

# Teaching Primary Science Outdoors

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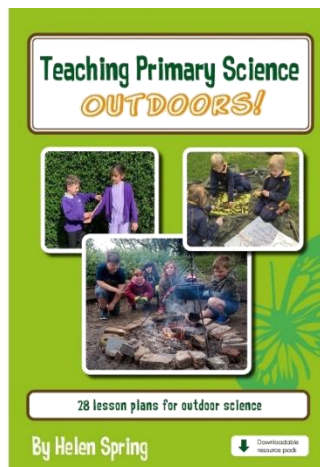
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# Spring Learning



LEAD FACILITATOR



# 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)



# Outdoor Learning and PSQM

## PSQM Science Subject Leadership Criteria

Science is valued and improved through the development of effective processes for subject leadership:

- A. There is a clear vision for science, created and implemented by teachers and children, through principles for teaching and learning.
- B. Strategic support for subject leadership is provided and includes:
  - Focussed CPD for subject leader
  - Regular release time
  - Resources to facilitate development in science.
- C. There is a monitoring cycle, including pupil voice, that informs actions taken and the development of science.

# Outdoor Learning and PSQM

## PSQM Science Teaching Criteria

Subject leadership responds to development needs in science teaching:

- A. There is provision and signposting of relevant internal or external professional development and support with which staff engage.
- B. Teachers are supported to use a range of effective strategies for teaching science which challenge and support the learning needs of all children.
- C. Resources are audited annually, well-organised and accessible, so that children can regularly and safely use appropriate practical and digital resources, information texts and the outdoor environment.

# Outdoor Learning and PSQM

## PSQM Science Learning Criteria

Subject leadership develops teachers' practice:

- A. Children are taught to use different enquiry types to answer scientific questions about the world around them, through the use of scientific enquiry skills.
- B. A range of strategies and processes for formative, summative and statutory assessment are used, which reflect a shared understanding of the purposes of assessment in science and current best practice.
- C. Initiatives that encourage all children to think that science is relevant and important to their lives, now and in the future, are supported and promoted.

# Outdoor Learning and PSQM

## PSQM Wider Opportunities Criteria

Children's experiences of science are enriched:

- A. Curriculum planning links science to other areas of learning.
- B. There is participation in some external initiatives, topical science events and family learning.

# Teaching science outdoors in your school?

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





# 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).

# 5 Types of Enquiry



ReachOut  
CPD

enquiring  
science<sup>4</sup>all

# The 5 types of enquiry outdoors...

LA

- Comparative and fair testing – How does the length of time we exercise for affect our heart rate? (taken from [Ogden Trust](#), 'Developing Children's skills in Fair Testing')
- Research using secondary sources – iPad apps – Pl@ntnet
- Observing over time – observe the changes across the four seasons. Can you create a representation of Winter using materials around you? Twig game!
- Pattern seeking – What colour flowers do pollinating insects prefer? (taken from [Ogden Trust](#), 'Develop Children's skills in Pattern Seeking')
- Identifying, classifying and grouping – leaves, trees, fungi, flowers, minibeasts, rocks, materials....

# Materials

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# Materials

Images © Millgate House Publishing  
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# Definitely outdoors....

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# Could be outdoors....

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# Planning to teach science outdoors

## 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

# Planning to teach science outdoors

## **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

# 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?



# Evolution and inheritance



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# Forces



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# Assessment



- A system for assessing Working Scientifically (eg PSTT TAPS)
- A system for assessing conceptual understanding (PLAN Assessment can support with this)
- A good tracking system

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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	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 Working Scientifically

LB



## 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.

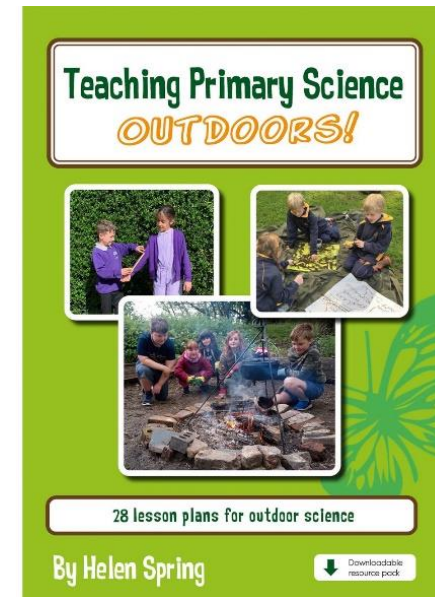
	Possible skills focus	Examples of science learning which can be done outdoors	Examples of science learning about the outdoors
<b>Age 4-7</b>	<ul style="list-style-type: none"> <li>- Ask questions</li> <li>- Perform simple tests</li> <li>- Observe closely</li> <li>- Gather and record data to answer Qs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

# Resources to support outdoor learning and science





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