

AWE & Wonder

(Source: Special needs ministry resources)

Portfolio

&



(Source: Clipart, no date)

Mathematics



(Source: Science pictures clipart,

Science

Introduction

This portfolio will include four parts. Part one will be an image of an outdoor area where children can explore. Part two will include opportunities for mathematics and science learning in the outdoors . Three objects will be chosen and spoken about in more depth to support those subjects. Part three will include a risk assessment about the image. Part four will be an academic piece of writing explaining how adults working with children in the early years can support and encourage scientific and mathematical concepts within the outdoors.



(Source: Rogers, 2024a)

The site in the image above will be visited by ten children of the ages 6-7 whom are in year two and will be accompanied and observed by myself and another member of staff.

Curiosity one: Trees



(Source: Rogers, 2024b)

The children were interested in the trees and asking questions to one another, such "I wonder what lives in this tree." How do trees get to be so big? Why do trees come in numerous varieties? A staff member joined them and asked open-ended questions including "I wonder if we could climb this tree?" and "What do you think lives in this tree?" The children then create different stories using their imaginations.

Mathematical opportunities:



⇒ Measuring the circumference of the tree by using a piece of string and going around the tree about foot away from the ground and then using that string against a tape measure to get an accurate measurement. By doing this the children will be measuring and learning that every tree is different and getting an estimated age of the tree.



⇒ Children could learn about the importance of each component of a tree, including its roots, trunk, canopy, crown, bark, and leaves, by understanding the structure of a tree.



⇒ Children may want to know how tall the tree is, in which case they will need to solve a problem due to the size of the trees, which may make it hard for them to measure independently. They could enquire about the largest and smallest trees, as well as information on specialists in the field of trees.

Links to the curriculum:

- Collecting Data
- Position
- Measurements
- Sizes
- Height

(Welsh government, 2022)

Science opportunities:

- ⇒ Children may be interested in how trees are used, including how they can reduce pollution, remove carbon monoxide, produce oxygen, provide shade for wildlife. Items that may be made from the trees include paper, sports equipment, furniture, and building materials.
- ⇒ Children could be interested in learning about the many kinds of trees that exist, their benefits, and whether or not they are categorized as hardwood or soft wood.
- ⇒ Children may want to explore with the tree parts such as leaves branches possibly roots to create art, they may want to make faces out of the parts along with leaf rubbing art.
- ⇒ Children may also learn about the many tree life cycles and types of trees they can encounter.

Links to the curriculum:

- Environments
- Plants
- Evolution
- Photosynthesis

(Welsh government, 2020)

Curiosity two: Tires



(Source: Rogers, 2024c)

The children also became interested in the tires, moving and rolling them about. I went to join them and questioned as to what we might do with the tires. How can we get the tires to roll more quickly? Are they heavy? Why do they move firmly on grass or dirt and more lightly on roads? Where do you think they came from?

Mathematical opportunities:

- ⇒ Children can determine if the amount of tires is odd or even by counting them. They might gather an equal number of various items that exist in the area.
- ⇒ The children could stack the tires on top of one another to build a tower and see how high they can get it without falling. That may include balancing them on top of each other.
- ⇒ On the tires, children could measure the outside and inside dimensions. To discover the size, they may find other items, like sticks, to measure or measure their arms.
- ⇒ Children may wish to look at the tires' shapes, such as if they are flat or round, since this might create questions such, "Why are they round?" Along with observing any patterns, such as zigzags or straight lines, on the tire's outside.
- ⇒ Children might want to discover how quickly the tires can roll. This can encourage them to try different ways and location to roll the tires such as the field or the footpath maybe down hill or uphill to see whether they roll faster or slower. This may involve timing the tires as they move from point A to point B.

Links to the curriculum:

- Units
- Shape
- Counting
- Balance
- Quantities

(Welsh government, 2022)

Science opportunities:

- ⇒ Children could create patterns with the tires on the ground by adding paint or even making the ground muddy so that the patterns are more clear. 
- ⇒ Children may want to know the material the tires are made from and where that material comes from. To add to they may want to know what other stuff are made from the same material.
- ⇒ Children could also learn where the tires came from. What car they may have came from. That give the opportunity to have conversation about cars and how the tyers work along with the different type of tires that there are. 
- ⇒ Children may want to create routs where they can roll the tires on different surfaces such as roads, gravel and grass and document what surface was easier to roll them on. That then leads to friction between the different surfaces and the tires.

Links to the curriculum:

- Problem solving
- Sound
- Materials
- Mechanisms
- Friction

(Welsh government, 2020)

Curiosity three Soil

(Source: Rogers, 2024d)



(Source: Rogers, 2024e)

The soil attracted the children's interest. They discussed why some areas were wet and others were dry, as well as how some areas had more mounds than others and why flowers and grass grew in certain areas but not in others. Open-ended questioning were asked including "What dries the ground?" What may be preventing the soil from drying up? What may have caused the dirt mounds?

Mathematical opportunities:



- ⇒ The weight difference between wet and dry soil . Children can add water to the soil to determine the difference in weight and consider what would be easier to carry wet soil or dry soil.
- ⇒ An opportunity for children to plant seeds. Children may be able to calculate how much soil they may need to plant the seeds. Children may ask about and learn how deep the seed needs to be placed in order for it to grow in the area where it will be planted. In addition to planting, they may monitor the plants' possible height and growth throughout time.
- ⇒ Children can gather soil and put it in jugs. They can then see how much water the soil can hold by adding water themselves or by waiting for it to rain. They may then test which soil may hold the most water and discover various soil types from various areas.

Links to the curriculum:



- Weight
- Temperature
- Quantities
- Data collecting
- Less and more
- Measuring



(Welsh government, 2022)

Science opportunities:

- ⇒ Children can use soil to build sculptures of humans or animals that they can place on trees or the ground. This can include adding water to the soil to create mud. Using the flowers and leaves as features, or even creating a solid structure by shaping mud around an object.
- ⇒ Children may be able to recognize differences in the soil's texture as well as differences between different areas of the ground. Children might ask about the effects of different weather conditions on the soil. That can expand to experiment with soil in different weathers' and also questions on weathers.
- ⇒ Children can learn what animals live in the soil along with discovering that soil is a living thing its self.
- ⇒ Children may be interested in learning about the components of soil, its different types, and locations for these differences. This might then initiate a discussion on why different soil types exist in different parts of the world.
- ⇒ Children can use soil to grow flowers and other plants, which can lead to discussions on plant life cycles. The reason soil is necessary for plant growth. The children may try growing the same plant in different soil kinds to see if there is a difference.



Links to the curriculum:

- Living things
- Habitats
- Animals
- Life cycles

(Welsh government, 2020)

Part 3: Risk Assessment

Eliesha Rogers ECEY5005 2308244 Word count: 4384

Location / Activity:	Forest area within a school	Date:	21/7/24
Assessor:	Eliesha Rogers	Review date:	2/9/24

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 pre-cautions RATING: L/ M/H
Climbing frame	Children can improve their social, cognitive, and physical development. They can also explore with various objects to set challenges for themselves.	Children can lose their balance and injure themselves. The frame can have some missing elements. maybe sharp edges. May become damp as a result of the weather . Clothes might snag on sharp edges. May be obstacles obstructing the frame.	Children	Adults are able to check that the frame is appropriately positioned and to see whether there are any obstructions surrounding it. They might look for any loose pieces or sharp edges. Beforehand, remind children not to wear baggy clothes. And let children know about the risks.	Medium
Pile of branches	Children are able to feel various textures. Make use of them as a location to hide. Create something using the sticks to encourage imaginative play. They can discover more about the possible animals that calls that may have taken home in the pile. They could investigate what is under the pile.	There might be a variety of creatures in the pile that could endanger children. Given that various trees may have branches with varied tips, it may have sharp edges and spikes. Additionally, because the branches will be extending out, children might trip over them.	Adults and children	First, adults should check the pile of branches to see if any animals have set up home there. They should also make sure that children are wearing the correct footwear and may provide them gloves so they can move the branches. Keep an eye on the children while they play in and around the pile.	Medium
Patio tiles	Improve your mathematical abilities by counting the number of and styles of tiles. Use the tiles as a foundation for your imaginative designs. Starting structure to establish a state of balance for objects.	Children may stumble over the tiles and suffer injuries. There's a chance the tiles are have sharp edges. They could be heavy.	Adults and children	Children may be supervised by adults while they play on the tiles. They can also be told that the tiles are heavy and they should be aware of their surrounding when walking around.	Low
Swing	Can enhance children' bodily awareness and coordination. May be considered a physical activity as it works the arms, legs, and core. Increases their abilities for gross motor play and enhances it.	Children may injure themselves if they fall off the swing. They could swing into the shed and knock against it. There's a danger the rope may break, sending children flying, and they can burn their hands from gripping the rope too firmly or for too long.	Children	It is possible for adults to inspect the swing's strength and support systems. They can check to make sure the swing is free of any obstacles. Verify if the weather has made it very wet, and watch over the children at all times.	Medium

Shed	Children perform role-playing games in and around the shed, which may involve problem-solving, to exercise their imagination and creativity. It is a chance to engage in social interaction. And improve upon their communication skills.	Children could get splinters from the wood. There might be animals in the shed that are hiding. If the door were to open, they may hurt another child or they could stumble over the concrete stand that the shed sits on.	Adults and children	Adults can inspect the structure of the shed and make sure that no animals are residing there. If there are, they should either remove them if at all possible or warn the children that there are animals within the shed and that they should keep clear. Informing children to use caution when opening doors.	Low
Fence	Children may rest easy knowing they are in the care of responsible individuals who will watch out for them. Because the fence is made of bars, children can see what plants grow on the other side and keep an eye out for any potential creatures that could be on the hill above.	Children may get inquisitive and attempt to squeeze their arms or legs between the bars, becoming caught in the process. The same goes for prickly bushes and overgrown trees as natural risks. In addition to the children being visible to outsiders.	Children	Keep an eye out for odd behaviors from strangers by keeping a close eye on the surroundings. Verify the fence's structural soundness. Discuss the effects of sticking their arms and legs through the fence and the dangers of approaching strangers.	Low
Ribbon	With the ribbon, children have the ability to enhance both their mental and physical growth, allowing them to create expressive artworks. The ribbon could be used for mathematical purposes.	Choking and tangling could come from it.	Children	When allowing children to use the ribbon, adults should always keep an eye on them and discuss with them the importance of keeping it out of their necks and what the risks may be.	Low
Bird house leaning on the tree	Children might become curious in how they can support and assist the birds by learning about the many kinds of birds that may like to live in the bird house. They get the chance to construct their own bird home.	Due of its placement on the ground, where other animals may have established a home for themselves, it may topple over and break, resulting in several sharp pieces.	Adults and children	In addition to checking it for other animals beforehand, adults may secure the bird house to reduce the possibility of it toppling over and breaking.	Low
Tires	Children can engage in role-playing, building, climbing, and creative play. They may use the tires to create an obstacle course, which helps improve their balance, coordination, and motor skills.	They may trip over them and fall resulting in getting hurt. They could become trapped in one of them. They could also be injured if they have nails lodged in them.	Adults and children	First, adults may check the tires for nails. While children play with the tires, supervise them and engage them in conversation about safety.	Low

Awe and Wonder

Introduction

The following piece will cover the role of the adult in the outdoor environment and how adults assist children in their outdoor learning. The advantages and benefits that children may gain from playing outside, there will be information on the mathematics and scientific components of supporting outdoor play for children. It will contain connections to the new curriculum as well as details about Friedrich Frobel's outdoor approach.

Role of the adult

Smith-Gilman (2018) and White (2011) explain that teachers are expected to provide a curriculum which encourages children's capacity to think critically, question, identify solutions, assess and reflect, be inquisitive, innovative, adventurous and be messy, all of which can be done in the outdoors. Hunter *et al* (2019) and Richardson (2014) say that what makes school grounds important locations for active learning is that they are among the limited environments in which children can interact outside with other children in the natural environment. However, Hunter *et al* (2019) do suggest that there has not been much discussion between teachers about how to prepare and organize for outdoor learning. Yet Hunter *et al* (2019) research indicates that there is a strong belief that planning for outdoor learning takes less time and effort than planning for indoor learning. Despite that, the research maintains that professionals continue to agree that child-led, open-ended play is beneficial. Children's cognitive development is often considered to be enhanced by their curiosity and discovery (Hunter *et al*, 2019, Richardson, 2014) and Blatt and Patrick, (2014). McNally and Slutsky (2016) and Jose *et al* (2016) say that children cannot gain their understanding and sense of connection with classmates, materials, teachers and the environment through remote lessons, but rather they build these skills through repeated interactions across a longer period. Furthermore, Hunter *et al* (2019) and Brodie (2024) continues to say the natural surroundings that schools offer for children can influence the children's experience. Practitioners that accompany children in the outdoors can create an engaging and responsive learning environment. According to McNally and Slutsky (2016) relationships and learning are important to enable children to grow in self-worth and confidence so they can fully engage in activities.

Bento and Dias (2017), Richardson (2014) and Bilton, (2010) suggest that any adults are sceptical about their children playing in the outdoors due to concerns about the children's health and safety. Nevertheless, professionals should communicate with those adults and explain the importance of outdoor play and the benefits that come with it including children getting fresh air, sun, and daylight. The benefits of children experiencing the outdoors result in benefits such as them being less hyperactive, they can concentrate better, play more independently, and develop the ability to connect with nature (Bento and Dias 2017, Richardson 2014 and Bilton, 2010). However once adults are aware of the benefits and the importance of the playing outdoors, they may include it into their daily routine in which will have a positive outcome on children's development and give the children experiences that are relevant and meaningful. (Bento and Dias, 2017 and White, 2011). Many occasions being outside can be an opportunity for teachers to take a break while safely supervising the children along with observing them, with no interaction needed (Hunter *et al*, 2019). Nevertheless, Senent *et al* (2022) says that some educational professionals promote holistic learning and development by using guided exploration to direct children's play. Senent *et al* (2022) continues to say that teachers should involve all children and encourage children's independence, inventiveness and curiosity. The starting point of teaching and learning is the relationships that develop between individuals, and their surroundings (McNally and Slutsky, 2016).

According to Earle (2022) and Brodie (2024) adults should find a balance between social interaction, teaching and listening to a child. Children are active participants in their own learning. Bilton (2010) explains that children create their own learning, but professionals may enhance it by concentrating on the science and mathematics aspect. For example, if children show an interest in creatures, staff can assist them by discussing their life cycles and habitats (Bilton, 2010). Awareness that each individual child has their own unique personalities, life history and culture experiences, should influence curriculum choices to enable children to collaborate in their own learning (McNally and Slutsky, 2016).

Adults' interaction plays part in children's learning process which contribute to the development of skills and necessary for understanding the topic and encourage the building of language for expressing ideas (Earle, 2022, Bilton, 2010 and White, 2011). When adults play alongside children and demonstrate correct language that can encourage the development of greater vocabulary (Earle, 2022). Hunter *et al* (2019) says that a great deal of focus has been placed on the viewpoints and experiences of teachers in outdoor learning environments. According to Bento and Dias (2017) and Hunter *et al* (2019) when adults are involved it can impact what kind of experiences children may have with the world and the way they process new information it can help children with their emotional and mental well-being where their self-image and self-esteem can grow (White, 2011).

Mathematics

Boaler (2022) explains that many would argue that maths is separate from other subjects since it is an area where there are right and wrong answers, but this is untrue and demonstrates that change is needed. Brodie (2024) says that instead of directing children's learning outdoors teachers' roles are to assist and guide it. Furthermore Boaler (2022) continues to say the study of mathematics is a complex topic that calls for logic, imagination and the ability to make connections. Mathematics is a body of knowledge that provides insight about the world around us. Through practitioners supporting involvement with mathematics and the outdoors, children will get a better understanding of the world (Boaler, 2022). Svecova *et al* (2014) point out that all schools must concentrate on improving children's capacity to reason, think critically and solve problems. Since outdoor environments offer a variety of experiences and difficulties, they can help children develop these abilities. Teachers may help children to doing so by providing them with chances to investigate the environment and allow the children to improve abilities such as the ones listed above. Svecova *et al* (2014) and Arifani *et al* (2021) continues to explain that one way to see the teaching of mathematics in the outdoors is a means of encouraging creative growth. According to Waite (2011) and Blatt and Patrick (2024) children can learn more about mathematics and science from the outdoors as it is a hands-on experience, as well as being experimental and providing engagement and enjoyment. Teachers can use examples of the mathematics children already know in their daily lives. Recognising the potential the outdoors gives for mathematical development and how it can be utilised in the real world can also encourage engagement in the outdoors while supporting the development of mathematical knowledge. Providing implicit mathematical activities builds on these skills and gives children the chance to gain knowledge of new mathematics as a result (Waite, 2011). Waite (2011) and Arifani *et al* (2021) also says that teachers can embrace mathematics in the outdoors by letting the children touch and manipulate various objects. Additionally, this supports the children by giving them opportunities to establish a mathematical mindset by participating in frequent outdoor activities including experiencing different materials. Welsh Government (2020) say that mathematics plays an important part in everyday lives. The development of five linked, connected and non-hierarchical skills such as conceptual understanding, communication using symbols, fluency, logical reasoning and strategic competence are necessary for the development in mathematics. When creating their curriculum, schools must take these important factors into account to guarantee the learning of their children (Welsh Government, 2022). Welsh government (2022) maintains that since there are so many mathematical possibilities in the natural world, encounters outside may be intriguing and stimulating. The development of the four objectives can proceed alongside providing realistic experiences by incorporating reasoning and problem solving to all aspects of mathematics.

Science

According to Waite (2011), Rois and Brewer, (2014) and Finn *et al* (2018) teachers may help children with their scientific studies outside by allowing them to explore, asking them questions and planning activities that will deepen their knowledge of the subject and lead to an in-depth knowledge. Additionally, Waite (2011) and Finn *et al* (2018) says that it encourages children in gaining a sense of identity, awareness of their surroundings and a recognition of ecological ideas such as interconnectedness of all living things. Teachers can use flow learning that offers a progression of exercises that capture their curiosity, focus their attention, provide deeper experiences and provide information so the children acquire a firsthand look at how the natural world works (Waite, 2011 and Rois and Brewer, 2014). According to the Welsh Government (2020) acquiring knowledge in science is typically supported by advancements in knowledge of mathematics, as expressed through the five mathematical skills. These developments include the application of facts and figures in research and documentation, to mathematics and measurement in planning and development, to processing information in technology. Welsh Government (2020) continue to say as a result, there are many and often extremely broad curriculum connections between these two areas. When establishing and organising their curriculum, schools might consider paying special attention to curriculum sequencing for the purpose to get the best use of possibilities in science and technology for implementing mathematics conceptual learning (Welsh Government, 2020).

Frederick Froebel

According to Pound (2006) Froebel explains that space and light are key aspects for learning. Early education (2021) explains that play according to Froebel is the most fundamental stage of growth for humans in childhood since it allows children to freely express their innermost thoughts and feelings. According to McNair and Powell (2020) and Bruce (2021) Froebel children build their understanding of the world through experiencing it firsthand. Froebells leading ideas on the outdoor environment is that everything is connected and learning living should be done together with nature (Early education, 2021 and McNair and Powell, 2020). Rather than children being instructed or demonstrated what to do they should be encouraged to have freedom with guidance resulting in a better outcome. (Tovey, 2012 and Pound, 2006). Brodie (2024) also add that it is believed that children contribute to the creation of knowledge. Froebel thought that the outdoor space provided a perfect setting for small children. Children learn about the world around them, recognise its beauty and discover how to care for it by means of discovery and outdoor play (Tovey, 2012 and Bruce, 2021).

Tovey (2012) and Bruce (2021) says that according to Froebel children are inquisitive, imaginative and engaged learners. He believed that play, conversation, problem-solving, direct involvement and independent thinking are best ways for children to learn. They flourish in environments that offer support, excitement and deep interactions with others, all of which are aspects of the outdoors (Tovey, 2012). According to Tovey (2012) Froebel's view on the role of the adult during children experiencing the outdoors is, observing and supporting along with extending their learning and understanding. Froebel considered it was essential that professionals become familiar with the values of observation fundamental to professional practice. It is one of the numerous lenses by which professionals can see the way in which children understand their surroundings. Recognising that providing children with the freedom to explore their environment helps with them interacting with others while interacting with different elements of the outdoors such as trees, ground, flowers, water (Early education, 2021).

Conclusion

In conclusion, given all the advantages that outdoor learning offers, it is essential that children get this experience. In addition to the requirements for children, including sunshine, fresh air, and the sun. Even while children may learn a lot inside, outside education offers far more opportunities for learning with less preparation. Children may gain knowledge in all subject areas by spending time outside. Through direct experience with nature, children may learn in all areas of mathematics and science outside and design their own learning experiences. The encouragement and embrace of outdoor learning are greatly supported by adults. Children may flourish when adults provide them with the assistance they need.

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