

Portfolio

Part 1



(PublicDomainPictures.net, 2022)

Part 2 – The Learning Story

On Welly Wednesday, my small group of 4-5 year olds goes on a forest walk to explore the outdoors and learn through real, hands-on experiences. The open forest space in the photo gives the children lots of chances to explore, move and follow their own curiosity and ideas. There are leaves, sticks, logs and natural materials everywhere, which means the children can pick things up, compare them, build with them and use them in their play.

Before going on our Welly Wednesday walk, I chose a few simple resources to support their exploration such as buckets, black card, coloured chalk, magnifying glasses, small trowels and fabric squares. These fit easily into the outdoor environment without taking away from the already natural resources in the space and help the children look closely at leaves, collect natural items and use materials creatively while still keeping the learning child led.

Leaf exploring – 9:30am

As we stepped into the forest, the children walked ahead in their puddle suits and wellies, excited to explore the space around them. The forest floor was covered in leaves of every colour—yellows, oranges, browns and fading greens. I paused and asked, “What colours of leaves can you see?” Child A pointed to a bright yellow leaf. “Yellow!” Child B held up an orange one. “Orange!” Child C found a brown leaf and said, “Brown!” Child D added, “Green!” I smiled and said, “Wow, good observing skills. So, if these are the colours we can see on the ground, what season do you think we are in?” The children looked around again. “Autumn!” they replied confidently. “Fantastic,” I said. “Well done, we are in autumn.” With the season identified, the children were ready to explore the leaves more closely.

I asked, “How many leaves do you think we can find?” The children grabbed buckets excitedly and scattered around the forest, weaving between the trees and crouching down to collect leaves from the uneven ground. When they returned, their buckets were overflowing with leaves of different sizes and colours. This simple challenge encouraged early maths skills like estimating and counting. This links to the Maths Area of Learning in the Curriculum for Wales as the children are beginning to use numbers in real situations (Welsh Government, 2020a).

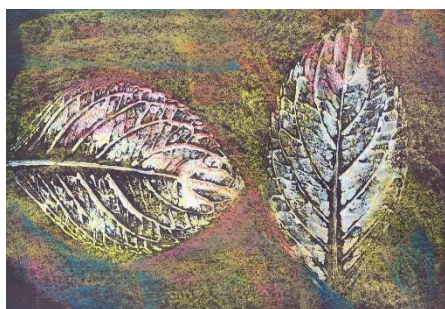
Some of the children immediately began sorting the leaves into colour groups, creating piles of greens, yellows, oranges and browns. Others chose to sort them from smallest to biggest, lining them up carefully along a fallen log. “I wonder why some leaves are bigger than others?”. Some children decided to use their magnifying glass to look closer at the leaves they had just collected. These choices showed early maths skills such as sorting, matching and comparing. This links to the Maths area of learning as the children are learning to recognise patterns and organise objects (Welsh Government, 2020a).



(The Family Edit, 2022)

Child A proudly held up a leaf. “This one’s my favourite!” she said. Her excitement prompted the others to choose their favourite leaf too. I asked, “Why is it your favourite?” to encourage deeper thinking and language development. Child B said, “I like the colour.” Child C added, “Mine feels soft.” Child D said, “This one crunches!” Another child pointed to the veins and said, “I like the patterns.” Their explanations showed developing communication skills and early science learning because they were observing details and talking about what they noticed. This links to the Science area of learning as the children are beginning to describe what they observe in nature (Welsh Government, 2020b).

To extend their curiosity, I suggested, “Shall we take a closer look at the patterns and textures? I wonder if they are all the same or different.” I provided black card and chalk and modelled how to print the pattern of the leaf onto the card. The children placed their chosen leaf on the card and rubbed chalk gently over it. When they lifted the leaves, the prints revealed clear veins, shapes and textures. Child A gasped, “Look at the lines!” Child D noticed, “Mine looks cracked!”, “I wonder why the leaf patterns look so different?” I asked as they compared their prints. Looking closely at the leaves supported their early science learning, helping them observe details and compare what they found. This links to the Science area of learning as the children are exploring materials and noticing differences (Welsh Government, 2020b).



(Pinterest, n.d.a)

Measuring using natural materials – 10:15am

Further into the forest, the children noticed acorns, pinecones and larger sticks scattered across the ground. Child B picked up a long stick and held it against his body. “This is nearly as tall as me!” he said. Child D compared a smaller stick to her

own height. "Mine's tiny!" These observations showed early maths skills like comparing size and height. This links to the Maths Area of Learning as the children are beginning to compare measurements (Welsh Government, 2020a).

I asked, asked, "I wonder which natural object will be the best for measuring?" The children explored different ideas straight away. Some matched sticks to their height, checking how long each one was. Others chose to lie down on the forest floor and used leaves, acorns, concurs and pinecones to measure each other, lining them up carefully along their bodies and counting how many they needed. They laughed as they realised that everyone needed a different number depending on how tall they were. This supports the Maths Area of Learning as the children are using non-standard measurement in a meaningful way (Welsh Government, 2020a).

Child A laid down giggling as the others placed sticks end to end beside her. "She's six sticks tall!" Child C announced proudly. "I wonder why you needed more pinecones than sticks to measure your height?" I asked curiously, encouraging them to think about size and quantity. Measuring with a range of objects like sticks, pinecones and acorns helps children understand size and quantity in a hands-on, meaningful way before they use rulers or formal tools. Working together also builds teamwork and communication.

Den Building – 11am

The children spotted an area with a big pile of logs and branches and immediately ran over, balancing on them, walking across, jumping over them like hurdles. I wondered aloud, "I wonder can we make something with all of these logs? What do you think?" The children paused, looking at the logs and branches around them and then around the forest, considering the possibilities. Suddenly, Child B shouted, "Let's build a den!" His idea sparked immediate excitement, and the group rushed to gather sticks, leaves, the fabric squares and pinecones from all around the forest floor.

Child A tried lifting a heavy log and struggled. "It's too heavy," she said. Child C stepped forward. "I'll help you!" Together they lifted the log slowly, figuring out the best way to hold it, showing collaboration and shared problem-solving. These social skills matter because they help children learn cooperation, communication and

resilience. This links to the Health and Wellbeing area of learning because children are learning to work together safely (Welsh Government, 2020c).

The children tried to balance the sticks against each other but became frustrated when they kept falling. I asked, "I wonder what could help make the sticks stay up in place?". They looked around and decided to use a big tree trunk to support the sticks. As they leaned the sticks against the trunk, Child A realised, "We have to make it wider for us all to fit in." This showed early maths skills like thinking about space and size. This links to the Maths area of learning because children are exploring shapes and spatial reasoning (Welsh Government, 2020a).



(Pinterest, n.d.b)

To extend their thinking, I asked, "What shape do you think you're making?" Child D looked closely at the angled sticks. "A triangle!" she said proudly. Recognising shapes in real-life contexts helps children understand early geometry. This links to the Maths area of learning because children are identifying shapes in their environment (Welsh Government, 2020a).

As the children stood back and looked at their den, their sense of achievement was clear. They had worked together, solved problems, used early maths and explored scientific ideas, all through play and curiosity. Learning outdoors matters because children can move, explore and follow their own ideas. They use all their senses, which helps them stay engaged and curious. Activities like these build confidence, independence and problem-solving skills. The forest gives them real things to investigate such as sticks, leaves, logs, creatures, which makes maths and science feel natural and enjoyable.

Part 3

RISK BENEFIT ASSESSMENT

Location / Activity:	Autumnal Forest	Date:	15.09.2026
Assessor:	Georgia Nedin	Review date:	22.09.2026

Experience exploring outdoor space in photograph	How will young people BENEFIT from this activity?	Hazards and associated risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk after precautions RATING: L/M/H
Free exploration of forest space.	Children develop independence, curiosity, confidence and a strong connection to nature. They use all their senses, follow their own ideas and engage in meaningful, child-led learning. Outdoor play supports wellbeing, physical development and problem-solving.	Slips, trips and falls. Low branches. Uneven ground. Insect bites or stings. Contact with mud or water. Children wandering out of sight. Weather related risks (cold, rain, wind).	Children and Staff.	Clear boundaries set at start. Children wear appropriate clothing (wellies, puddle suits). Staff positioned around area for supervision. Regular headcounts. Children reminded to walk safely. Activities adapted to weather. First aid kit carried. Staff aware of any allergies.	L

Experience exploring outdoor space in photograph	How will young people BENEFIT from this activity?	Hazards and associated risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk after precautions RATING: L/M/H
Leaf collecting, sorting and chalk rubbings.	Children develop early maths skills (sorting, matching, counting, estimating). Early science skills (observing colours, textures, patterns). Communication skills through discussion, and curiosity through hands-on exploration of natural materials. Being outdoors supports wellbeing, independence and real-world learning.	Slips or trips on uneven ground, wet leaves or tree roots. Children putting leaves or natural items in their mouths. Minor cuts or splinters from sticks. Contact with unknown plants. Chalk dust near eyes. Buckets becoming tripping hazards if left on the ground.	Children and Staff.	Children wear wellies and puddle suits. Adults model safe walking on uneven ground. Clear boundaries set for safe movement. Regular reminders not to put natural items in mouths. Magnifying glasses and chalk used safely with adult guidance. Buckets placed out of walkways. Staff monitor for plants that should not be touched. First aid kit carried.	L
Measuring height with natural materials.	Children develop early maths skills (comparing size, height, non-standard measurement). Teamwork, communication and problem-solving. They learn to use natural materials creatively and make meaningful links between their bodies and the environment.	Children lying on uneven ground may bump heads or get stood on. Sticks may have sharp ends. Pinecones and acorns could pose choking hazards. Children may poke each other accidentally with sticks. Slipping on loose or wet natural materials.	Children and Staff.	Children reminded to keep sticks pointed downwards. Safe space chosen for lying down. Children encouraged to measure gently. Staff supervise closely the changing risks. Reminders of natural materials being kept away from mouths. Puddle suits protect from damp ground. First aid kit	L

Experience exploring outdoor space in photograph	How will young people BENEFIT from this activity?	Hazards and associated risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk after precautions RATING: L/M/H
Den building.	Children develop gross motor skills, balance, coordination, teamwork, resilience and problem-solving. They explore shapes, space and early geometry through real materials. They learn to collaborate, communicate and adapt ideas.	Falls from logs or branches. Unstable logs rolling. Heavy logs causing strain or injury when lifted. Sticks snapping. Den structure collapsing. Children bumping into each other. Splinters. Tripping over logs left on ground. Fabric squares becoming entanglement hazards.	Children and Staff.	Adults setting clear rules and reminders about how to be safe when lifting and building. Adult show how to lift heavy logs safely with help from a friend or adult. Children taught safe ways to carry sticks. Den building supervised closely. Reminders about fabric being used safely and kept away from faces. First aid kit carried. Staff maintain ratio and stay within arm's reach during higher-risk moments.	M

Part 4

Outdoor environments provide valuable opportunities for young children to explore and develop mathematical and scientific understanding through first-hand experiences and play (Play Wales, 2025). Outdoor play has been recognised as supporting children's learning, development, wellbeing, and critical thinking skills and through activities such as investigating natural materials, solving problems, and exploring the world around them, children can engage with concepts in meaningful ways (Play Wales, 2025). However, children's learning outdoors is influenced by the support and encouragement they receive from adults. Practitioners play an important role in helping children develop knowledge, skills, and understanding while ensuring learning remains engaging and relevant (Bryce-Clegg, 2025). This essay will evaluate how adults working with children in the early years support and encourage engagement with mathematical and scientific concepts in outdoor environments, drawing on relevant theory and research and considering some of the challenges that may affect practice.

Vygotsky's sociocultural theory highlights the importance of social interaction in children's learning. Central to his theory is the Zone of Proximal Development (ZPD), which explores the difference between what a child can achieve independently and what they can achieve with support from a more knowledgeable other (Vygotsky and Cole, 1978). This highlights the significant role practitioners play in supporting children's mathematical and scientific learning outdoors.

Bryce-Clegg (2025) suggests that before practitioners can effectively support children's learning, they must first observe and assess what children already know and can do. Observation allows practitioners to identify children's interests, strengths, and current understanding, while assessment helps them determine appropriate next steps (Ouvry and Furtado, 2020). For example, when observing children collecting and sorting sticks, a practitioner may recognise that they are already comparing size and length. This assessment allows the practitioner to introduce new challenges, such as measuring the sticks, estimating lengths, or comparing quantities. This process reflects the child-centred approach promoted within the Curriculum for Wales, where assessment is viewed as an ongoing part of learning rather than a separate activity. This allows practitioners to respond to

children's interests and needs while supporting development in both the Mathematics and Numeracy Area of Learning and Experience and the Science and Technology Area of Learning and Experience (Welsh Government, 2022).

Once practitioners understand children's current level of knowledge, they can provide scaffolding to extend learning. Through questioning, modelling, and support, adults can help children recognise mathematical and scientific concepts within their play and make connections between their experiences and new knowledge (Education Endowment Foundation, 2025). For example, while children are building a den, a practitioner may encourage them to consider which branches are longer, how many materials are required, or whether the structure is balanced. Similarly, when children are exploring water, practitioners can encourage scientific thinking by asking them to predict what will happen when different objects are placed in the water. This reflects Vygotsky's view of learning as a collaborative process, where responsive adult interactions help children develop understanding whilst maintaining the curiosity and exploration that Whitt, Beaumont and Lewis (2025) identify as important for early science learning.

However, Vygotsky's theory can be criticised as Gear (2025) suggests there is a risk that too much adult involvement may limit children's independence. Outdoor learning is often valued as it allows children to explore, experiment, and take ownership of their learning. If practitioners intervene too frequently, children may become reliant on adult guidance rather than developing confidence in their own problem-solving abilities. Therefore, effective practice requires a balance between supporting children and allowing them the freedom to explore independently, with practitioners recognising when to step back and trust children's capabilities (Gear, 2025). Another challenge is practitioner confidence. French et al (2023) highlights that some practitioners may feel less confident teaching mathematics and science than other areas of learning, possibly leading to them overlooking valuable opportunities to extend children's understanding outdoors. This suggests that effective scaffolding depends not only on theoretical knowledge but also on practitioner confidence and professional development.

Overall, Vygotsky's theory demonstrates that observation, assessment, and scaffolding are essential aspects of the practitioner's role. By carefully observing

children's play and responding appropriately, practitioners can support meaningful engagement with mathematical and scientific concepts (Conkbayir and Pascal, 2021).

According to Conkbayir and Pascal (2021), Bruner's theory of discovery learning highlights how adults can encourage children to construct knowledge through exploration and discussion. Bruner argued that children learn most effectively when they actively engage with their environment and discover ideas for themselves (Conkbayir and Pascal, 2021). This is particularly relevant in outdoor learning, where children have opportunities to investigate what is happening around them, solve problems, and develop their own understanding of mathematical and scientific concepts.

One way practitioners can support this process is through sustained shared thinking. Neale and Pino-Pasternak (2017) describe this as practitioners and children working together to discuss ideas, solve problems, clarify concepts and develop understanding through meaningful conversation. This links closely to Bruner's theory of discovery learning, as practitioners support children to explore their ideas, test their thinking and construct their own understanding rather than simply being given answers. Smidt (2015) suggests practitioners often encourage this through the use of open-ended questions, which require children to explain their thinking rather than give a simple answer. For example, adults may ask questions such as, "What do you think will happen?", "Why do you think that happened?" or "How could we find out?" These questions encourage children to explore ideas, test predictions and develop their own explanations (Smidt, 2015).

For example, children exploring a puddle may notice that it becomes smaller throughout the day. Rather than immediately explaining evaporation, Trina *et al.* (2024) suggest that practitioners encourage children to observe, question and investigate what is happening around them. By asking why they think the puddle is changing and encouraging them to suggest explanations, children construct their own understanding through exploration and discussion. These experiences reflect Bruner's view that children learn most effectively through active exploration and discovery (Conkbayir and Pascal, 2021). Neale and Pino-Pasternak (2017) state that such interactions help children develop a deeper understanding because they are

actively involved in the learning process. This reflects the aims of the Curriculum for Wales, which promotes enquiry, critical thinking and problem-solving across learning experiences. Through discussion and exploration, children are encouraged to make connections and apply their knowledge in meaningful contexts (Welsh Government, n.d.).

Adults can further support learning through metacognitive talk. Metacognition refers to thinking about and reflecting on one's own learning. The Education Endowment Foundation (2025) states that metacognitive approaches support learners to plan, monitor and evaluate their learning, with teachers playing an important role in modelling and scaffolding these strategies. Practitioners can encourage this by asking questions such as, "How did you work that out?", "What is your plan?" or "Would you do anything differently next time?". Jackson (2023) suggests that metacognitive talk provides opportunities for reflection and future planning, helping children become more aware of their learning processes. These questions help children reflect on their thinking and understand how they solve problems. Within mathematics, this may involve explaining a strategy used to count or measure. Within science, children may reflect on a prediction or evaluate the outcome of an investigation.

Bruner's theory complements Vygotsky's ideas about scaffolding (Aubrey and Riley, 2026). While Vygotsky highlights the importance of adult support, Bruner emphasises children's active involvement in discovering knowledge. Together, these theories suggest that effective practitioners should guide children's thinking without taking control of the learning process. Adults support learning by extending children's ideas while allowing them to remain curious and independent learners (Aubrey and Riley, 2026).

In addition to observing, assessing and interacting with children, practitioners play an important role in creating outdoor environments that encourage mathematical and scientific learning. Estyn (2024) states that practitioners are responsible for organising spaces, selecting resources and providing experiences that stimulate curiosity, exploration and problem-solving. This is supported by Nicholson's (1971) Theory of Loose Parts, which suggests that environments containing a variety of open-ended materials create greater opportunities for creativity, exploration and

discovery. Practitioners can support learning by providing natural resources such as sticks, stones and water, allowing children to experiment, compare, sort and investigate through play. This reflects the Curriculum for Wales approach to learning through play, exploration and first-hand experiences, particularly within the Mathematics and Numeracy and Science and Technology Areas of Learning and Experience (Welsh Government, 2022).

However, simply providing resources does not guarantee learning. While Nicholson (1971) highlights the importance of a rich and stimulating environment, the theory places less emphasis on the role of the adult. Play Wales (2023) suggests that children may not always recognise the mathematical and scientific concepts within their play, so practitioners play an important role in helping them make connections and develop their understanding. This aligns with the Curriculum for Wales view of progression as a continuous process, with practitioners responding to children's individual interests, needs and stages of development (Welsh Government, 2022). The Department for Education (n.d.) states that an important part of this role is knowing when to intervene and when to step back. If practitioners intervene too early, children may lose opportunities to explore independently and develop their own problem-solving skills. However, if adults wait too long, valuable opportunities to extend learning may be missed. This suggests that loose parts alone do not guarantee learning, as practitioners must recognise opportunities to extend children's mathematical and scientific thinking.

For example, when children arrange stones by size, a practitioner may encourage them to compare, estimate or measure. Similarly, when children investigate water flow, adults can support scientific enquiry by encouraging children to make predictions and test their ideas. This links to Vygotsky's concept of scaffolding, as practitioners use observation to decide when support is needed and when children should be allowed to continue exploring independently (Vygotsky and Cole, 1978). It also reflects Bruner's view that children learn through active exploration and discovery (Aubrey and Riley, 2026). Together, these theories suggest that effective outdoor learning depends on both an enabling environment and skilled practitioner support.

Despite these benefits, Bilton (2025) highlights practitioners may face barriers when trying to provide effective outdoor learning experiences. Practitioner confidence may also present challenges. Adults who lack confidence in mathematics or science may overlook opportunities to develop children's thinking or avoid extending discussions beyond simple observations. As well as limited outdoor space, poor weather, staffing pressures and concerns surrounding health and safety can reduce opportunities for exploration (Bilton and Waters, 2017).

In conclusion, research suggests that practitioners play a crucial role in supporting young children's engagement with mathematical and scientific concepts in outdoor environments. Through observation, assessment, scaffolding and the creation of enabling environments, adults can identify learning opportunities and extend children's understanding through meaningful outdoor experiences (Welsh Government, 2024). The theories of Vygotsky, Bruner and Nicholson highlight the importance of balancing adult support with opportunities for children to explore and learn independently. Through these approaches, practitioners can support mathematical and scientific learning in ways that reflect the aims of the Curriculum for Wales and support children to become ambitious, capable learners (Welsh Government, n.d.).

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