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Word count – 4,391

I confirm that I have not used any AI tools in the research and creation of this assignment. I confirm that I have not presented any AI generated materials as my own work. I confirm I have copies of my drafts, notes, and other resources I used, which I may be asked to provide in evidence.

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Awe and Wonder : science, mathematics and the outdoors



(Source: Stock Cake (2026))

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Task 1 – Outdoor Photograph



(Source: Camping and Caravanning Club (n.d.)

Task 2 – Learning Story

Learning Story – Exploring sand, rock pools, mathematics and Science at Caswell Beach.

9:15am – Arriving at Caswell Beach

As we arrived at Caswell Beach, the children were eager to explore the sandy beach and rocky areas. We gathered briefly and discussed what we might discover. The children looked towards the rock pools, noticing the water between the rocks and wondering what might be hiding underneath.

Child A pointed towards the rocks and said, “I wonder what's in there?”

Child B replied, “Maybe we can find a crab!”

I asked, “What do you think we might find living in the rock pools?”



(Source: California.com (2024))

The children shared ideas and made predictions. Rather than providing answers, I encouraged them to explore and find out for themselves. Some children moved towards the rock pools, while others collected stones and shells. I placed an empty tray nearby so interesting objects could be collected and investigated later.

This experience encouraged curiosity about the children's surroundings. They used their senses to make observations, ask questions and make predictions, supporting the Curriculum for Wales emphasis on curiosity, exploration and observation within Science and Technology (Welsh Government, 2020). It also provided an authentic context for early mathematical development as children sorted, compared and described objects (Welsh Government, 2020).

9:30am – Exploring Stones

The children collected stones of different sizes, shapes and colours. Child A picked up two stones.

“This one is bigger,” he said.



(Source: The Happy Learner (n.d.)

Child B responded, “But mine is heavier.”

I asked, “How could we find out?”

This created a natural opportunity for mathematical learning through comparison and classification. The children were beginning to recognise that a larger object is not necessarily heavier, developing an early understanding of measurement through hands-on experiences.

This links to the Mathematics and Numeracy Area of the Curriculum for

Wales, where learners develop understanding of measurement, mass, comparison and estimation (Welsh Government, 2020).

The children used mathematical vocabulary such as *big*, *small*, *heavy*, *light*, *long* and *short*. Rather than completing a formal mathematics activity, they developed mathematical understanding through play and interaction with real objects in their environment. This reflects the Curriculum for Wales emphasis on meaningful and practical mathematical experiences (Welsh Government, 2020).

9:45am – Exploring the Sand

The children's attention turned towards the sand. Child A began building a sandcastle but watched as it collapsed.

“Mine keeps falling down!” he exclaimed.

I asked, “I wonder why?”

Child A replied, “It's too dry.”

Another child suggested, “Put water on it.”

The children experimented with different amounts of water and noticed that damp sand was easier to mould and could make stronger shapes.

Child B said, “Look! Mine stays up now.”

Child A replied, “You need more water.”

I asked, “What do you think will happen if you put too much water in?”



(Source: Wonderful (n.d.)

The children tested this idea. One child poured a large amount of water onto their sandcastle and watched it collapse.

“It's too wet!” they laughed.

The children explored cause and effect by making predictions, testing ideas and observing results. They investigated how changing the amount of water affected the sand, supporting the Science and Technology Area of the Curriculum for Wales, which encourages learners to investigate materials through curiosity and practical exploration (Welsh Government, 2020).

The children wanted to repeat the experiment, so I allowed them time to continue. Repetition enabled them to test different ideas and develop explanations. This reflects the Curriculum for Wales emphasis on exploration, investigation and trial-and-improvement approaches to learning (Welsh Government, 2022).

10:00am – Rolling, Slopes and Forces

Further along the beach, the children discovered a small natural slope. Child A ran towards it and shouted, “I'm going to roll down!”

He climbed to the top and rolled towards the bottom.

“I'm going really fast!”

I asked, “I wonder why you went faster from the top?”

Child A replied, “Because it's higher.”

Another child rolled from halfway down and noticed that they did not travel as far.

“Mine didn't go as far!”



(Source: Taken by Jess (2025).)

The children compared where they had started and recognised that starting higher allowed them to travel further. They also used vocabulary such as *up*, *down*, *fast*, *slow*, *high*, *low*, *further* and *nearer*.

This provided an authentic introduction to forces and movement. The children experienced the effects of gravity physically rather than simply being told about it. This connects with the Science and Technology Area, which identifies forces and energy as important for understanding the physical world (Welsh Government, 2020). Their comparisons of distance, direction and speed also supported Mathematics and Numeracy through mathematical language and comparison (Welsh Government, 2020).

10:15am – Which Object Will Roll the Furthest?

I introduced several safe objects, including balls of different sizes and shapes. I asked the children to predict which would roll the furthest.

Child A chose the largest ball.

“I think this one will win because it's bigger.”

Child B chose a smaller ball.



(Source: Kodo Kids (n.d.).)

“No, mine will go faster!”

We placed the objects at approximately the same starting point and allowed them to roll down the slope.

“Mine went further!”

“That one stopped!”

“Try it again!”

The children repeated the experiment and changed the position of the objects. I asked, “What did you notice?”

Child A replied, “The round one rolls better.”

Another child said, “That one went sideways.”

The children explored shape, distance, speed and movement while making predictions and comparing outcomes. I encouraged metacognitive thinking by asking, “Was that what you thought would happen?” and “What could we try differently?”

The children learned that predictions may differ from outcomes and that investigations can be adapted and repeated, supporting inquiry and learning through trial and improvement (Welsh Government, 2020; Welsh Government, 2022).

10:30am – Discovering the Rock Pools

The rock pools quickly became a favourite area to investigate. The children crouched down and looked carefully into the water.

Suddenly, Child A shouted, “I can see something moving!”

Child B pointed towards a small creature and said, “It’s hiding under there!”

I asked, “I wonder why it went underneath the rock?”

Child A suggested, “Maybe it’s scared.”

Another child said, “Maybe it’s looking for food.”

Rather than immediately explaining, I encouraged observation by asking, “What can you see?”, “How is it moving?” and “Where do you think it is going?”

The children noticed that some creatures moved quickly while others moved slowly. They also compared differences in size, shape and colour.

Child A said, “That one is tiny!”

Child B responded, “Look, that one is bigger.”



(Source: Freedom Surf School (n.d.).

We discussed how rock pools provide water and shelter, encouraging observation and respect for living things and their habitats (Welsh Government, 2020).

10:45am – Heavy and Light

The children began collecting stones around the rock pools. Child A picked up a large stone and dropped it into a shallow pool.

SPLASH!

“That made a big splash!”

Child B picked up a smaller stone.

“Mine didn't splash as much!”

The children searched for larger stones to make bigger splashes. I asked, “Do you think the biggest stone will always make the biggest splash?”

They investigated by collecting stones of different sizes and weights and dropping them carefully into the water. We then used a simple balance with natural materials. Child A watched one side move down.

“That one is heavier!”

I asked, “How do you know?”

“Because it went down.”

The children developed their understanding of mass and comparison while exploring and testing objects, linking to Mathematics and Numeracy and Science and Technology (Welsh Government, 2020).



(Source: Pinterest (n.d.).)

11:00am – Floating and Sinking



(Source: Teaching Mama (n.d.).)

The children began placing natural objects into shallow water. A leaf floated, a stone sank and a small stick floated.

Child B asked, “Why did the stone go down?”

I asked, “What do you think?”

The children began making predictions before testing them.

“This will float.”

“That one will sink.”

“Let's see!”

They explored leaves, twigs, stones and other natural materials, noticing patterns and investigating which objects floated or sank. This encouraged curiosity and helped them develop explanations from their observations and evidence (Welsh Government, 2020).

11:20am – Sorting Our Discoveries

As our time at the beach came to an end, we gathered around the wooden discovery tray filled with stones, shells, seaweed and other natural objects. The children eagerly picked up and compared the objects.

I asked, “How could we sort these?”

The children responded:

“These ones are big.”

“These are small.”

“These are smooth.”

“These ones are heavy.”

They began grouping the objects by size, texture and weight, explaining their choices to one another. This created opportunities to develop mathematical language and classification skills.

The children also recalled earlier investigations and discussed what they had discovered. Child A said, “The sand needs water to make it stick,” while Child B explained, “The big stones make big splashes.” Another child added, “The little animals live in the rock pools.” Their comments showed how they were able to recall experiences and communicate their developing ideas (Welsh Government, 2020; Welsh Government, 2022).

11:30am – Reflection

Before leaving, we gathered and reflected on the morning.

I asked, “What was your favourite thing today?”

Child A replied, “The rock pools!”

Child B said, “Making the biggest splash!”

Another child smiled and said, “Rolling down the hill!”

Their responses showed the enjoyment and learning they had gained through exploring the outdoor environment.



(Source: Egan Reid Education (n.d.).)

Overall, Caswell Beach provided an authentic outdoor environment where children could follow their interests and develop understanding through play. The experience supported learning in Science and Technology and Mathematics and Numeracy, while also encouraging curiosity, communication, problem-solving and collaboration. This reflects the Curriculum for Wales emphasis on meaningful learning through exploration (Welsh Government, 2022).

Initial Benefit-Risk Assessment of Activities in Nature-based Early Childhood Education



This benefit-risk assessment focuses on the specific activities that occur in a space. This tool should be used in tandem with a site assessment which identifies potential hazards in a space—no matter the activity occurring there. Once you've completed this initial benefit-risk assessment it's recommended to generate detailed protocols for medium- and high-risk activities.

Location/Organization:	Exploring sand, rock pools, Mathematics and Science at Caswell Beach.	Date:	Thursday 17 th September 2026
Assessor(s):	Nasima Ali	Scheduled review date:	Sunday 27 th September 2026

The three questions driving this assessment: 1) What are the benefits of doing this activity? 2) How might we (or nature) get hurt doing this activity? 3) How can we keep ourselves, each other, and nature safe doing this activity?

Activity	How will young children benefit from this activity?	What are the possible risks of this activity?	Who is at risk?	What actions will be put in place to reduce the risk of injury?	Overall risk rating*: L/M/H
Exploring rockpools	Children will develop curiosity, observation and early scientific understanding by exploring marine animals, plants and coastal habitats. They will have opportunities to ask questions, share observations and develop language. Carefully moving around the rockpools also supports balance, coordination and awareness of their surroundings. Sensory experiences, such as touching, observing and listening to the coastal environment, can support confidence, independence and awareness of potential hazards.	Slipping or falling on wet or uneven rocks. Cuts from rocks, shells or barnacles. Falling into deeper rockpools. Bites, stings or contact with marine animals. Unexpected waves or tides. Cold or wet conditions. Sunburn, dehydration or heat exposure. Pollution or contaminated water. Disturbance or harm to marine life.	Children and adults	A first-aid kit will be available, and at least one responsible adult will be aware of the appropriate first aid and emergency procedures. A recognised safe access point and clear boundaries will be established before the activity. Staff will maintain close supervision and position themselves between children and the sea where necessary. Children will walk rather than run and wear suitable footwear with good grip. Slippery, unstable, sharp or deep areas will be restricted. Marine life will be observed carefully without unnecessary disturbance, and handled animals will be returned to where they were found. The activity will stop if weather, tides or sea conditions become unsafe.	M

Activity	How will young children benefit from this activity?	What are the possible risks of this activity?	Who is at risk?	What actions will be put in place to reduce the risk of injury?	Overall risk rating*: L/M/H
Sand play and exploration	Sand play supports physical development through digging, carrying, pouring and building. Children can explore mathematical concepts including size, quantity, weight and capacity by filling, emptying and comparing containers. It also encourages imagination, creativity, sensory exploration and positive social interactions through sharing resources and taking turns.	Sand entering eyes or mouth. Children digging deep holes and falling into them. Sharp shells, stones, litter or other objects hidden in the sand. Contact with animal faeces or contaminated materials. Sunburn, dehydration or overheating. Children wandering towards the sea. Sand being thrown at other children.	Children and adults	The area will be checked before use and obvious hazards such as broken glass, litter and sharp objects removed where its safe, A clear boundary will be established, with active adult supervision throughout. Children will be reminded not to throw sand or create deep holes. Drinking water, suitable clothing and sun protection will be provided, and children will be monitored for signs of overheating or becoming too cold.	L

Activity	How will young children benefit from this activity?	What are the possible risks of this activity?	Who is at risk?	What actions will be put in place to reduce the risk of injury?	Overall risk rating*: L/M/H
Exploring the shoreline and shallow water	Children will develop confidence, physical coordination and sensory awareness through experiencing the movement and sounds of the sea. Children can develop understanding of tides, waves, weather and coastal environments through curiosity, problem-solving and scientific exploration. Children will also learn to recognise hazards and develop safer behaviours.	Drowning or being swept into deeper water. Unexpected waves or strong currents. Slipping on wet sand, stones or rocks. Cold-water shock or hypothermia. Children becoming separated from the group. Polluted water. .	Children and adults	Children will not enter the sea unless a specific water-activity risk assessment and safety procedure is in place. A clear no-go boundary will be established, and tide times and sea conditions checked before and during the visit. Close supervision and regular headcounts will be maintained. Children will wear suitable clothing and footwear, and dangerous shoreline areas will be avoided. Emergency procedures and safe access points will be identified. The group will leave immediately if conditions deteriorate or the tide makes the area unsafe.	H

Activity	How will young children benefit from this activity?	What are the possible risks of this activity?	Who is at risk?	What actions will be put in place to reduce the risk of injury?	Overall risk rating*: L/M/H
Collecting natural materials	Children will develop observation and classification skills by exploring shells, stones and seaweed. Loose-parts play can encourage creativity, while sorting, counting, comparing sizes and identifying patterns support early mathematical learning. Discussion of materials also supports language development and respect for the natural environment.	Cuts from sharp shells or stones. Children handling unknown or potentially harmful objects. Children putting objects into their mouths. Contact with dead animals or decaying organic matter. Children moving away from the supervised area while searching.	Children and adults	Staff will closely supervise children within a defined exploration area. Children will not handle dead animals, unknown substances, litter, sharp objects or potentially hazardous materials, and nothing found outdoors should be eaten. Where appropriate, children will collect only loose, non-living materials and avoid removing materials from sensitive habitats. Items will be used temporarily and returned where appropriate. Children will wash their hands after handling natural materials.	L

		Damage to wildlife habitats through excessive collection.			
Activity	How will young children benefit from this activity?	What are the possible risks of this activity?	Who is at risk?	What actions will be put in place to reduce the risk of injury?	Overall risk rating*: L/M/H
Climbing and Moving Across Rock	Climbing supports balance, coordination and physical competence while helping children develop confidence. Navigating natural rocks can also encourage problem-solving, spatial awareness and appropriate decision-making about manageable challenges.	Falls and slips on wet, muddy or seaweed-covered rocks. Trips caused by uneven surfaces. Cuts, bruises or trapped hands and feet. Lose or falling rocks. Climbing beyond children's abilities. Falling towards the sea.	Children and adults	A first-aid kit will be readily available, and staff will follow appropriate emergency procedures. Staff will inspect the area beforehand and ensure that only stable, low-level rocks suitable for children are used. High rocks, cliffs and unstable surfaces will be out of bounds. Children will be encouraged to maintain three points of contact and climb down rather than jump. Close supervision will be maintained, suitable footwear worn, and children encouraged to seek help when needed. The activity will stop if weather, tide or surface conditions become unsafe.	M

Task 4 – Academic writing

The Role of Adults in Supporting Mathematical and Scientific Learning Through Outdoor Play in the Early Years

Outdoor learning is an important aspect of early years education, providing children with opportunities to learn through play, exploration and interaction with the natural environment (Little, Elliott and Wyver, 2017). Watts (2020) highlights the importance of children's first-hand experiences of the natural world, while White (2020) identifies outdoor environments as valuable contexts for play, exploration and learning. These experiences can support mathematical and scientific understanding through observation, questioning and investigation. Speldewinde (2024) highlights how outdoor environments can encourage scientific thinking, while Keith (2017) demonstrates how outdoor play and nature-based experiences can support mathematical learning when adults recognise and extend children's thinking. However, an outdoor environment does not automatically produce meaningful learning. The adult has an important role in recognising learning opportunities, providing appropriate resources and responding to children's ideas (Keith, 2017). Therefore, this essay argues that effective outdoor learning depends not simply on the environment or resources provided, but on the quality, timing and responsiveness of adult interactions. Adults need to balance intentional teaching with child-led exploration, using professional judgement to determine when to intervene, extend thinking or step back.

Nicholson's (1971) theory of loose parts provides a useful theoretical perspective on how adults can create opportunities for learning. Environments containing movable and adaptable materials allow children to manipulate resources, experiment and construct their own play experiences. Gibson, Cornell and Gill (2017) similarly suggest that loose parts encourage child-led exploration and creativity. Adults can provide sticks, stones, leaves, water and containers without prescribing a particular outcome. Such materials can create opportunities to explore size, shape, quantity, measurement and spatial relationships. For example, children constructing with sticks may compare lengths or investigate which materials create a stable structure. The adult therefore supports mathematical learning indirectly by creating an

environment in which mathematical problems naturally arise. However, resources alone do not guarantee conceptual learning. Children may use materials creatively without explicitly developing mathematical or scientific understanding. Conversely, if adults turn loose-part play into a predetermined task, they may restrict children's autonomy. This demonstrates that the effectiveness of resources depends on how adults interpret and respond to children's activity rather than simply on the presence of resources.

Mathematics provides an important context for using children's natural curiosity and everyday outdoor experiences to develop conceptual understanding. Speldewinde and Campbell (2022) found that nature-based settings provide opportunities for children to engage with mathematics through nature play, particularly when adults recognise and extend the mathematics within children's experiences. Collecting stones, leaves or sticks, for example, can involve counting, comparison, pattern, shape and measurement. This is consistent with Froebelian thinking, which recognises the natural environment as an important context for children to develop concepts and make connections through play and first-hand experience (Tovey, 2017). Adults can introduce vocabulary such as more, fewer, longer, shorter and equal, while asking questions such as, "How do you know this group has more?" Such interactions can make mathematical thinking more explicit without necessarily removing children's ownership of the activity. Purpura *et al.* (2017) found a relationship between children's mathematical language and mathematical knowledge, suggesting that mathematical talk can support children in developing and communicating their understanding.

The adult's role, however, should not be reduced to asking questions or naming mathematical concepts. The quality and timing of intervention are important. A Froebelian perspective supports this balance between adult guidance and children's autonomy. Rather than directing children's play towards predetermined outcomes, adults are encouraged to observe, listen and respond to children's interests while providing appropriate opportunities to extend their learning (Tovey, 2017). Keith (2017) emphasises open-ended questions and prompts, while İnönü and Demircan (2023) suggest that questioning can support learning when it is relevant to children's thinking. Skene *et al.* (2022), in a systematic review and meta-analysis of guided play, found evidence that guided play can support early mathematical skills and

shape knowledge, while also highlighting the importance of adapting guidance to individual children's needs. Poorly timed questioning may interrupt sustained play, whereas carefully considered questions can encourage children to explain, reconsider and test their ideas. For example, rather than telling a child which object is longer, an adult could ask, "How could we find out?" This encourages the child to develop a strategy rather than simply receive an answer. The adult is therefore supporting mathematical reasoning as well as mathematical knowledge.

Nevertheless, open-ended questioning is not automatically effective. If questions are excessive, leading or disconnected from children's interests, children may focus on guessing the answer expected by the adult. Professional judgement is therefore essential adults need to recognise when a prompt will extend thinking and when stepping back will allow children to develop their own strategies. Vygotsky's (1978) sociocultural theory, particularly the Zone of Proximal Development, provides a framework for understanding this balance. Children can achieve more with appropriate support than they can independently, meaning that adults can extend learning through scaffolding. Skene *et al.* (2022) similarly highlight the potential of guided play to support children's learning while maintaining elements of child-led activity. For example, when a child constructs a bridge, an adult could ask which piece of wood might reach across and encourage comparison of different lengths. The adult is not solving the problem but supporting the child to develop a strategy. As competence increases, support can be reduced.

However, scaffolding presents a significant challenge because the appropriate level of support differs between children. Too much assistance may create dependence and reduce opportunities for independent problem-solving, while insufficient support may lead to frustration or leave mathematical opportunities unexplored. Vygotsky's theory therefore should not be interpreted as requiring continuous adult intervention. Rather, it supports responsive interaction in which the adult adapts support according to the child's current understanding. This distinction is important in outdoor learning because children need opportunities to take risks, make decisions and experience uncertainty. Effective scaffolding should consequently increase children's independence over time rather than replace it.

The same principles apply to scientific learning. Outdoor environments provide direct opportunities for children to observe natural phenomena and investigate questions

arising from their experiences (Skalstad and Munkebye, 2022). Adults can support scientific thinking by encouraging children to observe, predict, investigate and explain. For example, when investigating whether natural objects float or sink, an adult might ask, “What do you think will happen?” before children test their predictions, followed by, “What happened?” and “Why do you think that happened?” This supports children in understanding that ideas can be tested against evidence. Tunnicliffe (2015) identifies observation, questioning, prediction and investigation as important processes in children's scientific learning, while Ramanathan, Carter and Wenner (2022) emphasise children's curiosity as a starting point for scientific inquiry. The adult's role is therefore to facilitate inquiry rather than simply transmit scientific facts. Kurkul, Dwyer and Corriveau (2022) found that responding to children's causal questions by encouraging their own explanations can support further thinking, while McNerney *et al.* (2020) demonstrate how open-ended questioning can support predicting, testing and explaining. For instance, if children discover a worm, the adult could ask where they found it, why it might be there and what it needs to live. Resources such as magnifying glasses can encourage closer observation, while vocabulary such as habitat, soil, living and environment can connect children's observations with scientific concepts. Dwyer and Harbaugh (2020) highlight the importance of adult support for vocabulary development. Nevertheless, inquiry-based learning should not be confused with simply allowing children to experiment without adult involvement. Young children may generate explanations that are incomplete or inaccurate and may require adult modelling, vocabulary and appropriate information. At the same time, explaining the correct answer too quickly can prevent children from forming and testing their own hypotheses. The challenge is therefore one of balance. Adults need to provide sufficient structure to make scientific inquiry productive while preserving opportunities for children to think, predict and investigate independently. This suggests that effective scientific teaching outdoors is neither completely adult-directed nor completely child-led. Spontaneous events provide particularly valuable opportunities for this responsive approach. A frozen puddle, changing leaf or spider web may generate children's questions and provide an authentic starting point for investigation. Hammer (2020) highlights the importance of adults recognising children's curiosity and entering into

dialogue with them to support the development of scientific understanding, while Paños, Carrión and Ruiz-Gallardo (2022) demonstrate the value of supporting children to formulate scientific questions. Adults can therefore use children's existing curiosity rather than imposing an unrelated scientific activity. However, spontaneous learning can be unpredictable and may not correspond directly with planned objectives. Hamel *et al.* (2021) found that teachers frequently used closed-ended questions during preschool science activities, although science-related interactions were more likely to involve open-ended questioning. This suggests that practitioners need flexibility to adapt planned provision when children's interests create meaningful opportunities for scientific investigation. Sustained shared thinking further explains how adults can participate without taking control of children's learning. This reflects Froebel's emphasis on the adult as a supportive partner in learning, who listens to children's ideas and develops understanding through shared experiences rather than simply transmitting knowledge (Tovey, 2017). Purdon (2016) suggests that sustained shared thinking involves child-initiated interactions and co-construction, allowing adults and children to develop ideas together while children remain actively involved in the learning process. For example, when children build with sticks, an adult might wonder aloud why one structure is more stable than another and encourage children to test their ideas. This creates a shared problem-solving process rather than a teacher led activity. However, sustained shared thinking also contains a potential tension adults may believe they are extending learning while gradually directing children's play towards an adult defined outcome. The distinction between extending and controlling is therefore crucial. Adults should respond to children's ideas and interests rather than using questioning as a means of steering them towards a predetermined answer.

Planning the outdoor environment is another important aspect of the adult's role. Gibson's concept of affordances highlights how environments and resources create possibilities for action. Boulton and Thomas (2022) found that loose parts can provide sensory engagement, creativity and self-directed exploration, while Mårtensson *et al.* (2020) demonstrate that outdoor affordances are shaped through interactions between children, adults, places and objects. Practitioners can therefore plan environments that provide varied possibilities for mathematical and scientific exploration. For example, children interested in construction could be provided with

materials of different lengths, weights and shapes, creating opportunities to explore balance, stability, measurement and spatial relationships. However, effective planning should not become prescriptive. Children may use resources in unexpected ways, and these unexpected uses can produce equally valuable learning. Planning should therefore create possibilities rather than dictate outcomes.

Overall, research and theory indicate that adults play a central role in supporting children's mathematical and scientific engagement outdoors, but effective practice is characterised by responsiveness rather than the amount of adult intervention. Loose parts and affordances demonstrate how adults can create environments that invite exploration, while Vygotsky's theory explains how responsive scaffolding can extend children's capabilities. Questioning, vocabulary, feedback and sustained shared thinking can deepen mathematical reasoning and scientific inquiry, particularly when they emerge from children's interests and experiences. However, these strategies are not universally effective. Excessive questioning can interrupt play, inappropriate scaffolding can reduce independence, and resources without adult responsiveness may fail to develop conceptual understanding. Equally, excessive adult direction can undermine the autonomy that makes outdoor learning valuable.

Consequently, the adult's role involves a continual balance between intentional teaching and child-led exploration. Adults need to recognise when children require support, when a question could extend their thinking and when stepping back will provide greater opportunities for independent investigation. The evidence therefore suggests that outdoor learning is most effective when adults create rich environments, notice children's mathematical and scientific thinking and respond flexibly to emerging opportunities. Ultimately, adults should not simply transmit knowledge but create responsive conditions that enable children to develop their own understanding and remain active participants in their learning.

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