

# Using outdoor space more effectively to enhance the science curriculum

## RA198 B280

16<sup>th</sup> January 2024, Helen Spring, [helen@springlearning.co.uk](mailto:helen@springlearning.co.uk)  
National STEM Learning Centre and Network



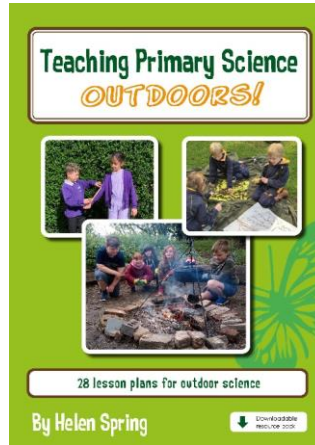
# Intended learning outcomes

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

- Make links between Working Scientifically curriculum objectives and Outdoor Learning
- Explore how Subject Knowledge curriculum objectives can be taught in the outdoor setting
- Consider assessment in the outdoor setting
- Explore resources to develop and support outdoor learning.



# Spring Learning



# Teaching science outdoors in your school

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



# 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)

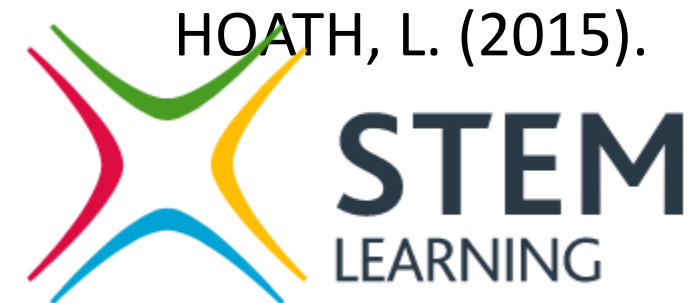


# Why go outside anyway?



# 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



# Health and Safety in Primary Science

**CLEAPSS** [www.cleapss.org.uk](http://www.cleapss.org.uk)

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



**Be Safe book** [www.ase.org.uk](http://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.*

# Materials Y2



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Outdoors'  
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# 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:

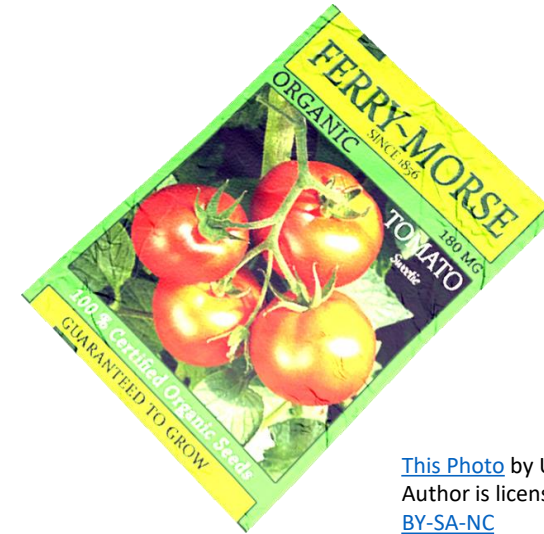
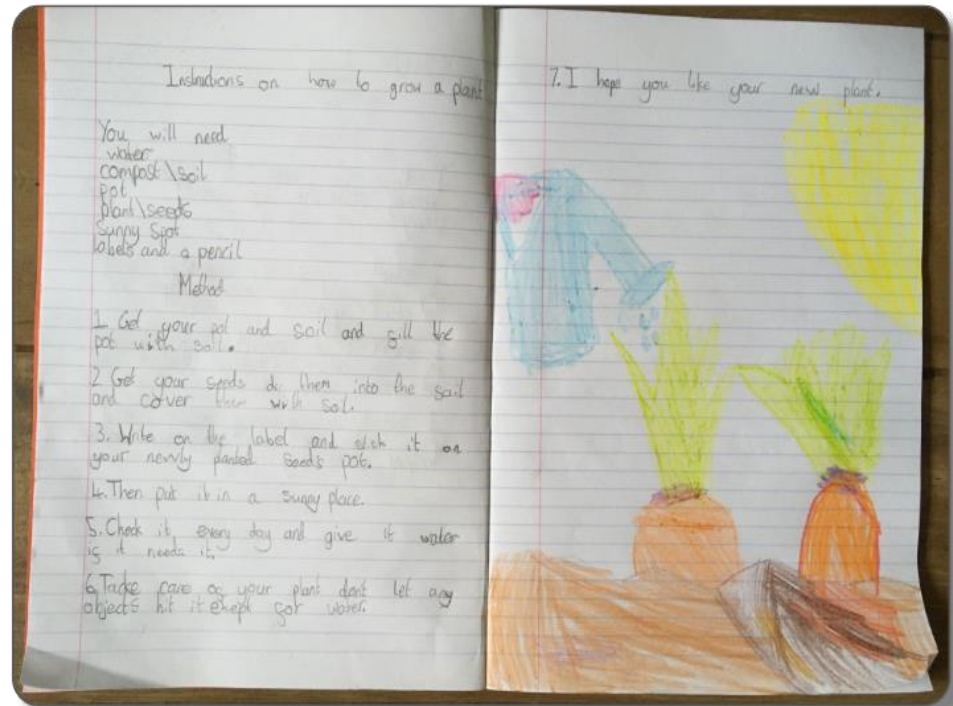
- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which 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



# 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](http://www.SpringLearning.co.uk)

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**STEM**  
LEARNING

# Animals including Humans



# 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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www.ciec.org.uk

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
	<b>Working Scientifically: working at the expected standard (LKS2 NC requirements)</b>						
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							
<b>Science Content: working at the expected standard (Y3 NC requirements)</b>							
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.

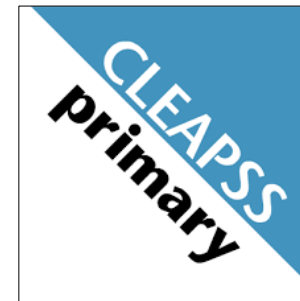
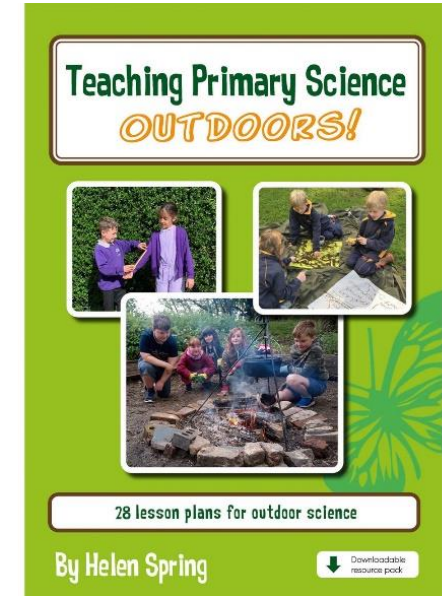
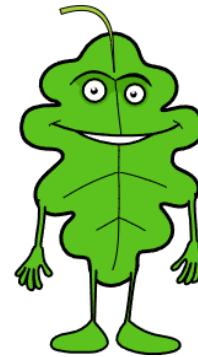
	Possible skills focus	Examples of science learning which can be done outdoors	Examples of science learning about the outdoors
<b>Age 4-7</b>	<ul style="list-style-type: none"> <li>- Ask questions</li> <li>- Perform simple tests</li> <li>- Observe closely</li> <li>- Gather and record data to answer Qs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

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.



# 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](mailto: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.

