

Awe and Wonder - Science, Mathematics and the Outdoors

Total word count across all parts: 4325

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Learning Opportunities in an Outdoor Environment (Word Count: 1573)



(Dunky's Day Nurseries Ltd, 2024)

This photograph shows a woodland play area with uneven ground, logs, tree stumps, soil, plants, and open spaces for exploration. This section looks at how children's play in this setting can help them learn science and mathematics, in line with the Curriculum for Wales. Drawing on Piaget's constructivist theory, which holds that children learn by actively engaging with their surroundings, the discussion imagines a small-group visit and considers how early years practitioners can support learning by observing, asking questions, and responding to children's interests.

Who is Visiting the Site?

In this example, eight children aged 3 to 5 from an early years setting visit the site with two practitioners. This age group aligns with Progression Step 1 in the Curriculum for Wales, which emphasises exploration, curiosity, and play (Welsh Government, 2020a).

Outdoor spaces are especially important at this age because children often learn best through hands-on experiences rather than formal lessons. The Curriculum for Wales highlights that early maths and science skills grow from real-world experiences. It notes that play helps children “solve problems, explore ideas, establish connections and collaborate with others” in maths and numeracy (Welsh Government, 2020b).

The woodland space, therefore, becomes not simply a play area but a living, learning environment that supports inquiry and experimentation.

Holistic Play Supporting Science Learning

Exploring Forces and Movement

The sloped, uneven ground naturally invites children to run, roll, slide, and climb. For example, a child may roll down a small hill while another attempts to roll a stick or a pinecone beside them. These actions introduce early scientific understanding linked to forces and motion.

The Science and Technology Area of Learning and Experience within the Curriculum for Wales states that: “Forces and energy provide a foundation for understanding our universe.” (Welsh Government, 2022a).

Through play, children begin to notice relationships between slope, speed and effort. A practitioner might observe a child noticing that a round object rolls faster than an irregular one. Rather than explaining directly, they may ask:

- “I wonder why that one rolled faster?”
- “What happens if we try it on a steeper part?”

Such questioning supports children in developing scientific reasoning while maintaining child-led exploration.

When children try things out again and again, they start to understand how changes in surface, shape, or slope affect movement. The Curriculum for Wales Science and Technology Area of Learning and Experience supports this approach, emphasising the value of curiosity and encouraging children to find answers through exploration and questioning (Welsh Government, 2022c).

Understanding Living Things and the Natural World

The woodland setting also provides opportunities to investigate living organisms. Children may notice insects beneath logs, observe moss growing in shaded areas or compare leaves.

At Progression Step 1, science begins with exploring the world around us. This early exploration lays the groundwork for later science learning. The curriculum says that exploring the world around them helps children advance their understanding of science (Welsh Government, 2020a).

Possible child-led investigations include:

- Lifting logs to search for minibeasts
- Comparing wet and dry soil
- Observing seasonal changes
- Noticing textures and smells

These activities help children become more aware of nature and learn to respect it. To help children understand science more deeply, practitioners can ask questions that get children to talk about what they see and think. By guiding children to notice patterns, compare things, and guess why things happen, practitioners help them build scientific thinking.

- “Why do you think the bugs like hiding here?”
- “What is different about this ground compared to over there?”

These conversations help children start making guesses and predictions.

Mathematical Learning Within Outdoor Play

Geometry, Shape and Spatial Awareness

Tree stumps, logs, and paths give children chances to explore ideas about space and position. When children balance on logs, they learn about distance, direction, and where things are by moving their bodies.

The Mathematics and Numeracy Area within the Curriculum for Wales explains that: “Geometry focuses on relationships involving shape, space and position.” (Welsh Government, 2022b).

For example, children may:

- Jump from one stump to another.

- Arrange sticks into shapes.
- Navigate around obstacles.

During play, practitioners can introduce mathematical vocabulary naturally:

- “You stepped over the long log.”
- “Can you go around the big tree?”
- “Which gap is wider?”

When practitioners use maths words during play, they help children understand ideas about space and measurement. For example, a practitioner might say, 'You are walking across the long log,' or ask, 'Can you jump to the next stump?' These comments help children notice things like distance and direction. By using maths language during play, adults encourage children to think about what they are doing and describe it. This support happens in the moment, as adults watch and join in with children's interests, helping them learn while still letting them lead their own play.

Measurement Through Physical Experience

Bumpy ground helps children practice estimating and comparing, which are basic measurement skills. They might see who jumped the farthest or which stick is the longest.

Measurement learning within Curriculum for Wales involves quantifying aspects of the physical world using both standard and non-standard units (Welsh Government, 2022b).

Children might measure using their bodies:

- counting steps between trees
- comparing hand spans

- estimating height differences

Learning maths through movement helps children understand better because they experience ideas with their bodies before thinking about them abstractly.

Number and Problem Solving in Play

Mathematical thinking also emerges socially. Children collecting natural materials may begin counting or sharing resources:

- “I have three sticks.”
- “You need one more.”

The Curriculum for Wales identifies the number system as supporting comparison between quantities and relationships (Welsh Government, 2022b).

Loose parts gathered from the environment naturally promote early numeracy:

- grouping stones
- creating patterns
- distributing materials during collaborative play

These experiences develop reasoning and logical thinking through authentic situations rather than structured tasks.

Role of the Adult: Scaffolding Without Interrupting

A main idea in the Curriculum for Wales is to help children become independent while still guiding their learning. Practitioners take on a supportive role, responding to children’s needs instead of telling them exactly what to do (Welsh Government, 2024).

Practitioners primarily:

- observe play patterns
- ensure safety
- extend thinking through questioning
- model curiosity

Examples of effective scaffolding include:

- “What do you notice about that?”
- “How could we make it roll further?”
- “What might happen if we try again?”

This approach aligns with the curriculum’s emphasis on learners developing understanding through inquiry and evidence-based exploration (Welsh Government, 2023b).

Importantly, silence and observation are also pedagogical tools. Allowing children time to repeat actions supports consolidation and deeper learning.

Metacognitive and Exploratory Conversations

Outdoor environments encourage spontaneous dialogue rooted in wonder and discovery. Conversations may include:

- “Why is this mud sticky?”
- “That hill made me faster!”
- “This stick is heavier.”

Practitioners can model reflective thinking:

- “You noticed something changed - what was different?”

- “How did you solve that problem?”

Such exchanges promote metacognition, helping children think about their thinking processes. This supports progression across Areas of Learning by encouraging reasoning and communication (Welsh Government, 2023b).

Enhancing Play Through Additions

The natural environment already offers plenty of learning opportunities, but adding a few well-chosen items can give children more ways to explore without taking over their play.

Possible additions include:

- balls of different sizes (exploring rolling and speed)
- ramps or planks
- baskets for collecting materials
- measuring tapes or ropes
- loose parts such as tubes or fabric

Introducing a variety of rolling objects allows children to compare movement, directly supporting their understanding of forces and geometry.

However, the most important thing practitioners can add is their attitude. Valuing curiosity, movement, and trying things out matters more than focusing on specific results.

Time, Repetition and Progression

The Curriculum for Wales sees learning as an ongoing journey, not just a list of things to tick off. Children learn more deeply when they revisit the same experiences (Welsh Government, 2023a).

Returning to the same outdoor space allows children to:

- test new ideas
- refine physical skills
- notice seasonal changes
- build confidence

For example, a child who is unsure about climbing a log at first might later try jumping different distances, showing growth in both movement and thinking.

Repetition strengthens conceptual understanding as children compare previous experiences with new discoveries.

Holistic Development and the Four Purposes

Learning in this outdoor environment contributes to the wider aims of the Curriculum for Wales by supporting children to become:

- Ambitious, capable learners through inquiry and experimentation
- Enterprising, creative contributors through imaginative play
- Ethical, informed citizens through environmental awareness
- Healthy, confident individuals through physical activity

(Welsh Government, 2021; Welsh Government, 2024).

Science and maths learning happen together, not separately. The Curriculum for Wales supports this by stressing that subjects should be taught through real-life, meaningful experiences (Welsh Government, 2024).

Conclusion

The woodland in the photograph gives children many chances to learn science and maths through play. By climbing, rolling, collecting, and exploring, they begin to understand concepts such as forces, measurement, space, and numbers.

In line with the Curriculum for Wales, children learn best through curiosity, exploration, and real experiences rather than through formal lessons alone. Practitioners help by watching, asking open questions, and letting children make choices (Welsh Government, 2024).

In the end, being outdoors lets children feel awe and wonder, which helps them stay interested in science and maths throughout their lives. By encouraging curiosity and deep involvement, early years practitioners are urged to make outdoor, hands-on learning a key part of early education. This way, children develop in all areas and benefit from learning that connects different subjects.

Risk-Benefit Assessment (Word Count: 620)

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
Using the tyre and rope swings that are hanging from the trees.	It helps develop balance, coordination, and core strength; builds confidence through physical challenge; encourages turn-taking, cooperation, and social interaction; and supports awareness of movement and space.	Falling from a swing, collision with a moving swing, or loss of grip.	Children who are using swings and those who are nearby.	The swings will be checked regularly; a clear waiting area will be established; adult supervision will be nearby; and children will be supported in recognising safe distances and taking turns.	Risk is reduced but remains part of the physical challenge necessary for development (M).
Walking and running across uneven woodland ground.	It improves balance, spatial awareness, and muscle development; it also encourages resilience and independence, while supporting problem-solving as children adapt their movements.	Trips, slips and minor bumps due to uneven surface.	Children who are moving on uneven ground.	Appropriate footwear to be encouraged; adults will visually monitor the area; children will be reminded to move carefully and at their own pace.	Low likelihood of serious injury; minor falls considered acceptable, managed risk (L).
Climbing or holding onto trees and natural structures.	It builds strength, perseverance and confidence; it develops risk awareness and decision-making skills; it enables a connection with nature.	Slipping, minor scratches, and overreaching physical ability.	Children who are climbing.	The adults will model safe limits and supervise closely without preventing exploration; additionally, unsafe branches will be identified beforehand.	Managed risk supporting physical development (M).
Exploring loose natural materials (sticks, leaves, bark).	It encourages creativity, imagination and sensory exploration; promotes cooperation and curiosity about the natural environment; provides opportunities for sorting and investigating.	Splinters; potential injuries if materials are thrown.	Children handling materials and nearby peers	There will be clear expectations about safe use, a discussion of respectful handling, and adult intervention if behaviour becomes unsafe.	Low risk when boundaries are understood (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
Moving freely within open woodland space.	It promotes independence, exploration and self-confidence; it supports social play and communication; and encourages engagement with natural surroundings.	Children briefly moving out of direct sight, and uneven terrain hazards.	All children in the area.	Clear physical boundaries will be agreed upon; adults will be positioned strategically; regular head counts will be maintained; and active supervision will be maintained.	Risk is minimal with effective supervision (L).
Sitting or gathering on logs/natural seating areas.	It provides opportunities for rest, storytelling and social interaction; it supports group communication and emotional well-being.	Logs shifting or imbalance causing minor falls.	Children sitting or climbing on logs.	Stability will be checked before use; unstable materials will be repositioned; adults will remain aware and keep a close eye during active play.	Very low risk following checks (L).
Outdoor play in varying weather conditions	It builds resilience and adaptability; supports wellbeing and sensory engagement; enhances appreciation of seasonal change and nature.	Cold, wet or muddy conditions, potentially causing discomfort.	All participants, including children and practitioners.	Suitable outdoor clothing will be encouraged; access to shelter if required; practitioners will monitor comfort and warmth.	Minimal risk when clothing is appropriate (L).
Interaction with natural environment (plants, insects).	Encourages curiosity, environmental awareness, and respect for living things; supports awe and wonder experiences; and encourages learning about life cycles and seasonal changes.	Minor stings, allergic reactions or fear responses	All participants, including children and practitioners.	Practitioners aware of allergies; children to be taught to observe rather than disturb wildlife; and handwashing after play.	Low risk with supervision and awareness (L).

Part 4 (Word Count: 2132)

Introduction

The role of adults in supporting young children's engagement with mathematical and scientific concepts in outdoor environments represents a significant focus within educational research. Outdoor learning spaces provide substantial opportunities for exploration, experimentation, and problem-solving, especially when adults serve as facilitators, observers, and scaffolds to extend learning. Participation in outdoor environments enables children to test ideas, make predictions, and develop understanding through active engagement, thereby supporting both cognitive and practical skill development (Play Wales, 2025; Moorhouse, 2019).

Mathematical concepts in early years settings include counting, comparing quantities, recognising patterns, and exploring measurement, while scientific concepts include forces, properties of materials, life cycles, and changes in the natural environment. Practitioners play a pivotal role in creating enabling environments that support these concepts, using both natural and manmade materials, including loose parts, while providing guidance that encourages reflection and extends children's understanding (National Day Nurseries Association, n.d.; Richardson, 2019).

This discussion draws upon established theories, including Piaget's (1952) concept of children as "little scientists," Vygotsky's (1978) scaffolding and zone of proximal development, Nicholson's (1971) loose parts theory, Bruner's (1960) ideas on discovery learning, and Gibson's (1979) affordance theory, all supported by relevant research evidence. It is important to acknowledge that these theories have limitations and have been subject to critique. For instance, some scholars argue that Piaget's stages may underestimate young children's abilities, as subsequent reviews suggest his theory underestimated infants' cognitive capacities and relied on methodological limitations

(Babakr, Mohamedamin and Kakamad, 2019). Vygotsky's theories can be challenging to implement consistently across diverse contexts, as varying interpretations and the removal of his ideas from their original cultural and historical context have led to inconsistent applications in contemporary education (Vasileva and Balyasnikova, 2019). Nicholson's loose parts theory, while valued for promoting creativity and open-ended play, has been critiqued for insufficient attention to cultural and practical constraints. Research indicates that factors such as institutional policies, practitioner confidence, and environmental resources influence the effectiveness of loose parts approaches across different settings (Gibson, Cornell and Gill, 2017; Casey and Robertson, 2016). Nevertheless, integrating these theoretical perspectives provides a comprehensive framework for supporting children's engagement in mathematics and science outdoors. The following sections examine the role of practitioners as facilitators, enabling environments and loose parts, strategies for encouraging curiosity and scientific thinking, barriers and challenges, and alignment with the Curriculum for Wales (2022).

Practitioners Supporting Maths and Science Outdoors

Practitioners play a central role in scaffolding children's learning by observing, questioning, and supporting exploration rather than directing it (Vygotsky, 1978; Beatson, 2019). Scaffolding allows children to engage with tasks slightly beyond their independent ability and gradually internalise new skills through guided support from more knowledgeable others, reflecting Vygotsky's concept of the Zone of Proximal Development (Vygotsky, 1978; Zhou, 2020). During outdoor play, practitioners can use open-ended questions such as "What do you think will happen if we roll this stone down the slope?" or "How could we measure the height of this tree?" to extend mathematical and scientific thinking (Bilton, 2014; Moorhouse, 2019; Beatson, 2019; Vygotsky, 1978). Modelling and demonstrating problem-solving strategies further support learning (Bruner, 1960). Practitioners may also encourage children to verbalise their

observations, compare results, and consider alternative strategies, enabling higher-order thinking and reflection (Zhou, 2020).

Research demonstrates that practitioners can recognise the value of outdoor environments in supporting children's learning across curricular areas, including numeracy (McInnes and Wright, 2023). Some practitioners report that numeracy activities such as measuring and mathematical thinking are often more meaningful when conducted outdoors (Davies & Hamilton, 2016). Such facilitation enables children to experiment safely while developing independence and confidence. For example, when observing children filling containers at a water table, a practitioner might ask, "Which container do you think will hold the most water? How could we find out?" This prompt encourages children to test predictions using measuring jugs and compare results, thereby building understanding of volume and fair testing. Similarly, when children construct with sticks and stones, a practitioner might suggest, "How many stones do you need to make your bridge strong enough for your toy car?" This question encourages experimentation with weight and quantity, prompting children to test different combinations until their structure succeeds. In each scenario, practitioners are responsible not only for providing access to materials but also for supporting reasoning processes, prompting children to make predictions, test hypotheses, and reflect on outcomes (Play Wales, 2025; Bilton, 2014).

Practitioners support learning by creating enabling environments with spatial flexibility and access to varied, open-ended materials, allowing children to explore, collaborate, and engage with experiences that stimulate creativity and deep learning (Adlerstein and Cortázar, 2022). Nicholson's (1971) loose parts theory emphasises that movable, open-ended materials, such as sticks, stones, ropes, crates, and planks, encourage children to test ideas, construct structures, and explore mathematical concepts such as length, volume, weight, and balance. Outdoor environments support scientific exploration as children engage in constructive and manipulative play that helps them understand physical properties, space, and how objects move and fit together through

hands-on activities. For example, through activities such as building with blocks, moving logs, or playing with sand and water, children begin to estimate how objects fit and move in space and to understand size and spatial relationships, which are foundational concepts related to motion and material properties (Craig *et al.*, 2024).

Gibson's (1979) affordance theory demonstrates that both natural and manmade materials offer opportunities for action that stimulate cognitive development. Early years practitioners can design outdoor spaces to maximise these affordances by creating features such as water channels, ramps, or construction areas where children can experiment with gravity, measurement, and volume. Research shows that specific outdoor features support a broader range of exploratory play behaviours and that access to varied, open-ended materials increases children's involvement in outdoor play (Morgenthaler *et al.*, 2024; Storli, Sandseter, and Sando, 2020). Studies indicate that children engage more deeply with mathematical and scientific concepts when outdoor environments are stimulating, rich in open-ended materials, and responsive to their curiosity. Nature-based outdoor environments offer spontaneous opportunities for active, playful exploration that supports cognitive development (Craig *et al.*, 2024). Early years pedagogy prioritises materially rich, play-based settings that encourage exploration and problem-solving (Grindheim, Sørensen and Rekers, 2021).

Enabling Outdoor Environments and Loose Parts

Loose parts play a vital role in developing mathematical and scientific skills in outdoor settings. Nicholson (1971) proposes that open-ended, movable materials allow children to test ideas, problem-solve, and develop creativity. Practitioners can provide a variety of natural loose parts, such as twigs, leaves, and stones, as well as man-made materials, including tyres, planks, and ropes (Clarehouse, 2025; National Education Nature Park, n.d.; Clanfield, 2025). These materials encourage experimentation with mathematical concepts, such as counting, measuring, comparing, and exploring patterns (Hu, 2024). Scientific exploration is supported by observing forces, balance,

and material properties, as outdoor play enables children to experiment with cause-and-effect relationships and physical materials through hands-on investigation (Speldewinde, Infantino, and Campbell, 2025; Delserieys and Kampeza, 2025).

Extended and repeated engagement with loose parts enables children to consolidate understanding and develop increasingly complex reasoning skills, as play processes promote problem-solving, exploration, and the drawing of conclusions over time (Cankaya *et al.*, 2023; Cankaya, Martin and Haugen, 2025). This perspective aligns with Piaget's (1952) view that knowledge develops through repeated active interaction with materials, allowing schemas to be refined through experience. Practitioners facilitate reflection and discussion by guiding conversations about children's hands-on experiences, helping them articulate actions, notice patterns, and interpret their activities. Research indicates that reflective dialogue following activities enables children to connect concrete experiences with developing conceptual understanding and awareness (Žibėnienė *et al.*, 2026). For example, when children construct bridges using planks and stones outdoors, they may test structural stability and predict outcomes, reflecting findings that construction play supports the development of an understanding of balance and weight distribution through experimentation (Weber, Reuter, and Leuchter, 2020). Practitioners further support reflective thinking by using open-ended questioning to extend reasoning, as questioning is a key mechanism through which young children construct knowledge and engage in deeper learning (Murray, 2022). This approach balances child-led exploration with intentional adult guidance, as practitioners support understanding through hands-on experiences while introducing mathematical and scientific language through discussion and shared meaning-making, enabling children to connect exploration with emerging conceptual understanding (Murphy, Muir and Thomas, 2025; Monteiro, Jiménez-Aleixandre and Siry, 2020).

Encouraging Curiosity and Scientific Thinking

Practitioners encourage scientific thinking by prompting children to make predictions, test ideas, and reflect on outcomes. Open-ended questions, such as “What will happen if we change the slope?” or “How can we make this container hold more water?”, aid in hypothesis testing and observation skills (Speldewinde, Infantino, and Campbell, 2025; Gryphon House, 2025). Piaget (1952) describes children as “little scientists” who construct understanding through experimentation, while Bruner (1960) highlights the importance of discovery learning. Practitioners support children in noticing patterns, making comparisons, and articulating reasoning, strengthening both understanding and communication skills (Smedsrud *et al.*, 2023).

Research shows that children who engage in structured yet flexible outdoor play demonstrate improved understanding of scientific concepts and increased confidence in experimenting with new ideas (Speldewinde, Infantino and Campbell, 2025). Practitioners can further extend learning by encouraging reflection, discussion, and prediction, thereby promoting problem-solving, critical thinking, and sustained curiosity (Bento and Dias, 2017; Ramsden *et al.*, 2025; Waters and Rekers, 2019).

Barriers and Challenges

Despite the benefits, supporting mathematical and scientific learning outdoors can be challenging; some practitioners may lack confidence in facilitating open-ended play or fail to recognise its educational value. Constraints such as time pressures, risk concerns, limited access to materials, and curriculum demands can reduce opportunities for children to experiment, explore, and consolidate learning (Gray *et al.*, 2025; McCrorie *et al.*, 2025; Frances *et al.*, 2024; Kiviranta *et al.*, 2024).

Some early years settings may have limited space or outdoor resources, which restrict the scope of possible investigations. Additionally, practitioners may feel compelled to prioritise indoor activities perceived as more academic, thereby overlooking the

significant learning potential of outdoor environments. These challenges can hinder children's engagement and limit opportunities to develop problem-solving, critical thinking, and mathematical reasoning skills (Ramsden *et al.*, 2025; Craig *et al.*, 2024; Grant *et al.*, 2024; Frances *et al.*, 2024).

Addressing these challenges requires professional development, reflective practice, and careful planning of outdoor learning experiences. Research indicates that effective outdoor learning depends on educators' pedagogical knowledge and training, enabling practitioners to intentionally support children's learning rather than relying solely on the environment itself (Kiviranta *et al.*, 2024; Frances *et al.*, 2024). When adults receive adequate support, they are better equipped to scaffold learning and design enabling environments that balance child-initiated exploration with purposeful guidance (Kelly *et al.*, 2022; Kiviranta *et al.*, 2024). This highlights that the adult's role is both pedagogical and organisational, requiring thoughtful planning and coordination to ensure children can fully engage with mathematical and scientific concepts in outdoor spaces (Traynor *et al.*, 2025).

Policy Context – Curriculum for Wales 2022

The Curriculum for Wales (2022) recognises outdoor learning as a valid pedagogical approach that supports independence, problem-solving, and engagement with mathematical and scientific concepts. Practitioners are central to implementing curriculum guidance, ensuring that outdoor environments and resources are thoughtfully designed to promote learning. Activities that include counting, measuring, experimentation, and observation align with curriculum aims while supporting children's development across multiple domains (Welsh Government, 2022; Tonge, Jones and Okely, 2018).

Embedding outdoor learning within curriculum practice supports children's holistic development by integrating cognitive, physical, and social learning experiences (Harper, Hespos and Gray, 2025). From a Piagetian perspective, outdoor environments provide opportunities for active exploration through hands-on interaction with materials, enabling children to construct knowledge through experimentation, classification, and problem-solving (Piaget, 1952). However, while Piaget emphasised independent discovery, Vygotsky's sociocultural theory highlights the essential role of adults and peers in extending learning through social interaction and guided support within the Zone of Proximal Development (Vygotsky, 1978). In outdoor contexts, adults scaffold learning by planning enabling environments, observing children's interests, and using questioning and dialogue to deepen thinking, particularly in mathematical and scientific exploration. Research demonstrates that outdoor learning enhances engagement, collaboration, physical coordination, and resilience while promoting creativity and curiosity (Bento and Dias, 2017; Johnstone *et al.*, 2022). Therefore, aligning developmental theory with contemporary research and pedagogical practice positions outdoor learning not as an enrichment activity but as a fundamental component of effective early years education, where carefully supported exploration promotes independence alongside meaningful conceptual understanding (Bento and Dias, 2017; Kiviranta *et al.*, 2024).

Conclusion

Research and theory consistently affirm the benefits of intentional practitioner facilitation in dynamic outdoor settings. Piaget (1956) emphasises active learning, Vygotsky (1978) highlights scaffolding, Nicholson (1971) demonstrates the value of loose parts, and Bruner (1960) advocates for discovery learning. Integrating theoretical perspectives, research, and curriculum guidance (Welsh Government, 2022) shows that adults can transform outdoor play into a rich learning experience that supports children's

mathematical and scientific development while nurturing independence, confidence, and curiosity.

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