

Eleanor Thomas – 2009486

Module – ECEY5005

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Science, Mathematics and the outdoors



Part 2

In the photograph that has been taken above, the trees are a feature that can be used to promote mathematics and science in the outdoors environment for children's learning and help to explore their imagination. Trees come in all sorts of different shapes and sizes that can be identified by children by the tallest, smallest, widest, and thinnest. Trees change their appearance throughout different seasons causing leaves to fall off the trees and even change colour. The leaves also come in different shapes and sizes that can be explored by the children. During the time where leaves fall off trees, children can collect all different types of leaves from the ground to measure as an activity and place into piles of sizes and colours. Fallen branches can also be resource that can be used for children to measure, they are also able to use their creative imagination by using the branches to create dens outdoors. In early years children will begin to learn the concepts of measurement in many activities that they take part in. Children will begin to be able to compare different sizes to each other and will start to begin to estimate sizes which will improve their vocabulary of measurement and comparison. When children are learning about trees they are able to learn about how trees are important to the environment and us, trees remove pollutants for the atmosphere and provides us with oxygen so that we are able to breathe, allowing children to become familiar with the environment. With the upcoming rise of climate change, it is extremely important that children have a good understanding of how trees can help prevent climate change to help protect our future. (Hwb Welsh government, 2020) states that mathematics surrounds us in our everyday lives. Mathematics experiences for the children should be engaging that will allow children to become interested in taking part in mathematical experiences, where children can develop mathematical resilience. practitioners play a role in developing mathematic and numeracy development for children, allowing learners to take part in solving problems, exploring ideas, understanding connections and collaborate with others. Geometry involves playing with, controlling, contrasting, identifying and classifying shapes and structures in activities. Practitioners need to allow children to have the opportunity to work independently and with others to develop skills that they are able to use through their lives. Children learning about sizes and properties of shapes allows them to acknowledge the world that they live in and mathematical shapes. The second feature that I will discuss from the photograph is the grass and plants. The outdoors offers children to gain an understand on plant cycles, how and what plants need to grow. Children are interested in plants that they are able to find outdoors, activities can be planned allowing children to explore different plants and discuss their findings on the plants different shapes, sizes and colours that can be recorded. The outdoor environment allows children to have an opportunity to see plants in their natural habitat. When exploring plants insects can be found, children are able to use tools such as magnifying glasses to study the insects sizes and colours. Allowing children to have access to plants and living creatures allows children to become familiar with the world around them and their purpose. According to (Hwb, Welsh government, 2020)

children are able to develop an understanding of living things and the environment around them and how over time they have evolved. Learners can come familiar with how things grow in the world, develop and reproduce, learns will begin to understand the requirement for the living things needs and how we have an impact as individuals on the growth, development and reproduction of the world. Practitioners are able to expand learns scientific and technical vocabulary within the setting that they are in from an early age, where they can understand and use the terms in their vocabulary. The third feature is shadows. Shadows can be a way of promoting science in the early years as shadows are all arounds us by objects blocking light from passing through. Children are often interested in the shadows that they see, the most interesting shadows are the ones that we are able create ourselves with our own bodies. Practitioners in the early years setting can allow children to create different shapes with objects and their own bodies which can be done at different times throughout the day and in different weather conditions as the children will be able learn that where the sun is positioned in the sky will play a role in how the shadow will appear to the children. In the outdoors environment children can learn that depending on the how many clouds are in the sky will have an impact on the light the sun gives off to create shadows, on a cloudy day the sun can be blocked completely creating no shadows, where on a sunny day the children will be able to see and create different shadows. Children learn the best in a playful environment, shadows can be used in a playful way. Depending on the distance of the light and the angle that the light source is hitting the object will change the shadows this will change the shape which can be amusing for some children as the shapes may be taller, shorter, wider or thinner creating the object of the shadow to appear in a funny shape. (Montessori Centre International, 2020) states that the outcome of shadow activities allows children to understand that is a shadow is made when an object blocks the light and what shadow is created. During the activity children are able to learn new vocabulary such as shadows, light, bigger, smaller, closer or further and what the meaning of the vocabulary. Shadows introduce children to different shapes and different sizes allows children to discuss, measure and record the shadows.

RISK BENEFIT ASSESSMENT

Location / Activity:	Woodland Area	Date:	
Assessor:	Eleanor Thomas	Review date:	

Activity	How will young people BENEFIT from this activity?	Hazards and risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk RATING: L/M/H
Walking on uneven ground.	Supporting children's vestibular sense. Children will become aware of different gradients.	Children and adults may trip, fall over resulted in cuts, bruises, sprains, or other injuries.	Children and adults.	Before going to the woodland area, children can be told about the area and the ground will be uneven in parts and what to expect when walking on it. Children can also be notified to walk slowly until they are back on flat ground. Parents can also provide children with sensible clothing	L

				and appropriate choice of shoes.	
Living creatures and insects.	Supporting children in different environment and allowing children to become aware of nature and where different creatures can be found.	Children and adults may be bitten or stung by a living creature or insects	Children and adults	Before going to the woodland area practitioners are able to discuss with the children what animals and insects that they may come across and what insects to not touch in the outdoor environment. Practitioners are able to remind children to be kind and gentle to all living creatures and if they are able to pick them up to place them back where they found them from. To reduce the risk of	L

				children picking up any living creatures, practitioners are able to give the children magnifying glasses. First aid bag can be taken to the area by practitioners that is can be used if needed.	
Trees	Children are able to learn of the plant cycle, they will also be able to see and feel the trees.	Tree branches may fall down causing cuts, wounds, bruises, or any other injury	Children and adults	Children can be made aware that branches do fall down time to time. Practitioners are able to ask children before going to the woodland not to pull branches off the trees to reduce the risk.	L
Fallen Branches	Children will be able to measure the length and width of the fallen branches as part of an activity.	Fallen branches may result in an adult or a child tripping over causing cuts, wounds	Children and adults	Before entering the woodland, area practitioners are able to discuss with the children that fallen branches may be on the floor and	L

		, bruises, or any other injury		that to avoid any injuries to watch their footing when walk or running.	
Stingy nettle bushes/ plants	Children can become familiar with the outdoors environment and the nature of it and understand that they are not able to touch everything without getting hurt. Children can learn of different plants and bushes and what makes them different, what they need to grow and how different environments have a different impact on the way they grow. Practitioners can also discuss with the children what living creatures that live in bushes and what animals they might find on	If a child touches a stingy nettle bush / plants it may cause that child to have a skin irritation, rash or swelling.	Children and adults.	Practitioners are able to discuss and show children what stingy nettle bushes / pants look like, making the children aware what they look like. Practitioners are also able to explain to the children how it would feel if touching a stingy nettle bush or plant.	L

	different plants and why.				
Fencing and walls	Children can measure the fence and walls with measuring equipment.	Fencing may cause splinters,	Children and adults.	Before children begin measuring practitioners are able to check the area that they will be measuring for any rough surface that may be a risk of causing harm.	L
Medical conditions	Being outdoors supports children's holistic development, the outdoor environment supports children's mathematical and science learning while exploring, problem solving and experimenting.	Some children in the group may suffer from allergies that can be found in the environment such as, hay fever. Another medical condition may be asthma.	Children and adults.	Practitioners should be aware or made aware of any children or adults that suffer from any medical conditions and have the resources for their condition, practitioners are able to notify on the letter that would be sent out to the children's parents or guardians asking if children have hay fever to be given Hay fever tablets before dropping off the children and to hand over any medical equipment.	M/H

Equipment	Children using different mathematical and science equipment can help engage children in the activity whilst learning to using the correct equipment to take records or findings.	Some children may not use to equipment correctly causing risk to others and themselves,	Children and adults	Practitioners are able to demonstrate to children how to use the equipment correctly. When outdoors practitioners are able to observe children when using the equipment such as measuring tapes.	L
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Part 4

(Bilton, 2010) states that practitioners need to ensure that children have the best outcomes to learning and by ensuring that the children have access to the outdoor learning environment with practitioners understanding of what aims need to be achieved when children are taking part in the outdoor activities. The outdoor activities should have the same standard of learning as indoor learning and that practitioners should not view the outdoors activities as a break. (Julie, 2011) states that practitioners have the responsibility of ensuring that children have the best learning opportunities outside. Practitioners need to have a good understanding of the importance of outdoor learning to deliver engaging activities with confidence. According to (Early Excellence, 2022) the outdoor environment provides more space for physical activity than learning indoors, allowing children to take part in outdoor activities will provide a beneficial Impact on their cognitive development and their gross motor skills. Children like to use their imagination, practitioners are able to use resources in the outdoors environment to support their imaginative play. Allowing children to explore the resources can allow children to create dens with the materials all while exploring different sizes, height, length, width and weight. Practitioners are able to help and guide the children when learning outdoors through communication, explaining to the children what they are learning and making sure that they understand what they have learnt. The outdoor environment provides opportunities for mathematical concepts to be explored, practitioners should challenge and extend children's thinking when taking part in the activity to support their learning. (Williams, 2016) states that adults play a role in improving children's experiences outdoors. Practitioners attitude on the outdoors has an impact on what the children learn and what occurs outdoors. Therefore, it is important that practitioners show interested to the outdoor environment and understand the importance of outdoor learning for

children. Outdoor activities should be approached with the same values of indoor learning. Vygotsky's model of social learning suggests that adults interactions with children is vital to children achieving activities independently with understanding at the later stage. For children's outdoor activities are beneficial to their learning and development, practitioners will need to prepare, plan and update outdoor activities. Observations on the children should be carried out by practitioners when children are taking part in the activities is essential, observations should include what the children say and do when taking part which will allow practitioners help children develop on present and future activities. Careful observations will allow practitioners to gain a better understanding of the children's knowledge and what practitioners are able to change or develop to carry out more of an understanding if needed or to extend their knowledge. (Dancer No Date) Practitioners are a key role in developing simulating environment for children. In the outdoors practitioners need to identify all aspects of the environment and what outside resources that can be used to allow children to have outdoor mathematical learning opportunities. Children's mathematical learning outdoors can often offer bigger, messier and nosier activities that the indoor classroom environment can not offer. Practitioners are able to use natural materials that can be found outdoors that children are able to use to measure, practitioners can use specific mathematical vocabulary during the activities to widen the children's knowledge. Practitioners can help children learn mathematics through touch, smell, sound, and taste, using all of their senses. (Early Years Matters, 2016) states that learning outdoors allows children to enjoy the light and shade at different times throughout the day. Children will also notice the changes to the environment depending on the season, this will support children's imagination and help them understand the way the world is. Children developing an understanding of the world, allows children to be aware and understand the importance of caring for plants and living creatures. (Watts, 2020) states that the outdoors gives children and adult freedom. A practitioner should be able to explore and widen the outdoor learning experiences for the children throughout the year whilst using outdoor resources. An activity that children are able to do outdoors is measuring plants as they grow by using measuring tapes and graphs to identify the growth. The outdoor environment offers different sounds and textures that can also be explored by children. According to (Khan, McGeown and Islam, 2018) A research study showed that children's science score was much higher after the children had been taught science outdoors, compared to indoors. Practitioners were able to support children's understand of science outdoors, children took greater enjoyment in the outdoor classroom. (Davies and Hamilton, 2016) states that the outdoor environment for children's learning and development is documented. A research study has found that practitioners are not using the outdoor classroom environment to the fullest potential. The study found that boys, children from deprived areas and children with additional learning needs were mostly likely to benefit from the outdoor learning. The research study also found that outdoor learning can be affect for children with the lack of resources that practitioners have, practitioners not having enough knowledge, the weather and the changes in the learning curriculum. Practitioners are able to gain more experience on carrying out learning activities outdoors by courses on outdoor learning to support their understanding that can be carried out across to the children. (Naeyc.org, 2017)

states that the outdoors is overfilled with opportunities for mathematical and scientific learning that can promote real life problem solving for children. Practitioners should encourage outdoor play activities every day, outdoor learning will also support children's indoor learning. Children having access to different objects will allow children to carry out activities using their imagination that will allow them to be in control of their play that will engage them in big body movement. Objects that children may find outdoors include fallen trees that have been cut into tree stumps, children will be able to use the tree stumps to create activities by placing the tree stumps in size order to create steps that they can walk or jump cross or using the tree stumps as an obstacle course with different resource that the children can find outdoors such as tires and stones. Children observe and wonder while exploring the outdoors, practitioners should encourage children's wonderings. Children may be curious of how big a tree is or perhaps some children may notice that the leaves on the trees change colour before falling off, practitioners are able to support the children's curiosity by answering the questions asked and using the correct mathematical and scientific vocabulary to support their understanding and knowledge, practitioners can also allow the children to measure the trees or tree stumps with a measuring tape in a measuring activity. According to (Flannigan and Dietze, 2018) Chakravarthi, Piaget and Vygotsky viewed children's play as creative, where children are able to explore, experiment, process change, communicate, interact with others and learn. Loose parts used in the outdoors can increase opportunities that can support children's development. Children having access to loose parts allows them to develop curiosity, children that experience new thing and different experiences in the outdoors can triggered curiosity that will help them engage in exploring in their learning. (Pacey.org.uk, 2019) states that providing opportunities for children interact with loose parts will support creativity and invention. Loose parts used in activities will need to be interesting objects that is able to meet the children's stages of development. There is no incorrect way of using loose parts, allowing children to develop a sense of achievement when using the material during play and no sense of failure. The pedagogical approach for loose parts allows children to undertake their own learning activities with the use of everyday objects instead of toys, where they are able to enjoy learning and find things out by themselves. Loose parts should be easy for children to have access to, where they can be seen and allow children to have a choice of what objects to use. Natural objects that can be used as loose parts include stones, feathers, pinecones, leaves, sticks and conkers, loose parts are objects that we use, see or find in our day to day life that can be moved, collected, built and any of play. According to (Smyth, No Date) children are able to find number-work out in the outdoors by counting the number of branches on a tree, number of leaves that have fallen off the tree and the number of petals on a flower, children are able to count and sort them into piles of colour and sizes. (Outdoor learning in the early years, 2014) states that risky play allows children to manage risk during their play when having access to risk. Activities that include children jumping from heights, balancing, and climbing are considered as risky play, practitioners and parents should understand the importance of risk-taking during activities and do not intervene with children's risk taking. Children taking risks allows new learning experiences and challenges will allow children to

learn life skills and help with their development. Movements such as climbing, jumping, and swinging allow children to develop on their motor skills, balance, coordination, and their body awareness. Children that are not exposed to different body movements are at more risk of being clumsy, have poor balance and have a fear of different movements. Practitioners have a duty in allowing children to use as much movements as possible. Children interaction with risky environments has widely been discussed, it was suggested that by removing risks in the outdoor environment would allow children to play safer. However, by removing risk-taking for children will have a negative effect on children's well-being, health, motor skills, ability to manage risk and their physical development. Practitioners have the role of reassuring parents with risky play and creating an understanding of why it is important for children's development. Practitioners play policy in the settings can help ease parental anxiety. (www.outdoor-learning.org, n.d.) suggests that outdoor learning is beneficial for children and comes with risks. Practitioners have a duty of care for the children that they are responsible for. Hazards need to be identified and assessed for the children's safety which will minimise potential risk or harm towards the children. The individual's needs, weather, materials and living creatures is a potential risk and would need to be considered. Practitioners are able to put risk-benefit assessments in place to identify the level of risks and what can be put into place to reduce the risk, activities do not need to be rearranged due to risk the children may experience if the risk is acceptable and that no significant harm can be done. According to (Education Scotland 2019) it is necessary that children experience risk for children to develop skills on how to handle risk as throughout their lives they will come into contact with risk. Practitioners are able to identify if the location selected to carry out the outdoor activities is appropriate for the learners and whether the other practitioners are suitable for the activities.

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