

Awe and Wonder – Science and Mathematics in the Outdoors.

Part One.



(Beynon, 2023)

Part Two.

Welsh Government (2023) says High levels of wellbeing, self-assurance, and engagement can result from outdoor learning. Being outside encourages the growth of the social, emotional, spiritual, and physical aspects of a person. It also gives students real-world opportunity to build and strengthen their cross-curricular competencies. The setting in the image above provides students with a variety of learning possibilities, including those for science and maths.

Working on numbers to five has been a class task for the students. They are starting to recognise numbers and associate them with related objects. Welsh Government (2020) says that children should engage with and investigate numbers in a variety of settings, both indoors and outdoors. With assistance from an adult, the children started by counting the number of trees, birds, and ducks they could see in the distance. The children also joined in with number songs on their walk to the setting. The children began picking things up off the floor which were of interest to them like stones, leaves, and sticks. Making the most of the teaching moments that arise organically when we observe or participate in their play, we should promote and support children's natural curiosity while modelling a joyful attitude to learning (Welsh Government, 2022) Asking questions like 'how did that stick get there?' and 'where did the leaves come from?' helped us achieve this. Children believed that the sticks and leaves had fallen from the trees or had been abandoned by squirrels. The topic of Autumn came up as a result. Inquiries about the world around us are sparked by our curiosity about science and technology (Welsh Government, 2022). Some of the children laid the sticks out in a row. I gave them a number line and some acorns to practise matching the numbers. Other children made similar selections of grass and leaves. The foundation for understanding mathematical ideas and concepts should be built on (Welsh Government, 2022) When adults are aware of their children's interests, they can encourage learning-friendly attitudes, broaden knowledge, and enhance skills (2022) The youngsters were given the opportunity to select objects and match them to the numbers on the number cards 1 to 5, which were scattered over the grass. If a card had been filled with too many things, some of them collaborated and supported one another to get the right answer The children were

able to verify their calculations with their fingers to see whether they were accurate, and if not. Children that have familiarity with one-to-one correspondence and the counting sequence of numbers may count sets accurately (Welsh Government, 2020) Children in the group started painting with water on various surfaces when some of them discovered containers in the loose parts supplies and wanted to fill them with it. The children enjoyed filling all the different size containers, and they got to experiment with full, half-full, and empty, as well as exploring how many little cups it would take to fill a bucket. Paintbrushes were then introduced. The children were encouraged to draw a straight line down, like a number 1 and like the trees, after an adult drew a picture in the ground as an example. Welsh Government (2022) says children should be able to utilise mark-making instruments with more restraint.

At the river's bank, a different group of children were throwing stones into the water. Welsh Government (2022) says that children learn best when they are actively involved in activities that pique their curiosity, stoke their creativity, and peak their attention. Questions like "what is happening to the stone?" and "how is it going down?" were posed to children. The use of the terms heavy and light as well as big and small by the adults to determine the sizes of the stones also introduced children to mathematical language. After that, a grownup enquired as to the children's perceptions of whether everything would sink. The children investigated the material's characteristics and chose the best resources to further their education (Welsh Government, 2022) Sticks and leaves were among the materials that the children collected from their surroundings. In addition, they made use of some of the supplies that had been introduced into the environment, such as crayons and metal spoons. The children talked about how heavy or large the objects were, and some of them could anticipate whether they would float or sink. Children should have the curiosity to investigate their surroundings, ask questions about how things function, and make observations (Welsh Government, 2020) The children were familiar with the area's restrictions and guidelines, so they were aware that they weren't supposed to get too close to the water. As this group gathered the items that needed to be taken out of the water, another staff member went to assist them to ensure safety. We were able to offer a secure setting for children to engage in outdoor exploration of their surroundings (Welsh Government, 2023) A leaf that was floating was being poked by a child using a stick. He desired that it sink. One of the staff

members asked, 'How could we make it sink? '. The child was unsure so he was shown what would happen if a stone was put on top of the leaf. Welsh Government (2022) says that Drawing on the prior knowledge and experiences of the children, enabling adults should present a comprehensive and balanced curriculum. They should give children the chance to create and select from a variety of materials with various properties, and they should encourage them to refine their problem-solving abilities. The child started to collect additional items from his surroundings after coming to this understanding. He was advised not to remove branches from the trees because doing so might endanger them. He asked, 'Would the leaves grow if the branch was in the river?' According to Welsh government (2020) children should understand that both plants and animals are living beings that grow and children should understand that their actions and the things they use might affect the environment and other living things. By this time, the activity had caught the attention of others, who used it as a contest to see who could sink the largest leaves. The staff were encouraging observers to count how many leaves were in the water while also boosting the children's vocabulary by utilising the words 'floating' and 'sinking.'

The children were taken back to their classroom by staff where they washed their hands following the health and safety policy.

Part 3.Risk/Benefit Assessment.

Location / Activity:	Woodland area along side river.	Date:	15 th September 2023
Assessor:	Jessica Beynon	Review date:	15 th March 2024

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 Slippery slopes, wet ground, and slippery paths	Moving on uneven surfaces can help children improve their balance, core stability, and development of children's foot arches. Children can become aware of slopes and gradients enabling them to negotiate natural obstacles, excellent for prompting different types of physical movement: jumping, clambering, crawling, sliding, rolling, climbing. Children can become aware of forces. Pushing, pulling, or rolling objects down a hill.	Falling Cuts, bruises injuries, broken bones	Pupils and Staff	Ensure all students wear appropriate wear, (not open toed shoes.) Children to wear long sleeves and trousers to reduce the risk of cuts. Make students aware of any known hazards around the site such as exposed tree roots and rocks prior to visiting the environment. Encourage students to be aware of their surroundings. All staff to have access to first aid kits.	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
Children exploring the things they see such as rocks, trees, flowers, and insects.	Builds children's confidence and may promote creativity. Children will start to understand that animals and plants are living beings that grow. Children will gain knowledge of the connections between living organisms, their environments, and how to protect and look after them. Children become responsible for looking after the environment. Gross motor skills will be improved.	Stings, bites allergic reactions. Lost or separated pupils Low branches or stingy nettles and thorns.	Pupils and Staff	All staff to carry first aid kits. Leader to ensure that necessary children have their medication on site. Children to be highlighted to staff with specific medical needs. Leader to ensure all staff are briefed and aware of their responsibilities and roles. Correct adult to child ratio Suitable groupings provided with sub leaders and all staff to carry mobile phones and numbers are shared with all staff. Children advised what to do if they are separated from the group. Safety talk - Boundaries discussed with children before activities have begun. Hand wash and wipes provided due to nature of location. Most important – nothing is to go in our mouths.	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
Outdoor in different weather conditions.	Children will become aware of different weathers and how to look after themselves, what to wear, appropriate clothing. Children become aware of the water cycle when its raining. Looking at shapes of the clouds. Splashing in puddles and talking about water dispersion. Looking at shadows. Build confidence when moving - Fine motor skills and gross motor skills. Balance and stability on wet or icy surfaces. Children will become aware of the Seasons – Autumn leaves, flowers in the summer.	Extreme cold – hypothermia Extreme heat – sunburn High winds - damaged trees – possible head injuries, risk of death.		Met Office Website checked before and visit. Temperatures below 30 degrees should be carefully monitored by leader. Safety of slipping due to conditions assessed by leader. Ice and snow. Children to have appropriate clothing. Hats, scarfs, gloves, socks, and coats. Temperatures above 80 degrees should be carefully monitored by leader, with shorter breaks outside. Children should have plenty of fluids to reduce the risk of dehydration. Staff to carry more if needed. Suntan cream to be applied before and during activities. Children to wear appropriate clothing including t shirts (no vests) hat, sunglasses, and appropriate footwear (no sandals). Winds over 30 mph and stormy weather, children should not go out.	L/M

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
Playing with water and soil. Picking up natural items.	Assist in the growth and development of children's gross and fine motor skills. Lifting, pouring, carrying, sprinting, and splashing assist children improve their gross motor skills, coordination, and physical fitness, while activities like squeezing help build the little muscles in a child's hands. Children will be able to watch processes in their environment, such as floating and sinking. Children can investigate mathematical concepts like volume and capacity, full and empty, and.	Animals: geese, swans, rats, foxes, cats, dogs, and their faeces. Minor injuries. Getting wet. Minor cuts, splinters.		Clear faeces from area where activities taking place. Wipes and hand gel available. All participants reminded to wash hands after session. All participants reminded not to put fingers/hands in mouth/on face. Children in appropriate clothing. Modelling of equipment and tools at the start of activity by the water's edge. Small group work with adult supervision. Appropriate wet weather clothing. All staff to carry a first aid kit. Health and safety talk about thorns and sharp things they might see and touch in the environment.	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
Water/River	Teaches children about their local environment. Children will become aware of the dangers and will see risks. They will be aware of how to keep themselves safe. Children will be able to observe living things at the waters edge and compare to habitats on land.	Shock. Drowning		All staff to have mobile phones to contact emergency services. Allocated member of staff for first aid who is paediatric trained in case of an emergency. Spare clothes to be taken in case children become submerged in cold water. Pupils to be briefed about water safety prior to the commencement of any activities. The water topic is assessed on a daily basis and if necessary alternative activities will be offered that are deemed necessary	L/M

Part 4.

According to Padayichie (2022) outdoor play is crucial for children's growth, especially in the early years, and it's becoming more and more common in schools. Children can benefit much from outdoor learning experiences, which are enriching and offer many advantages. The variety of sensory experiences children have while playing outside is one of the main advantages. Due to increased exposure to nature, children are better able to relate to their surroundings. They also learn a variety of physical abilities in a natural setting, such as balance, coordination, and dexterity. Moreover, outdoor play gives children the chance to challenge themselves and take reasonable risks, both of which are crucial for a child's healthy growth. The great outdoors provides exceptional chances for being creative, active, boisterous, and risk-taking, making it the ideal setting for experiential learning. A child's learning environment can be enriched and improved by exposure to the outdoors' unique stimuli, which include the weather, noises, scents, and textures. Children's social, physical, creative, cultural, and personal development are all improved by being outside. Children who have mastered these skills are more likely to learn new things and to remember them later (Welsh Assembly Government, 2009) Play Scotland (2023) says every child and adolescent should have access to high-quality play opportunities every day in early learning and childcare, nursery, and school, with a focus on outdoor free play in engaging environments with access to nature. Children and young people need to play outside to develop their bodies, minds, and social skills. Playing outside also improves learning. When given regular chances to play outside, young children are happier and healthier. By including outdoor play and learning into your early childhood curriculum on a regular basis, you may promote a child's healthy intellectual, emotional, and social growth and establish the groundwork for a lifelong appreciation of the natural world (Learning Through Landscape, 2023). The mental, physical, social, and emotional health of children's who play outside is better. Play is a great way for children to learn about the world and about themselves. Outdoor play benefits children's physical, emotional, and social wellbeing as well as their overall development. Friedman et al. (2022) assert that outdoor play is essential for children's healthy development, especially in the early years, as being active outdoors

provides children with priceless experiences that can significantly affect their physical and emotional development, social skills, creativity, and even intelligence. Poppell & Monroe (2017) contend that less opportunities for children to interact with nature may hinder their development physically and cognitively and increase the gap between them and their environment. According to Wyver (2019), there is mounting evidence that regular exposure to excellent, unstructured outdoor play opportunities is good for children's social and cognitive development.

Tovey (2013) believed that of all the early childhood education pioneers, Friedrich Froebel was undoubtedly one of the most important. He created the first kindergarten is, a garden or nursery where young children can grow and develop at their own speed, nourished by informed and encouraging adults. He made the case that talking and self-activity are the best learning methods for young children. The kindergarten's centrepiece was its garden, which offered opportunity for close encounters with nature. He took them out of the garden and led them to the nearby orchards, fields, and forests so they could continue learning about crop cultivation. He took them to see streams up close and helped build dams to demonstrate what occurred to the water and teach them about cause and effect (Bruce, 2012) Early Education (2021) says that according to Froebel, each child develops at a different rate, so each one should be given the freedom to learn at their own pace. The Welsh Government (2023) concurs with this notion and states that a child's journey should fulfil individual requirements and be at a speed that is suited to each individual learner. The practitioners should function as guides for children, assisting them in understanding. Resources should be abundant in all classrooms. Children should be provided with the right tools and materials that are appropriate for their stage of learning (Early Education, 2021) Children's counting abilities may be improved by adding items like shells or stones. When measuring or sorting by size or colour, they may utilise sticks or leaves and flowers. They have the ability to sow seeds and see them grow in their environment. They will learn how to take care of the plants as well as themselves after gaining this knowledge.

Adult attitudes and behaviours have a significant influence on what happens outdoors and how children learn. Therefore, it is crucial that children have the assistance of alert, involved adults who are passionate about nature and recognise the value of outdoor learning. Like indoor environments, outdoor environments will

only be truly effective as locations for high-quality learning experiences if the adults involved in their planning, use, and upkeep understand the significance of risk assessment to facilitate rather than limit children's experiences. According to White (2011) adults should interact with children and encourage conversation.

Opportunities for child-initiated play should be provided. They need to recognise, capitalise on, and scaffold play for children's outside interests. According to Vygotsky (1978) When a child's capacity to handle issues independently, with adult support, or in cooperation with others who are more advanced than they are, is used to gauge growth, the Zone of Proximal development is the gap between that child's potential development and their actual development. In order to help a children pass through the zone of proximal development, teachers are encouraged to focus on these three essential components of the learning process. The presence of someone whose knowledge and abilities are greater to the student's, social interactions with a knowledgeable teacher which enable the learner to observe and practise their abilities. Provide scaffolding or encouraging actions to help the pupil succeed (Macloed, 2023) Davies *et al* (2014 says that although they lack experience, young children can think like grownups. This serves as a reminder to practitioners of the value of an inviting setting in giving children experiences at key developmental stages that will foster their understanding of science and technology. Adults' outdoor responsibilities include participating as a team member, being active, and not always acting as a supervisor. In addition to including enabling statements and open-ended questions regarding all elements of learning, practitioners need to develop a plan for introducing, modelling, and reinforcing the use of specialised scientific and mathematical language. Adults can do things like measure, categorise, and count natural objects, as well as plant seeds. Using mud, create designs on a wall. Adults can help children by explaining what they see, such as a butterfly or a web of spiders. In 1971, Simon Nicholson created The Theory of Loose Parts. Materials with loose pieces can be moved, carried, mixed, redesigned, lined up, disassembled, and put back together in a variety of ways. The concept of "loose parts" makes use of objects to inspire imaginative play. Ingenuity increases with the quantity of components and participants (Wide School, 2022) "Open-ended" is a phrase that has a strong connection to loose parts. Problem-solving is encouraged and prioritises the child's participation in open-ended materials, contexts, and experiences. With the help of loose components, children engage in concrete

activities that encourage explorations that are naturally occurring rather than being encouraged by adults. Adults do, however, intentionally, and significantly contribute to the planning, directing, and recording of open-ended learning events (Wide School, 2022) Nash (2022) says there are many opportunities for mathematical language using loose parts. There are so many varied shapes to discover in nature and so many natural shapes in the world around us. Children can be encouraged by adults to notice the shapes around them, talk about their characteristics, compare the number of sides and points, and see how many distinct shapes they can locate. Loose parts are frequently offered in a variety of numbers, which is fantastic for honing 1:1 correspondence and early counting abilities. Children can simply experiment with adding two sets of loose parts together to find a total or investigating what occurs when they remove one or more loose components from a set. Flowers, buttons, feathers, herbs, stones, and sticks are excellent for investigating, comparing, and sorting since they come in a variety of colours, textures, and sizes. Children could categorise objects depending on their colour, size, location, or fragrance, giving them a sensory experience in addition to a more realistic math lesson. Fout and Middleton (no date) suggest using some metal loose parts children may gain knowledge of cause-and-effect linkages, fine motor and hand-eye coordination, the characteristics of magnetism, and pre-math concepts like patterns and symmetry. Adults should be using open ended questions like 'Did you notice?', 'What do you think will happen?', 'is it different?' Gano (2021) says that STEM education will be facilitated by merely providing our children the gift of time. Young children naturally gravitate towards this kind of play, which is significantly more productive than worksheets. Children may learn about weather, life cycles, and how things grow just by being outside and watching their surroundings. When they work alongside dedicated adults, they will learn via their creative play. Bianchi and Feasy (2011) believe it is important for adults to think about how learning is occurring outside and how to encourage and extend it. However, not all young children will have access to outdoor space immediately, and as students advance through the school, the amount of time spent outside decreases. Van Dyke *et al* (2019) says some teachers say they feel constrained by their lack of confidence in their ability to teach outdoors because they lack the expertise and training necessary. According to them, due to curriculum requirements, the majority of educational activities must be conducted indoors, and outdoor learning is neither

encouraged nor supported. Some teachers battled with child management, weren't sure how to use and include topics and found organising outdoor learning to be more challenging.

Welsh Government (2022) is of the opinion that authentic and engaging experiences are provided by competent, perceptive, and engaged individuals in effective, stimulating environments as the foundation for holistic and meaningful learning for all children. One of our responsibilities as adults is to organise meaningful activities and places that are relevant to children's interests. We can raise the bar for learning by creating emotionally stable environments that enable children to start expressing and directing their emotions and actions in positive ways. In order to strengthen the child's sense of belonging, by embracing both the past and the present, it is our responsibility to develop tight links with the child's family and community. We should respect children by endorsing their activities and decisions. By promoting children to take measured risks and challenge themselves, we may help them grow in their resilience, independence, and confidence.

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