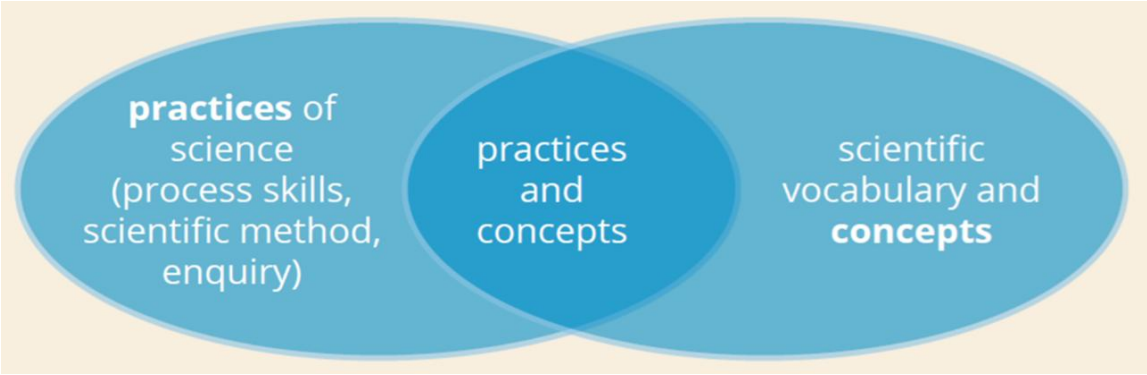
APiPS collection: Practical work

This Assessment and Progression in Primary Science (APiPS) collection includes examples of practical work. Sometimes practical work might be used to support the development of science conceptual understanding, for example, when the focus is on learning the names for things or in the use of process modelling activities. Other times practical work might be used to help develop science enquiry skills (the practices of science). Sometimes practical work can help with both: to apply science skills and build conceptual understanding, for example when drawing conclusions from enquiries.



This collection aligns with the Nuffield practical work project findings which propose teachers choose **a clear purpose** for practical work. This also aligns with the Teacher Assessment in Primary Science (TAPS) project, which recommends that only **one part of each enquiry** is selected as the focus for any pupil recording, with the other parts being more discussion-based. Hyperlinks are included where activities align with TAPS lesson plans.

Thanks go to the teachers and schools involved in the *APiPS SSERC Meets* and those taking part in the *Inspiring a Sustainable Approach to STEM* programme for their support in the creation of this collection.

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For queries or to share further examples, please email primary.science@bathspa.ac.uk

Explore and choose materials

scientific vocabulary and **concepts**

‘There are lots of different materials and they all feel different’

‘My clothes are all made from material’

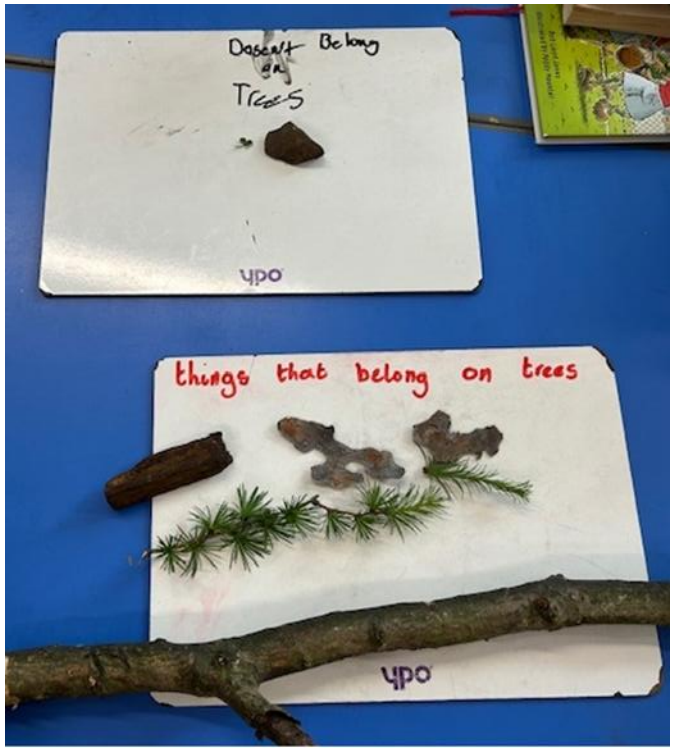
‘I like material because it is soft and cosy’

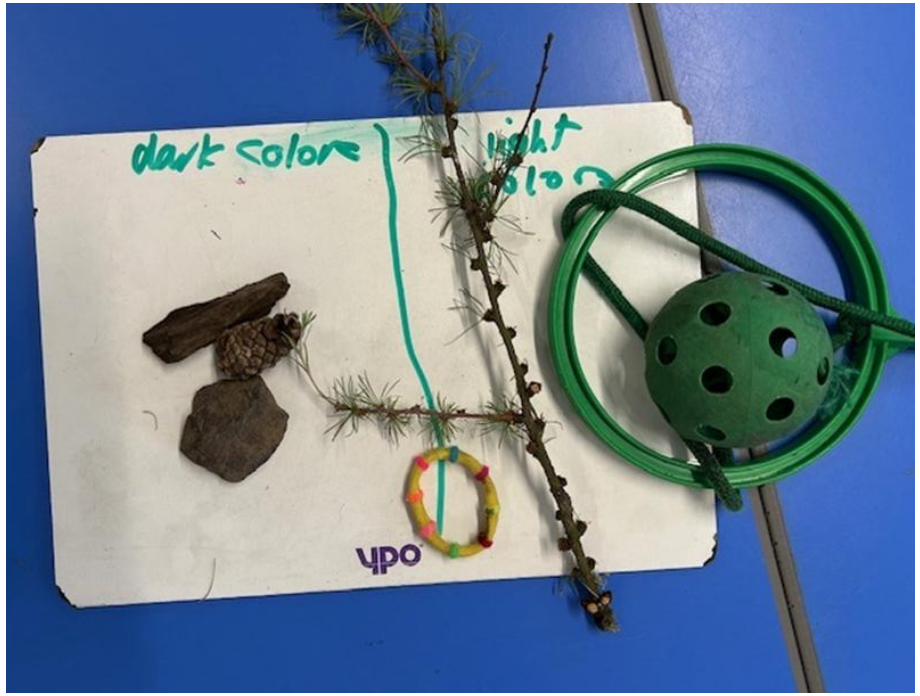
P1/2 (age 4-6) Materials topic

practices of science (process skills, scientific method, enquiry)

From exploring to classifying

After an outdoor materials hunt, we tried different ways to sort and classify the items we had collected.





P5 (age 8-9) Skills focus

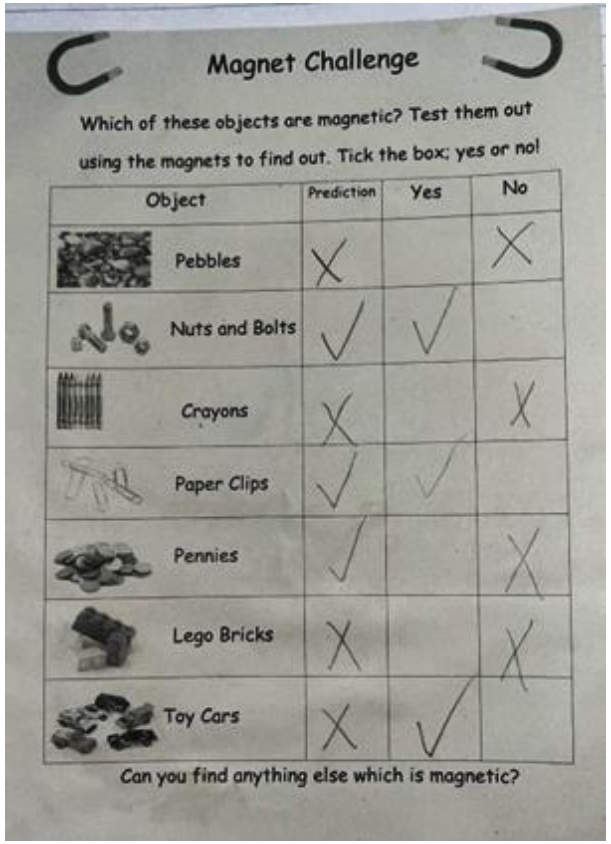
Exploring magnets and magnetic materials

scientific vocabulary and **concepts**

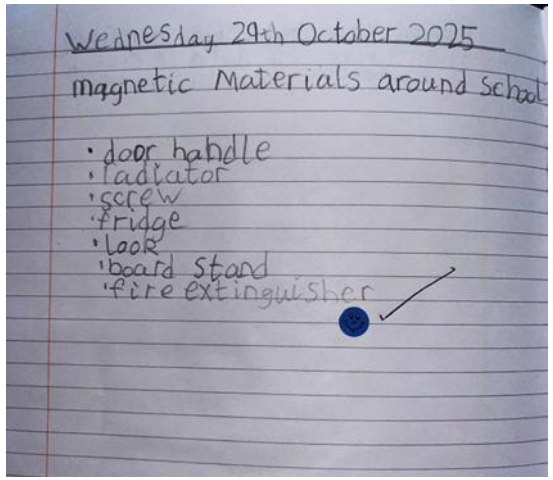
'We selected things from around the school to see if they were magnetic'

'Magnetism takes place even through sand and water'

'We put cornflakes in a bag with some water and put a magnet on top of it and we were able to see iron in the water'



'Some little bits of the toy car could be magnetic'



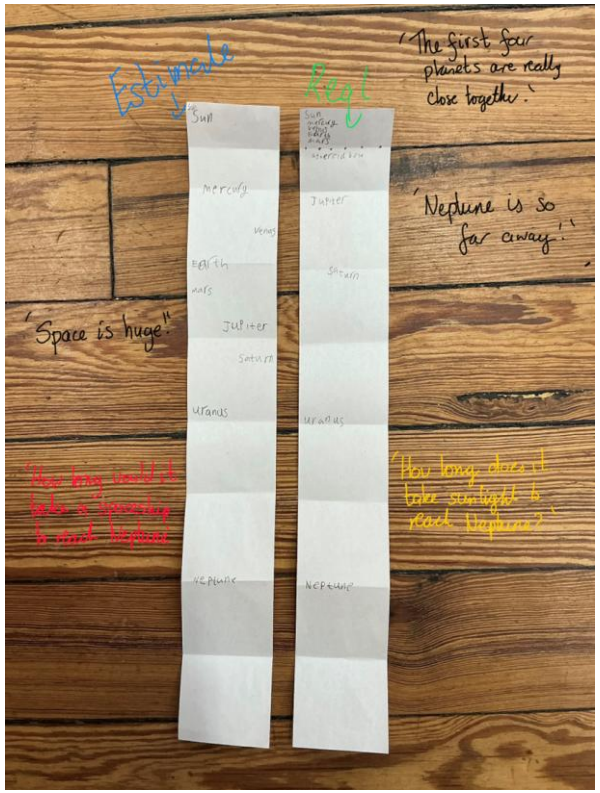
'The paper clips were the most magnetic'

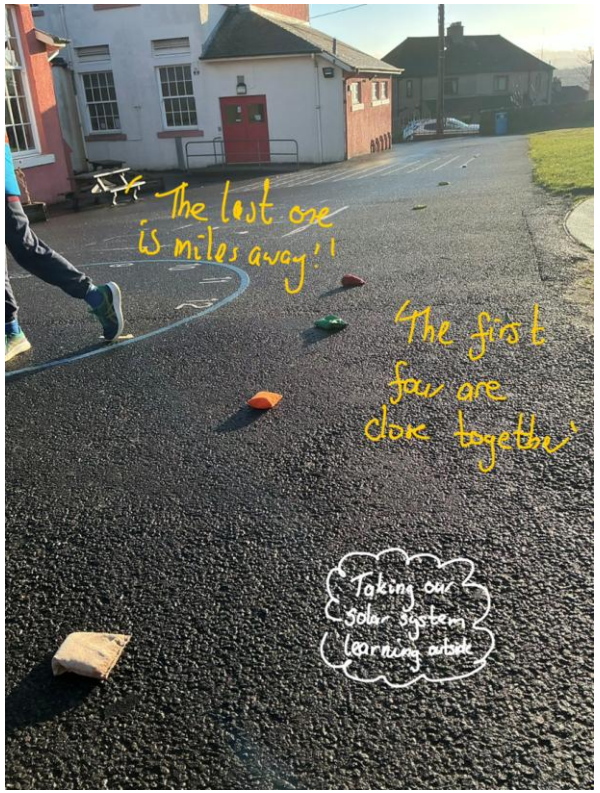
P3/4 (age 6-8) Magnets topic

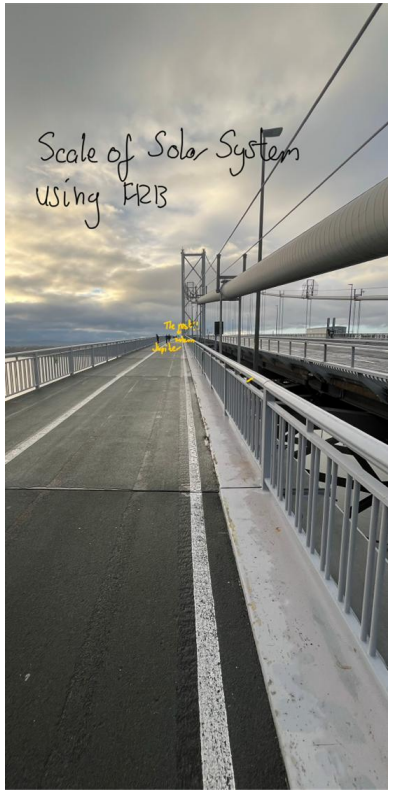
Modelling the scale of the solar system

scientific vocabulary and **concepts**

The paper folds solar system was not enough to see the scale, so we counted steps and placed beanbags for planets, but our playground was not big enough either. We asked permission to use the nearby Forth Bridge and the children became planets. Those within the asteroid belt could talk to each other, the outer planets were too far away to see (with an adult nearby).





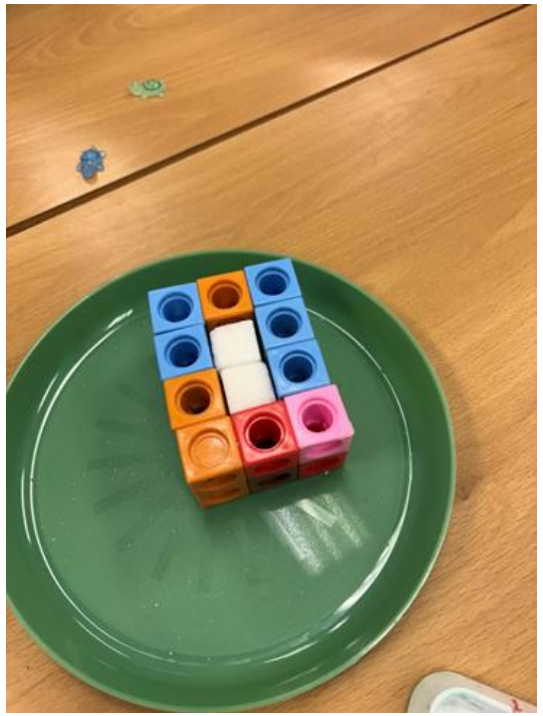


P5-7 (age 8-11) Space topic

scientific vocabulary and **concepts**

Modelling sink holes

The children could see the ground ‘sink’ when the ‘water pipe’ pipette burst, helping them to understand something that they might not see underground. They could observe and describe change, using words such as dissolve and collapse.

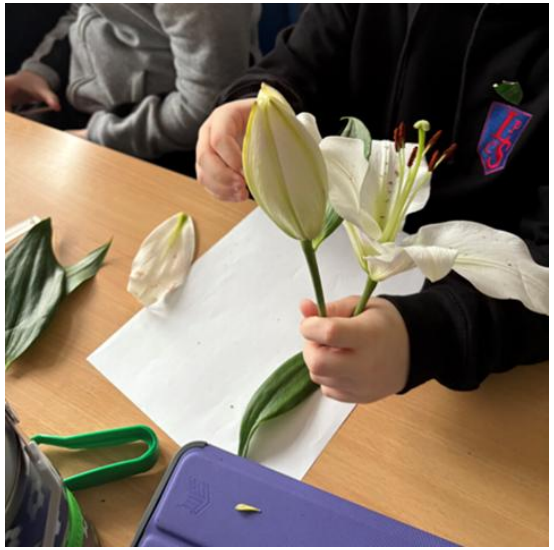


P4/5 (age 7-9) Natural disasters topic

Exploring real flowers

scientific vocabulary and **concepts**

Using real flowers (lilies) and magnifying glasses/microscopes increased curiosity and motivation. Children observed closely then dissected and labelled the parts of a flower, using scientific vocabulary such as stamen, anther, filament, stigma, style and ovary.



Waterproof testing for different ages

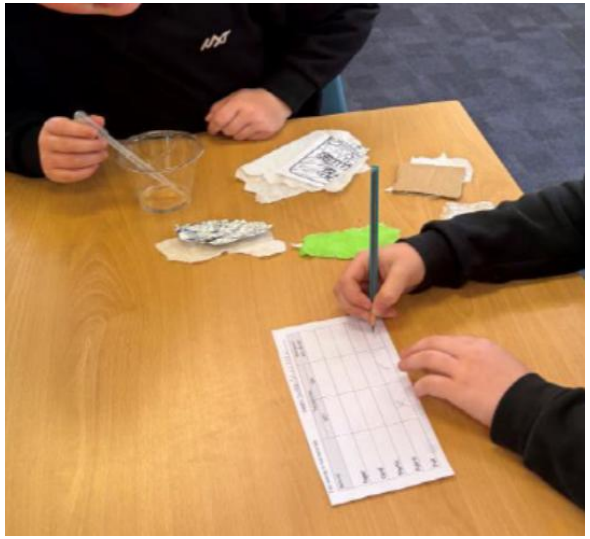
practices and concepts

Comparing the waterproofness of materials, two at a time.

‘The plastic kept my teddy dry. The water rolled off the paper’

‘The bubble wrap is waterproof because the paper towel didn’t get wet’

P2/3 (age 5-7)



Testing a range of materials

‘Waterproof materials stop water going through them’

‘The material (fabric) soaked up the water but the plastic didn’t’

‘That material is really strong (corrugated cardboard) but it isn’t waterproof’

‘Plastic is waterproof because it keeps you dry and water doesn’t get through it’

P4/5 (age 7-9)

Testing Mackintosh layers

P6-7 (age 9-11)

Oil clean up

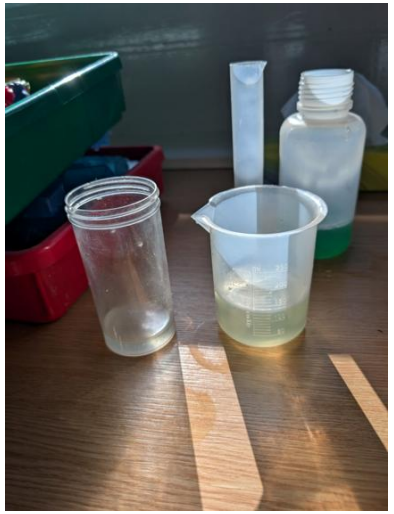
practices and concepts

As part of our oceans topic, we looked at pollution like oil spills. We discussed how this could affect sea-life and how such spills could be cleaned up.

- “You could scoop it out with a digger.”
- “Maybe a big sponge could soak it up.”
- “You could use soap to clean the fish and birds.”

Each group was given a container with water and oil and a different material to help soak it up, cotton wool, dish soap, sawdust and sand. They had to predict which material would be the most effective at removing the oil. It was agreed that the cotton wool would be the most effective as it soaked things up. I introduced the term ‘absorbs’.

- “Cotton wool is good because it soaks things up.”
- “Sand won’t work because there’s already sand at the bottom of the ocean and it doesn’t help.” “Yeah and look the oil is on the top of the water.”
- “Sawdust might float because wood sometimes floats, like sticks so maybe it’ll get the oil because it’s on the top.”
- “(dish soap) Maybe to wash the things that have oil on them but it would mix in with the ocean and not work.”



We found out that scientists are developing special sponges to help absorb the spill.

- “That’s like the cotton wool, it soaked up the oil.”

P2 (age 5-6) Oceans topic

Mummified apples

practices and concepts

Using slices of apples, we placed our “mummies” in different materials: salt, sodium bicarbonate, a mixture of salt & sodium bicarbonate, vinegar, and a plain/control group; for each material, one apple slice was wrapped in gauze beforehand, and one was unwrapped to allow for comparisons. Children predicted which material would dry out the apples most/least and which would have the most/least decay. We observed and measured (mass) over 8 days.

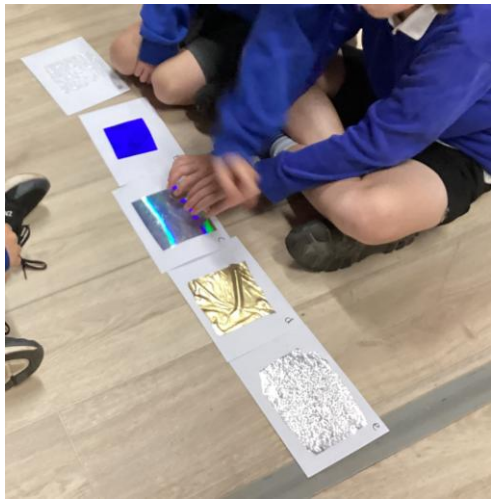
P5-7 (age 8-11) Life in the past topic: Ancient Eqypt

Exploring light and reflective materials

practices and concepts

Which material is the best reflector?

Children discussed how to test reflectivity using a torch and target. They put the materials in order, from 'Most reflective' to 'Least reflective'. The children compared their results and found that, though there were differences in the order of materials, they had all agreed on the 'Most reflective' and 'Least reflective' materials: Smooth, shiny mirror card was the best. Dull, bumpy fabric was the worst. We linked this to observations in the real world, discussing the use of reflective strips on clothing.



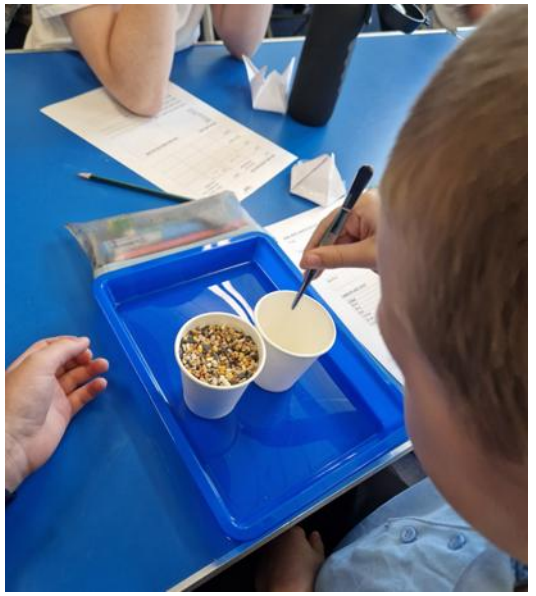
P6 (age 9-10) Famous Scots topic

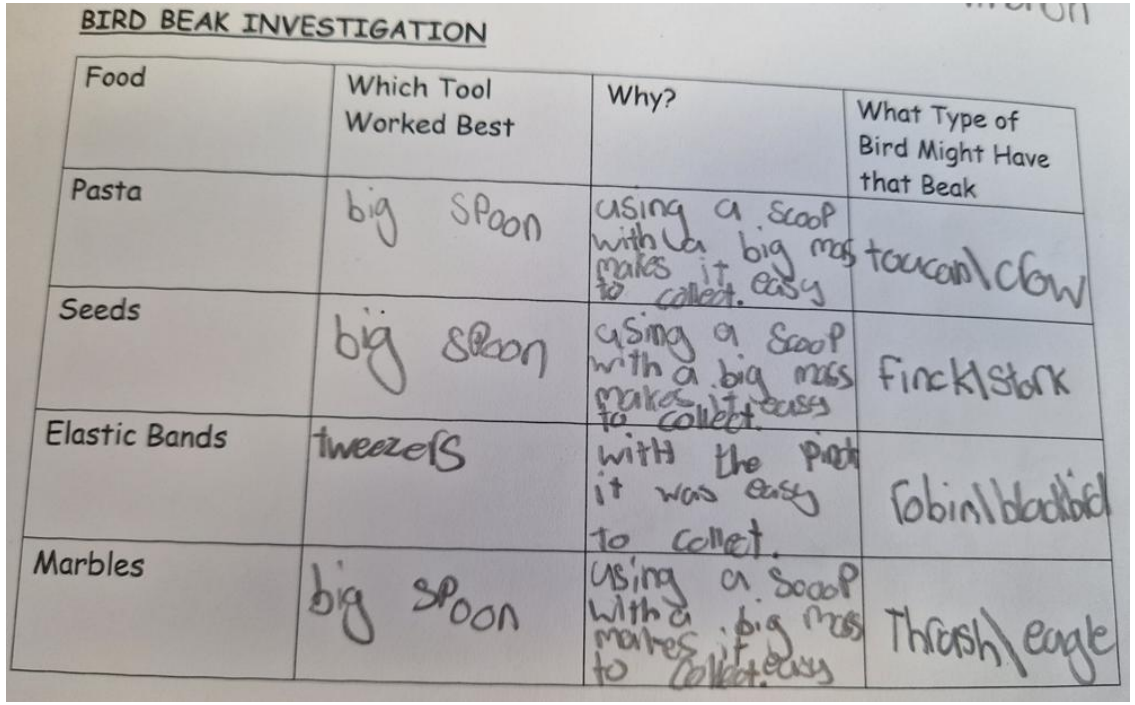
Building task: Applying learning to make a **kaleidoscope** (invented by local Victorian scientist David Brewster)

Modelling bird beaks

practices and concepts

After BBC video clips showing real-life examples of animal and plant adaptations, the Bird Beaks practical was introduced. The pupils used tools (tweezers, spoons, chopsticks) to mimic different types of animal beaks and investigate how adaptations affect feeding success, comparing how much of each food was collected by different ‘beaks’. Discussion and reflection linked the activity back to survival and extinction.





BIRD BEAK INVESTIGATION

Food	Which Tool Worked Best	Why?	What Type of Bird Might Have that Beak
Pasta	big spoon	using a scoop with a big mas makes it easy to collect.	toucan/crow
Seeds	big spoon	using a scoop with a big mass makes it easy to collect.	finch/stork
Elastic Bands	tweezers	with the pair it was easy to collect.	robin/bluebird
Marbles	big spoon	using a scoop with a big mas makes it easy to collect.	Thrush/eagle

P6 (age 9-10) Forces topic