

Awe and wonder science , mathematics and the outdoors



Portfolio

Part 2: Learning Journal

A group of 10 3–5-year-olds and four fully qualified staff from rosewood nursery will be attending a trip Margam park. Where children will be exploring a little fielded area that has plenty of choice for learning opportunities. The aim of the trip is to ensure that there are activities that suit the interests of the children so that the children are learning about life cycles and nature in a way that they are most likely going to enjoy it and fully engage in. In order to consolidate and further their understanding of living things and their lifecycles.

The children in this group all enjoy looking out for things, paint and experiment with different resources.

I imagine the children would become curious about their surroundings perhaps the wildlife that they see or the tree's. Therefore, providing them with magnifying glasses to examine whatever has caught their interest will provide them with an opportunity to inspect it up close and take in the detail of the plant or animal.

Children may ask questions such as why does this ladybug have red and black colouring, can they fly, what do they eat? This would be a good opening to start discussing different insects and wildlife perhaps using open questions to get a better idea of the child's ideas and thoughts on why the ladybug may fly, or what they think it may eat. There will also be resources for children to explore different textures, shapes and properties of objects and things in the environment. These resources will include crayons and paper for them to get impressions of the bark or leaves from trees, paint swatches for them to identify different shades of greens and blues. As well as a tick list of types of leaves so the children can learn about different types of trees, their different sizes, textures etc. Each activity will be planned and based upon the curriculum for Wales (2022) which states that settings have the responsibility to guide and support a student's understanding and skills overtime. Suggesting that settings should aim to build on the student's prior knowledge and experiences. By ensuring that the children's curiosity and creativity is nurtured and that promoting inquiry-led based learning opportunities. So that they are able to consolidate their understanding of scientific concepts through opportunities to apply their learning to real world scenarios. The curriculum for Wales (2022) also highlights the importance of children having the opportunities to apply mathematical concepts to real world scenarios to further develop their understanding of problem solving, grouping, counting and critical thinking.

Children may become interested in shadows and how they appear if it is a sunny day and light shines through the trees. This could spark a conversation about how the earth rotates and the direction of the sunlight and what impacts that may have on the shadows. Children may take an interest in different natural materials and may voice

how they think a certain leaf feels and the different textures they can feel as well as plants and the different colours and shapes of different plants and leaves.

Resources that would be available for children on the trip include:



Scavenger hunt kits:

To encourage the children to identify plants, animals and insects by using the discs as a reference of what they are looking for. Therefore, supporting their understanding of different living things in a fun and exciting way that caters to the interests of the children. The children will also have the opportunity to use a magnifying glass if they want to enable them to inspect things more closely as well as baskets to collect any plants, they may find that they want to keep for a craft project that they will have the choice of doing to document their discoveries.



A wide range of arts and crafts resources with inspiration photos laid out on the picnic bench to encourage children to create or design something using natural materials, flowers or plants they have collected. Giving the children the freedom to decide what they would like to use and what they would like to create using their own imaginations. This activity would not only promote a child's imagination but also their fine and gross motor skills as they could be handling pens or paint brushes. Tying sticks together with string or perhaps gluing and sticking plants or leaves to their paper.



Activities that encourage children to recognise different properties, colours and textures to support their understanding of scientific concepts. As well as incorporating numbers of items to collect to support and develop their understanding of mathematic concepts such as counting.

Discussions of different habitats and diets of wildlife could make them question.

Why do they live in the tree?

What do they eat?

Where do they sleep?

Do they stay in the same tree?

What time of day do they come out?

This can lead to discussions about many other concepts and understandings of wildlife and their classifications.

Some children may take a liking to a particular part of nature for example they may be fascinated by the bugs so the practitioners can facilitate this interest by asking open ended questions about the bugs the child may find. Perhaps the practitioner can ask the child why they like the bug, what do they think the bug is, why do you think it has wings, why do you think it doesn't have wings? Where do you think the ants are going? Can you see if you can find a different insect?

Giving children the opportunity to document their observations or their findings can help to consolidate the child's understanding of the differences they might have identified between certain insects or plants. And allows the child complete freedom to delve into their curiosity and creativity.

Providing children with a range of loose-parts natural materials can encourage them to experiment and have freedom to create whatever they want to create a child may decide they are going to build a bug hotel because they want to encourage more bugs to appear for them to inspect. Some children may want to explore the textures and weights of the items or maybe see if they can find more of that natural space in the woodland.

RISK BENEFIT ASSESSMENT

Location / Activity:	woodland	Date:	20/4/24
Assessor:	Bethany Birdsall	Review date:	20/5/24

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 things they see around them for example rocks, flowers, plants and insects.	Children have the opportunity to learn about wildlife and their life cycles, habitats and diet. Children become more aware of the world around them. While also having the opportunity to explore relationships within nature. This activity would also support fine and gross motor skill development for example bending, stretching, reaching and grasping. Children have the opportunity to become ethical citizens, by learning how to be kind to the environment	Large Branches that have fallen could be considered a hazard as children could trip over them or cut/ injure themselves on them. Children could have allergies to certain plants or bites and stings. Could handle poisonous or irritant plants that could harm or cause irritation.	Children and adults	Ensure that if a child does have any allergies that they have the appropriate medication with them for example if a child is allergic to bees, then the child's EpiPen is brought with them. Have discussions with children about the poisonous and irritant plants perhaps through a game with photos of these plants so that the children can recognise the plant if they come across it to help reduce the risk of them getting harmed by it. Advise the children to be careful when exploring the environment ensuring they know what they can and can't collect. As well as making them aware to not put anything in their mouths and that they are to wash their hands at the end of the activity. Ensure boundaries are in place with markers or flags so children are aware of how far they can go and where they are unable to go. Ensure children are aware of stranger procedures, that they are not to talk to or go off with anyone they do not know.	L

	and other living things. Activity could involve conversation about sustainability, species of animals and flowers/plants.				
Outdoors in different weather conditions	Children become aware of different temperatures and types of weather. Become familiar with words such as hot,cold, wet and dry, they may start to utilise these words to describe what they're experiencing. Become aware of things in the environment that could be potential hazards and take action to prevent or reduce risk to themselves. If it is sunny it is a good opportunity for children to learn about shadows.	Heat exposure could lead to sunstroke or sunburn. Extreme weather conditions such as high temperatures or extremely low temperatures can lead to severe health risks such as hypothermia. If the children become wet it can lead to discomfort and distress. While also making them susceptible to illness. High winds can cause things to fall or be thrown at great force which could result in severe injury such as brain damage or fatality.	Children and adults	Ensure children are wearing weather appropriate attire. For example, if it is sunny then ensuring children are wearing hats, breathable and light clothing, sun cream and bring a water bottle. In wet weather conditions ensure children are wearing waterproofs, wellies or waterproof footwear, warm layers and perhaps ensure the child brings a spare change of clothes in the event that the waterproofs have not kept them warm and dry. Monitor the met office to ensure the weather conditions are safe to go out in for example do not proceed with the trip if the wind speed is over 30 or there is a storm. If there is not sufficient shading take appropriate resources to provide shade such as sun blockers, umbrellas etc. Ensure children are staying hydrated and suncream is reapplied to ensure they do not dehydrate or burn. Ensure that a first aid kit is available so that if a child does cut themselves on a branch etc that the cut is able to be protected from any dirt or bacteria. If temperature begin to change drastically from being a safe temperature to an unsafe temperature draw the trip to a close or find suitable shelter where no one will get burnt or too cold.	L

		If dehydrated children could pass out or become unwell.			
Children exploring the environment independently	This can give children an opportunity to have the freedom to explore something that they are personally interested in, therefore giving them a sense of control in the activity. They can observe and communicate their ideas and thoughts. Are encouraged to be independent, capable individuals. Become more aware of how to take care of themselves and how to recognise hazards and how to prevent or reduce risk to themselves.	Children may wander off and get lost. The child may injure themselves.	Children	Ensure boundaries and rules are set and are made clear to the children with markers or flags. Ensure there's an appropriate ratio of staff and children to ensure that children are supervised sufficiently which can reduce the opportunity for a child to be left unattended. Make sure children are aware of what they can and cannot touch. That they are not to put anything in their mouths, and they must wash their hands at the end of the session. Ensure children know potential risks. Ensure child is wearing a high visibility waistcoat so they are easy to locate.	L
walking on uneven ground	Children have the opportunity to become aware of slopes, gradients and force. The activity supports their vestibular (balance) sense. Children become more aware of their bodies and what they are capable of doing.	Children may fall and injure themselves.	Children and adults	Play games and activities that help children become more aware of balancing and a sense of how to balance. Advise children that they may want to take it slowly until they are familiar with it. Make sure that the children are wearing appropriate footwear.	L

Academic Analysis

The Welsh government's (2022) curriculum for non-maintained nursery settings highlights the importance of an enabling environment. Suggesting that exploration in the early years is one key aspect of a child's development. Therefore, children having the opportunity to explore their environment children obtain a sense of belonging and can appreciate the world around them. According to Tovey (2016) Froebel believed that through gardening, exploration and play outdoors, children gain an insight of nature. This is further supported by Piaget (1970) who believed that the outdoor environment provides a rich and stimulating environment for children to be able to explore and experiment with new concepts, suggesting that the outdoor environment provides children with the opportunity to experience nature firsthand which would then support and develop their cognitive development, can understand how to take care of it. Brown (2012) supports this further suggesting that children have direct experience of nature by having opportunities to play in and explore the outdoors.

Furthermore, Tovey (2016) discusses how adults can support maths and science in the outdoors by providing children with an outdoor environment that allows children to move their whole bodies in the space which supports their physical development and sense of self. As well as opportunities to experience different scientific concepts such as force, gravity, energy and height. This could be provided by having different resources that can provide children with the opportunity to climb and slide. Welsh Government (2022) states in outdoor environment children are able to explore, practice develop their skills. Richardson (2013) highlights the importance of providing children with an outdoor environment stating that children have the freedom to experiment and be more imaginative with the resources provided to them. Richard (2013) also states that for children to get the most out of the outdoor environment they need to experience it directly so that children can authentically experience the world around them, the elements and changes in weather. Therefore, providing opportunities for children to explore concepts such as volume, height, weight and distance is essential in providing a child with an outdoor environment in which they can experience different elements and experiment with open ended resources that scaffolds children's curiosity and experimentation.

Moreover, one example of how practitioners can help to provide an enabling environment is providing loose parts. White (2019) and Nicholson (1971) propose that adults need to provide children with an enabling environment that has access to both natural and manmade loose parts such as rocks, twigs, leaves, tyres, ropes and planks of wood. In order to encourage children to consider and explore mathematical and scientific concepts such as weight, gravity, friction and volume through play. Play Scotland (no date) suggests that loose parts are materials in which can be interpreted as anything the child imagines it to be. Therefore, promoting and encouraging a child's curiosity and imagination as loose parts allow children to explore and gain a better understanding of the world. As loose parts can make children aware different textures, shapes, properties and colours while also giving

them an opportunity to explore mathematical and science concepts such as grouping, counting and matching. Similarly, Nicholson's (1971) loose parts theory discusses how providing children with open ended, movable resources can help to promote a child's problem-solving skills as they are able to experiment with building, mixing and inventing different things from the resources provided. Nicholson (1971) also highlights the opportunities for a child's creative thinking skills to be developed with the use of loose play as there are so many variables.

However, Robertson (2017) suggests that the way in which loose parts play is facilitated plays an important role in how the children experience and perceive loose parts play. Ecokids (2018) suggest that loose parts award children with an abundance of nature in environments in which they may not have the access to materials they need to support their creativity. Children will naturally investigate loose parts and identify potential uses for them, so sufficient opportunities to partake in loose parts play can help to support and develop a child's cognitive and physical development. Ecokids (2018) suggests that these experiences encourage children to have a resilient body and flexible mind. While loose-parts play provides a variety of benefits to children's play practitioners may run into challenges such as not knowing what resources are appropriate or not having the appropriate space or storage for it. Frost (2012) supports this stating that practitioners may have a challenge deciding on what loose-parts are suitable for the age range of the children and this may make the practitioner to hesitant to introduce loose-parts in their environments. Another potential challenge is the ability to access appropriate resources. However, the benefits outweigh the risks. Verdine *et al.* (2017) highlights how loose-parts play can provide children with opportunities to experiment and explore maths and science concepts being able to experiment with concepts such as measurements, weight and classification. According Brostrom (2017) affordances such as logs, branches and stones in an outdoor environment can give children the opportunity to develop their understanding of things such as balance, stability and how their bodies work. Gibson *et al* (2017) suggests that while manufactured resources such as slides and climbing frames provided opportunities to develop physical and gross motor skills they did not offer too much opportunity for imaginative play that natural materials could. Gibson *et al* (2017) also highlights how an outdoor environment can provide a much more versatile environment for play suggesting that natural resources provide children with an abundance of opportunities to explore, discover and connect with their environment.

This leads me to my next point of affordance. Gibson's (1966) affordance theory suggests that the world is not only perceived in terms of objects but in terms of the possibilities the objects can provide. Moreover, early years education (2016) discusses the affordance in terms of play suggesting that children are 'affordance connoisseur's' who will naturally search for play opportunities through interacting with their environments. Furthermore, the curriculum for non-maintained settings (2022) highlights the importance of settings providing an environment in which supports a child's holistic development and incorporates play-based learning that supports and encourages a child's curiosity. Facilitators can scaffold a child's understanding of mathematical and scientific concepts by providing outdoor environments which

integrates aspects of the curriculum. By doing this, practitioners can reinforce a child's understanding by providing children with activities which promote cross-curricular learning. Welsh government (2022) also highlights the importance of catering to each individual child's interests, practitioners can ensure that the environment enables all children to engage and enjoy the activity by observing the children to highlight potential hidden affordances in the open-ended materials and adapt the environment accordingly to suit their interests. Therefore, the role of the adult is to understand and utilize affordances in the outdoor environment by creating enriching experiences that scaffolds the children's development and creativity. Play affordance can provide ample opportunities for children to explore and experiment with maths and science concepts which help to promote and scaffold their understanding of these concepts. Examples include weather patterns. According to Nugent *et al.* Outdoor environments afford children with the opportunity to experience weather patterns and seasons. Therefore, giving them the opportunity to develop scientific concepts (2010) Brostrom (2017) highlights how affordance-based learning opportunities can promote the integration of maths and science concepts which supports their holistic development and curates more meaningful learning experiences. By integrating maths and science concepts into outdoor environment practitioners are able to link learning opportunities to the needs of the children. Vygotsky (1978) theory underpins the importance of experiential learning and curating opportunities that suit the child's individual needs as if the activities are able to cater to those needs the children will be able to learn in an effective way in which will enable them to consolidate and retain their knowledge through experiencing those concepts for themselves.

However early years settings face several challenges in being able to provide an enabling environment that sufficiently supports maths and science concepts in the outdoors. Davies (2013) discusses that one of the challenges is lack of sufficient funding and resources. Suggesting that insufficient funding and limited resources makes creating an effective and diverse outdoor environment that caters to each individual child's needs quite challenging. Therefore, practitioners are unable to provide relevant resources that support mathematical and scientific exploration. Furthermore, Waite-Stupiansky and Williford (2008) discuss how lack of appropriate or sufficient training among early years setting staff regarding outdoor learning poses as a challenge as practitioners struggle to plan and implement outdoor learning opportunities that integrate maths and science concepts.

Moreover, Sandsetter (2007) highlights that practitioners and parents' concerns and level of risk aversion perspectives regarding the safety and level of risk that outdoor play could pose can restrict the experiences and wealth of learning and exploration children can have in the outdoors. Froebel mentioned in Tovey (2016) supports this further discussing how for children to learn it is essential that they are able to engage in risky play as it a natural component of children's play. Facilitators should support this by ensuring children are provided with opportunities for risky-play as it can support a child's learning and holistic development as they can gain self-confidence and are able to challenge themselves. As long as the risks are managed and take into account the children's safety and wellbeing. Risky play can help children to gain

an understanding of different scientific concepts such as balancing, stability and weight. Gill (2017) supports this stating that risky play allows the opportunity for children to be inquisitive as it encourages them to ask questions, start to question why something happens the way that it happens these lays a good foundation for scientific concepts. So it is important that practitioners try to move past their usual risk adverse perspectives and recognise the learning potential that it can provide children and how it can be utilised to support science and maths. Gill (2017) suggests that it also allows children to become aware of risk themselves and they can start to recognise how they can minimize or avoid risk to themselves and others. Therefore, making them more capable and independent which aligns with the curriculum for Wales (2022) which states that their aim for children when they leave school is to be ambitious, capable learners who are prepared to learn throughout their lives. It also allows them to gain confidence in their abilities and will encourage them to continue to try and challenge themselves and progress further. According to Waite-Stupinasky & Williford (2008) outdoor learning enhances a child's learning experience and helps them to enjoy learning.

In conclusion, adults can support a child's mathematical and scientific learning by providing them with an enabling environment that has a range of resources that support and integrate maths and science concepts. Ensuring that there are resources that provide an abundance of affordance and versatility that fosters and promotes the children's curiosity and exploration. Ensuring that they continue to observe what the children take an interest in or have a positive reaction to and adapting the environment accordingly dependent on the interests and the needs of the children in their care. While also being cautious that they do not let their own personal preservations about risky play become a barrier to giving the children the opportunity to take risks, gain self-confidence and the freedom to experiment and explore concepts they are intrigued by. Practitioners should ensure that themselves and their staff are adequately trained and up to date with how to approach outdoor learning to ensure that they feel confident to plan and implement learning opportunities that support the children's understanding of maths and science concepts.

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