APiPS collection:
Science skills focus

This Assessment and Progression in Primary Science (APiPS) collection includes examples of science enquiry activities. Such activities provide an opportunity to apply previously learnt skills, and/or focus teaching and learning on the development of particular parts of the enquiry.

This collection aligns with the Teacher Assessment in Primary Science (TAPS) project, which recommends that only **one part of each enquiry (Plan, Do or Review)** 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. New examples will continue to be added to the SSERC website as they are co-created with teachers from across Scotland.

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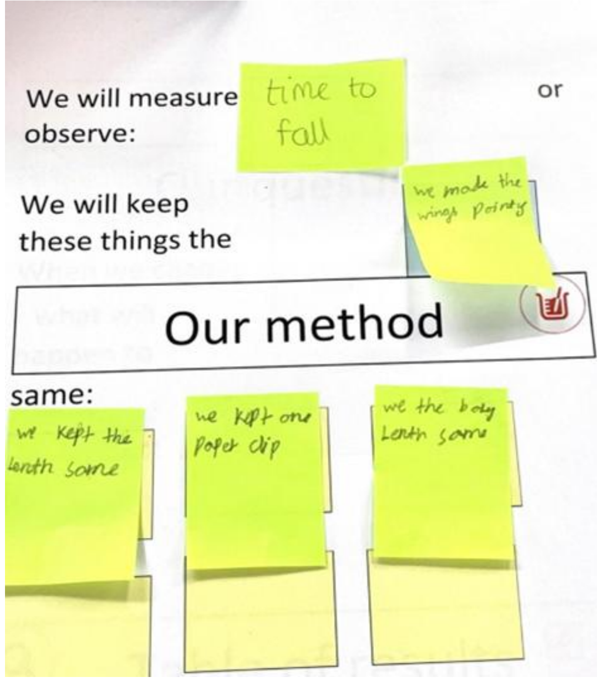
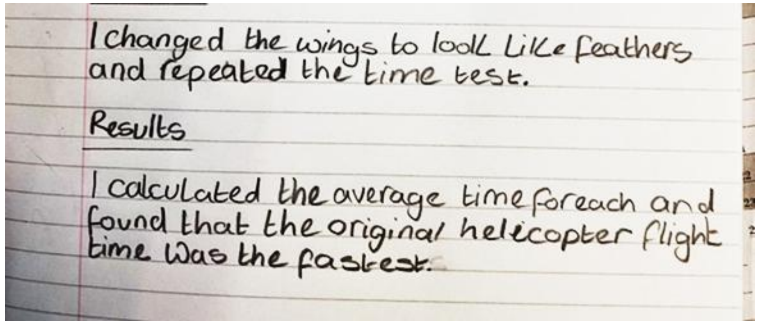
For queries or to share further examples, please email primary.science@bathspa.ac.uk

Changing one thing on the paper spinner

Which spinner will take the longest time to fall?
Pairs used post-it planners to consider possible variables to change. They picked one to change and the rest would be kept the same. They compared their changed spinner to a control model spinner by testing each 4 times.

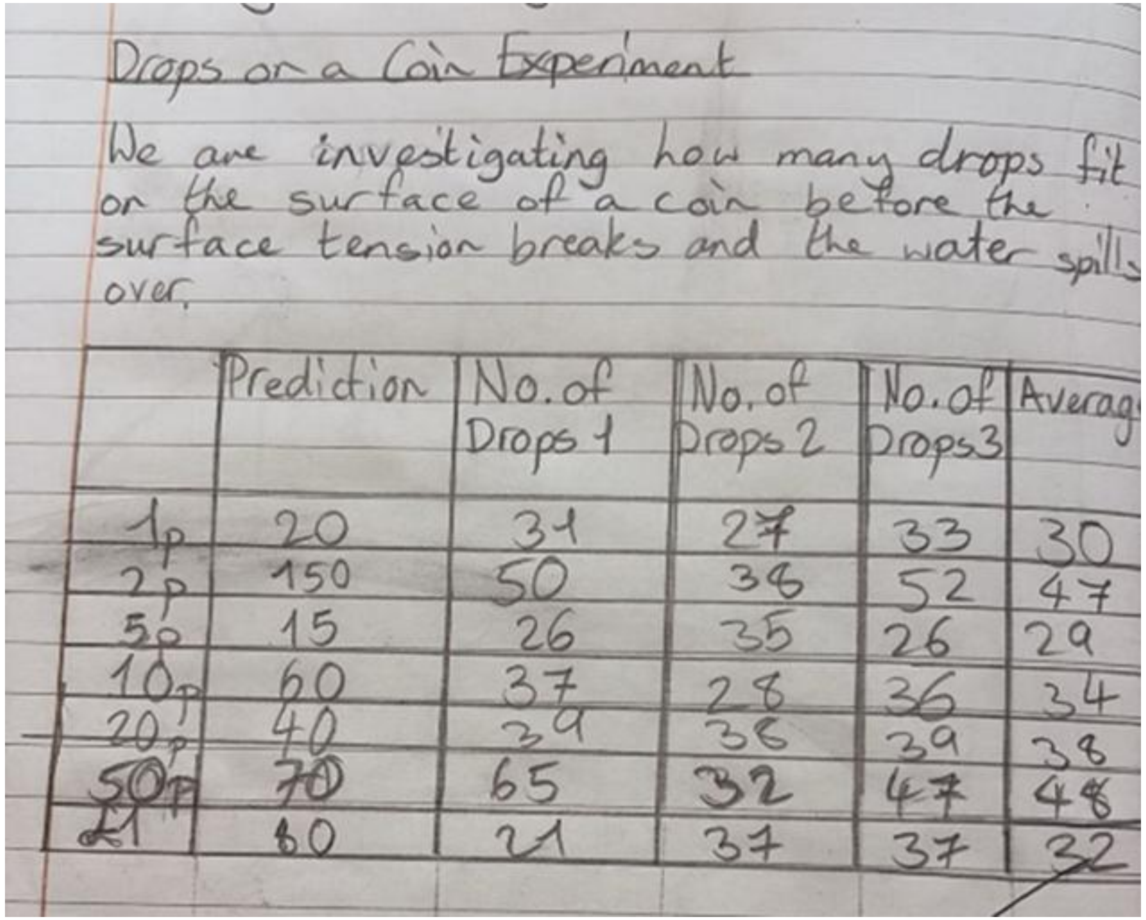




P6 (age 9-10) Forces topic

Recording results focus

For Drops on coin, the class investigated how many drops of water could fit on a coin before spilling over. We recorded results in a table to compare different coins.



Drops on a Coin Experiment

We are investigating how many drops fit on the surface of a coin before the surface tension breaks and the water spills over.

	Prediction	No. of Drops 1	No. of Drops 2	No. of Drops3	Averag
1p	20	31	27	33	30
2p	150	50	36	52	47
5p	15	26	35	26	29
10p	60	37	28	36	34
20p	40	39	38	39	38
50p	70	65	32	47	48
£1	80	21	37	37	32

P7 (age 10-11) Skills focus

Catapult playground graphs

Focus on measuring:
The children made catapults and measured how far they fired a projectile. They measured distances in metres and centimetres, and recorded their results as a radial graph, using chalk on the playground. They then formed a human bar graph according to the furthest distance they had achieved (up to 1m, 1-1.5m, 1.5-2m and so on).

P5 (age 8-9) Forces topic

String phone conclusions

Children explored the impact of using different materials for the 'wire' (string vs wool), length of 'wire', and different sizes of 'receivers' (yoghurt pots), using their findings to design what they thought would be the most efficient string telephone.

"The sound doesn't travel as well when you touch the string, as it stops the vibrations."

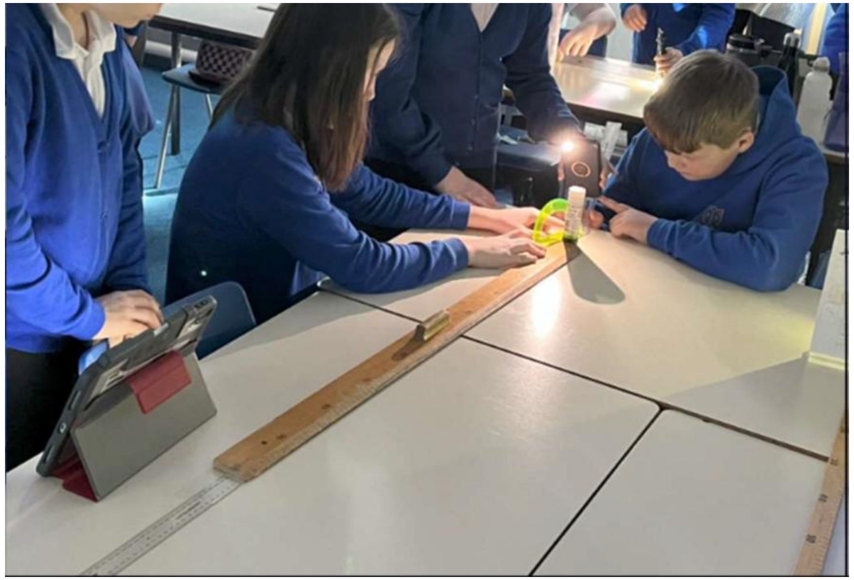
"The telephone works best with string not wool and the bigger the cup the louder the sound is."

"Even when you attach a third telephone it still works as the vibrations can travel along both pieces of string."

P5-6 (age 8-10)

Presenting shadow data

Children explored how different variables seemed to affect the length of the shadow created when shining a light on an object. They decided which independent variable they would investigate – distance from light, or angle of light. (The other variables would remain consistent as a control variables). Children worked in groups to measure shadow lengths and record the data in a table, which was then used to create a digital line graph using the Numbers app on their iPads, which they presented to the rest of the class.



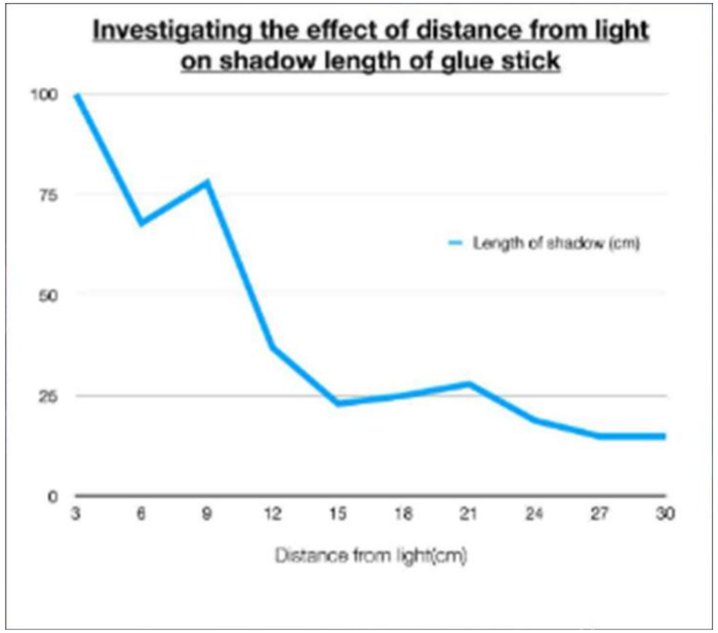
STEM Investigation – Investigating Shadows – Phase Two

Object measured: glue Stick   Object height: 11cm

What will stay the same (Control): angle   Control variable measurement: 40°

What will change each time (Independent variable): distance

Distance (Independent)	Length of shadow (Dependent)
3cm	1M
6cm	68cm
9 cm	78cm
12 cm	37cm
15 cm	23cm
18 cm	25cm
21 cm	28cm
24 cm	19cm
27 cm	15cm
30 cm	15cM



P6 (age 8-10) Light topic

“The closer the light was the shadow was longer. As the light gets further the shadow gets shorter.”

Exploring water

Before this activity, children had shown a strong interest in water play and exploring how things move, noticing changes in speed and direction. Practitioners observed this curiosity and supported it by introducing resources that encouraged further investigation, such as tubes, channels, and objects that roll or slide. As the play developed, adults supported children in testing their ideas, predicting outcomes, and problem-solving when challenges arose. Open-ended questions were used to prompt thinking, such as wondering what might happen if the guttering was higher or at a different angle.

The children demonstrated a deeper understanding of how water moves by independently adjusting the height and angle of the guttering to change the speed and direction of flow. They began to make predictions, such as recognising that raising one end would make the water travel faster and tested these ideas through experimentation.

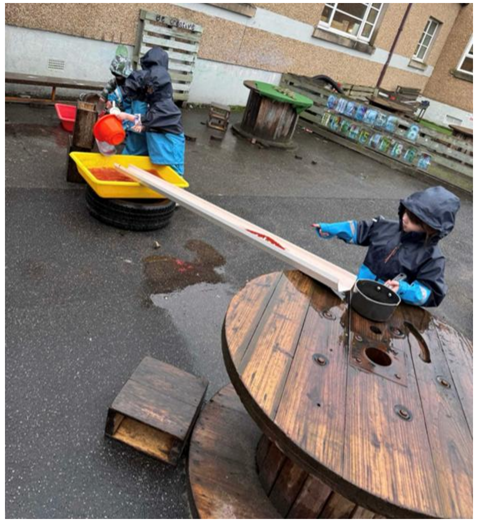
Nursery (age 3-4) Water – cause & effect

Applying learning to other contexts

Following the outdoor water play experience, children were able to transfer and apply their learning within the indoor construction area. A week later, they independently explored similar concepts using ramps, cars, guttering, and shelving to investigate movement, speed, and distance.

The children demonstrated a growing understanding of cause and effect by adapting the height and angle of the ramps and observing how this changed how far and fast the cars travelled.

This experience highlights how prior learning had been embedded, with children making meaningful connections between water flow and object movement. They continued to develop early scientific thinking, numeracy language, and collaborative skills, working together to share ideas and extend their play in a new context.



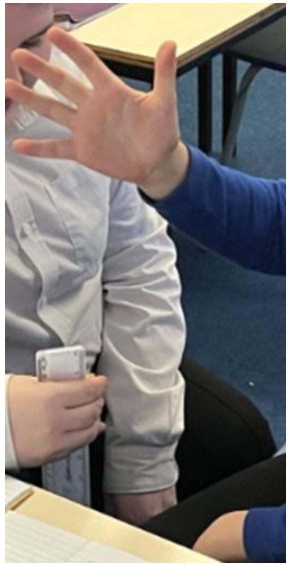
Nursery (age 3-4) Water – cause & effect

Reaction catch

After our initial 'ruler catch' experiment (which aimed to determine if reaction times improved with repeated attempts – with varied results), learners were given the opportunity to design their own follow-up investigation. Working in small groups, they explored different variables e.g. using dominant or non-dominant hand, standing/sitting, being distracted by counting/singing whilst waiting for the ruler's release.

"The results show the dominant hand is faster"

P7 (age 10-11) Body works topic



Group1 Dominant hand	Group 2 Non Dominant hand
3cm	23cm
4cm	17cm
26cm	16cm
13cm	26cm
12cm	23cm
24cm	17cm
21cm	22cm
17cm	12cm
16cm	17cm
+ 22cm	+ 27cm
158cm	200cm

158cm ÷ 10 = 15.8cm
16cm

200 ÷ 10 = 20.0
20cm

		Attempt number	Ruler measurement (cm)
GROUP 1:	Dominant	1	3cm
		2	4cm
		3	26cm
		4	13cm
		5	12cm
		6	24cm
		7	21cm
		8	17cm
		9	16cm
		10	22cm
		Average	16 cm
GROUP 2:	Non Dominant	1	23cm
		2	17cm
		3	16cm
		4	26cm
		5	23cm
		6	17cm
		7	22cm
		8	12cm
		9	17cm
		10	27cm
		Average	20cm

Supporting younger learners

P7 then used the reaction times experiment as the basis for their Young STEM Leaders project – tweaking the design of their experiment based on their own findings (as well as making it more P1-friendly, such as allowing both hands to catch the ruler if required, etc.) and using the investigation as the context for procedural writing.

P7 delivered a short lesson on the nervous system and reaction times to their P1 buddies before directing them through the ruler catch investigation.

P7 (age 10-11) Body works topic