

Awe and Wonder, Science, Mathematics and the Outdoors

Section 1: An enchanting wood ready to be discovered!



(Source: Patch, 2015)

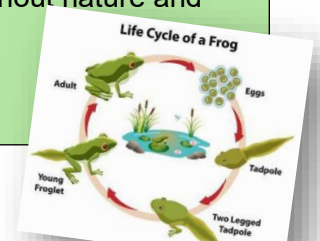
Outdoor exploration directly aligns with the New Curriculum for Wales (2022) and serves as a valuable tool to support and promote the 'Science and Technology' and 'Mathematics and Numeracy' areas of learning. This natural environment will foster curiosity and wonder through child-led, real-life practical experiences enabling embodied learning when they feel the spikes on a pinecone, see the ripples on the water, hear the snap from a twig and observe the effect of the weather on the habitat. The children exploring the area in the photo will be aged between five and six and will have access to natural elements such as, water, soil, natural loose parts, climbing structures, pathways, trails, slopes, gradients and light and shadow. And will have freedom and independence to let their imagination be captured by the 'Awe and Wonder of the World' on a damp September day. As Einstein famously stated "Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world" (Goodreads, 2024).

'Oh how many eggs are there?'
'What comes next in the lifecycle?'

Pond Life

Resources provided: Magnifying glass, books, ruler, net and bucket

I will encourage the children to inspect the pond by giving them magnifying glasses and ask them what they can see? Listening and expanding on their interests and encouraging their observational scientific techniques in observing living things in their natural habitat. Such as fish, dragonfly and tadpoles. I will assist the children with books to support their understanding of the biological process and life cycle of a frog. And introduce them to life being a matter of stages and changes over time, growth, development and metamorphosis. A Curriculum for Funded Non-Maintained Nursery Settings (2021) objective to develop early mathematical skills through practical experiences is achieved as they count the number of life stages and order the sequence of events. They can also use a ruler to measure the tadpoles and observe how many have grown legs. By observing biological stages, noticing the ripples in water and rings in a tree trunk, children learn about patterns throughout nature and gain an understanding of spatial awareness.



(Source: Adobestock, 2024)

Water

Resources provided: Ladle, bottle, cup, jug, ice cube tray, apple, spoon

According to the Welsh Government's Curriculum for Funded Non-Maintained Nursery Settings (2021) children develop mathematical and scientific concepts through multi-sensory play. Water is an exciting hands-on activity where children pour, mix, freeze and add objects to learn through experimentation. Such as, **state of matter** when water is frozen and changes from liquid to solid. **Density and buoyancy** when stones, leaves, apples and metal are dropped in, and the children make predictions as to which will float or sink. Using questions such as 'Why did the stone sink?' and metacognitive talk such as 'Oh the plastic floated!' enhances their understanding. Mathematical concepts are also learnt through water when exploring **measurement**. Using a ladle they can predict how many spoonful's it takes to fill each container. This introduces them to the concept of **Volume and Capacity**. By asking 'How many millilitres does the bottle hold?' and discussing which container has the largest capacity or fills up the quickest helps children understand and compare quantities. Descriptive language benefits children's learning throughout waterplay including terms such as 'more' 'less' 'full' 'empty' 'equal' 'fast' 'slow' 'heavy' 'light' 'wide' 'short' supporting their understanding of mathematical concepts and aligning with the curriculum's focus on developing language and cognitive skills through play-based learning.



Child: 'The apple is big, but it floats'
Adult: "Yes it's not very heavy for its size, so it floats. It's less dense than the water."

The Viewpoint



"What will happen if we drop a heavy and a light object at the same time?"

Gravity from the Viewpoint!

Resources provided: a basket and a stopwatch

A Curriculum for Funded Non-Maintained Nursery Settings (2021) promotes active learning through real-world applications, encouraging children to develop a deeper understanding of the world around them. Through hands-on experiences children can learn scientific and mathematical concepts such as force, gravity, speed, friction, size, and weight. The children will use curiosity and exploration methods to forage for pinecones, smooth pebbles, jagged rocks, acorns, heavy logs, light sticks, and leaves. Using a stopwatch, they will take turns dropping each item from the viewpoint, recording how quickly they hit the ground, and observe how each shape and size affect their behaviour. For instance, an acorn with its cap on might spin, leaves may flutter, and stones may fall in a straight line.

This activity introduces the scientific concept that gravity pulls objects towards the Earth, with heavier objects falling faster. This aligns with the Curriculum for Wales (2022) focus on 'Increasing breadth and depth of knowledge' The activity also involves mathematical concepts with measuring time, data comparison, and the beginnings of linking time to speed ratios. Aligning with 'Conceptual understanding' progression step.

Rolling down the path

The children then take turns rolling the objects down the sloped path, predicting which will reach the pond first, eagerly anticipating if they were right! This allows them to explore how forces and motion affect speed and acceleration. For example, they observe that gravity causes objects to start rolling slowly and then speed up as they go downhill. This aligns 'Increasing effectiveness as a learner' 'Refinement and growing sophistication in the use and application of skills' in the science and technology area of learning (Curriculum for Wales, 2022).

Mathematical concepts are learnt as children compare the properties of the objects such as their weight and size and observe similarities between them. For example, by asking "Which objects were the quickest?" "So the big heavy log rolled faster than the small light stick?" This encourages them to think critically about the relationship between an object's characteristics and its movement. The scientific concept of friction is introduced as children notice that jagged, irregular shapes may stop sooner than the smooth, rounder objects, teaching them how surface texture impacts motion. This type of hands-on, inquiry-based learning is strongly supported by the Curriculum for Funded Non-Maintained Nursery Settings (2021) as it helps children develop a deeper understanding of the physical world around them.

The Sloped Path



"What will happen if we roll the stone up the slope?
Ok it didn't work, why?"

A bridge over the stream

The Curriculum for Wales 2022 Science and Technology Area of Learning and Experience aims to "encourage learners to develop and apply their understanding of the natural world through exploration, problem solving and applying their knowledge to practical tasks" (Welsh Government, 2022, Science and Technology). Drawing on inspiration from the photo, I will set the children a task to build a bridge across the stream using natural resources found in the woods. The children will collaborate, use their imagination and creativity to find large rocks and branches and will engage in problem-solving to determine how to use these materials to build a structure to get to the other side.



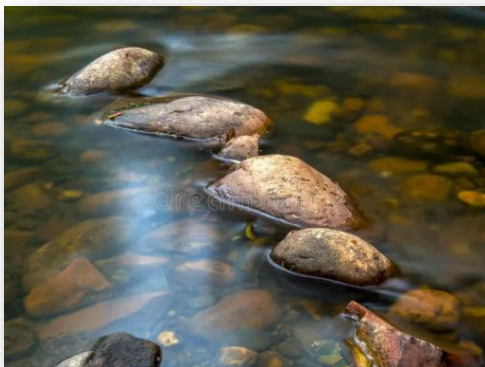
(Source: Vector stock, 2024)



Independently they will explore the reasons why some materials such as leaves and pinecones would not be suitable due to their weight, size and durance and apply principles of physics such as force, balance and stability to test their ideas.

Additionally, the Curriculum for Wales (2020) Mathematics and Numeracy's 'Fluency' progression step is developed as learners engage in "measuring, estimating, understanding shapes and space, and applying mathematical reasoning to solve problems". In this activity, the children will estimate and measure distances to calculate the correct length and weight of materials needed to cross the water, applying their mathematical reasoning to solve problems in a fun embodied way.

"Ooo would your bridge
take my weigh yet?"



(Source: Dreams time, 2024)



(Source: Vaughan, 2013)

Mud Kitchen

Resources provided: Bucket, Spade and Cup

As the children have access to sand, water and soil they can engage in a natural 'Mud Kitchen' where they will participate in independent play experiments. This aligns with the Science and Technology focus of the curriculum for Wales (2022), which aims to encourage investigation and curiosity, enabling children to make decisions and explore different outcomes, increasing breadth and depth of knowledge. For instance, when children mix the soil, sand and water to create different consistencies for pies and cakes, they learn cause and effect. By adding leaves, flowers, stones and twigs they learn about material properties and discover that stones and twigs are durable and resistant to breaking down. Whereas leaves and flowers are soft and susceptible to decay. Similarly, A Curriculum for Funded Non-Maintained Nursery Settings (2021) advocate that children are given 'time' to observe, explore and investigate'. Therefore I will prompt the children to create potions by mixing and adding berries and fruits from the trees, so they observe simple chemical reactions as the berries change the colour of the water. Children will also develop conceptual understanding in mathematics when measuring, pouring, counting, adding ingredients and comparing weights and volume with wet and dry materials.



(Source: Blackwoods, 2023)

'Oh look you have crushed those berries,
but can you do that with the stone?'
'No! Why?'

(Source: Claire, 2024)



Laura Bray-Milton
2312267
ECEY 5005
Word Count 4393

RISK BENEFIT ASSESSMENT

Location / Activity:

Woodland

Assessor:

Laura Bray-Milton

Date:

September 5th 2024

Review date:

March 5th 2025

The boxes in the table below will expand as you type into them; pre-entered text is simply for illustration. You should delete irrelevant items and replace with text relevant to your circumstances.
Your overall risk rating – Low, medium or high – is based on your judgement about whether the BENEFITS of the activity or opportunity outweigh the RISKS.

Laura Bray-Milton
2312267
ECEY 5005
Word Count 4393

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
Walking on Uneven Ground	Supports proprioception while also engaging their vestibular sense for balance, strength and co-ordination and muscle development. Cognitive thinking is developed as they plan movements carefully on the terrain, slopes and gradients. Scientific concept of forces and energy are observed by feeling the resistance and increased energy in their muscles walking uphill and the pull of gravity and acceleration as they walk down.	Uneven surfaces can hide holes, roots and rocks. Children may trip or fall causing cuts, sprains or bruises.	Children and Adults	Ensure there is the correct child/ adult ratio. Children to wear wellington boots and wet weather clothes to give a layer of protection. Discuss that the rocks, steps and path maybe slippery and to walk slowly down the path, hold onto the handrail on the steps and hold your arms out to balance over the rocks. Game: Be like a Fox... 'Keep your eyes sharp, your feet steady and help each other'	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
Exploring woods collecting leaves, rocks, sticks, logs and mud.	Problem solving, making choices where and what to forage for. Physical development: reaching, bending, using fine motor skills to collect materials and gross motor skills jumping over surfaces. Scientific exploration, learning material properties, biodiversity and ecosystems. Mathematics: sorting leaves measuring sticks and comparing shapes and sizes.	Falling branches, tree roots causing trip hazards, resulting in head injuries, scratches or cuts leading to infection. Large heavy logs and rocks carried unsafely causing muscle injury or falling on someone. Insects' bites, stings or ticks resulting in pain, limes disease, rash or allergic reactions. Collecting inappropriate materials such as poisonous berries, mushrooms, ivy, sharp broken glass or plastic. Children wondering too far and getting lost.	Children and Adults	“Use eyes and ears look up and down and all arounds watch out for low branches and rabbit holes” Discuss the type of materials they will collect and not touch. Simplify manual handling – bend knees and team work to carry heavy objects. Be aware of children with allergies, take anti histamine creams, EpiPen, antiseptic wipes, plasters. Ensure wellington boots and long trousers are worn to give protection to legs. Arranging children in pairs giving them responsibility to stay together. Set boundaries by putting coloured ribbon on the tress. Have a calling whistle – for them to return.	L

Laura Bray-Milton
2312267
ECEY 5005
Word Count 4393

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
Exploring water and living creatures.	Children learn habitats and a responsibility to living creatures to be kind and respectful, becoming ethical citizens. Mathematical and scientific concepts such as patterns, measurements, density, volume and life cycle. Social and emotional benefits teamwork and communication to find egg/tadpoles connecting to nature and sharing equipment.	Drowning – even shallow water is dangerous Injuries to wildlife Contaminated water	Children and Adults	Provide nets and buckets minimising direct contact with wildlife. Wash hands and teach children not to drink the water or put hands to face. Used shallow area of pond setting boundaries of how deep they can explore. Have constant adult supervision.	M

Weather conditions	Scientific concepts observing weather conditions affecting the environment, rain makes: the soil muddy, waters the plants and slippery surfaces. They learn scientific vocabulary in context such as hot sun, cold water, dry leaves, wet soil. Become aware of self-care keeping feet dry in boots, protecting skin with hats and sunscreen and adapting by finding shade and navigating walking in wet mud. Sensory experiences: listening to the wind in the trees, feeling the rain drops, manipulating the mud and kicking the leaves.	Sun exposure causing heat stroke/sun burn. Children's clothes may become wet causing uncomfortable friction to their skin. High winds cause branches to fall with possible head injuries. Rain makes surfaces slippery to fall and slip causing bruises and cuts	Adults and children	Wet weather coats and trousers layered clothing to take on and off, wellington boots, sun hats and cream, towels for drying. First aid Kit/suncream/water Check weather forecast before going out.	L
--------------------	---	--	---------------------	---	---

Section 4 –Adults roles in encouraging children to engage with mathematical and scientific concepts in an outdoor environment.

Introduction

The Curriculum for Wales (Education Wales, 2023) emphasizes the importance of integrating outdoor learning across all subjects, describing the outdoor environment as an extended classroom which serves holistic educational needs. This aligns with the Curriculum for Wales (2022) when learning ‘Science and Technology and Mathematics and Numeracy. Particularly to enhance children’s curiosity to search for answers to understand and predict phenomenon. As seen in part two, the children are encouraged to explore, observe and communicate their ideas during practical experiments to discover and develop key mathematical and scientific ideas, laying foundational skills and supporting the curriculum progression steps.

Outdoor environments offer children an embodied learning experience, where their brains construct an understanding of the world through hands on activities, movement and physicality. This not only provides environments to learn science and maths but also plays a critical role for their overall development and wellbeing. Adults are responsible to ensure these opportunities are consistently accessible and safe in an everyday context (White, 2016).

Froebel

Froebel (Pound, 2005) believed that children learn best in open spaces with natural light, and saw a connection between play, learning and outdoor environments. Examples of teaching science and maths this way can be seen through the Froebel Trust as each child is given their own garden plot to dig, plant, tend and grow plants, teaching germination and photosynthesis (Tovey, ND). Froebel believed that education should be grounded in real-world experiences, with the adult guiding the children by creating rich outdoor environments for them to explore rather than directing them. For example, by providing bikes for children they are supporting the children’s learning process with an enjoyable experience but also able to explain scientific concepts such as speed, distance, time, balance and momentum.

Froebel believed children should have interesting provisions with interactions and open-ended materials to encourage independence to make choices and problem solve and therefore become less dependent upon adults within a supportive community. Moreover, the adult’s role in Vygotsky’s zone of proximal development (Aubrey and Riley, 2019) is to scaffold learning with the help of a more knowledgeable other. With this support the children are able to perform tasks they cannot yet achieve independently. For example, the adult may assist them to count the number of petals on a flower or measure the shadow of a tree using footprints.

Froebel’s philosophy aligns today with ‘Forest Schools’ (Blackham, 2021). The benefits of affordances are achieved during outdoor experiences when children collaborate and learn from one another. For, each child will creatively see loose parts, such as a twig, in different ways. One may imagine a magic wand, while

another a fishing rod. However, the University of Sterling (2023) survey of twenty-five random schools in the United Kingdom found that children are spending only seven minutes of learning time outdoors. In comparison to 70% of learning time in Norway (Mosey, 2010)

Gibbs (cited in Campbell and Speldewinde, 2020) suggests that the affordances of outdoors are only meaningful if adults can recognize and utilize their properties. Therefore, the role of adults involves trusting children to become competent and confident in navigating outdoor spaces and taking risks. When exposing children to risk benefits at a young age such as climbing trees or making dens and fires, adults help them develop the ability to manage potentially dangerous situations in a controlled manner, equipping them to take measured risks in later life. Additionally adults support learning during forest schools by encouraging reflection and shared knowledge. For example, when building a shelter they learn symmetry, angles, forces and physics. Adults can extend this learning by prompting critical thinking by asking how they might secure the shelter against the wind and introducing terms such as 'load bearing' and 'estimation'.

Adult's Role

Yelland (2014) suggests both structured and spontaneous experiences provide adults with opportunities to promote mathematical understanding for children inside and outside the classroom. Likewise the Elementary Science Study (Nicholson, 1971) broke down the distinction between indoor and outdoor learning and specifically promoted learning through every day interesting loose parts. Nicholson (1971) described loose parts as 'variables' believing every child can be creative if given the right materials. Cassey and Robertson (2016) suggest loose parts are anything children can move, manipulate, invent, construct, evaluate and modify. Scrapstore playpods (2009) is an example of adults facilitating a playground environment with loose parts in the form of recycled everyday materials such as nets, steering wheels, tarpaulin, tyres and tubes for outdoor self-directed play. This supports scientific and mathematic concepts as they explore which are waterproof, float, flexible, strong and sort, measure and weigh. Casey and Roberson (2016) highlight the role of the adult is to support play by allowing children to decide on the content and intent without interruption and allow them to develop skills at their own pace. Adults observe the children by 'noticing' behaviours and conversations to plan, support and extend learning. Piaget, Montessori, Reggio and Bandura (Aubrey and Riley, 2019) all believed observation paramount to understanding each child's interests, track their development and foster an environment to enhance progression.

Reggio Emilia

Similarly, the Reggio Emilia approach view adults as both facilitators and co participants in children's learning. They observe and design open-ended environments to spark interest and engagement to build on what the children already know and provide resources to extend their knowledge through hands on exploration

(Michiana, 2018). According to the approach, outdoor exploration transforms the environment into a dynamic 'third teacher,' with nature sparking wonder, excitement, curiosity, and investigation through its ever-changing elements. Observing the weather patterns, flowers growing or birds nesting, adults can enhance children's knowledge by following their interests and using metacognitive discussions and sustained shared thinking to introduce scientific and mathematic terminology (Kurada, ND; Schmidt-Jones, 2020). For instance, if a child comments on a hot sunny day, the adult could use this opportunity to explore further by checking the temperature with a thermometer together. They might also discuss how shadows change position and explore how the sun's movement affects this throughout the day.

When children see a rainbow, their eyes light up with awe and wonder, and their excitement grows as they wonder how the magical colours could appear out of nowhere. With the Reggio Emilia Approach (Kurada, ND; Michiana, 2018) adults enhance learning by introducing scientific and mathematical concepts by encouraging critical thinking. For example by asking, 'What do you think happens to the rainbow if it stops raining?'. They can further extend learning by using practical demonstrations, such as using a hose to show how water and sunlight create a rainbow and engage in mathematical activities like ordering and counting the colours. Furthermore Montessori (Macblain, 2022) also believed in the benefit of using real objects for real jobs and not teaching through representation picture books. This child-led approach and focus on individual progression is strongly linked to the Curriculum for Wales (2022) which tailors teaching to ensure that all learners have opportunities to progress according to their own abilities.

Enabling adult

According to The Curriculum for Funded Non-Maintained Nursery Settings (2021) the role of the enabling adult is to provide a rich natural, stimulating and engaging outdoor environment that inspires awe and wonder and promotes exploration, discovery and problem solving. It is their responsibility to provide experiences that are hands on, purposeful, meaningful, challenging and promote independence and opportunities for success. As well as, modelling curiosity and asking open-ended questions to prompt critical thinking such as "How many sticks long is the space between those two trees?". At the same time, allowing children freedom and space to make their own choices. This aligns with the McInnes *et al* (2011) research which suggests that when children see the adult as a co-participant, rather than in charge they are more likely to transform into a playful state of learning and therefore maximize their learning potential. White (ND) suggests that it is the knowledge, attitude and enthusiasm of the adult which unlocks the full potential of outdoor play. Through this the environment can be designed, planned and organised to support holistic development built on first hand experiences. For example, by preparing zoned areas for exploration, construction, and creation. Exploration Zone; a natural

area with rocks, soil, planting, mud kitchen and trees for climbing and balancing. Construction Zone; with crates, planks and tires for building. And creative Zone with paints, brushes, chinks, leaves and flowers. White (ND) suggests outdoor provisions should be child-led allowing an alternative freedom from indoors, to be active, noisy and messy on a large scale but equally complimenting the indoor experiences. Gascoyne, (2018) advocates messy play describing it as a time when children are not restricted and able to enjoy the tactile sensory sensations, and open-ended exploration independent of adults. The option to make a noise, collaborate and interact with peers in a social setting is a key feature of Vygotsky's (Aubrey and Riley, 2019) theory into cognitive development. This is prominent when building a shelter or playing with water as the children enhance their language development discussing why solid stones sink and hollow cones float, negotiate roles and share ideas.

Barriers to Outdoor Learning

According to the Froebel Trust, play represents the peak of child development and is the natural expression of their thoughts and emotions (Tovey, ND). However, McInnes *et al* (2011) article found that some practitioners feel uncomfortable with 'Play', preferring to what's traditionally seen as work tasks. This highlights a potential barrier as if adults' perception of teaching is one of indoor classroom tasks, it is likely to limit the time spent outside and therefore the benefits of outdoor play and experiential learning, particularly in the maths and science subjects. This is only accentuated by the addition of modern developments in technology, (Rosenow and Wirth 2013). Carbon (2013) urge adults themselves to reconnect with the joys of outdoor exploration to better understand and support the value of play in children's development. Similarly, White (ND) stresses that adults must enjoy the outdoors themselves and through this will gain knowledge of how to create opportunities for children to engage with mathematical and scientific concepts. However Bilton's (2020) research found that personal experiences impact attitudes towards outdoor learning. If an adult's childhood experiences of outdoor play were positive, they were passionate about an outdoor environment, however in contrast, those that did not, lacked an overall interest. Consequently, opportunities for outdoor exploration at a young age not only benefits a child's physical, mental and social wellbeing but lays the foundations for their attitude, interest and enjoyment for future learning experiences.

Pratt (2011) suggests there are challenges to taking mathematics outside. Firstly, he stipulates that there is a lack of understanding of what the subject is and secondly a dislike for it. He believes however in the importance of the outdoor learning environment. Particularly, for the opportunity to touch, manipulate and see tangible objects change, to gain an understanding and develop a positive attitude towards mathematics in everyday situations. And to be able to find mathematical solutions to everyday problems. For example, when planning and organizing a flowerbed, real-life problems related to space, quantity, and measurements are addressed. Likewise, Piaget (Aubrey and Riley, 2019) believed that through hands on exploration and

manipulating objects to observe the effects of their action's children learn and develop. This aligns with learning science and maths through outdoor activities such as planting seeds, nurturing them and watching them grow. Piaget described children as "little scientists," actively engaging with their environment to construct knowledge. Along with other constructivists such as Vygotsky, Reggio and Bruner (Aubrey and Riley, 2019) believed that learning is based on the idea that children build upon existing knowledge. To do this, they must test out theories with hands-on experimentation, and trial and error. By engaging independently they will create their own ideas and theories using their imagination. The adult enables this process by facilitating the environment to encourage problem solving and critical thinking (Constructivism in Education, 2023). Bruner's Curriculum Spiral (Aubrey and Riley, 2019) emphasises that children learn through their senses and must touch, see, smell to experience cause and effect.

Documentation

Science and Mathematics are part of the broader 'Four Purposes' within the Curriculum for Wales (2020). Assessment of these subjects is an ongoing process fed by continuous observation and are essential for gaining an insight into a child's knowledge, values, skills, and interests. This includes their stage of development, what they understand, and a way to recognize concepts they still need to grasp. In turn this enables them to effectively support and facilitate ongoing learning (Welsh Government, 2021). Adults facilitate learning through a continuous cycle of observation, assessment, planning, implementation, and evaluation. By using tools such as learning stories and love letters which capture moments, adults document children's progress against the Curriculum for Wales (2020) learning steps. For example, progression step one in the science and technology area describes children learning through exploration of the world around them, making simple observations and sharing ideas. Part two's natural environment is an example of where adults observe children picking up leaves and noticing one bigger than their hand, others small and pointy, some green and some yellow. A learning story will capture the child's ability to make observations and demonstrate early scientific inquiry into categorising natural phenomena. Adults can enhance learning with metacognitive discussions into why some have changed colour, introducing seasons. A key aspect of the Reggio Emilia approach is 'visible documentation', not only amongst the teachers but also the children, parents and general public. Adults observe the children and create records of what they say and do including photos, videos and written work. These records capture the children's development, questions, beliefs and confusions (Schmidt-Jones, 2021). Adults share best practice as the records are organised and discussed, highlighting the style of teaching used and the effect on children's learning. Similarly Gibbs suggest there are six stages of reflection, illustrated in his 'Reflective Cycle' (Gibson, 2021). Parent and community involvement is a feature of the Welsh Curriculum's (2024) 'Implementation and practical considerations' area which emphasises parents, carers and communities

understanding the vision and ethos of the curriculum and having the opportunity to contribute to the design.

However, there are challenges to documenting learning in this way. A significant barrier is finding time during the school day to effectively record, discuss, and reflect on observations. Additionally, it requires adults who are trained and knowledgeable in how to observe and document correctly, which is not always the case in all educational settings.

Conclusion

Children who only see an image of a den made from sticks will have a limited understanding of how materials come together in comparison to those who have immersive experiences of physically making it. The richer the adult makes the outdoor environment the more children will be curious and therefore the more they will construct an understanding of the world. This is then built upon, developed with challenges and revisited.

References

Bilton, H (2020) Values stop play? Teachers' attitudes to the early years outdoor environment. *Early Child Development and Care*, 190 (1). pp. 12-20. ISSN 1476-8275 doi: <https://doi.org/10.1080/03004430.2019.1653548> Available at <https://centaur.reading.ac.uk/86411/>

Blackham, L., Cocks, A., & Bunce, L. T. (2021). 'Our Forest School isn't just the trees.' *Forest Schools: micro-communities for social and emotional development. Journal of Adventure Education and Outdoor Learning*, 23(2), 158–169. <https://doi-org.ezproxy.uwtsd.ac.uk/10.1080/14729679.2021.1984964>

Blackwoods Mama (2023) The Benefits of Mud Play, Mud Activities and Mud Picture Books for Kids, Raising Outdoor Kids. Available at:

<https://www.backwoodsmama.com/> (Accessed: 6.9.24)

Campbell, C. Speldewinde, C. (2020) Affordances for Science Learning in "Bush Kinders". *International Journal of Innovation in Science and Mathematics Education*, 28(3), 1-13, 2020

Carbon, L. (2013) Advice to Teachers. The Wisdom of Nature O U T M Y B A C K D O O R. Available at: [Tile: Adnoddau ychwanegol i gefnogi eich gwaith / Extra resources to read and support your work | Syndod a rhyfeddod – gwyddoniaeth, mathemateg a'r awyr agored/Awe and wonder- science, mathematics and the outdoors \(ECEY5005/C\) | Home \(uwtsd.ac.uk\)](#)

Casey, T. Robertson, J. (2016) Loose Parts Play. A toolkit. Available at: [Loose-Parts-Play-A-Toolkit-pdf-1.pdf \(playscotland.org\)](#) (Accessed: 7.9.24)

Claire (2024) The Ladybird Adventures. 30 Fun Things to do with Sticks. Available at: <https://theladybirdsadventures.co.uk/fun-things-to-do-with-sticks/> (Accessed: 6.9.24)

Constructivism in Education: 5 Key Features. (2023) YouTube Video. Available at: [Bing Videos](#). Accessed 19.9.24)

Dreamstime (2024) Another line of rocks on a pond. Multiple exposure of the cold stream of a ravine in the mountains near the colonial town of Villa de Leyva, in the central region of the Colombian Andes. Available at: <https://www.dreamstime.com/another-line-rocks-pond-multiple-exposure-cold-stream-ravine-mountains-near-colonial-town-villa-image145697028> (Accessed: 6.9.24).

Education Wales (2023) Teaching and learning in the outdoors: the current state of outdoor learning in schools in Wales. Research document no: 76/2023 Date of issue: September 2023 Available at: [Teaching and learning in the outdoors: the current state of outdoor learning in schools in Wales \(gov.wales\)](#) (Accessed 12.9.24)

FGHat: [Life Cycle Flower Images – Browse 53,574 Stock Photos, Vectors, and Video | Adobe Stock](#) (Accessed: 6.9.24)

Gascoyne, S (2018) *Messy Play in the Early Years*. (1st Ed) London: Routledge

Gibson, C. (2021) Reflection means more than keeping a diary. Available at: [Reflection means more than keeping a diary | SoR](#) (Accessed: 26.9.24)

Kurada, R (ND) Investigating the Everyday: Planning a Reggio Emilia-inspired Science PBL Unit. The Reggio Emilia Approach and PBL. Available at: <https://www.earlychildhoodpbl.com/blog/investigating-the-everyday-planning-a-reggio-emilia-inspired-science-pbl-unit> (Accessed 7.9.24)

Macblain, S (2022) *Learning Theories for early years Practice*. Sage Publications: London

McInnes, K. Howard, J. Crowley, K. & Miles, G (2013) The nature of adult–child interaction in the early years classroom: Implications for children's perceptions of play and subsequent learning behaviour, *European Early Childhood Education Research Journal*, 21:2, 268-282, DOI: 10.1080/1350293X.2013.789194

McInnes, K. Howard, J. Miles, G. Crowley, K (2011) Differences in practitioners' understanding of play and how this influences pedagogy and children's perceptions of play, *Early Years*, 31:2, 121-133, DOI: 10.1080/09575146.2011.572870

McInnes, K. Howard, J (2012) The impact of children's perception of an activity as play rather than not play on emotional well-being. *Child: care, health and development*. DOI:10.1111/J.1365-2214.2012.01405.X

Michiana, PBS (2018) The Reggio Emilia Approach. Education Counts Michiana. YouTube Video. Available at: https://www.youtube.com/watch?v=fYx_aGs-DjU (Accessed: 6.9.24)

Mosey and Martinsen (2010) The outdoor environment in Norwegian kindergartens as pedagogical space for toddlers' play, learning and development. December 2010 European Early Childhood Education Research Journal 18(4):457-47118(4):457-471DOI:[10.1080/1350293X.2010.525931](https://doi.org/10.1080/1350293X.2010.525931)

Nicholson, S (1971) How Not to Cheat The Theory of Loose Parts. Landscape architecture. Hubbard & Wheelr. Bound Periodicals

Patch. (2015) 'Natural Playscapes: Pond and Playground oasis that will grow with the kids', The Deck and Patio Company Patch, Posted Fri, Aug 7, 2015 at 5:00 pm ET Updated Fri, Aug 7, 2015 at 5:07 pm ET

Pound, L. (2005) *How Children Learn*. London: Step Forward Publications Limited

Pratt (2011) *Children Learning Outside the Classroom : From Birth to Eleven* London: Sage Publications

Rosenow, N. Wirth, S. (2013) Out Door Spaces. The Wisdom of Nature O U T M Y B A C K D O O R. Available at: [Tile: Adnoddau ychwanegol i gefnogi eich gwaith / Extra resources to read and support your work | Syndod a rhyfeddod – gwyddoniaeth, mathemateg a'r awyr agored/Awe and wonder- science, mathematics and the outdoors \(ECEY5005/C\) | Home \(uwtsd.ac.uk\)](#)

Schmidt-Jones, C. (2020) Provocations: A central Aspect of the reggio Emillia Philosophy. YouTube Video. Available at: <https://www.bing.com/videos/riverview/relatedvideo?q=The+Reggio+Emila+outdoors+science+and+maths+&&view=riverview&mmscn=mtsc&mid=CE019CEC53A57C63A299CE019CEC53A57C63A299&&FORM=VMSOVR> (Accessed 7.9.24)

Schmidt-Jones, C (2021) Documentation: A Central Aspect of the Reggio Emilia Philosophy. YouTube Video. Available at: [Documentation: A Central Aspect of the Reggio Emilia Philosophy \(youtube.com\)](#) (Accessed: 26.9.24)

Scrapstore Playpods in Action. YouTube video (2009) Childrensscrrspstore. Jun 29. Available at: [Scrapstore Playpods in Action \(youtube.com\)](#) (Accessed:6.9.24).

Tovey, H (ND) Froebel's principles and practice today. A Froebelian Approach. Available at: [Layout 1 \(froebel.org.uk\)](#). (Accessed: 7.9.24)

University of Sterling (2023) Primary school children spend less time outdoors, University study finds. Available at: [Primary school children spend less time outdoors, University study finds | About | University of Stirling](#) (Accessed: 19.9.24)

Vaughan, A. (2013) 'Four out of five UK children 'not connected to nature', The Guardian, Wed 16 Oct 2013 05.59 BST.

Vector stock (2024) Stack of firewood materials for lumber industry vector image. Available at: [Stack of firewood materials for lumber industry Vector Image \(vectorstock.com\)](#) (Accessed: 6.9.24)

Welsh Government (2020) *AREA OF LEARNING AND EXPERIENCE Mathematics and Numeracy*. Available at: [Descriptions of learning - Hwb \(gov.wales\)](#) (Accessed: 6.9.24)

Welsh Government (2020) *AREA OF LEARNING AND EXPERIENCE Science and Technology*. Available at: [Descriptions of learning - Hwb \(gov.wales\)](#) (Accessed: 6.9.24)

Welsh Government (2021) Assessment arrangements: subordinate legislation resultant of the Curriculum and Assessment (Wales) Act 2021. Available at: [Assessment arrangements: subordinate legislation resultant of the Curriculum and Assessment \(Wales\) Act 2021 | GOV.WALES](#) (Accessed:26.9.24)

White (2016) Every child a mover – Supporting children's physical development. Community Playthings Available at: [Every child a mover | Movement and physical development | Community Playthings](#) (Accessed 17.9.24)

Yelland, N (2014) *Early Mathematical Explorations* Cambridge university press: Cambridge

Laura Bray-Milton
2312267
ECEY 5005
Word Count 4393

AI Acknowledgment

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.