

Portfolio: Promoting children's scientific and mathematical thinking in the outdoor environment

Part 1



(Source: Llewellyn-Jones, 2024)

Part 2

I will start by taking a closer look at the outdoor space:

The outdoor space is a forest school area in a primary school. The primary school is situated in an urban area, where there are few green spaces.



Camp fire with tree stump seating



Mud kitchen



Brooms and pickers



Trees



Large tyres and cable reels



Investigation station

I will be examining how Reception children (aged 4-5 years) could use this outdoor space.

The Statutory Framework for the Early Years Foundation Stage states that early years children must have access to an outdoor area. (Department for Education ,2023).

It would be beneficial for the Reception children to visit the forest weekly or even more frequently, and for an entire afternoon, where they have ample time to play and explore without their learning being interrupted. Fiemes et al. (2015) found that outdoor learning almost always has a positive impact on children's learning and longer sessions over a prolonged period are more beneficial than shorter sessions. As the school is situated in a deprived urban area, with few green spaces, it is particularly beneficial for the Reception students to have regular access to this space.

Such an outdoor space provides a wealth of opportunities for learning in all areas of the EYFS. Learning is holistic, and children's learning often overlaps across various areas of learning. Scientific and mathematical learning are often closely connected as they are naturally linked. For example, learning about the scientific concept of force, would also require children to have some knowledge of comparison of quantity, weight, energy, size, or speed.

Forest school provides a wealth of opportunities for mathematical learning, for example;

- matching by size
- Counting/collecting
- Matching by colour
- Pattern
- Comparing height
- Comparing weight
- Tessellation
- Shape

Forest school also provides a wealth of opportunities for scientific learning, for example;

- mini beasts
- Animals
- Birds
- Habitats
- Lifecycles
- Planting and growing
- Trees, leaves, flowers
- Seasons
- Weather
- Gravity
- Forces
- Materials
- Forces

I have chosen to focus particularly on the scientific concepts of growing, seasons, and minibeasts.

In forest school, the children could explore the environment and learn about the types of trees and plants that grow in the forest and what is necessary for this growth to take place (air, soil, space, water, sun light). Children could grow plants or even food. Practitioners could support the children to learn about concepts such as photosynthesis.

By visiting the forest throughout the year and noticing changes, the children could learn about the seasons.

Children could learn about minibeasts, how to identify them, their habitats and diet. Bug viewers and magnifying glasses, could enable the children to explore and closely study minibeasts. The children could also learn about the lifecycle of a minibeast.

I have chosen to focus on these scientific concepts because I believe that the forest environment is an excellent place for Reception children to obtain first hand experience of these scientific concepts, which will enable them to be curious and enquiring.

It can often be challenging for practitioners to provide outdoor learning experiences. The setting may not have a suitable outdoor space, or there may be limited equipment or a lack of suitable clothing, such as wellies for wet weather. Other demands on the timetable, such as phonics may take precedence over outdoor learning, or the attitude of the practitioner, if they do not recognise the benefits of outdoor learning, may be a barrier to outdoor exploration. Parents may be reluctant for their child to get messy, or the child may initially dislike outdoor exploration if they have had limited experience of this before.

How could practitioners enhance the outdoor environment?

Practitioners could support the Reception children to learn about the natural environment by enhancing the environment with books or durable laminated resources to encourage their curiosity and enable them to learn about and identify different trees, leaves, twigs, fruit, seeds, plants, flowers etc. that are present in the forest.



(Woodland Trust, 2024)



(Source: Llewellyn-Jones, 2024)

Showing:

Zoomer, Y. (2016)

Raintree (2015)

Clover Robin (2018)

Huggins-Cooper, L. (2003)



(Woodland Trust, 2015)



(Woodland Trust, 2016)

Resources should be relevant to the environment and change according to the season. For example; resources depicting blossom and spring flowers should be available in spring time, and resources depicting conkers should be available in the autumn.



(Woodland Trust, 2017)



(Woodland Trust, 2017)



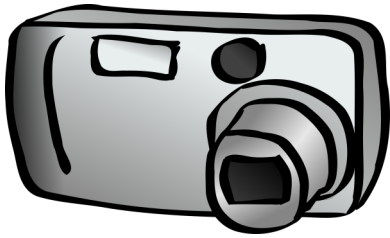
(Source: Llewellyn-Jones, 2024)

In addition to the clipboards and pencils available for observational drawing and recording, practitioners could make paints or crayons available to enable the Reception children to more accurately record their findings or depict their surroundings. Children's pictures could be kept to compare changes throughout the seasons.

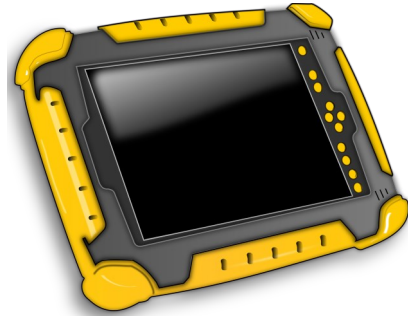
Practitioners could also provide additional gardening tools as well as seeds or bulbs to enable the Reception children to grow their own plants or food in the forest, to further their knowledge and understanding of the requirements of plants to grow.

The non-statutory guidance; Development Matters (2023) suggests that practitioners provide opportunities to closely observe the natural world and draw pictures.

Practitioners could also add cameras or tablets, to enable children to take photos or videos of things they have seen or created, or to capture the changing seasons or growing plants that can be compared to pictures at other times.



(Clipart, 2024)



(Clipart, 2024)

Practitioners could add planks of wood to allow the children to balance them on tyres to make platforms to look higher in the trees. This would also enable the children to work cooperatively to move the heavy planks, and would support their personal, social and emotional development and Building Relationships.



What types of questions could practitioners ask to support the children's curiosity?

"I wonder what would happen if..."

"How could you..."

"I wonder why..."

"Has that changed? I wonder why it changed? "

"What can you see?"

"What can you hear?"

"What can you smell?"

"What does that feel like?"

"How could we find out?"

"Are they the same?"

It is however, important that practitioners do not interrupt children's exploration to ask lots of questions, which may overwhelm or distract children from their individual exploration. Practitioners need to observe and develop an awareness of when to get involved and when to take a step back to observe. Practitioners should scaffold children's learning; asking a pertinent question, demonstrating a skill or imparting some knowledge, then allowing the child to have a go themselves, to encourage independent critical thinking.

Part 3

Risk-benefit assessment

Location: School Forest School

Assessor: Elizabeth Llewellyn-Jones

Experience	How will young people benefit from the activity	Hazards and associated risks	Who is at risk?	Precaution in place to reduce the risk of injury	Overall risk after precautions (L/M/H)
Collecting natural materials from the forest floor.	• learn about plants, leaves, seasons... • Loose parts play	• poisonous berries • Thorns/ stingers/ splinters • Dangerous litter thrown in to the forest	Children	• Children warned about not picking or eating berries. • Stingers removed from the forest where possible. • Practitioners first aid trained. • Forest visually inspected before session and any litter removed.	L
Gardening; planting seeds/ bulbs, digging soil...	• learn about plants and what is required for growth • Physical development: gross motor skills	• injuries with tools • Potential illness after handling soil	Children	• Children taught how to safely use tools. • Children taught why it is essential to thoroughly wash their hands after forest sessions. • Practitioners ensure that all children thoroughly wash their hands with soap and water.	L
Climbing trees	• Learning how to manage risk • Physical Development: gross motor skills • Learning about and identifying types of trees	• falls from height • Grazes/ scrapes (minor injuries)	Children	• Children supervised by practitioners and advised not to climb too high. • Practitioners first aid trained.	L

Experience	How will young people benefit from the activity	Hazards and associated risks	Who is at risk?	Precaution in place to reduce the risk of injury	Overall risk after precautions (L/M/H)
Exploring the forest	Sparking curiosity, learning about plants, trees, etc.	Trips and falls	Children and practitioners	- Children advised that it is not safe to run in the forest. - Practitioners first aid trained - Adults to take care and supervise children	L
Leaf and bark rubbings	Learn to identify types of leaves	Prickly leaves may cause injury	Children	* practitioners warn children and advise them to not select spiky leaves	L
Collecting minibeasts in bug viewers	Learning about minibeasts and their habitats	- Children may collect dangerous species - Children may injure minibeasts - Illness	Children	- Adult supervision - Small shovels and paint brushes used to collect minibeasts	L

Part 4

Outdoor learning is particularly beneficial for children in the early years. Grigg and Lewis (2016), Waite (2011), Bilton (2010) and Harding (2005) are all clear on the benefits for children. Harding (2005) discusses the holistic nature of outdoor learning and the stimulus for all the senses.

Over recent years, there has been a decline in the amount of outdoor play, and particularly child led investigative play. (Harding, 2005; Hope et al., 2007; Louv, 2005; Waite, 2011; Waters and Begley, 2007).

Gill (2007) considers the lack of outdoor play to be as a direct result of society being more risk averse. Easton and Brzyska, 2011 agree with Gill, 2007. Bilton, 2010, differs slightly with Gill and Easton and Brzyska, and believing that parents are the ones concerned about safety, rather than teachers. Campbell, 2011 and Curtis, 2013, believe that the lure of technology is the reason behind the decline in outdoor play. Bilton, 2010 disagrees, and believes that a lack of garden space, and the prevalence of organised activities, is responsible for the reduction in outdoor play.

According to Doherty and Hughes, 2009, movement is an essential part of early development. Waite, 2011, discusses how the outdoor environment affords more space for movement.

Children's right to play is set out in Article 31 of the United Nations Convention on the Rights of the Child, and Early Years Statutory Framework (Department for Education, 2023) states that play is essential for children's development.

Playing and learning, is one of the three characteristics of effective teaching and learning, detailed in the statutory framework for the Early Years Foundation Stage. The framework goes on to state that children learn through play and through observing adults.

The Early Learning Goals, which is the expected level of development that a child should have reached by the end of the early years foundation stage, states that children should explore the natural world and have an understanding of similarities and distances, as well as important processes. Outdoor learning is essential to enable Reception aged children to be able to obtain this early learning goal.

The non-statutory guidance; Development Matters (2023) states that practitioners should provide children with frequent opportunities for outdoor play and exploration.

The role of the practitioner is essential for learning. Bilton, 2010, discusses the multi-faceted roles of the adult. Waite, 2011, talks about the need for sensitive adults who are tuned in to their students.

Bruner talked about scaffolding, and how the practitioner could support learning through scaffolding.

Learning through doing was promoted by Froebel, who was also committed to the importance of play and involvement with nature. The Reggio Emilia approach also considered the environment to be particularly important.

Piaget believed that children were 'little scientists' and also placed much importance on the environment and practical learning.

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