

Provide a portfolio of evidence outlining how you would use an outdoor environment to promote and support children's scientific/mathematical thinking.



Blue Planet Aquarium (2023) describes the life cycle of a frog to be a remarkably interesting part of life. In a brief period of time, they develop from eggs to tadpoles to froglets, eventually becoming frogs. The way I would introduce this to the early years setting is that I would first start off by showing them a frog at the end of the cycle. I would then show the class the frogspawn in the body of water shown in my photo, I would ask them to pick it up and describe how it feels. I would describe how they then evolved into tadpoles, showing them an example of what tadpoles look like. Some children may describe them as looking like snakes, explaining that they both do not have feet as well as they both look slimy. The next step in the life cycle is for them to grow legs and shorten their legs, eventually then growing into an adult frog. This lesson fits into the Area of Learning and Experience that fixates

on science and technology, as this refers to biology and the development of an animal throughout their life cycle. I would relate this to how we start out as eggs in our mother's stomach, eventually becoming a baby and developing into a healthy adult.

Tree rubbings involve applying pressure to a piece of paper that is on top of tree bark. The children then need to use crayons or chalk to rub on the paper, effectively mimicking the pattern of the bark on the tree. The way I would introduce this to the class is by looking at 2 diverse kinds of bark. I would ask Child A to do a tree rubbing on one tree, simultaneously asking Child B to complete a tree rubbing on a different tree. I would then ask the class to look at both rubbings and describe them, eventually pointing out how they look different because of them living in different environments, they need to evolve. I could link this to us as humans by comparing ourselves to fish, why don't we live in the sea? Can fish live on the land? These are some of the questions I would ask to boost their understanding of why trees are different in various parts of the world. This activity can be linked to two different Areas of Learning Experience. The first Area being expressive arts as one of the main components of this activity is colouring on the tree to mimic the pattern on the tree. The second Area is science and technology as in the lesson, we are discussing evolution of both plants and animals. This activity focuses on holistic development as well, focusing on expressive arts and design which is also an Area of learning experience.

Comparing weights in early years can be taught through multiple hands-on methods. In my chosen outdoor environment, we can compare the weight of various objects such as leaves, sticks and stones, among others. I would do this firstly by getting children to collect various objects in a basket, and sort them into the heaviest and lightest, or order them from lightest to heaviest. If there were more complex resources and materials available, I would get a weighing scale and ask the children to write down how much it weighs in grams. This would incorporate the Area of Learning Experience that revolves around Mathematics and Numeracy as this activity would incorporate skills such as comparing numbers and learning units of measurement.

Britannica (2024), describes photosynthesis as the process by which green plants and other organisms convert light energy into chemical energy through photosynthesis, converting water, carbon dioxide, and minerals into oxygen and energy-rich organic compounds. The way that this can be taught in my early year's outdoor environment is by making a diagram with a plant such as a flower or tree in sunlight. I can then explain that the plant uses carbon dioxide and water to make food for themselves and air for us. I could expand on this and explain how good plants are for the environment and why we need to take care of them. This topic links to the Area of Learning Experience that focuses on Science and Technology as it relates to biology.

Sorting natural objects such as leaves, acorns, stones, sticks can plan out in various different ways. I would introduce this to the class by going on a walk around the environment and looking at different objects and what shape they look like. The way that I could incorporate learning about shapes in the outdoor environment would be sorting various shapes into groups by what shape they look like. This links to the Area of Learning Experience that focuses on Mathematics and Numeracy as the activity focuses on shapes, which can be progressed by talking about how many sides the objects have or measuring the objects as well as themselves, this teaches children about length and different measurements. Another way that I could sort natural objects is through size, the children can collaborate and sort the objects from biggest to smallest, or categories such as one group of stones, one group of leaves etc. Some resources that will be useful in these tasks could be measuring tape, rulers, string, and plastic shapes to compare the natural objects to.

Bento (2017) advises that it is possible to advance education in the widest sense by encouraging outdoor play and investigation of natural components. Examples of learning opportunities where concepts relating to science, mathematics, or language were promoted in an integrated manner include playing with soil and water, children could investigate concepts of weight, volume, and time as they repeatedly filled and emptied containers. As children do this, they learn new vocabulary as they speak about their experiences. Other studies may produce comparable results, for instance how children may use their bodies as learning tools to apply mathematical methods and products while playing outside. Bento also mentions that a substantial amount of

evidence supports that play is crucial for children's healthy development. Play is a natural and engaging activity that supports children's holistic development and creates the ideal environment for learning. Through play, a child can learn more about their environment and themselves through experimenting, problem solving, using their imagination, and collaborating with others. Providing children with multiple opportunities for unstructured play from an early age fosters positive self-esteem and confidence, as they choose what to do, who to do it with and how they are going to do it.

Hampton Court House (2023) talks about how outdoor learning can benefit holistic development in the short-term and long-term. On one hand, outdoor learning encourages social interaction and collaboration among students. They continue to state that their outdoor learning provides adequate space for students to engage in group activities, play games, and engage in imaginative play, thus building their social skills such as communication, teamwork, and leadership. On the other hand, outdoor learning can benefit holistic development in the long term as frequent outdoor experiences can enhance children's mental and emotional health, develop their social skills, and enhance their physical health and well-being. Children who receive a comprehensive education are better prepared to succeed in their personal and professional as well as academic efforts.

Name of activity:	Outdoor Learning Time
Description of activity	My activity has many different tasks which mainly focus on the two Areas of Learning Experience, Mathematics and Numeracy as well as Science and Technology. The tasks in this activity combine theory and practical learning. The activity teaches children the basics of the task theoretically, then allows them to develop through hands on learning. My activity covers mainly biology of plants and animals, as well as units of measurement and sorting objects through shape.
Appropriate for which ages and abilities	My activity is suitable for children in the Early Years Foundation Stage as this activity can be taught at a basic level however, if the task has progression, which can make the task more complex for older students, this activity will also be suitable for ages up to 11.

Equipment or resources needed	This activity does require a limited number of resources due to the environment the activity takes place in. The resources needed to lead this activity effectively re: • Paper • Crayons • Weighing scale • Lamp • Measuring tape • Rulers • String
Any special adaptations for different needs	This activity may need more visuals for children with hearing issues, or I may potentially need to simplify some concepts for children with Additional Learning Needs to understand. I may be able to do this through using visuals and simple language so that I do not overcomplicate the activity or make it difficult to understand. For children who get overstimulated easily, I could remove any external factors that increase the chances of a child with Additional Learning Needs getting overstimulated.
Benefits e.g. Soft/Hard outcomes, Early learning outcomes, Key stage outcomes	To further develop the child's knowledge around 2 main Areas of Learning Experience, being Science and Technology, and Mathematics and Numeracy, in line with Curriculum for Wales. To introduce children to the expressive arts which promotes holistic. Learning
Overall risk (refer to separate risk assessment)	5.8 (Medium to Low risk)

Activity	Factor	Risk	Severity	Benefit	Action to remove or reduce risk	Who?	Where?	Level
Learning about photosynthesis	Sun	Children could look directly into the sun, thus causing strain or damage to their eyes. Children could get sunburnt.	Likelihood - 1 Severity - 3	Learning about the biological functions of plants. Teaches the children about the importance of plants and why. We need to protect the environment.	Sunglasses to avoid strain on eyes in the event of children looking at the sun Ensuring children have sunscreen applied to any bare skin to prevent sunburn.	Children in the Early Years Foundation Stage	A time of day where the sun is visible	3 (Low)

Tree rubbing	Tree Crayon	Children could fall over roots of tree Children could ingest crayon	Likelihood - 2 Severity – 2	Learning about patterns and the difference in species of tree and other organisms due to evolution. Introducing children to the expressive arts, which promotes holistic learning.	Ensure that the children are aware of their surroundings, reminding them to be careful throughout the activity. Ensuring that the children are aware that they cannot ingest the crayons as they may be toxic.	Children in the Early Years Foundation Stage	In the time of day that is allocated for outdoor learning	4 (Low)
Comparing weight	Rocks Sticks	A child could throw a rock at another child, causing injury A child could throw a stick at a child or hit a child with a stick	Likelihood – 3 Severity - 3	Learning about units of measurement, comparing numbers, and developing independent thinking skills to determine which objects are bigger or smaller.	Ensure that the children are supervised at all times. Ensure that staff members are ready to intervene if a child makes the choice to throw a stone or stick or hit someone with a stick.	Children in the Early Years Foundation Stage	In the time that is allocated for outdoor learning	9 (Medium)
Life cycle of a frog	Touching frogs Frogspawn Falling in water	A child could contract salmonella from touching a frog and not taking necessary precautions to eradicate it after touching the frog A child could eat the frogspawn A child could fall in the water and potentially drown	Likelihood – 1 Severity – 4	Learning about the life cycle of living things. Understanding the biology and development of living things Further developing scientific knowledge in children.	Ensure that children wash their hands before and after the session to avoid contracting salmonella Ensure the children are closely monitored so that they do not ingest frogspawn or fall in the water	Children in the Early Years Foundation Stage	In the time that is allocated for outdoor learning	4 (Low)
Sorting objects through shape	Rocks Sticks	A child could throw a rock at another child, causing injury A child could throw a stick at a child or hit a child with a stick	Likelihood – 3 Severity - 3	Learning about measurement, about Learning about geometric shapes Finding similarities	Ensure that the children are always supervised. Ensure that staff members are ready to intervene if	Children in the Early Years Foundation Stage	In the time that is allocated for outdoor learning	9 (Medium)

				and differences in object.	a child makes the choice to throw a stone or stick or hit someone with a stick.			
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In the Early Years Foundation Stage, children can learn through various methods, one of those methods being through the outdoor environment. Solly (2022) advises that the advantages of outdoor learning in early years have now been widely acknowledged for the learning and development of young children as well as educators. A concept that allows adults to develop mathematics and science outdoors is Loose Parts.

Play Scotland (2024) describes Loose Parts as introducing simple, basic objects that can foster inclusivity, increase creativity, and strengthen social and problem-solving abilities. A "loose parts" toy is flexible; children may use their imaginations and creativity to connect it with other loose pieces in a variety of ways. The best place to find loose parts is nature. Lipp (2024), states that toys are frequently available in copious quantities in households and classrooms, most serving a particular purpose. There might be less toys but more space outside. Children play outside with a natural resourcefulness. One stick can be used to stir a mug of freshly brewed mud coffee, sketch in the dirt, or transform into a magic wand. You can build a path or a log cabin out of many sticks. Naturally, children like to build, gather, connect, disassemble, design, create, and play with the loose components found in nature. A child's experience of nature can be enhanced by loose parts play outside. From a mathematical perspective, numerous mathematical applications can be made using natural loose components. Pinecones come in a variety that can be utilized for counting, sorting, and classification. Using leaves, one can study symmetry and form. Size and weight are two ways to measure and compare rocks (Ranheim, 2020).

There are many theorists in Early Years that support outdoor learning. Some of these are:

- Froebel – Friedrich Froebel was a German educator who invented the kindergarten. Froebel believed that “play is the highest expression of human development in childhood for it alone is the free expression of what is in the child’s soul.” Froebel argues that children build their knowledge of the world through play and firsthand

interaction with it. His theories on the value of play and nature-based learning have been widely accepted. Froebel created a set of gifts (wooden blocks) and introduced occupations (such as sticks, clay, sand, slates, chalk, wax, shells, stones, scissors, and paper folding) based on his knowledge of mathematics and science. It seems fitting to discuss Froebel's professions and gifts in relation to this new course, especially considering that the occupations and gifts are flexible and can be utilized to encourage children's self-initiated play (Early Education, 2021).

- Piaget – Piaget's theory of cognitive development is a fundamental notion in the fields of education and child psychology. It explains the progression of children's cognitive capacities from early childhood to adolescence and offers a framework for comprehending how children pick up knowledge and interpret their environment (Early Years TV, 2024). Piaget urges that play should encourage further psychological development as children mature. Engaging in outdoor play can foster a sense of environmental awareness in children and encompass all subject areas (Soft Surfaces 2024).
- Vygotsky – Hakkarainen (2008) states that in Vygotsky's cultural-historical psychology, the idea of the Zone of Proximal Development is defined differently in two distinct situations (play and school). The creative and motivating aspects of learning are highlighted in play-supported development. In the context of play, psychological function development and personality development are prioritized in the context of school problem resolution. A child's zone of proximal development is created through play. The child always acts older than his actual age when playing; during play, he acts as though he were a head taller than himself. Like a magnifying glasses focus, play encompasses all developmental inclinations in a distilled form and is a significant source of progress on its own.

Children Nature Network (No Date), defines affordance(s) as action possibilities that inspire children to experiment, take chances, and research while playing in a variety of active ways. In general, self-regulation abilities and goal-directed behaviour are referred to as executive function. Since the theory of affordances focusses on an individual's perception of their surroundings, it provides a framework for thinking about the relationship between a kid and their environment. What the environment offers a person

and what it furnishes or provides, whether for good or bad, is what is referred to as affordability. Since affordance considers the child's surroundings as well, it is specific to everyone. Research on how children use the outdoor Early Childhood Education and Care setting has previously used affordability. Research has shown how children's physical activity levels are influenced by both physical and social affordances; how different locations afford different activities; the significance of affordances for children's social play in the outdoor environment; how the environment provides children with opportunities for intense, thrilling, and risky play; and the advantages of having access to both natural and built environments (Sando 2020).

Childcare and Education Expo (2020) states that it is essential for early childhood educators to be involved in the learning and development of their students. Balance is also necessary while providing early developmental support for youngsters. Many educational experts have discussed the value of play for development over the years. It seems difficult to find adult roles in children's play, particularly when considering the position of the teacher. Early childhood educators contended that one of their responsibilities is to create chances for play, and that play should be a balanced mixture of adult- and child-initiated activities. Child-initiated play promotes their innovative and creative learning as well as their developing abilities. They can also select how to use their resources because they are able to gain firsthand knowledge. While some child-led activities begin as adult-initiated ones, when adults give children the room and time to explore, the children can use those resources and ideas to develop their own unique experiences. To achieve children's goals, it is crucial to make sure that adult- and child-initiated activities are balanced. Connect Childcare (2022) also personifies the importance of Child-led learning in Early Years, stating that play-based learning is an essential component of childhood development. The idea of child-led learning is one that is gaining traction in early childhood settings these days, but before it can be introduced into a setting, it is imperative to comprehend what it truly entails and how it may help a child. In summary, child-led learning is when a child is allowed to select their own activities to do at home or in a place of their choosing. Playing in the sandpit, reading a book, or using the arts and crafts table are some examples of this.

Observations are important in Early Years as we may learn about each child's preferences and dislikes through observation, as well as how they react to various circumstances like care routines or meeting new people. We can learn which habits, events, or pursuits a youngster finds easy or challenging, as well as any that cause them anxiety. Through observation, we can evaluate the development of the children and learn more about their individual care and educational needs. Next phases in the learning and development of children can then be planned (West Sussex County Council, 2015).

West Sussex County Council (2015) advises of some commonly used methods of observation such as:

- Participation observations - When you are really engaged with the youngsters, you make notes on important things you see during participant observations. This may be the majority of what you see, but it is crucial to schedule some observations so that you have time to spend watching the children play.
- Recording observations - Sticky notes are a useful tool for practitioners to record information since they allow them to quickly write down brief observations. You must include enough details in your writing for other readers to grasp. Sharing observations with children and their parents can be done easily and beneficially with the use of photos, tapes, and videos.

Teach Early Years (2024) states that utilising a variety of techniques is crucial if you want to learn as much as possible about the children under your supervision. In the same way, various practitioners will note various facets of children's growth while viewing through the prism of their own experiences. For example, you are more likely to record observations of motor abilities if you have experience in the physical development of children, but someone with knowledge in the development of music may record musical pitch. We may learn a great deal about children by closely observing them; we can learn about their interests, social groups, and inclinations.

The Reggio Emilia Play Approach was created after WW2 in Reggio Emilia in northern Italy. The village of Reggio Emilia, according to its founder and teacher Loris Malaguzzi, needed a new and better educational system for its children. An education that would facilitate collaboration and critical thinking. The Reggio Emilia Play Approach has seven

guiding principles that can be applied and modified based on the needs of each community and learning environment.

- Children are capable of actively participating in their education - According to the Reggio Emilia Play Approach, children can manage their own education. According to this theory, children can independently construct their own learning to increase their comprehension and knowledge.
- Children should be allowed to express themselves in any of their 100 languages - Since every child learns differently, it is important to offer them a variety of tools, materials, and techniques to help them learn more effectively. In whatever approach works best for them, they should be encouraged to discuss, explain, and convey their thoughts, feelings, and discoveries.
- The curriculum is emergent - A child determines what they want to study and how to go about getting that knowledge. But as a result, the curriculum is created around the child's passions, whether they are dance, painting, or music. It is the teacher's responsibility to keep an eye on and record each student's individual learning needs. In addition to talking with their parents and collaborating closely with planning teams, we make sure that the children have the appropriate activities that support their interests and group projects.
- Educational records - One key component of the Reggio Emilia Play Approach is documenting a child's learning log. To help coordinate the theories and methods utilised to develop each child's learning, teachers must keep track of each student's learning process. Written wall panels, photographic documentation, or written forms can all be used to accomplish this. Additionally, it makes it possible for educators and parents to assess how well each child has learnt by looking back at their learning curve and tracking how they have advanced through each task.
- Establishing connections and engaging the community - According to the Reggio Emilia Play Approach, learning occurs when people connect with objects, ideas, and experiences. These relationships are formed by our interactions with others and our surroundings. The Reggio Emilia Play Approach heavily relies on the community and parents. fostering a connection with the community and

encouraging parents to be involved in their child's educational journey. A strong connection between the community, parents, and teachers from the child's early years fosters a common identity for all participants as well as a connection to all three throughout the child's life.

- *Teachers support and guide students' learning and development on a level basis with them - Teachers are there to guide students, not instruct them. They are there to support children in their exploration and learning and to offer activities outlined in the emerging curriculum.*
- *The surroundings become into a "third teacher." - This concept examines the daily effects that the children's surroundings—which serves as their third teacher—can have. It offers children a plethora of everyday learning opportunities through unstructured play that foster inquiry, problem-solving, discovery, and comprehension. It is crucial that all school environments contain materials and activities that spark children's curiosity, encourage them, and help them think creatively. (Pentagon, 2024)*

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