

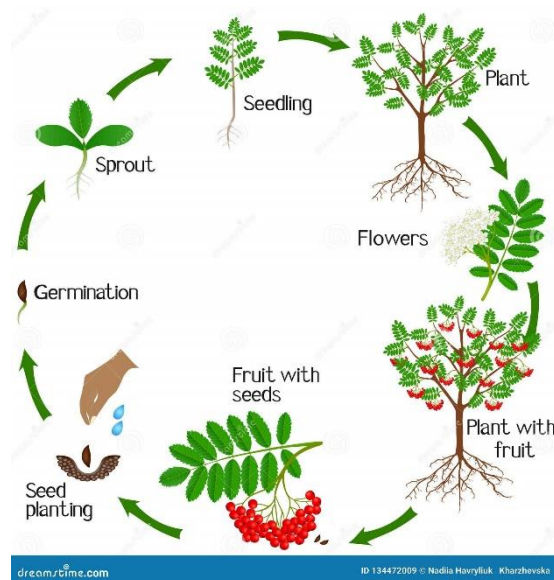
Awe and Wonder



Section Two

It was an overcast day in September when I accompanied my class of year one learners to our outdoor space. The wind was blowing through the branches of the trees, the sound of rustling leaves caught the attention of a few of the children, I could sense that their sense of touch and sound had been stimulated. Through the clouds, the sun's rays were bursting through. Some of the children were jumping from the shade into the sun, calling to their friends to join them as it felt warmer in the brightness. One child, Deedee, said to the others, "The trees and plants need this sunshine to grow". Another child, Tommy, disagreed, saying "no they don't, they need rain". I observed the discussion taking place by the large tree, between the children, waiting for a cue for me to join.

Deedee eventually approached me, telling me her thoughts and Tommy's and asked me who was right. I explained that both were correct, and this is when I took the opportunity to talk to the children about the life cycle of a tree. I asked the children open questions about how they thought the tree had got there. Deedee said that she thought it had been there for a very long time. Tommy said that he grows vegetables at home so maybe it grew from a seed like his tomato plants



Dreamtime (2023)

did. I praised Tommy for his knowledge. I continued asking open questions as we discussed the life cycle of a tree. The children were engaged as they felt and smelled the bark and the leaves and they were enjoying balancing over the roots of the tree, as we spoke about each step of the cycle. Some of the smaller trees in the outdoor space had berries on them, and the children enjoyed looking for these as we spoke about how the berries contained the seeds that would start the cycle again. This was an opportunity for the children to learn about other living things, their structures and properties along with the conditions that they require to grow and be healthy. These are mentioned in the statements of what matters in the science and technology area of learning and experience within the new Curriculum for Wales

(Welsh Gov, 2022a). The learning opportunity also afforded the children to use their senses, such as touch, sight and sound as well as their vestibular senses whilst balancing on the uneven roots underfoot. They used their fine motor skills whilst examining the leaves and their gross motor skills to bend down to the roots, balance and to reach up to the branches. To extend and cement the children's learning about life cycles of plants, I would ask them if they wanted to plant their own seeds and watch how they grow, asking them open questions about how to do this and whether they could predict the next stage of growth.

Whilst I was talking to Deedee and Tommy about the tree. I could see that some other children were using the log as a seesaw. They had tilted it on to the edge that we can see on the right in the picture. The children were pivoting on the curved part in the middle. What started off with two children, one sitting on each end, soon



progressed to more children joining. One of the children, Angelica, shouted over to me, asking for help with dragging one of the small tyres over to the log. I asked her what she needed the tyre for. Angelica went on to explain that they wanted to place the tyre under the middle part of the log, to make it higher. I asked her why she wanted it higher. She told me that they wanted to see if it would make them go up and down further. Whilst helping Angelica to lift one of the tyres, I asked her whether dragging the tyre was the best way of transporting it. She studied the tyre for a few seconds, coming to her own conclusion that rolling the tyre on its edge was a better idea. Angelica had deduced that due to the properties of the shape of the tyre she could make the task of repositioning it easier, this was evidence of mathematical and scientific understanding. Once the tyre was under the log, the children were surprised to find that the modification did not work. They proceeded to roll another tyre over and stack it on top of the first one. Again, the seesaw failed to work as they

had intended. When I questioned them as to whether they knew why, one child answered that the log was upside down and needed to be turned the other way around. The children got off the log and we turned it upside down as was suggested. The children delighted in the fact that they were now able to use the log as a seesaw again. I asked the children why they thought that the tyres were a good object to use, when there were other options, such as the plastic milk crates and the drainpipes. Angelica said that the drainpipes were not tall enough and that they were round and so they would move and wobble about under the log, these thoughts link to the geometry part of the mathematics and numeracy statements of what matters in the new curriculum for Wales (Welsh Gov, 2022b). Lili added to say that she thought the crates would not be strong enough and would crack if the log were put on top of them, Phil interjected telling me that he thought that the crates were not wide enough for the log to stay on and that it would not be safe. Angelica agreed with Phil, also stating that the tyres are wider, made of rubber and are bouncy, which is why the log stays on them. The children were discussing properties of the materials and why they would or would not work, this also links to the new curriculum for Wales (Welsh Gov, 2022a and Welsh Gov, 2022b). At this point there were six children enjoying balancing and bouncing on the log. They were swapping sides and getting on and off to see if they could balance each side equally, by sitting and standing on the log. Phil was using a lot of force to push himself up, I took the opportunity to ask him how it felt when he pushed harder. He said he loved the fast feeling and how he lifted off the log as the other end hit the floor. I asked him what he thought would happen if I sat on the opposite end to him. He replied with laughter saying that I was too heavy, and he would fly off when I got on. To his relief, he did not fly off. Throughout this activity the children were showing problem solving skills, curiosity and trial and error as well as group work and discussion. They had undertaken risk assessments about what object to use to increase the height of the log, taking into consideration the properties of the considered objects. It also allowed them to think about forces and their actions and reactions, which again are included in the new curriculum for Wales (Welsh Gov, 2022b). Whilst the children were balancing on the log, they were using their vestibular senses and their gross motor skills. The use of different materials, such as rubber tyres and wooden logs, enabled them to feel the different properties through their sense of touch. To extend and cement these areas of learning, I would look at getting some weighing scales for the outdoor space, where the children could

not only see what items weigh more or less but could become familiar with numbers and measurements on the scale.

RISK BENEFIT ASSESSMENT

Location / Activity:	Year One and Two outdoor area.	Date:	22/10/2023
Assessor:	Faye Davies	Review date:	22/04/2023

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.

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
Tyres	The children can practice their balance and coordination by walking, running and jumping on the tyre. The children can use fine and gross motor skills to lift and move the tyres. The children can develop mathematical skills by counting, adding and subtracting, with the tyres.	Tyres may be heavy for the children to lift and cause muscular injuries. The tyres may fall on to extremities if in they are standing upright. The tyres pose as a trip hazard. The inside of the tyres gather water, in prolonged hot weather this may become stagnant and give rise to growth of harmful bacteria.	Children and Adults	Talk to children about the safe way to lift and move the tyres, asking for help if they are too heavy. Explain the importance of being aware of the tyres, to reduce trips and falls. Put the tyres back to where they are stored at the end of use, to prevent trips and falls	L

Using the outdoor space in different weather conditions.	The children gain knowledge of different weather conditions and temperatures. Their understanding and vocabulary widen to include words such as hot, cold, wet, dry, windy, sunny, cloudy, raining. The children can become aware of their bodies, learning to care for themselves with respect to removing clothing if hot. Adding clothing if cold or getting wet weather gear if it is raining.	Sun exposure can cause skin damage, photosensitivity and heat stroke. High winds can cause damage to the trees, with the possibility of falling branches, which could result in serious injury or death. High winds could also cause some outdoor equipment to be blown around the outdoor space, causing serious injury or death. Children may become too hot resulting in hyperthermia or too cold resulting in hypothermia, in extreme situations.	Children and Adults	The use of suncream with at least spf 50. Shelter from high midday sun, have water constantly available. Wear appropriate clothing, for example, sun hats and UV protective clothing. The use of waterproof coveralls, warm layers and wellington boots. Monitor the weather conditions and do not use the outdoor space in extreme winds.	L
Uneven/changes in ground	The children use their vestibular senses to balance and manoeuvre. The children gain awareness of their own bodies and its movements.	Trips and falls may happen, resulting in cuts, bruises, sprains, strains or broken bones.	Children and adults	Discuss with the children the areas of the outdoor space that are likely to cause issues, such as the change from grass to concrete and the uneven ground around the base of the tree where the roots are protruding.	L

Log	The children use their vestibular senses to balance on the log. They use their gross motor skills and core strength to get on to and remain on the log. They use curiosity and imagination whilst playing with the log, developing scientific concepts.	Trips and falls may happen, resulting in broken bones, cuts, grazes and other injuries.	Children and Adults	The log is placed on the grassed area rather than the concrete surface, to reduce risk of cuts and grazes.	L
Bug/insect Hotel	Teach children about the natural world and other living things, their habitats and life cycles. Children learn to be kind to other creatures.	Sharps edges on the slate top could cause cuts. Bites or stings from the insects or bugs.	Children and Adults	Explain the importance of not dismantling the bug hotel. Antihistamine cream kept on sight to soothe bites or stings.	L
Children exploring the outdoor space and finding things such as trees, plants, flowers, and fungi.	Children learn about other living things. Children develop physically, using gross motor skills from bending or stretching, and fine motor skills if picking flowers such as daisies and dandelions. Children learn about life cycles of plants	Ingestion of inedible plants, flowers or fungi resulting in sickness or acute poisoning.	Adults and children	Discuss with the children the importance of not putting anything in their mouths and washing their hands thoroughly when returning inside.	L

	and gain respect for other living things. Learning how to care and nurture other living things and learning to leave certain plants or fungi alone.				
Children playing in the large tyres that contain sand and bark chip.	Children experience sensory play through the different textures. Children development fine motor skills through manipulation of the materials. Children experience imaginary play.	Ingestion of sand and bark, resulting in stomach upset. Possibility of animal faeces present in the sand and bark, could cause blindness if contact with eyes and could cause illness if ingested.	Children and Adults	Adult to check area for faeces prior to children playing. Discuss with children the importance of not putting any of the sand and bark in their mouths and washing hands afterwards.	L
Loose parts such as crates, logs, drainpipes, planks, hoops, and sticks.	Manipulation of varied materials affords children with knowledge of the properties of varied materials and shapes. The different textures of the parts offer a sensory experience. Scientific and mathematical concepts, such as forces, strength,	Trips and falls resulting in cuts, grazes, bruises breaks and other injuries. Wood splinters from logs, planks, and sticks. The children could throw the materials, causing injury to others. The children might engage in weapon role play,	Children and adults	Discuss with children, the hazards of running with sticks and the dangers of throwing materials. Ensure children understand the limits to weapon role play. Provide gloves to children to prevent splinters, if using rough materials.	L

	weight, length, and volume can be explored as well as curiosity, experimentation and problem solving.	giving rise to the risk of injuries such as bruising and cuts.			
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Section Four

Warden (2011) states that the outdoor environment is a necessary element to the daily life of children, believing that settings should not look at their outdoor space as an optional extra, but as a space of equal importance to the indoor environment with access to both being equal. This is supported by both Margaret Macmillan and Frederich Froebel who advocated the importance and benefits that outdoor learning has to child development (Tucker, 2014). Welsh Gov (2022d) also recognises the importance of the outdoors noting in the curriculum for funded non maintained nursery settings that the outside environment is a place to stimulate awe and wonder, with children developing a connectiveness with nature and the world around us. This can develop their scientific understanding of how living things function, the properties of matter and an understanding of forces (Welsh Gov, 2022b).

White (2014) is of the opinion that the role of the early year's practitioner should be to provide an effective outdoor environment, putting as much thought into it as they do to the indoor space. Pound and Lee (2015) claim that the outdoor environment gives children an enriching and creative space to learn mathematics. Warden (2012) insists that a role of the adult is to provide a quality outdoor space that gives opportunities for children to be curious, take risks, explore, and investigate, which Russel and McGuigan (2016) along with Tunnicliffe (2015) claim are essential characteristics to a scientific mind. It is stated within the curriculum for Wales that to enable learning, an effective environment should be designed, outdoors as well as indoors, offering learners the opportunity to be curious about the world around them, stimulating their critical thinking and affording them opportunities to explore and investigate through play-based learning (Welsh gov, 2022c). Pound and Lee (2015) agree, stating that learning mathematics should be fun and engaging, building the learners ability to investigate, question answers and explore strategies. Tucker (2014) claims that processes such as curiosity, decision-making, experimentation, prediction, and imagination which are all seen during children's play are also essential processes for mathematical and scientific thinking.

Effective outdoor environments for engaging children in mathematics and science do not have to end at the school fence, but can go beyond to places such as beaches, forests, ponds and rivers, open spaces such as fields, zoos, farms and around the

local neighbourhood and allotments (Grigg and Lewis, 2016). Allotments can provide the ideal space for children to learn about life cycles, seeing first-hand how plants and minibeasts grow, with the experience being sensory also, furthermore, Grigg and Lewis (2016) explain how the forementioned environments can all contribute in some way to the child's knowledge of number, shape, measures and science, whether it be looking at symmetry and patterns on the path ways through the neighbourhood, to seeing what creatures inhabit ponds and lakes. McGrath (2010) agrees, believing that rather than creating a curriculum, practitioners should allow curriculum to flow from the environment.

Allowing children space to explore their natural surroundings, allows them to learn through movement. When children are moving, they are likely to gain an understanding about the things around them, which in turn can lead to them generating ideas. Bruner supported this by developing his theory that children learn through being active explorers (Bilton, 2010).

Warden (2012) states that the role of the practitioner is to provide an adequate supply of resources, adding and removing where they see appropriate, to expand or redirect the children's play. Bottrill (2022) recommends the addition of a mud kitchen to the setting, with extra resources such as real utensils and pots and pans and natural ingredients such as leaves, pinecones, mud, and sand, which is supported by theorist Maria Montessori who believed authentic real-life experiences aid child development (Aubrey and Riley, 2022). Bottrill claims that mathematics can be brought into this area of role playing, as the children show increased levels of engagement and there are endless opportunities to introduce mathematical concepts. Russell and McGuigan (2016) claim that when the children are focussed on their activity within the mud kitchen there is opportunity for them to investigate measurements, number, and quantity. Tucker (2014) agrees, noting that it is here that vocabulary such as 'volume' and 'capacity' can be introduced by the adult, shapes can be discussed and experimentation by mixing varied materials can be done. However, Bilton (2010) warns that it is important for the adult not to interfere in child's play, but rather their role is to sometimes be involved through interaction as an aid to supporting children's learning. This type of adult-child interaction was termed 'scaffolding' by theorist Jerome Bruner (Aubrey and Riley, 2022). By observing children, the adult can gain an understanding of what the child already

knows and so can build on this knowledge by introducing additional resources, such as weighing scales, or by asking open questions to extend the thinking of the child (Waite, 2011). Tucker (2014) recommends using phrases such as, 'Tell me more..' and questions such as 'why do you think that?' to help improve children's mathematical problem solving. Vygotsky also believed that learning can be done through social interaction, and so it is important for the adult to encourage group play, so that children can learn from the more knowledgeable other, whether this be from peers or practitioners (Tucker, 2014). McGrath (2010) supports this by stating that the practitioner needs to be knowledgeable and demonstrate creative thinking as this is the greatest resource, they can provide the child. However, Piaget thought of the child as being 'the lone scientist' capable of forming their own conclusions from their own investigations (Grigg and Lewis, 2016).

Nevertheless, Welsh gov (2023) state in A Quality Framework for Early Childhood Play, Learning and Care in Wales, that the role of the adult is to support curiosity, exploration, and metacognitive talk, expecting the adult to facilitate the child's learning through the zone of proximal development, as theorised by Vygotsky (Aubrey and Riley, 2021)

Tovey (2014) states that other resources that the adult can provide to the outdoor environment, are loose parts. Nicholson (1971) refers to loose parts as variables which can be concrete objects or abstract phenomena such as gravity and electricity, that can evoke experimentation, investigation, and curiosity. The theory of loose parts insinuates that the extent of creativeness and discovery of the child, is relative to the availability of loose parts within the environment. Therefore, to stimulate scientific and mathematical concepts in the outdoor environment, adults need to ensure a plentiful supply of loose parts are available to the children (Nicholson, 1971). Daly and Beloglovsky (2015) claim that children have endless play opportunities with loose parts, engaging them in sensory, creative, active, and inquiry-based play. Insisting that mathematical and scientific thinking happens when children construct things from loose parts. They become aware of sequences and patterns, they test their builds through balance of objects and learn concepts such as gravity and cause and effect. McGrath (2010) explains how loose parts such as stones and buttons can act as a unit of count, and that bricks and blocks can be used for constructing, creating and problem solving. Furthermore, leaves can be

used to see patterns, twigs can be measured or used for counting (McGrath, 2010). Rahardjo (2019) agrees, stating that loose parts, that are found in the everyday environment can illicit creativity and invention and so support the learning of science and mathematics. Loose parts can come in all shapes and forms, meaning that they can stimulate the different senses of children whilst they engage in scientific and mathematical concepts through play. Stimulating these senses, makes the neuronal pathways stronger, connecting to prior knowledge and learning, therefore making hands on sensory experiences an essential part to learning (Daly and Beloglovsky, 2015).

However, Cutting and Kelly (2015) acknowledge that the outdoor environment could be over stimulating for children, with many opportunities to become distracted and not focussed on what the practitioner is trying to engage them with. This is where the enabling adult can allow the children to choose their own learning, as is stated in the new curriculum for Wales framework (Welsh gov, 2022c). Waite (2011) maintains that child-led learning allows the practitioner the chance to perform observations, which can be used to further develop the child's learning through knowledge of their interests and enjoyment, this type of child-centered pedagogy is supported by the work of theorist, Johann Pestalozzi who believed that children should be free to follow their own interests, actively engaging with nature (Aubrey and Riley, 2021). There are many things that adults within a setting can do to facilitate the engagement of mathematics and science in the outdoors, such as providing appropriate resources, ensuring that all learners can gain access to the outdoor space and that it is complementary to the indoor space where learners are given time to freely explore and be curious (Tucker, 2014). Pound and Lee (2015) state that the practitioner needs to be a creative teacher, keeping learning relevant and interesting, whilst bringing an element of fun, further describing how the chemical reactions in the brain brought about from giggling can stimulate aspects abstract thinking.

Bilton (2020) found that challenges to learning in the outdoor environment from a practitioner's point of view, were dominated by the attitudes of other adults within the setting as well as noise levels from passing traffic. Bilton (2020) noted how some practitioners were deterred from using the outdoor environment due to adverse

weather conditions, however, Russel and McGuigan (2016) state how unusual weather conditions such as a sudden drop in temperature can give rise to experimentation with ice, which is an opportunity for the children to learn first-hand scientific concepts about properties of matter and the effect of temperatures. Russel and McGuigan states that it is a fundamental part of educating to make the most of such spontaneous events. Edgington (2014) states that another challenge could be time management, with the practitioner not allowing for adequate meaningful time spent outside the classroom. Stating that when children are then let outside, they use this opportunity to expend their built-up energy. Edgington (2014) therefore recommends that children are let out in smaller groups so that the adult is not merely supervising but can become involved in the children's curiosity and ideas around mathematics and science. Warden (2012) claims that a challenge that commonly rises with outdoor play in the early years is the possibility of the children getting wet and not enjoying themselves. To overcome this, Warden (2012) states that it is the role of the adult to support the development of perseverance of the child, whether it be through warming up by increased physical activity or by supplying waterproof clothing for continued play. Waite (2011) suggests that the diverse abilities of a mixed age group could present as a problem when the adult is planning for an effective environment, as what may stimulate a young baby, may not have the same effect on an older toddler, therefore resulting in a lack of engagement in the environment.

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