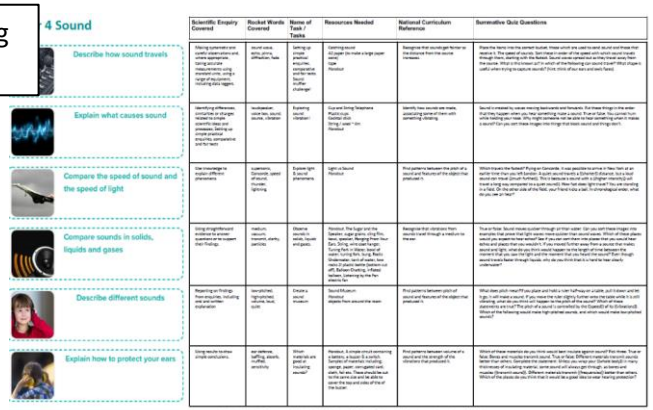


Impact: This is regularly updated with websites/links that may be suitable to staff across school. Building up a bank of resources means it's time saving for staff when looking for things they might need.



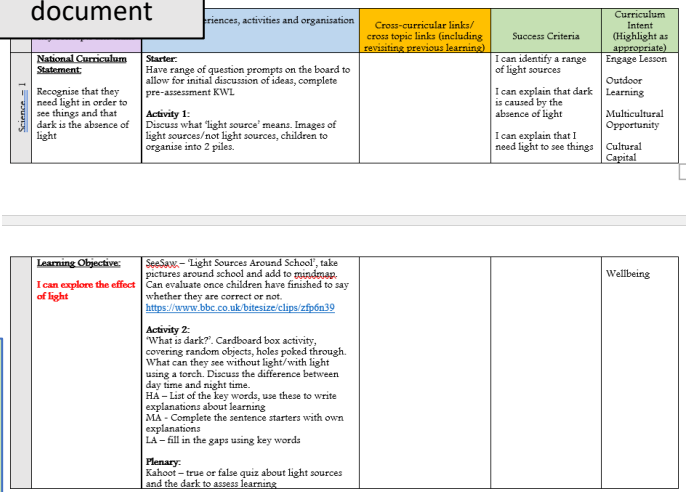
A shared area on the server to share science resources

New planning Overviews



Impact: The old planning format contained little guidance/support for science teaching. Following the developing experts scheme gives staff a clear overview of knowledge, skills and progression. This has supported staff's confidence with science teaching.

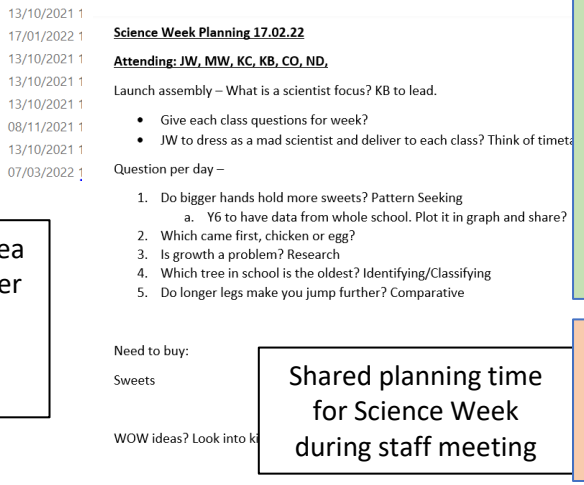
Old planning document



Evidencing science work has been a challenge and this is being address across the school ensuring staff understand the curriculum coverage requirements and Katie has focus learning walks and children work review on supporting staff to bring structure and consistency to the science learning.

Recognition of staff support from governor visit

Teacher Voice - "I felt I was overusing worksheets before and focused more on knowledge in science lessons. I feel confident that I am showing a range of knowledge and skills now"
Y1/2 teacher



Shared planning time for Science Week during staff meeting

Impact: We were able to bounce ideas around for developing our enquiry skills further during this week. We were able to consolidate any questions we might have about enquiry types and brainstorm activities for each class. Staff, including myself found this really useful

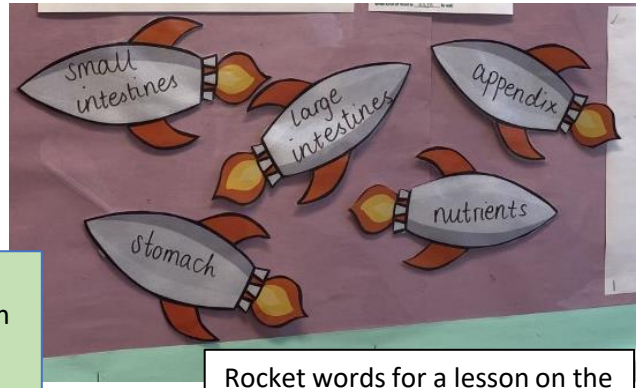
Next Steps:
Redo the staff questionnaire and see if areas for development have changed. Arrange CPD accordingly.

Science Teaching: B

Key Need: Provide new teaching and learning strategies for teaching science

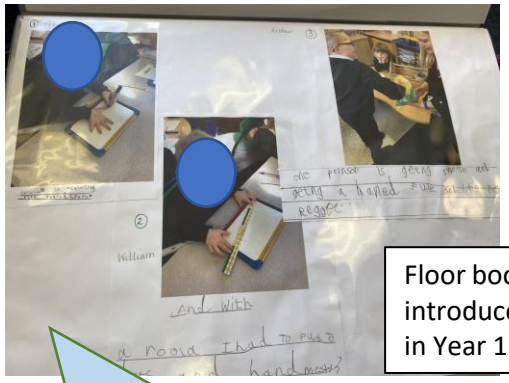
Resources were available but were not being used when appropriate and were not well organised.

Pupil Voice - "I can remember the rocket words from lessons we did a while a go"
Y 4 pupil



Rocket words for a lesson on the digestive system.

Impact: Introducing the key words each lesson as rocket words has helped children narrow down what the key vocabulary is for that lesson, in turn making it more memorable for them.



Impact: Introducing the floor books allowed more opportunities for collaborative learning and focused on their science skills rather than their ability to write at length.

Floor books have been introduced to record work in Year 1

Teacher Voice - "Using the floor books instead of individual books has had a huge impact on the work the year 1's are producing. They take pride in their floor book and enjoy putting work into it,"
Y1/2 teacher

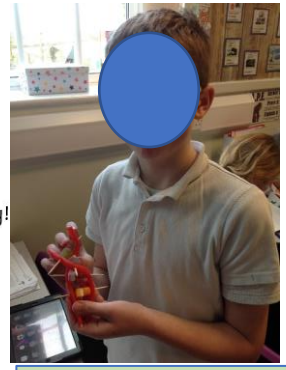
Sticky Learning starter that children complete at the start of every lesson.

STICKY LEARNING

Sticky Learning Starter:

1. Which teeth are used for **grinding food**?
2) Why is sleep important to keep your body healthy?
3) Which habitat do you think is the odd one out? Tell me why!

Impact: Each class will use this at the beginning of the lesson. It allows children to revisit previous learning and recall key facts. I also use the Explorify odd one out activities which link to previous units covered to develop those deeper thinking skills.

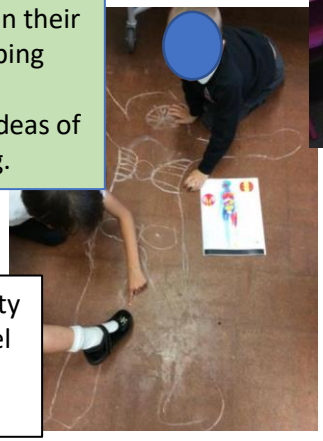


Y5/6 exploring insulators and conductors on a snow day.

Y5/6 separating materials using filtration, sieving, magnets and tweezers.

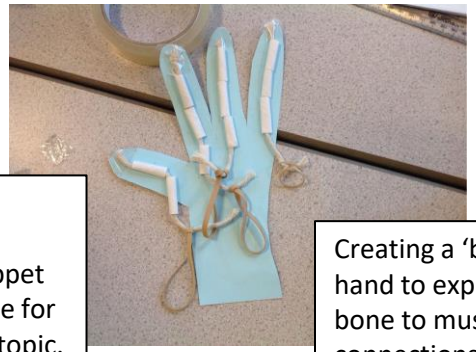
Impact: Models and practical investigation are being used throughout school to engage children in their learning. Developing experts has also supported with ideas of practical learning.

EYFS using continuous provisions to develop working scientifically skills



Hands on activity to draw a model of the human body in Y1/2

Making and creating a shadow puppet performance for their 'light' topic.



Creating a 'bionic' hand to explore bone to muscle connections.

Next Steps:
Pupil voice interview with children to see how children are engaging with the new teaching strategies.

Science Teaching: B

Outdoor Learning

A Y2 and Y5 child creating a herb garden in school.

Reception have been growing vegetables to put out in their vegetable patch.

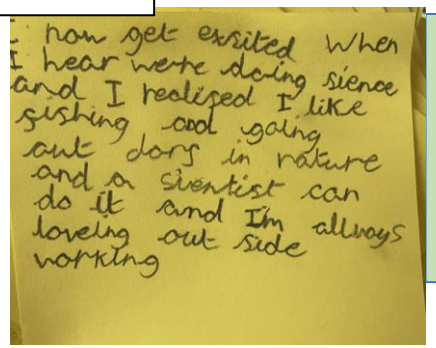
Impact: Growing our own plants made our latest plants topic more relevant to the children as they could associate the different stages with what they had witnessed for themselves.

Y3/4 were looking at roots, so we incorporated this into repotting our sunflowers to look at terms such as 'root bound' and the importance of roots.

A Y6 and Y3 child helping out on our new allotment .

Impact: We have been given a school allotment to take care of, a selection of children are invited up each week and we are using it to support their mental wellbeing along with their science learning. Children are really enjoying this new opportunity and are taking a hands-on approach to their learning.

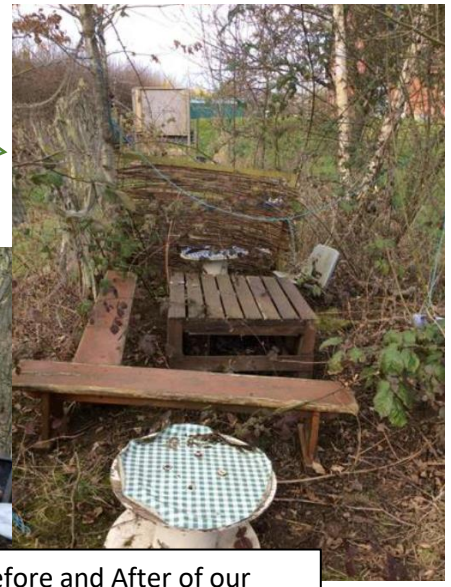
Year 2 children calculating the age of a tree in forest schools



A Y4 child's opinion on science learning in Summer 1.

Impact: Children were given a range of donations: a greenhouse, plants, soil, seeds, plant pots from families, the local community and local businesses and have enjoyed putting these to use to develop their learning on plants/growth.

Pupil Voice - "I love learning outdoors, it's fun and different to writing"
Y2 pupil



Before and After of our outdoor classroom in the nature area.

Impact: During forest schools, the Y3/4 class pent time sorting out our nature area. This was an area of school that had been neglected. The children loved doing this and regularly go up to check on it. They built areas for the animals to shelter and make sure there is always food for the birds. It's given them a new sense of responsibility and respect for nature in school.

The Y3/4 class wrote letters to local business asking for donations to improve our outdoor learning opportunities.

Science Teaching: C

Key Need: Audit science resources

Resources were available but were not being used when appropriate and were not well organised.

Teacher Voice - "It's easy to forget what resources you needed next time you reach the unit; this is really useful to keep track"
Y5/6 teacher

Impact: As Science lead, I am able to collate these forms to provide a better learning experience next time we reach the unit again.

Resource Review Sheet

Name: _____

Year Group: _____

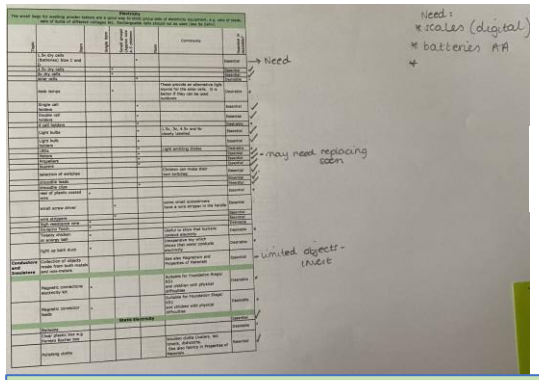
Science Unit: _____

Resources I used during this topic:

Resources I needed during this topic:

Resources I would like for this topic in the future (explanation of use would be helpful):

Comments:

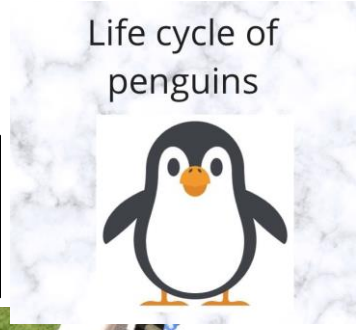


Comment from science governor report after a recent progress meeting.

Katie has also done a resources audit, looking at feedback form classes as they teach units on what was used an what would have been helpful digital scales school thermometer are examples of things identified though this process.

Impact: Once the science resource audit had been complete, I was able to organsie the resources so that staff could access the easier and know what they would find in each resource box.

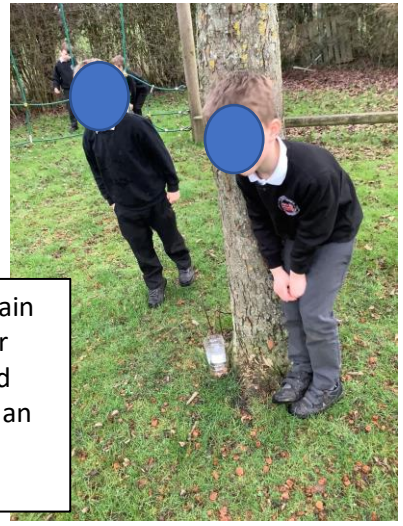
Children use Ipads to record their learning through apps such as Seesaw and Book Creator



Impact: Practical resources give children the hands-on activities needed to develop their experience of the enquiry types. A range of resources allow for children to work collaboratively in smaller groups, discuss their own ideas and increases engagement.

Impact: EYFS has been a focus for developing science-based provisions. Children are accessing the outdoors

Year 1's and 2's made rain gauges to link with their science topic. They used their results to support an observation over time enquiry.



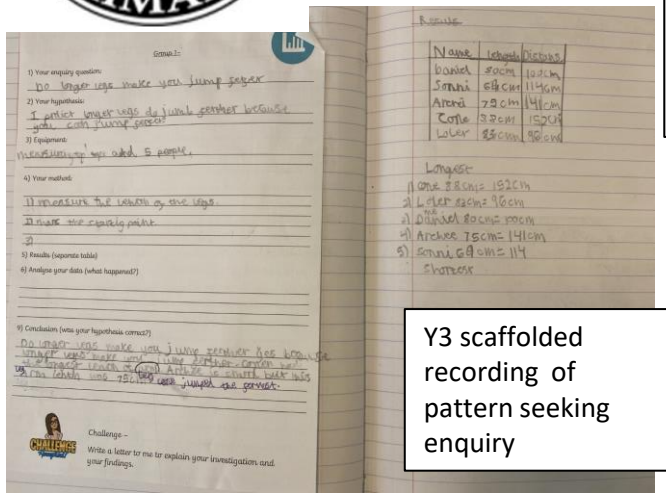
Y3/4 Using the dataloggers to record sound. This was then supported by extracting and evaluating the data produced.

Next Steps: Use the resource review sheets to invest in equipment that will be beneficial for the topic. Match this in line with the Developing Experts suggested resource list.

Science Learning: A

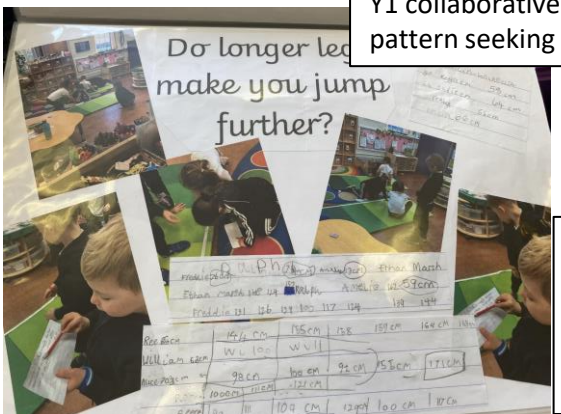
Key Need: Make the teaching of enquiry skills explicit

Children were not familiar with the enquiry skills or how these contributed to a larger investigation

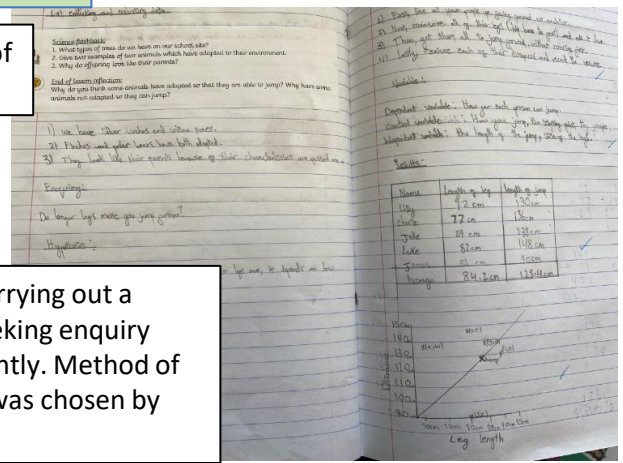


Y3 scaffolded recording of pattern seeking enquiry

Impact: We were able to use Science Week as our springboard for this as across the school we carried out the same investigation but adapted it to suit each key stage. See images for progression in a the enquiry 'Do longer legs make you jump further?'

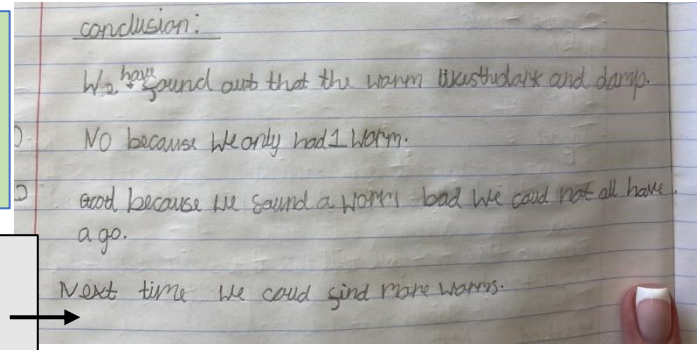


Y1 collaborative recording of pattern seeking enquiry

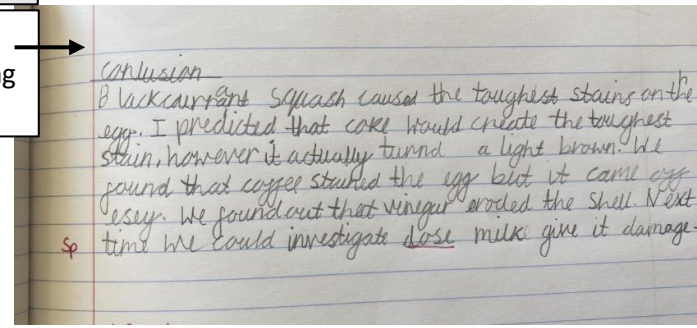


Y6 pupil carrying out a pattern seeking enquiry independently. Method of recording was chosen by the child.

Impact: Children are accessing a wider range of vocabulary linked with the enquiry skills. The example below shows the child now using words such as: *predict, eroded, investigate, cause*. A greater scientific understanding is being gained from teaching these skills explicitly.



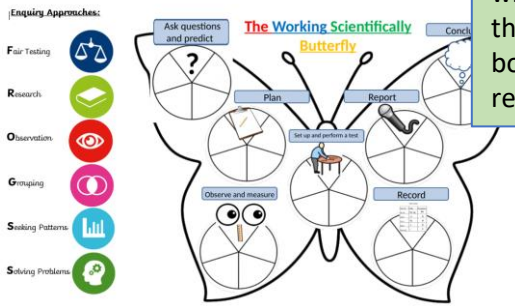
Y4 conclusion written during Autumn 1.



Y4 conclusion written during Spring 2.

Impact: In EYFS, there has been a wider range of science-based continuous provision for the children to explore which follows these working scientifically skills.

Impact: Progression across the skills is evident across the school and from using the PLAN documents, staff are more confident with what came before and what comes next to help build learning on.



Impact: Children shade in a block of the wheel after each lesson based on the skill(s) they have been focusing on. This has boosted children's autonomy and recognition for working scientifically.

Teacher Voice - "My class are confident when talking about the enquiry types and it's really improved their independence when carrying out investigations. There is a lot more learner autonomy which we were lacking before."
Y5/6 teacher

Next Steps: Continue to explicitly teach these enquiry skills and types so that they become embedded across the whole school including recognition of them in EYFS.

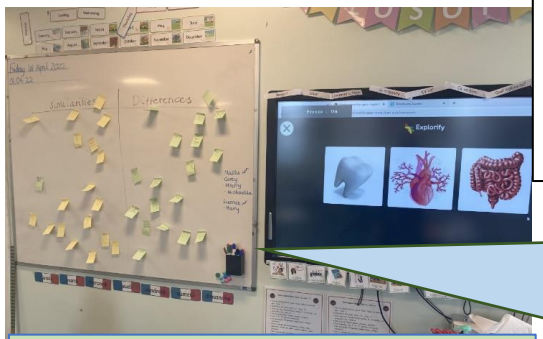
Science Learning: B

Key Need: Adopt assessment methods

Key Need Links – Monitoring Cycle

Staff lacked confidence with making judgements on scientific understanding and skills and wanted some prompting on where to go to get support.

Impact: Children are given a self-assessment task to consider their knowledge before and then at the end of a unit. This also focuses on the vocabulary that will be introduced. Children can revisit prior learning from these objectives and check their understanding against what they should know.

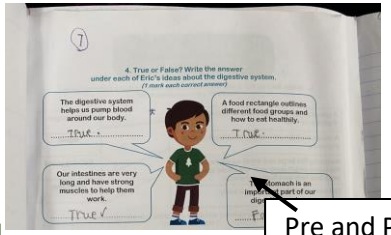


Year 3/4's were to identify similarities (yellow) and differences (green) between the organs.

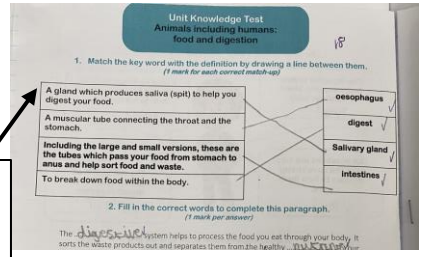
Pupil Voice –
Yellow –
- "All part of human body"

Green –
- "Not all part of digestive system"

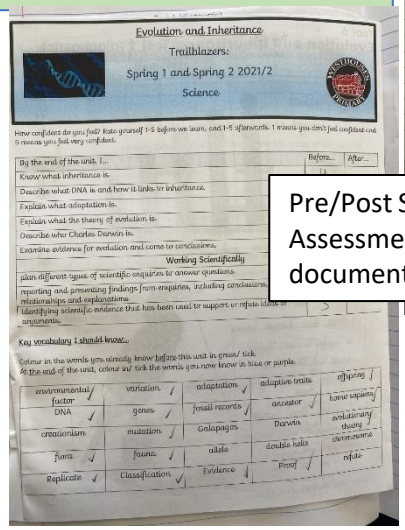
Impact: Explorify activities have supported teachers in identifying misconceptions and recapping previous knowledge.



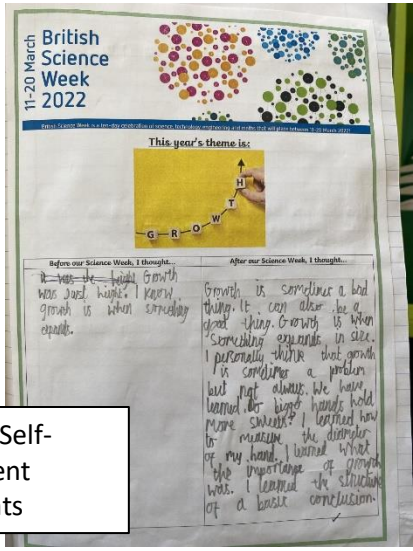
Pre and Post Knowledge tests.



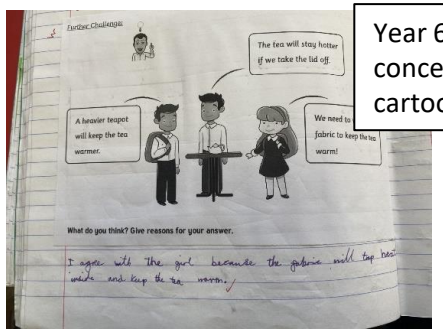
Impact: Completing the knowledge tests at the end of each unit allows teachers to check for any gaps in the learning. These tests also give assessment indicators based on score percentage.



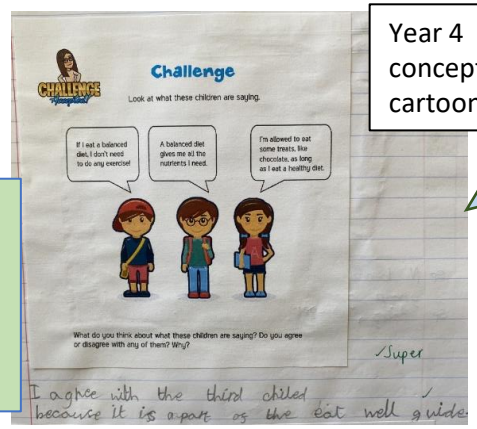
Pre/Post Self-Assessment documents



Impact: Staff use these assessments to inform their planning and adapt planning to reflect confidence levels or check previous knowledge.



Year 6 concept cartoon



Year 4 concept cartoon

Pupil Voice - "Some of these answers are really silly but we like to talk about why they might say these things. We do things like this in maths too,"
Y3 pupil

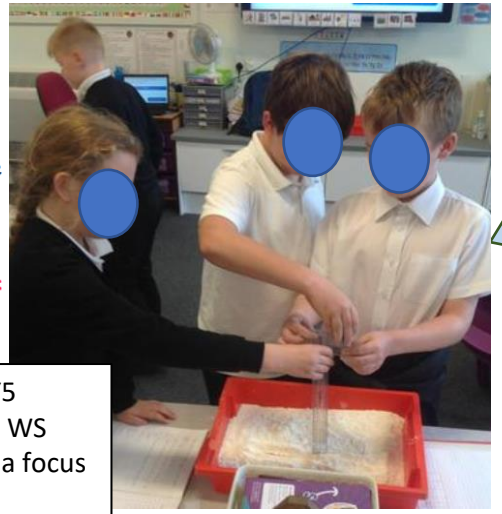
Impact: Children have engaged well with the concept cartoons and staff have found this has opened up opportunities for discussions around misconceptions. These misconceptions are checked using the PLAN documents before teaching.

Animal and Plant Adaptation (Y5)

NC: describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals

TAPS Assessment: interpret and report: life cycles research.

TAPS WS Focused Assessment added to our Long Term Plans based on the links between science units.



Y5/6 carrying out the Y5 Space and Forces TAPS WS assessment which had a focus on recording.

Teacher Voice – "I love that the TAPS (working scientifically) assessments give us indications on what the skills should look like for that year group. We didn't have anything before like that."

Y1/2 teacher

Next Step: As subject lead, I will monitor the use of these assessment methods to ensure they are all being used regularly.

Science Learning: C

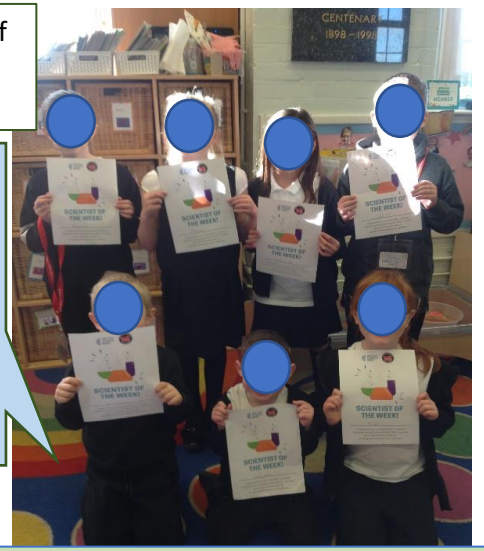
Key Need: Increase children's science capital

Key Need Links – Links to external organisations

We were lacking opportunities to increase 'Science Capital'.

Staff were unfamiliar with the term 'Science Capital'.

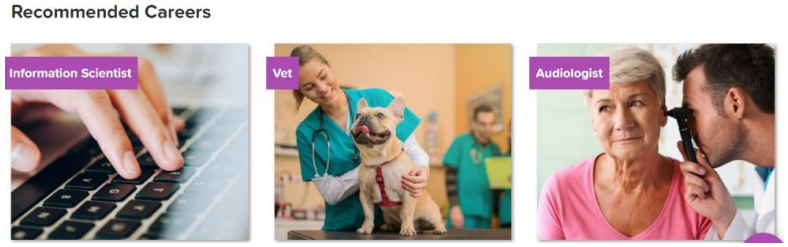
Children awarded 'Scientist of the Week' during British Science Week



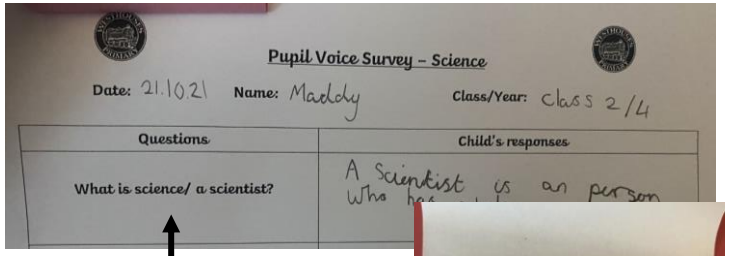
Pupil Voice - "I've enjoyed science week because we have done lots of investigating and I answered lots of questions,"
Y3 pupil

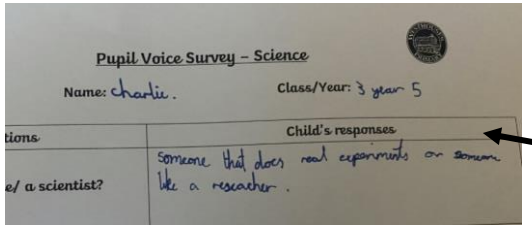
When asked "What is a scientist?" during pupil voice in Autumn a common themed showed the idea that a scientist was a man who makes potions and blows things up…

Impact: Career options on developing experts allow children to see this theme of 'Science is Real' in real life scenarios and make it relevant to them. It has also increased their awareness for jobs that are in a STEM role. We will continue to foster this positive attitude to STEM over the next couple of years and encourage girls to explore these avenues.

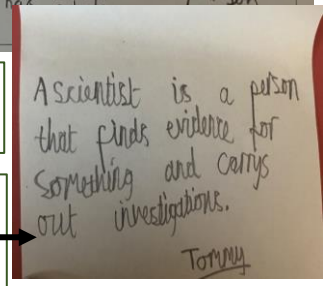


Impact: We have noticed that children are able to recognise themselves as scientists. Children across school have a positive attitude to science.



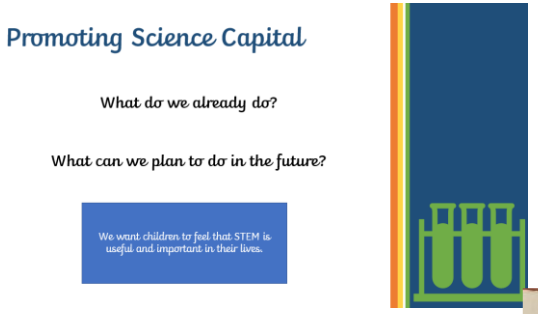


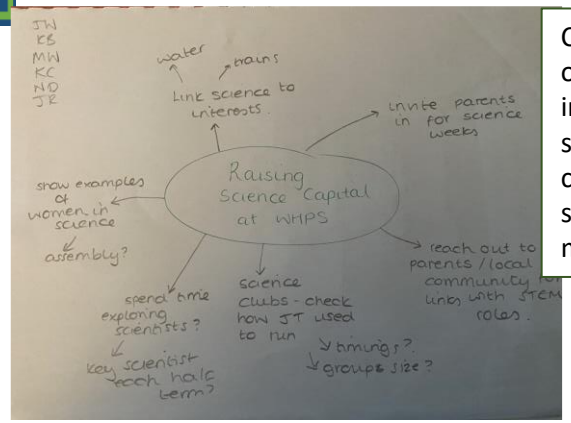
A comment from a Pupil Voice survey at the beginning of the year.



A comment from a class discussion about the role of a scientist 10.05.22.

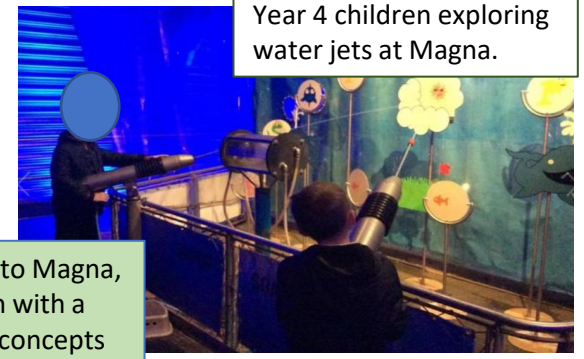
Impact: We used Science Week to promote the idea that 'Science is Real', we wanted to use this as an opportunity to raise the profile of science in school. We had good feedback from children and teachers about Science Week.





Collection of ideas to improve science capital from staff meeting.

Impact: From the brainstorm activity we decided that over the next couple of years, we will aim to: focus on key scientists (modern and non-modern), hold a science fayre, reach out to the local community for STEM professionals. We feel that this would be a good starting point when raising the profile of science.



Year 4 children exploring water jets at Magna.

Pupil Voice - "I now get excited when I hear were doing science"
Y4 pupil

Impact: A KS2 trip to Magna, presented children with a range of scientific concepts in a fun and engaging way. They were given opportunities to ask questions and find out how things worked through self exploratory activities.

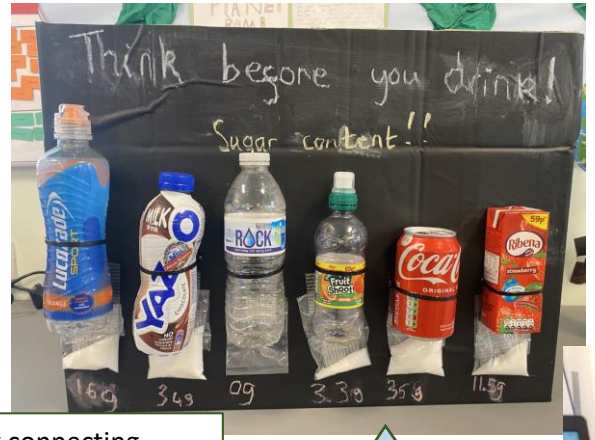
Next Steps: Reach out to the local community and STEM organisation to provide further opportunities to develop science capital.

Wider Opportunities: A

Key Need: Make cross-curricular links to science

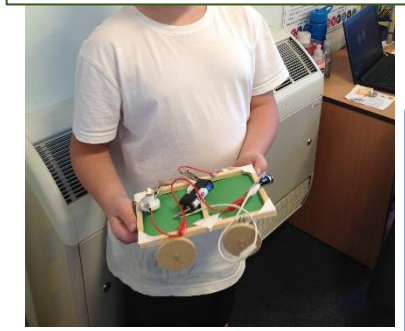
Key Need Links – Raising Science Capital

Impact: Each half term, children will be given a big question to answer at home in a creative, unique way. This example was based on the topic 'food and travel', which linked nicely to our science unit of digestion. This young girl wanted to mix both of these topics together for her task as she found it so interesting!



Topic Traveler Homework connecting science and geography.

Using knowledge of electrical circuits in DT to power their moon buggies (also linked to their space topic).



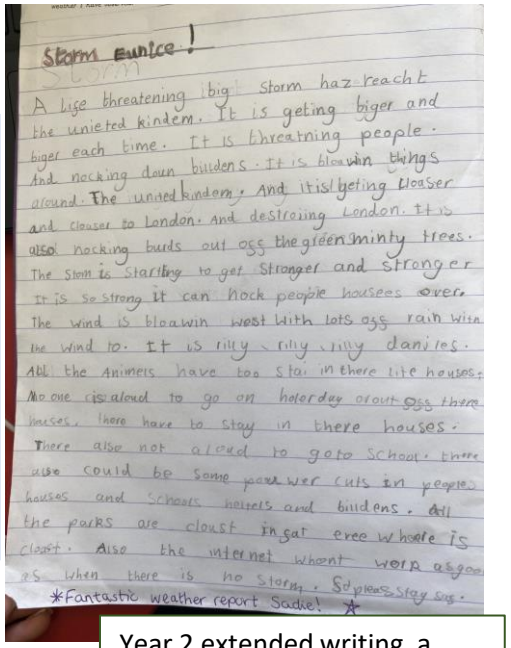
Parent Voice – "I love that *** (daughter) was so into this idea. She couldn't wait to bring it to school and tell everyone about what she'd found out. I even learnt a thing or two!"

Impact: We had a staff meeting at the beginning of the year to mind map any possible links we might be able to make to science. The examples given were links that were meaningful in the development of knowledge and skills. As we follow a 2 year cycle, it meant certain skills (electricity) could be revisited even when it wasn't due to be taught this academic year.

No examples of extended writing in science before.

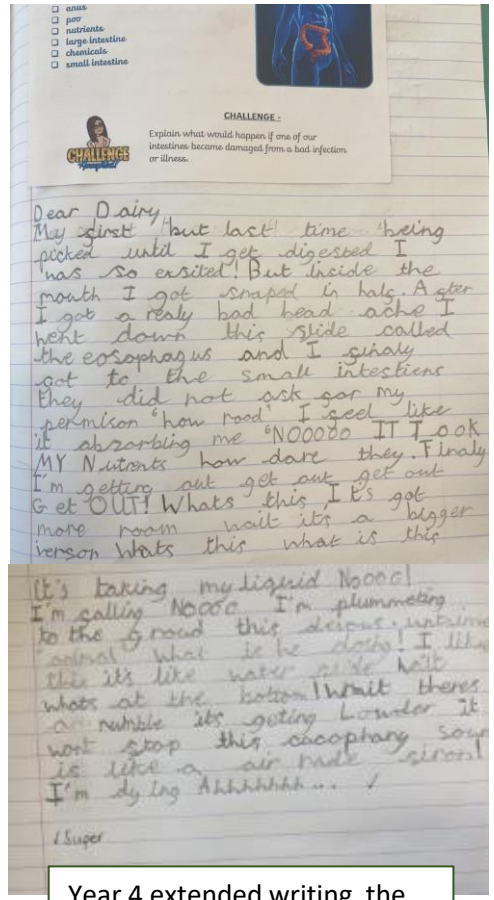
Impact: Showing examples of writing in science has helped children to use their key vocabulary independently and has linked their history/geography topics where possible. It has allowed for children to engage with the learning in a different way and make certain concepts memorable. Children have been excited by this.

Using knowledge on electrical circuits to support and challenge learning of crumbles in computing.



Year 2 extended writing, a weather report on Storm Eunice (linking to seasonal change topic).

Linking science into forest school lessons by finding out the age of a tree.



Year 4 extended writing, the journey of food through the digestive system.

Pupil Voice - "This was my favourite lesson in science this year!"
Y4 pupil

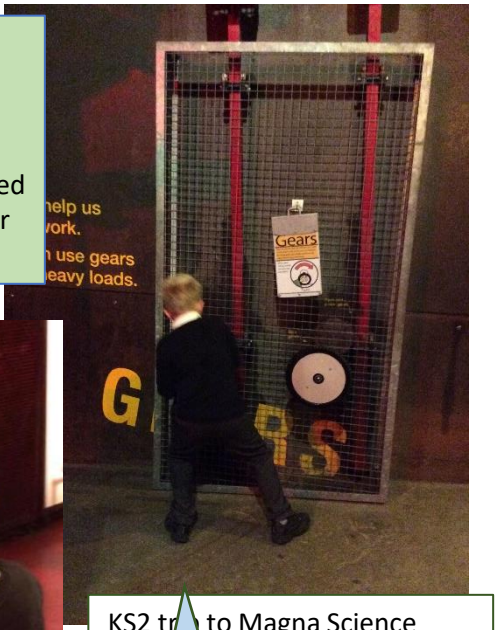
Next Steps: Arrange a staff meeting at the beginning of the next academic year to do the same activity, making meaningful links between topics.

Wider Opportunities: B

Key Need: Make links to external organisations

Impact: Children in KS2 were able to explore science as part of 'STEM' and we spent some time discussing what this means. Children were able to transfer skills they already had to help them solve the space challenge and they were able to see how science relates to the real world.

Impact: Children were immersed in a world of science. This promoted curiosity and interest within the area of science and helped to raise the profile within our school.



KS2 tr to Magna Science Adve re Centre.

Pupil Voice – "Some people rushed off ahead, but I wanted to read all the information boards because it was so interesting. I remember so many facts"
Y4 child, quote taken from trip recount in English

Pupil Voice – "We got to see how the fire engine works, it was funny. The noise made me jump"
Y1 child

Impact: Children in KS1 were visited by the local fire station to have a question-and-answer session. Children were able to think scientifically and ask scientific based questions. KS1 teachers gave feedback that the children got a lot from this experience and really enjoyed it.

Impact: We have made a connection with the local community by having access to a plot on the allotment next to our school. This is something we have been wanting for a while and with our noticeable effort with outdoor learning and growing, we have been fortunate enough to be given the opportunity.

Next Steps: Reach out to the local community and STEM organisation to provide further opportunities to develop science capital.