

Awe and Wonder

Science, Mathematics and the Outdoors

Section 1



(The Muddy Puddle Teacher, no date)

Section 2

According to Welsh Government (2023) the curriculum for Wales promotes that children are to be encouraged to be healthy, creative, ambitious, and confident, which will provide them with all the necessary tools that they will need later in their lives. In early years nursery settings, these requirements are followed using the funded non-maintained nursery settings, curriculum for Wales. These children in the early years settings do this in a variety of ways, using a vast number of different resources and activities. Children in these nursery settings learn more when they do not realize it, so the more fun it is the better they will enjoy, and the education will keep on going.

As is seen in the picture above there is a wide variety of learning that can be used by the children, especially mathematics and science. There are different resources available for them to use such as the tyres, planks of wood, some of which are on the ground and others are raised at different heights. There are also a variety of natural resources like twigs, branches, and leaves which could be gathered and kept safely to be taken back to the setting for their natural loose parts area.

The children can use the tyres in so many ways like jumping on them, walking on the plank of wood which has been laid across the tyres. Also, they can lift the tyres on top of each other then try to climb on top of them. They can run around in different directions, around the trees or jump over the tyres, twigs, branches, and planks of wood. We could make this into a game of tag so as the children are playing, they are using so many skills without realising. As they are running around, they are developing their gross motor skills as they are using whole body movement which relies on muscle strength. Also, they will develop other skills as agility, co-ordination, communication and spatial awareness.

If I had this opportunity to take the children in my setting to this woodland area, I would focus more on the science side of activities. As they are aged three to five years old, I would need to make it as fun and interesting but simple enough for them to follow and understand. For example, a wonderful way for children to learn about different heights and lengths is to allow children to choose two trees which are a certain distance away from each other, then let them run from one tree to the other tree and ask them “how far have you run?” I would ask the child too; what they think we would use to measure the distance between two sets of trees to see how far it is. They would have a choice on what measurement tool they would like, such as a measuring tape, a meter ruler and a measuring wheel. As this is an active and fun way of learning, the children would want to measure more, so the children could choose another two trees which are at a greater distance apart. For more measuring examples, I would ask the children to find a long stick and a short stick. When they have found the right ones and are happy with them, I would ask them “whose stick is longest and whose stick is the shortest?” This

will start them communicating and debating which stick it is. I would ask the children “how do you think we can find out which stick is longer and shorter?” Because they now know that you can measure distances, they would suggest measuring the sticks to find out. After they have measured the sticks, I would ask them to lay down by their sticks on the ground and I would take a photograph to be put up in the nursery so they can look at them in the future.

I would then ask the children if they can see or find anything else that we can measure. I would expect the children to bring over a variety of different things that they would like to be measured. So, they would start to understand the concept of length and distance. As the children bring me the things that they have collected I will ask them if they can take turns touching the objects. This will allow children to use their sensory skills by touch, smell, sight, sound and taste which I would try to dissuade. Then I will ask them if they all feel the same or different, some children will say the twigs feel rough and hard. Other children will describe the leaves saying that some leaves feel smooth and some dry and wet.

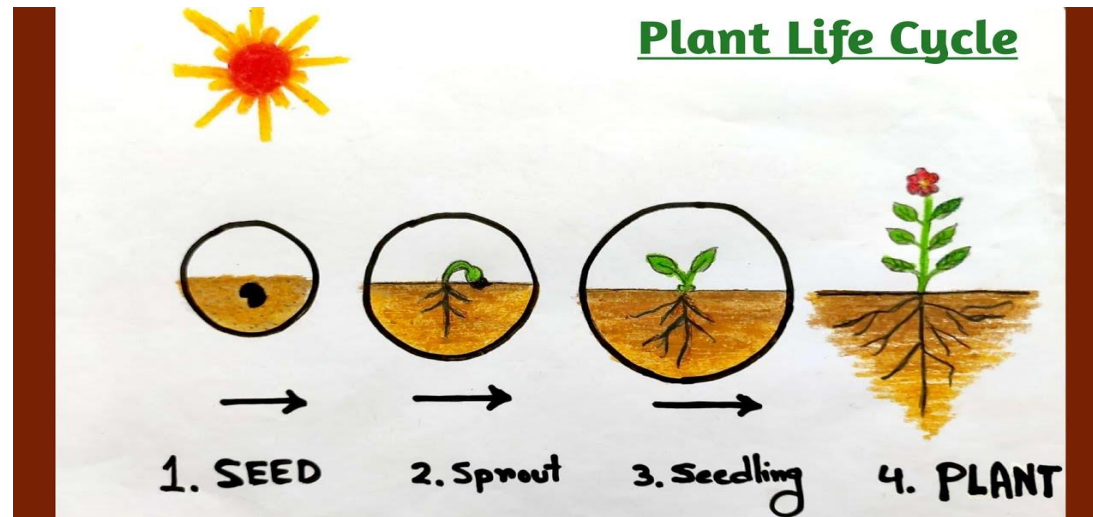


(Bing Images, no date)

I will ask the children why they think some leaves feel wet and dry, from this I can explain to them the wet is from the rain that falls out of the sky. This will help their metacognitive skills as the children will self-assess their findings and take part in positive learning. This will lead to questions about how the rain gets into the sky and where does it go. I will start a little activity to get them searching for more clues to see what else they can find is wet. When we have done that for a little while I will explain to the children that the rain is plays a particularly important part in a plant's life. That the plant needs the rain to help it grow above the ground and the rain helps the roots grow in the soil. I will also explain that the sun plays an important part too.



(personal image, no date)



(Bing Images, no date)

After we all get back to the nursery setting, the activity I would choose to help the children understand this more is to get the children to plant and grow their own flowers. Because I briefly went through this when I talked about plants earlier, I would sit them in a circle with myself and show them the picture above of the life cycle of a plant and hopefully the children would start to get involved by suggesting what we needed to do and what equipment we need for our activity of planting our own flowers. Hopefully, they will say plant pots, soil, seeds, water, shovels and sun. When they have given all the answers. I would let them choose which seeds they would like to plant by showing them the picture of the flowers. When they have planted the seeds in the pots, I would ask them where they think the best place for the flowers to go would be as they need sun as well as water to grow. When the children have agreed on where to put their individual potted plants with their names on them, we would sit back down in a circle and discuss the care the flowers need to grow. Every day the children can water their flowers and when the seeds start to sprout, the children can measure this with a tape measure at the same time every week and document it on a chart and then they will see how much it grows from a little seed to a full-grown flower. I would take a picture of the child with their own flower and stick it on their individual chart, and they can take them home to put in their own gardens. I feel that the activities that I would take part with the children would adhere with curriculum for Wales (Welsh Government 2023) framework which would like schools to set out their own curriculum with subjects to be intertwined with all their learning and experiences.

Section 3

RISK BENEFIT ASSESSMENT

Location / Activity:	Woodland Play Area	Date:	20/09/2023
Assessor:	Sharon Davies	Review date:	27/09/2023

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
Outside woodland area	They will be closely supervised to ensure any accidents will be stopped before happening. If accidents do happen, the procedure will ensure a fast response from members of staff. By having the appropriate equipment on hand to use on any cuts, falls and accidents.	Emergency Procedure Plan	Children and Staff	A written emergency procedure plan to be handed out to all members of staff before the outing and lead practitioner to take plan on the trip. A fully charged mobile phone with all relevant contacts such as parents, emergency numbers and early years setting. High standard of vigilance to be continuously carried out by members of staff. A fully equipped First aid box carried by the registered first aider. Children to be given simple but clear safety instructions about the hazards in the environment.	M

				Lead Practitioner to set boundaries for the children and to explain by leading them around and pointing the boundaries to the children.	
Outside Area	An opportunity to stretch muscles and improve physical health and their well-being. Boost the children's intake of vitamin D. Benefit from the freedom to run around. The children will improve their social interactions with their friends and teachers.	Children are very susceptible to weather conditions. Weather exposure – cold exposure, Heat exposure and sun exposure	Children and staff	Lead practitioner to check the weather forecast prior to the trip and then be able to notify staff and parents/carers of suitable clothing and equipment that is required. Practitioners to ensure that they have spare relevant clothing and equipment for children and members of staff who have not brought it in. Each member of staff and children to have they own water bottle labelled with individual names.	L
Planks of wood	Children will start to become aware of their spatial awareness and sense of (vestibular) balance and learn to correct their movement, aids understanding gravity and other forces.	Children might slip off when walking across the planks of wood and could get splinters from carrying them around and accidentally hurt someone else.	Children	Children to wear appropriate footwear for the trip. Explain to the children that the planks of wood are to be lifted and carried waist height to avoid any body or head injuries.	L
Outside Area	When the children feel safe, they will enjoy their experience in the woodlands a lot more. By moving around such as running, walking, and skipping. This will improve the physicality of children and promotes healthier children by enhancing gross motor skills.	Children getting lost or abducted.	Children	Members of staff agreeing on times and a checking in point such as the car park or entrance to the woodland area. Children to wear bright hi viz vests. Children to be told to stay in their groups and be told who their teacher is. Group practitioner to be given a list of the children's names and number of children in their group.	L

The areas of the woodland that have twigs and branches piled up and any grassy areas.	This will improve children's fine motor skills when they are picking up twigs, branches, and flowers. This will enhance their proprioception skills (the sense to know where their bodies are without looking). Also, by touching, smelling, looking, and listening to the environment will improve development of their sensory skills. When looking for animals or insects this will improve their communication and language skills by talking to each other about what they find. Looking for wildlife will build up curiosity which will keep them more focused. This improves their cognitive development.	Woodland Animals, insects, and environment. Children and staff can get stung by insects, nettles or various vegetation and have an allergy or rash. They could also receive splinters from the wood or any sharp stones on the floor. Also there might be foreign objects such as glass bottles on the woodland floor.	Children and staff	Explain to the children about animals that live in the woods and that they might bite out of fear. To have antihistamine cream and other soothing remedies on hand in case of a child getting stung or bitten by an insect and having an allergic reaction. Children to be taught that some plants and flowers may be poisonous and to be always supervised. Children to be told not to eat anything that is picked up from the ground and hands to be washed before any food is eaten. Member of staff to take a walk around the area to check for any foreign objects and to disperse of them in a safe manner wearing appropriate clothing and using proper equipment.	L
The ground area of the Woodland	Uneven ground will help the children concentrate and pay more attention on their surroundings and use their muscles to stabilize themselves which improves their gross motor skills.	Tree stumps protruding from the uneven ground which could cause the children and staff to take a stumble and hurt themselves.	Children and staff	Children to be shown the uneven ground and to point out the tree stumps so they know what they are like and to try to move around. Play an activity to show the children like an agility course, or the red light green light game. This will help the children to adjust to the ground and protruding tree stumps.	L
Tyres that are laid on the ground	Tyres are an adaptable resource for children to play with as they can be used for open ended play. This will also help the children problem solve (cognitive skills) construction and social interaction (communication skills)	Children may jump off them and get bumps, bruises, and cuts.	Children and staff	Children to be shown the tyres and to explain to them that they can be heavy to move, and it will be easy to slip off or fall off them. Make sure children have suitable footwear on.	L

Section 4

It is generally considered today that outdoor learning is important to each individual child? White (2014) states that all children deserve to take part in enjoying the freedom of outdoor play, as children flourish and develop in this environment. Adults have a responsibility to enabling environments, encourage curiosity and make use of loose parts for children to engage in scientific and mathematical concepts.

For a child to develop holistically Welsh Government (2023) states that in the early years curriculum for funded non-maintained settings, it is essential that the environment should offer a variety of experiences that allow children to safely to

pursue their own interests individually or as a group. Theorist Jean Piaget was a great believer that children learnt more by interacting with their environments (Online Learning College 2021). Also, Ernst and Tornabene (2012) states that there is an expanding like mindedness internationally, for having enabling environments introduced in the early stages of education, as this will lay the foundations for development of the child's intellectual, emotional, psychological, social and physical skills. Furthermore, Watts (2020) who also believes that an enabling environment benefits children by becoming aware of nature, if children are actively involved in the outside world by caring and seeing nature through an activity, it will reduce stress and tension within the child and boost their self-esteem and well-being. Additionally, Pacey (2023) states when a child is in a caring, loving and a supporting enabling environment they will discover and learn new things which acknowledge their own personal individual requirements, allowing them to play and investigate. Speldeweinde and Campbell (2022) say that children in the early years setting can begin to understand the concept of mathematics in the outdoors, for instance this can be done by investigating different patterns and shapes which are on leaves, branches, or flowers and then learn how to collate and contrast them into sizes, lengths, and weights. Theorist Maria Montessori also believed that children are curious by nature, and this curiosity is what lays the foundations for the child's ability to understand the concept of mathematics as curiosity begins questions such as what, why, when and how will start and the children's cognitive skills will develop by problem solving, logical reasoning, paying attention and memory (Wisbey 2018). Furthermore, not only does this help the child with mathematics, but the outdoor environment can also supply scientific concepts such as forest schools who plan their activities by the environmental changes (Hayward 2018). Hayward (2018) says they do this by exploring different seasons, pushing children's curiosity by discovering changes in the environments, plants, animals, insects and their habitats. Additionally, Tovey (nd) also supports this concept that the outdoor environment can hold tremendous opportunities for children to explore scientific matters by using what nature has already provided such as life cycles of plants and seasons. Theorist Friedrich Froebel also believed that children are by nature full of energy, inquisitive and innovative learners, who gain a better understanding of an all-inclusive knowledge when they are allowed to develop at their own speed (Tovey nd). Solly (2022) says that outdoor learning is beneficial for children as it allows children to grow and develop holistically whilst being able to link to the curriculum by being able to change and adapt with the children's interests and concepts.

Botrill (2022) believes that practitioners and teachers in education these days have recognised the importance of putting the child first and not to worry about exams, data collections, analysing and documenting the child's progress with tests as what has happened in the past. Additionally, Cunningham (2006) points out that over the years there has been a distinctive change in the practitioner and child's relationship and the research that Cunningham found is that most of it is

due to Piaget and his theory of the child being able to educate themselves. Welsh Government (2023) states that the practitioner must have a positive influence on the child and should supply opportunities for children to take part in different experiences which will spark curiosity which in turn will engage and motivate them to explore and develop their cognitive skills. UNICEF (1989) states that in article 29 educators should encourage every individual child to develop their character, aptitude and abilities to the maximum. Additionally, Wilson (2018) maintains that practitioners should supply an environment that is changeable to support the child's developmental growth, whilst keeping the central focus on the child. Furthermore, Wilson (2018) says that practitioners should engage with children with a helpful, constructive and practical manner. Practitioners should always encourage children to play freely, they should also encourage curiosity by giving children the opportunity to play and learn outdoors (Wilson 2018). Welsh Government (2023) also suggests that the practitioner should motivate and support a children's natural curiosity by interaction during play and any other activity that involves the practitioner and the child. Welsh Government (2023) Practitioners should also have a strong connection with the child's home environment including the parents or care givers. Theorist Urie Bronfenbrenner believes that his ecological model of environmental influences supports this (microsystem) if child has a strong connection to his/her immediate environment the child will grow and develop positivity and the second stage (mesosystem) the child's parent/cares having a good relationship with the practitioner as this could influence the child's developmental growth (Aubrey and Riley 202). Welsh Government (2023) also says that for a child to grow and develop holistically the practitioner should observe any repeated patterns in their behaviour and interests so to be able to plan activities and learning experiences for the child. The practitioner should supply support and help to the child when any changes or transitions occur in the child's life (Welsh Government 2023). Additionally, Welsh Government (2023) that the practitioner promotes productive cross-curricular links to supply a wider and balanced curriculum based on the children's prior knowledge and present-day knowledge. Furthermore, the practitioner should continuously encourage children to develop independence and confidence in taking on challenges and calculated risks (Welsh Government 2023).

Daly and Belogovsky (2015) believe that as children are curious by nature, recourses such as loose parts are an essential part of a child's development, as loose parts are also seen as open-ended play, loose parts are a variety of different objects and materials such as drain-pipes, planks of wood, rocks, shells, feathers, pinecones or whatever the child takes an interest in. In open-ended play the child's imagination can run free, if a child picks up a stick, the stick can become a wand, a plane, they can tap it on different surfaces to make different noises, drag it across a fence to hear the noise also (Daly and Belogovsky 2015). According to Swadley (2021) architect Simon Nicholson believed that children who played with loose parts from an early age are helped in their developmental growth including critical thinking and

creativity. Theorist Reggio Emilia also believed that open ended play where the child's imagination and originality have no restriction and no targets would allow the child's own creative ability to work out and understand their own environment (Swadley 2021). Daly and Beloglovsky (2015) supports this by pointing out that as loose parts can be changed into whatever the child needs as they play, this will help and support the children in their language, communication and social skills. Furthermore, the use of playing with loose parts are inclusive to children of any age, capability and gender as there is no correct or incorrect way of playing with them (Daly and Beloglovsky 2015). Additionally, Flannigan and Dietze (2017) studied children playing with loose parts in an outdoor environment in an early year setting, the results showed that the children displayed a variety of positive behaviours including metacognitive talk (talking aloud) and in communication behaviours verbally and non-verbally as in using facial expressions, eye contact and hand gestures. Flannigan and Dietze (2017) believe that playing with loose parts in an outdoor environment would promote development for a child holistically such as the social, emotional, physical, mental and the well-being of the child. Theorist Lev Vygotsky believed that when children are communicating to each other (co-construction of knowledge) this will promote the ability of critical thinking and problem solving (Parrish 2022). Loose parts can be used not only for imaginative play, but they can be used for mathematics and scientific concepts too. Dancer (2023) points out that loose parts such as shells, pebbles, chalk, twigs, pegs, hoops, buckets, containers and string will encourage mathematics. These items can be used by having the children draw a circle or different shape and searching for the pebbles that has been hidden and then placed and counted in the circle, this will develop their cognitive skills but also their fine motor, gross motor skills, and their interpersonal skills for communication and teamwork (Welsh Government 2009). Loose parts are also useful for children to start to understand scientific concepts such as weight, volume, problem solving, prediction and exploration, this can be done by gathering 3 different sizes of buckets and seeing which one gets the fullest fastest or having balancing scales and weighing different items against each other like pebbles, stones and wood (Daly and Beloglovsky 2015).

Wilson (2018) believes that not all practitioners are prepared to let children outdoors when the weather is not suitable, if it is raining, windy or even snowing, some practitioners also think that children should not play with mud, sand, pick up grass, flowers or even roll down hills for the fear of getting dirty and the health and safety aspect of it all. Additionally, Learning Through Landscape (nd) says that some practitioners are also worried about the children getting dirty or behaviour getting out of control, that teachers are concerned that there is not enough evidence documented to show work and that there is no funding for resources or materials. Also, Knight (2014) believes that there are too many risk factors in

the outdoor environment for the children but underlying it all is the real barrier, the adults fear. Additionally, Bottrill (2022) believes that barriers and challenges for outdoor learning stem from the educators themselves as they have been led to understand in the past curriculums that children learn in the classroom. Furthermore, Wein et al (2011) supports this by saying that teachers/educators need to adjust their way of thinking about the child's learning with the new curriculum, that it's not all about work in books. Wein et al (2011) believe that following the Reggio Emilia Approach will help the children and the educators work together more seamlessly as there will be less stress on the educator.

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