

Section 1

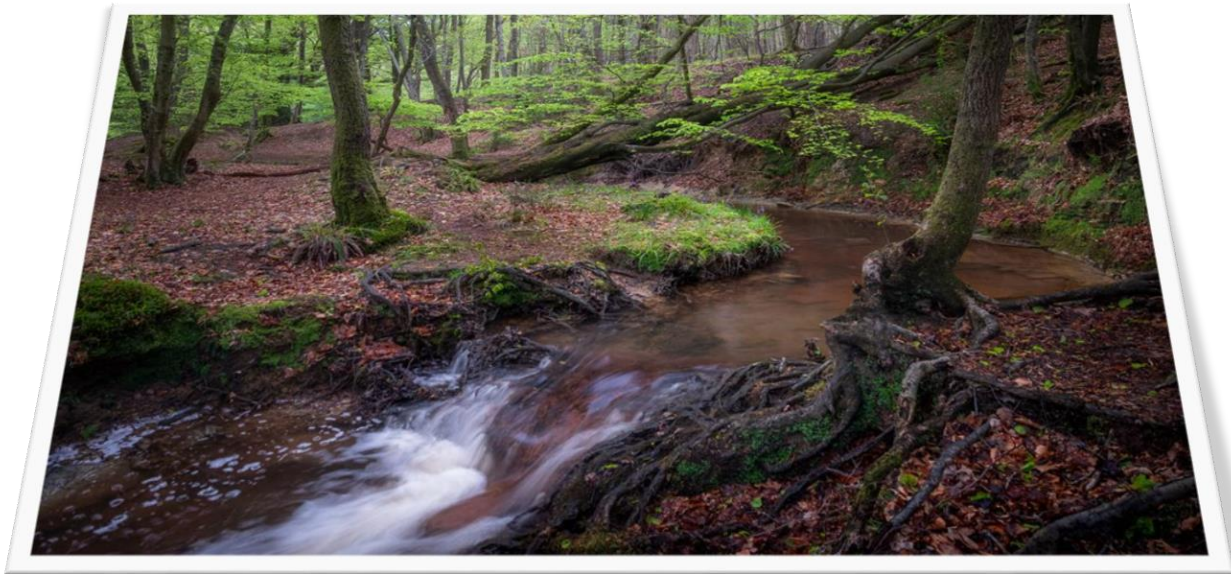
Awe and wonder: science, mathematics, and the outdoors



Section 2

Learning Journey

First day of spring trip out of the city and into the woods.



Subjects: Donica, Sarah, Tim and Jessie

This learning journey focuses on two groups of children.

Date: 5th April 2023

9:00 am

We began our learning journey outside our classroom, as we sang our flied trip song. It is called “we are going on a trip” by the little Einstein, the children proceeded to sing as we headed to the bus. Before we entered the bus the practitioners explained to their students the golden rules of their trip.

9:15 am

As we were halfway to our field trip site, students began to get restless. Therefore, we played games such as I spy, the practitioner starts off by saying "I spy with my little eye something new" Child A responded saying "I see a field of yellow flowers". She had never seen yellow flowers; this was her time leaving the city area and venturing into the woods. This game sparked their interest while they were looking out the window, exploring and discovering things using their observational skills. We also sang ninety-nine bottles of beer on the wall and the wheels on the bus. As we finished singing, Donica turned to Sarah and asked her, 'how many wheels do you think this bus has?' Although she did not have the correct answer, she estimated or guessed based on the number of buses she saw on the way. (Sarah is using both her mathematical and scientific skills to answer the question.)

9:35am

Everyone rushed to get off the bus, as we gathered in front of the bus members of staff were assessing the health and wellbeing of their pupils and making sure they were dressed appropriately. The practitioners discussed the golden rules of the trip amongst their students.

9:45 am

Everyone was excited to start their journey to the woodland site. It was a ten-minute walk/hike to our destination. Along the pathway towards the site we encountered different gradients, we started off with pavement, then gravel followed by dirt, it was even and full of slopes. Tim and Jessie pretended they were on a boat during a stormy day at sea, to see who c kept their balance (this promotes vestibular sense) while some of the other students were counting their steps. While making our destination Tim asked me "Why is it not snowing anymore? but it is always raining. I proceeded to asked him "what season do we experience snowfall?" he quickly replied, "winter Miss!" I applauded his answer and proceeded to ask him "what season takes place after winter?" Although Tim did not know the answer his classmates assisted him and shouted, "Spring Miss, we are in spring!". Tim realized the weather and his environment changed because of the change in seasons.

9:55am

As we approached our destination the students were excited, Donica jumped up and screamed "YEAH FLOWERS!!!!!!", while Sarah was just excited to be outdoors. Before children can begin their independent exploration, the practitioners set up and laid out different areas with loose parts such as measuring cups, magnifying glass, jars, buckets, and guttering. They also went over the golden rules and set boundaries, designating what areas were safe and what areas were off limits. To spark the interest in exploration creativity the practitioner set out a task, giving each child a plastic treasure box and persuading them to collect new and exciting things. Donica shouted "I

going to collect the best things' Tim responded, "nah ah ...I am going to collect the best things".

10:10 am

The children began to explore. Some were collecting sticks, twigs and branches and sorting them into groups by shape and size. While others were investigating the patterns on them by using a magnifying glass, children were also using their fingers to differentiate the textures of the leaves. While using the magnifying glass to identify the patterns on the leaves Donica noticed a tiny ladybug and decided to build him (Francis) a home. She went to collect two jars; one was for his habitat and the other to hold him in while she prepared his habitat. She placed soil in the bottom of the jar and then compressed it by using a magnifying glass. Once she was finished, she added some pebbles, twigs and some flowers (to make it pretty and to make it like a jungle she added). Before she placed him into his new home she asked, "what type of food would Francis like to eat Miss?" Instead of telling what Francis would like to eat, I responded "what type of animal is Francis? Donica responded "Mini bug"

Then I said "correct, can you tell me what mini bugs eat?"

She shouted with excitement "they eat plants!" Then I explained to her that animals that eat plants are called omnivores.

10:20 am

awe in science and mathematics

A group of children started collecting rocks of different weights, sizes and shapes. Then they decided to throw them in the stream and monitor the ripple pattern made from the splash. Tim and Jessie came to the conclusion that although the bigger rocks are heavier, the smaller rocks create a longer and wider ripple pattern. Also, the best rocks for making perfect ripple patterns are big and rounded rocks. Besides stones, children were throwing other materials they collected into the stream to see what floats and what sinks. After throwing rocks in the stream, the group of children proceeded to make their way to the stream. As they walked through the water Jessie turned to Tim with curiosity and said, "I wonder what type of animal lives here?" To answer their own question, they decided to explore the water, to their surprise they found a million fish, however they did not catch any.

10:30 am

Some children were making potions and mud pies. some of the children realized that if they more water than mud the constancy was a little runny, so they used the measuring cylinder for the correct amount of water to create solid mud pies they used flowers and leaves decoration. Shortly after some children were engaged in rough and Trumbly play, they were rolling down

and running up the slopes. Some were engaged in imaginative play; some were sword fighting with sticks and others were playing pirates on a piece of log.

10:55 am

It was almost time to go and so I gathered everyone for a short circle time. Throughout the morning, children were asked to collect new and interesting spring objects and place them in their treasure baskets. We took the time to look, smell, touch and listen as we discussed the objects. Everyone participated in snorting, counting and matching. Also, they learned new vocabulary related to Spring, including new discoveries related to the change in season, weather conditions and living things. I was pleased to have observed the many mathematical and scientific concepts that children were experimenting with, unfolding, exploring, investigating and engaging in. This outdoor environment provided many stimulating opportunities for holistic development.

RISK BENEFIT ASSESSMENT

Location / Activity:	Woodland	Date:	5 th April,2023
Assessor:	Bre-Ann Andrews	Review date:	9 th April,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 them 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 risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk RATING: L/M/H
Walking towards the site (woodland area)	Walking on uneven ground promotes balance and physical movement. Exposure to different types of surfaces, gradient, heights and textures e.g. gravel, dirt, soggy mud and pavement.	Children may trip and get scraps which may result in infections if not treated properly and efficiently. This may also result in broken bones, sprains and or fractures.	Children and Adults	Everyone should be wearing suitable shoes. Having a first aids kit. Staff accessing the surrounding and determining which area should be out of bound because the level of risk is too high for their stage of development. Example to children they where we are going would have uneven surfaces and try to prepare them because it would be a first for some.	L
Experience exploring outdoor space	How will young people benefit from this activity?	Hazard and risks	Who is at risk?	PRECUATIONS in place to reduce risk of injury	Overall risk RATING L/M/H
Collecting materials	Children can explore the preparties of materials, e.g., finding out my materials sink and float and why? Choosing specific materials for a	Uncertain of the danger, children may pick or collect dangerous or unwanted items such as trash, sharp objects such	Children and Adults	Adults should ensure the space designated for exploring is free from dangerous and harmful objects before children can start exploring.	L

	particular task, such as sticks for building dens, sword fighting or mixing portions. Developing mathematical concepts such as counting while grouping materials. Sorting measurement (weight, length, size and height). Physical development is explored both through gross and fine motor skills, finger dexterity, hand strength, reaching bending, lifting and stretching.	as rusty tin cans and animal waste. Children may collect natural objects such as sticks that may be too heavy to carry, resulting in sprains or pull muscles. They can also collect dangerous natural objects such as pricking thorns.		Explain to children that there are objects that we are not allowed to touch and if they are unsure, come and ask an adult for verification. Using pictures or examples to demonstrate safe, unsafe, familiar and unfamiliar objects. Golden rule- children should put any collected objects in their mouths and they must wash their hands at the end.	
Experience exploring outdoor space in photograph	How will young people benefit from this activity?	Hazards and risks	Who is at risk?	PRECAUTIONS in place to reduce the risks of injury	Overall risk RATING L/M/H
Exploring / Finding and Identifying plants and insects.	Developing an awareness of living creatures, exploring their life cycles and habitats. Learning how to be respectful of insects and their habitats. Since the weather has now changed into Spring, children may start to understand the value of bees in	Children could have an allergic reaction to an insect bite. Children may come into contact with a poisonous plant and have a reaction to it. Children may get cuts, bruises or scraps while	Children	Pointing out poisonous objects, animals and plants that may be unfamiliar to children, such as poisonous berries, snakes and stinging nettles. Explain to children they must not touch any of these visuals that are being shown and if they are still unsure, they ask an adult.	L

	the process of pollination and germination. Secondly the value and role of trees in the ecosystem. Children may find different types of plants and flowers and compare and contrast their characteristics, such as their number of petals, shape, scent and color.	collecting plants and flowers.		Golden rule- nothing should be put in their mouths and must be wash hands when they finished, if they touch poisonous plants their hands should be washed immediately	
Experience exploring outdoor space in photograph	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
Child led scientific/mathematical	Children exploring their own ideas, passions and hypothesis within the woodland area without being told what/how to play. Encourages children, share ideas and collaborate on projects, which helps children foster /develop important social skills such as communication, cooperation and negotiation.	Children could wander from the group and get lost or hurt.	Children	Ensure that there are enough members of staff, so they can be in different areas in the woodland area, such as a check point. Create boundaries for children using colored markers, e.g., Green would save space they can go by themselves, Yellow would be accompanied by a group of children and the red zone, children would be accompanied by a member of staff. Giving children a whistle, they can use	L

				to signal if they get lost. Stranger danger conversation.	
Children discover and explore things with their senses, such as rocks, trees, flowers, insects and other bugs.	Developing fine and gross motor skills and hand coordinating. Learning about the eco-system. Giving children the opportunity to learn about living things and food chains and webs. Being aware of different environments and living things and their habitats	There may be rubbish such as broken bottles and rusty cans, which children may try to collect. Low level branches could cause bodily injuries, scratches, which could lead to infections if not properly treated. Allergic reaction to insect bites. Aware of poisonous or irritating plants such as stringing nettle and prickly pine.	Children	Practitioners should have a first aid kit, which should contain bug spray and wound treatment. Golden rule- nothing must be placed in their mouths and wash their when they are finished exploring, especially if they touched anything that could cause a reaction. Explain to children what items are they are allowed to touch or collect and if they are unsure, they should ask an adult. This should be done before they reach the woodland site.	L
Experiencing Characteristics of spring such as the outdoor weather.	Identifying different characteristics of weather and spring. Learning phrases and words related to spring. Developing an awareness of the changes in seasons, e.g., trees going leaves, flowers, more sunlight, a rise in	Bodily injuries if they walk into low or fallen branches. Children may become wet causing them to be uncomfortable and distressed. Sun exposure causing them burns or heat stroke.	Children and Adults	Ensure the weather is checked before taking the children on the walk. This is to ensure that wind speed and rain fall are barrable, and it is safe to be outdoors. Ensure that children and staff are dressed appropriately, for example, good walking boots/ wellies and waterproof jacket and trousers.	L

	temperature and more rain. Developing a sense of curiosity about the water cycle, asking questions such as; where does rain come from? Why does water come from clouds and how does it get there? Lastly why are the trees wet?	slippery surfaces due to rain fall, which could cause slipping and sliding specifically in muddier areas around trees, insulting injuries.		Having a change of clothes	
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Section 4

Children are born passionately eager to make as much sense as they can of the things around them. However, if we as parents, practitioners or caregivers attempt to control, manipulate, or divert this process this would cause the little scientist in the child to disappear (Holt 1990 cited in Maynard,2014). Similar to this notion Piaget (1956 quoted in Evans,2016) suggests that children are ‘little scientist’ who learn through experimentation, trial, and error in their environment through play.

Within early childhood education, it is acknowledged that the environment is a critical pedagogical element, often referred to as the “first teacher”. According to Titman (1994) before choosing or designing a good environment for outdoor learning, one must first consider what would make children feel both powerful and empowered. Titam underlined that the environment has underlined messages known as the hidden curriculum, Hart (1979) Clark and Mosses (2005) add that where children are exploring

a space it becomes a place that they inhabit through interactions and routines. Research by Fjortoft (2000) and Fjortoft et al (2004) suggests that diversity in landscape elements such as vegetation and topography contribute to a good outdoor environment for young children. Their studies indicate that such landscape features met children's needs for a stimulating and varied play environment, positively influenced the ranges and levels of physical activity, and improved children's motor development and fitness. Huges (2001) and White (2011) suggest that simply moving over a varied terrain feeds complex sensory information to the brain which enables the child to calibrate themselves against the environment as they grow and develop. Wooley and Lowe (2013) argued that the value of play and development can be provided by a range of different surfaces beyond the limited opportunities of tarmac and carpet. Lieberman and Hoody (1998) highlighted the benefits of using the environment as an integrating context for learning, which includes outdoor activities. Their report demonstrated the positive effects outdoor learning has on children's social-emotional development, including improving self-esteem, increased motivation and engagement.

Researchers (Knight and Bultitude, 2020, Liberman and Hoody,1998) has proven that they are many benefits to outdoor learning and enhanced cognitive development: Outdoor learning activities can support children's cognitive development by providing them with opportunities for hands-on exploration and experimentation, observation and measurement, problem-solving, and critical thinking. Secondly, it enhances creativity and imagination: outdoor learning activities can stimulate children's creativity and imagination by providing them with a diverse range of natural stimuli and opportunities for imaginative play. Additionally, outdoor learning can improve physical health. Outdoor learning promotes physical activity, which can lead to improved health outcomes such as stronger bones and muscles, improved cardiovascular health, and lower rates of obesity.

Practitioners can use the outdoor setting to support mathematical and scientific concepts. There are many ways in which adults can support and engage children in learning mathematical and scientific concepts outdoors. According to Mann and Anderson (2021) by exploring the natural world, taking children on outdoor adventures to explore the natural world. Encourage them to ask questions and make observations about the environment. For example, you could go on a nature walk and ask children to observe patterns in the natural world, such as the shapes of leaves or the colors of flowers. Secondly, Dettweiler et al (2021) suggest using math and science in real-life situations; using everyday activities as opportunities to teach children about math and science. For example, you could ask them to measure ingredients when cooking or count the number of steps it takes to walk a certain distance. You could also teach them about the properties of water while playing in a stream or pond. Moreover, conducting experiments: Conduct simple experiments outdoors to teach children about scientific concepts. For example, you could make a DIY weather station to teach them about weather patterns or conduct a water displacement experiment to teach them about buoyancy. Additionally Playing math and science games: Play games that involve math

and science concepts. For example, you could play a scavenger hunt game where children have to find items in nature that match certain descriptions, such as "something green and fuzzy." This will teach them about classification and observation. All these ideas can be enhanced by adding loose parts to the outdoor environment, Nicholson (1971), suggests that loose parts, which are materials that can be moved, carried, combined, and transformed in many ways, can stimulate creativity, exploration, and learning in children. Nicholson argued that the open-ended nature of loose parts allows for unlimited possibilities for exploration and discovery. He believed that incorporating loose parts in outdoor environments could encourage children to engage in imaginative play and experimentation, and could promote problem-solving, collaboration, and risk-taking.

Gardner (1983) theory suggests that individuals have different strengths and abilities across a range of intelligences, and it is to use an outdoor environment to provide them with a range of learning experiences that tap into their different intelligences and abilities.

There can be several reasons why an adult might be hesitant to use the outdoors or support science and mathematics education. Lack of training or confidence: Some adults may feel they lack the skills or knowledge to effectively teach science and mathematics in outdoor settings. They may feel unsure about how to engage children in outdoor learning activities or how to incorporate science and mathematics concepts into the outdoor experience. Furthermore, safety concerns: Adults may be concerned about potential safety risks associated with outdoor learning activities, such as exposure to extreme weather conditions or contact with plants and animals. Additionally, lack of resources: Outdoor learning activities may require additional resources, such as equipment, transportation, or access to natural environments, which may be difficult to obtain or afford.

Furthermore, it may be time constraints, adults may feel that they do not have enough time to plan and implement outdoor learning activities, especially if they are already overwhelmed with other responsibilities.

Adding loose parts to outdoor learning environments can have several benefits when exploring mathematical and scientific concepts. Promoting creativity and imagination, loose parts, such as sticks, rocks, and natural materials, can inspire children to use their imagination and creativity in developing and exploring scientific and mathematical concepts (Chang and Choi,2018). Children can experiment with different materials and combinations to create unique structures and designs. Furthermore, it enhances problem-solving skills: Loose parts can provide open-ended opportunities for problem-solving and critical thinking. Children can experiment with different materials and concepts, testing hypotheses and discovering new solutions to challenges (Kohnen et al 2019). Lastly, supporting sensory and motor development: Outdoor learning environments that include loose parts can provide opportunities for children to engage in sensory and motor exploration. Children can explore the textures, shapes, and sizes

of different materials, and practice fine and gross motor skills as they manipulate and move loose parts.

One of the main roles of adults in outdoor learning is to create a safe and supportive learning environment. This can involve ensuring that children have appropriate clothing and equipment for the outdoor environment, identifying potential hazards and managing risk, and establishing clear guidelines for behavior. However, Adults should allow children to explore their own interests and ideas while engaging in outdoor play.

However, as a core player, the adult takes an active role in the play, encouraging exploration and experimentation, and prompting children to think critically about their actions and the materials they are using. The adult also provides support and guidance when needed, but also allows children to take the lead in their own learning. (Craft et al 2015)

whereas Nutbrown and Hannon (2005) refers to sustained shared thinking (SST) as a type of talk that is characterized by mutual engagement, a focus on ideas, and the use of reasoning to develop understanding. The role of the adult in developing SST is to engage in meaningful conversations with children, asking open-ended questions, and encouraging them to reflect on their experiences. The adult also listens actively, responding to children's ideas and building on their knowledge

In conclusion, it is crucial to remember that the key to engaging children in learning math and science concepts outdoors is to make it fun and interactive. Encourage them to ask questions, make observations, and explore the natural world around them. However, it is important to address these concerns and barriers to support the use of the outdoors and science and mathematics education. Training and support for teachers and caregivers can help to build confidence and knowledge in outdoor teaching practices, while access to resources and collaboration with others can help to address practical concerns. Advocacy for flexible and creative curriculum approaches can also help to create more opportunities for outdoor learning in science and mathematics education. Furthermore, adding loose parts to outdoor learning environments can provide rich and diverse opportunities for children to explore mathematical and scientific concepts in a creative and engaging way. Wanless et al (2017) suggests practitioners can create a stimulating outdoor environment with loose parts by considering the following. Ensuring there is a wide range of materials available for children to use. This could include natural materials like logs, stones, and leaves, as well as man-made materials like pipes, ropes, and buckets. Additionally, Kenny et al (2018) suggest making sure the materials are easily accessible and that children can move them around the environment. This allows for maximum creativity and flexibility in play. Furthermore, ensuring that the materials used are safe for children to handle and play with. For example, avoid using materials that are sharp or toxic. Moreover, encouraging

collaboration and social interaction by providing enough materials for groups of children to work together.

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