



Recruitment now open

- Focus4TAPS is a 3-day training program to support primary science teaching and assessment, based on Teacher Assessment in Primary Science (TAPS) research
- EEF found strong evidence of a **positive impact** on pupil attainment and teacher confidence
- New EEF trial will now test effectiveness at a bigger scale



Focus4TAPS

Focus4TAPS

Implementation cost



Evidence strength



Impact (months)

+2 months

 Research Results

New primary science Focus4TAPS EEF trial

- Funded by Education Endowment Foundation, evaluation by NatCen
- EEF trial: schools randomly allocated to intervention or control group

- 300 schools in 13 regions:

Newcastle, Sunderland, Sheffield, Liverpool, Bolton, Nottingham, Derby, Wolverhampton, Suffolk, Essex, Portsmouth/Southampton, South-East London, West London

3 CPD days for Y5 teachers and science subject leaders:

- **Intervention group** CPD 2024-25: heavily subsidised CPD - one off £150 fee per school for 2 teachers (science lead and Y5 teacher) for all 3 days in 2024-25, plus £200 thank you payment to school at end.
- **Control group** offered CPD 2025-26: £500 thank you for waiting

Outcome measures:

- Y5 pupil attainment and attitudes – June 2025 for all schools
- Teacher surveys, plus some invited case study schools

Recruitment now open

We are lucky to have two groups recruiting near here:

- Newcastle and Sunderland

Only 300 places across England, so sign up for more info now!



Register your interest for
Focus4TAPS professional
development



<https://forms.office.com/e/EVK1XeYNfH>

Outdoor Science

RJ198/C265

21st March 2024

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National STEM Learning Centre and Network



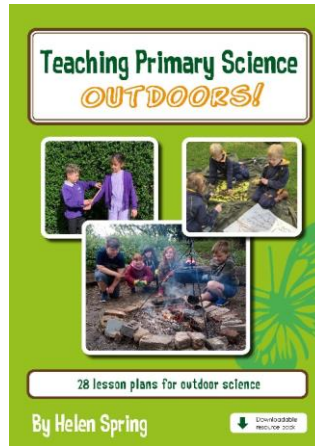
Intended learning outcomes

By the end of this session, you will be able to:

- Explore how Subject Knowledge and Working Scientifically curriculum objectives can be taught in the outdoor setting
- Consider assessment in the outdoor setting
- Consider how to record outdoors
- Explore resources to develop and support outdoor learning.



Spring Learning



What is Outdoor Learning?

Learning Outside the Classroom (LOtC) is the use of places other than the classroom for teaching and learning. It is about getting children and young people out and about, providing them with challenging, exciting and different experiences to help them learn.

Council for Learning Outside the Classroom



Outdoor learning is that which takes place beyond the four walls of the traditional classroom environment.

Association for Science Education (ASE)



Why go outside anyway?



5 Characteristics of Effective Outdoor Learning

1. one that supports children in making the transitions from within the classroom to beyond it
2. one where there is both regular and frequent use of the outdoor setting.
3. fully prepares children for working in the outdoors by addressing the basic psychological and physiological needs of the children before leaving the classroom
4. the teachers manage the transition back to the classroom as consciously as they manage the move to the outdoor setting
5. a shift to weaker framing

HOATH, L. (2015).



Teaching science outdoors in your school

- What is going well?
- What challenges do you face?
- What questions do you have?



Materials Y2



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Health and Safety in Primary Science

CLEAPSS www.cleapss.org.uk

There is an annual password which can be found on the latest newsletter. Email membership@cleapss.org.uk to check that you are a member.



Be Safe book www.ase.org.uk



Activity - Exploring materials for a pixie house

Before lesson - check for litter especially near bench

Resources needed

In an ideal world, this lesson would take place in a forest area, where there are lots of sticks, leaves and other natural materials around. Additional materials should include different types of cloth (cotton, felt, etc.), plastic carrier bags or cling film, cardboard and paper towel.

What to do

*John to work with TA
Take Abby's epi pen (wasps)*

Prepare the materials you want the children to work with.

Discuss what children already know about the materials available to them.

Explain your health and safety rules. These might include the area that the children are allowed to work in and the things they can and cannot pick up.

If possible, put the lesson into a context, such as a story or topic.

Set the task – Can you make a house for a pixie? Discuss what the requirements are for your pixie... Does the pixie need to be warm, dry, protected from predators? You can adapt this depending on the context and the materials available.

Give the children time to explore with the materials available to them and to build a shelter for their pixie.

Children should then carry out simple tests to find out whether the requirements set were met. This is likely to include whether the pixie house is waterproof, warm or windproof.

Ensure that children wash their hands thoroughly after working outdoors.

Go from the fence to the wall. Do not pick the orange berries.



Definitely outdoors...



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Could be outdoors...



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Planning for outdoor learning

- Take a copy of the curriculum
- Highlight the obvious opportunities for outdoor learning in your year group (eg – identifying trees)
- In a different colour, highlight the less obvious opportunities for outdoor learning
- Choose one objective and plan how you will teach it outdoors. What barriers need to be overcome in your context?



Planning for outdoor learning

Plants – Year 3

Pupils should be taught to:

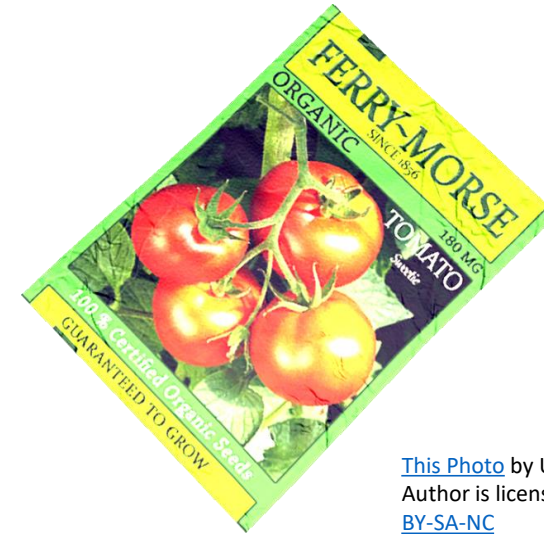
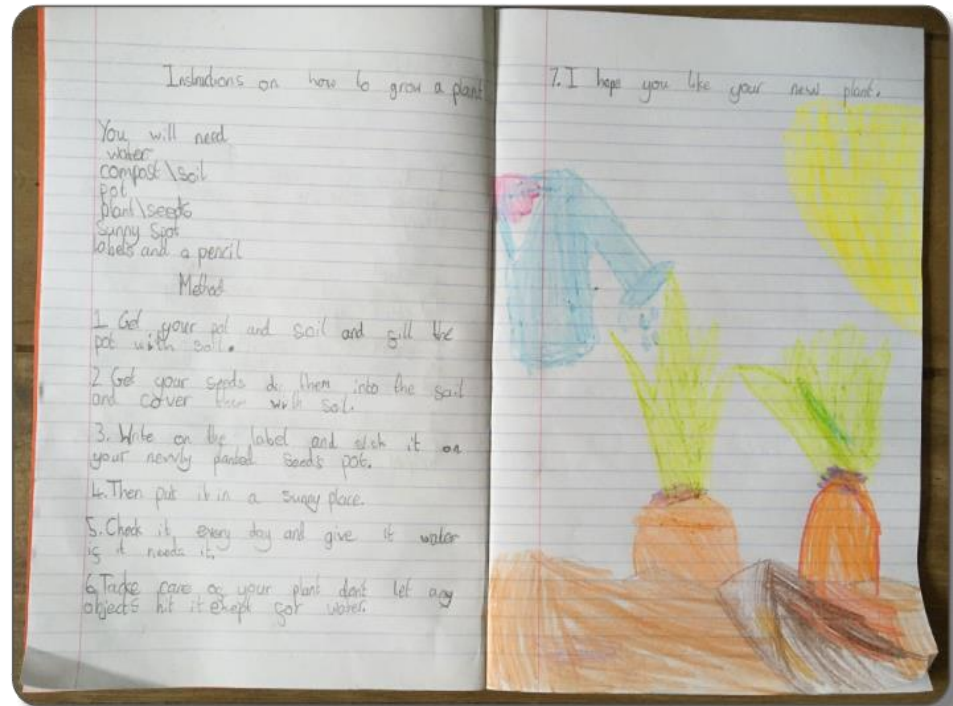
- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal



Plants



Plants



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Planning for outdoor learning

Forces – Year 5

Pupils should be taught to:

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



Forces



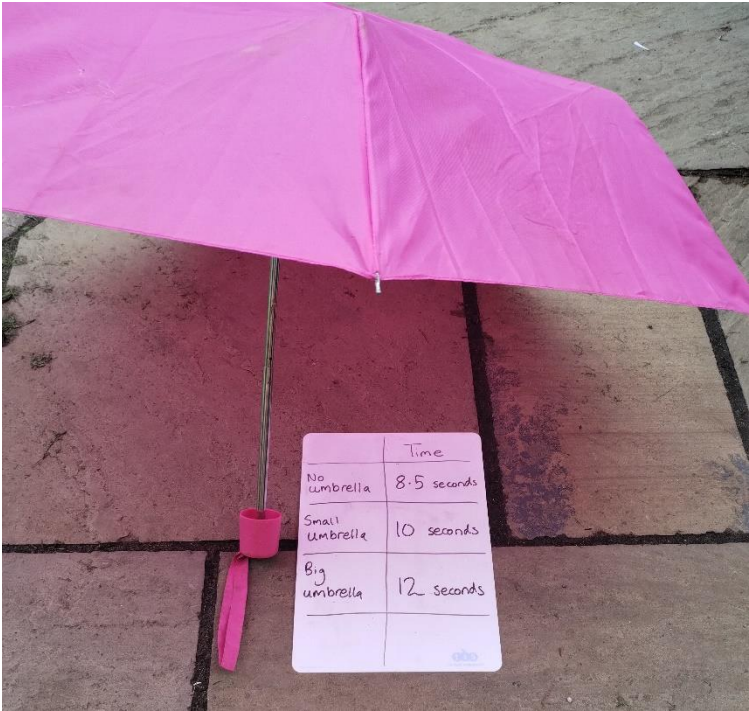
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Forces



Forces Y5



Forces Y5



Name: Chloe
Date: 15.12.23

LO:

- To identify the effects of water resistance.
- To use a timer to take repeat readings.

Do rafts with different size fronts take different amounts of time to cross a bowl and why?

Results
Table to show how long the raft takes to travel from one end of the bowl to the other.

Surface area	Time taken - 1 st reading	Time taken - 2 nd reading	Time taken - 3 rd reading	Mean time taken
<u>60 cm²</u>	<u>2.03</u>	<u>3.16</u>	<u>4.56</u>	<u>3.25</u>
<u>132 cm²</u>	<u>9.72</u>	<u>10.97</u>	<u>12.00</u>	<u>10.89</u>

Conclusion
The mean time it took for the raft with a front surface area of 60 cm² was 3.25 seconds. The mean time it took for the raft with a front surface area of 132 cm² was 10.89 seconds.

Can you explain your findings?
The larger raft with the larger front had taken longer to cross the bucket of water. The raft with the smaller front took 3.25 secs ~~to~~ whilst the larger front took 10.89 secs. Water hitting the raft is called water resistance more water hit the raft with a larger front surface area, making it cross slower.

Planning for outdoor learning

Animals, including humans – Year 1

Pupils should be taught to:

- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- identify and name a variety of common animals that are carnivores, herbivores and omnivores
- describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)
- identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense



Animals including Humans

Can you fill this sensory memory box?

What can you see?

What can you hear?

What can you feel?

What can you smell?



www.SpringLearning.co.uk

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Animals including Humans

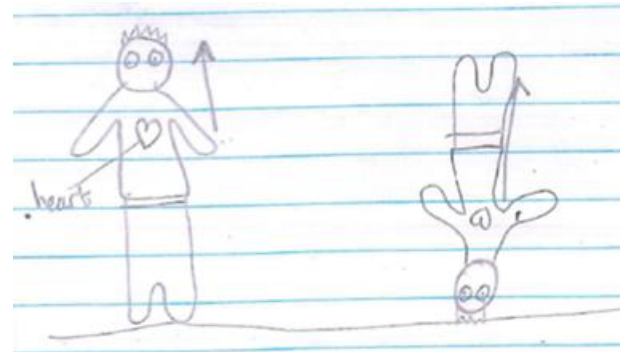


The Circulatory System


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The Circulatory System



The Circulatory System

	Year	6	Topic	Animals, including humans
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Describe the ways in which nutrients and water are transported within animals, including humans. 			
	Description of activity			
<p>The basic parts of the of the circulatory system were mapped out onto the floor in the playground – heart, lungs, blood vessels and muscles. The children moved around the body as though they were the blood. When the teacher said freeze, the children stopped moving and explained to the person in front of them where they were in the circulatory system.</p>				

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"I am in the left ventricle at the moment. I am going to be pumped into the aorta and then I will take the water, nutrients and oxygen to the muscles in the body."</p>		<p>By the end of this activity, it was clear to the teacher that Muharem had a good understanding of the double circulatory system that is required to be secure at Key Stage 2. The additional detail about the parts of the heart and the names of the different blood vessels is beyond Key Stage 2.</p>
<p>Teacher observations</p> <p>While moving through the complete circulatory system, Muharem demonstrated that he could explain where he was and what he was doing.</p>		<p>Working scientifically</p>

Assessment

- A range of approaches for assessing Working Scientifically (PLAN Assessment and PSTT TAPS can support)
- A range of approaches for assessing Conceptual Understanding (PLAN Assessment and PSTT TAPS can support)
- A good tracking system

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20

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YEAR 3 SCIENCE ASSESSMENT RECORD							
To judge that a pupil is working at the expected standard in science, teachers need to have evidence which demonstrates that the pupil meets all of the 'working scientifically' statements and all of the 'science content' taught in the final year of the key stage. Where possible, teachers should draw on assessments that have been made earlier in the key stage to make their judgement against this framework.	name	name	name	name	name	name	name
	Working Scientifically: working at the expected standard (LKS2 NC requirements)						
asking relevant questions and using different types of scientific enquiries to answer them							
setting up simple practical enquiries, comparative and fair tests							
making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers							
gathering, recording, classifying and presenting data in a variety of ways to help in answering questions							
recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables							
reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions							
using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions							
identifying differences, similarities or changes related to simple scientific ideas and processes							
using straightforward scientific evidence to answer questions or to support their findings							
Science Content: working at the expected standard (Y3 NC requirements)							
identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers (Y3 Plants)							
explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant (Y3 Plants)							
investigate the way in which water is transported within plants (Y3 Plants)							
explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal (Y3 Plants)							



Assessing Conceptual Understanding



PLAN

Planning for assessment



Assessing Working Scientifically



Primary science enquiry outdoors



Learning outdoors is a key part of primary science. The Teacher Assessment in Primary Science (TAPS) project has created a wide range of activities to support Working Scientifically. Many of these can take place outside and examples are listed below, with hyperlinks directly to the TAPS plan.

	Possible skills focus	Examples of science learning which can be done outdoors	Examples of science learning about the outdoors
Age 4-7	<ul style="list-style-type: none"> - Ask questions - Perform simple tests - Observe closely - Gather and record data to answer Qs - Identify and classify 	<p>How could we make the best shelter? Incy spider shelter R</p> <p>What happens to the ice? Frozen balloons R</p> <p>Which materials can we see light through? Transparency Y1</p> <p>Which objects do we think will float/sink? Float & sink Y1</p> <p>Which material made the best boat? Boat materials Y2</p> <p>How do we get the character out of the ice? Ice escape Y2</p> <p>What materials can we find? Materials hunt Y2</p> <p>How do we test which material is the most waterproof? Waterproof Y2</p>	<p>How can we sort the things we have found? Scavenger sort R</p> <p>Do all leaves look the same? Leaf look Y1</p> <p>What parts does this plant have? Plant structure Y1</p> <p>What colours/shades can we find? Shades of colour Y1</p> <p>What season is it now? Seasonal change Y1</p> <p>What does a plant need to keep healthy? Plant growth Y2</p> <p>What living things can we find nearby? Nature spotters Y2</p> <p>Is this alive? Has this ever been alive? Living & non-living Y2</p> <p>How many daisies are in each area? Daisy footprints Y2</p> <p>Where do woodlice live? Woodlice habitats Y2</p>
Age 7-11	<ul style="list-style-type: none"> - Plan different types of enquiry to answer Qs - Take measurements - Gather, record and classify data - Report findings - Use results to draw simple conclusions - Evaluate degree of trust in results 	<p>Which kind of materials make shadows? Making shadows Y3</p> <p>Which rock is the most hard-wearing? Rocks report Y3</p> <p>How can we package the egg? Egg drop Y3</p> <p>Which area is hottest/coldest? Adapt Measuring temp Y4</p> <p>How do we find out the best conditions for drying? Drying Y4</p> <p>Which is the best material for the job? Adapt Champion tapes Y5</p> <p>How can we compare our planes? Paper planes Y5</p> <p>How far can we make a spinner travel? Spinners Y5 (link to seed dispersal)</p>	<p>How much water do plants need? Measuring plants Y3</p> <p>How can we help our local environment? Eco action Y3</p> <p>What living things can we find? Local survey Y4</p> <p>Making a classification key for our area, e.g. Outdoor keys Y6</p> <p>Plus:</p> <p>Woodland Trust spotter sheets and activities</p> <p>Growing plants website guide for each month of the year</p> <p>Dr Katherine Forsey's detailed plans for pond/bush/minibeast/rock pool hunts</p>

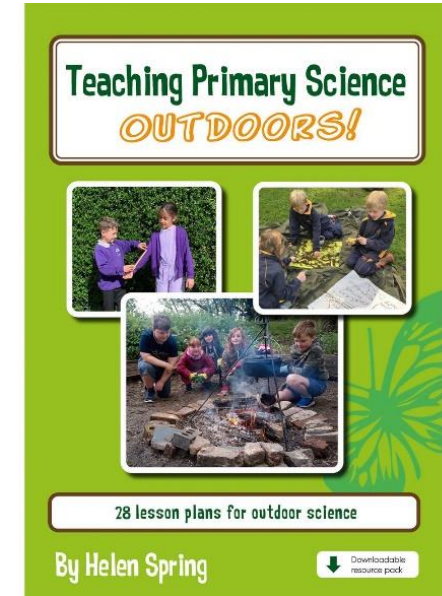
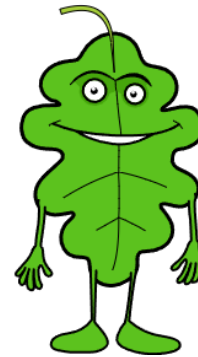
The full set of enquiry lesson plans can be found under the 'Focused Assessment plans' tab, including many others which could take place outdoors: <https://pstt.org.uk/resources/curriculum-materials/assessment>

The majority of plans can be adapted for any age group or situation, so the above are only suggestions.



STEM
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Resources to support outdoor learning and science



Action planning & next steps



Reflection

Has this session changed your thinking?

Are you going to make any changes to your practice in any way as a result of this session?

What will you do next?



Evaluating your CPD

You will have received an email prior to joining the session from STEM ITK no-reply-itk@stem.org.uk with a link to the evaluation form.

Alternatively you can log in to your [Impact and Evaluation Dashboard](https://impact.stem.org.uk/) (<https://impact.stem.org.uk/>) or you can use the QR code.

