

SECTION 1



(Source: Waby, 2021).

Feature One

Water Stream

The presence of a stream of water in this particular learning environment is an ideal opportunity for young children to develop their curiosity and creativity from both a scientific and a mathematical perspective. The young child will already be familiar with water, for example, the water running from a tap at home but the experience of water in an outdoor setting as a fundamental raw resource presents many wide and varied development opportunities. According to Community Playthings (2012), water can stimulate a young child's thought process and introduce the mathematical concepts of shallow and deep; more and less and heavy and light. These concepts can be further be enhanced by introducing 'loose parts' for example, plastic tubes which could be used by the young child to allow the water to flow through them and to count how long this process takes; filling measuring tubes to utilise the concept of more and less; using rulers to measure different areas of the stream to provide an understanding of shallow and deep.



(Source: Google, no date).



(Source: Google, no date)

The Curriculum for Wales (2022) outlines that working mathematically needs and progresses creativity and curiosity which in turn transmits to many aspects of life. As the young child spends time at the stream they will begin to build their ideas and mathematical thinking. The stream is also a feature that can be revisited at a later date in order to further progress the young child's mathematical development and activate their prior knowledge.

In relation to the young child's scientific development, this learning environment will allow for the child to question and stimulate their thinking about their surroundings for example, where does the stream come from?; where does the stream go to?; what is the difference between a stream and a river? and this will in turn lead to experimentation. Furthermore, there will be opportunities for scientific investigation which could involve searching for any living creatures in the stream with the use of strainers and magnifying glasses. The young child can take photographs of the creatures which can be used for further learning when they return to the indoor setting. The addition of loose parts to assist in the understanding of key scientific concepts will further develop learning. The use of pebbles to place in the water could highlight how the stream of water can be stopped. By using small plastic boats or paper boats that the children have made in the water could also explain the concept of float or sink. Early Years Resources (2016) has identified that learning through water can also have a positive impact on the young child's personal, social and emotional development since it provides opportunities for them to collaborate with their peers and have fun splashing in the water whilst developing their communication skills.

Feature Two

Trees

In an outdoor setting the existence of trees is beneficial to a young child developing an understanding of the natural world around them. They provide the freedom for the young child to explore, use their imagination and creativity and have fun as highlighted by the Early Years Foundation Stage (2011). Developing the young mathematical mind in this setting can take the form of making patterns with leaves, twigs, feathers and pinecones that have fallen near the tree. They can also be used for sorting activities where the young child can discover different shapes and categorise the natural materials into size, colour and shape. Tree stumps are also available in this setting which will enable the young child to create stair steps where they can be lined up in size order and numbered with chalk and develop the use of cardinal, ordinal and nominal counting; providing measuring tapes can encourage the young child to measure the tree stumps before moving them and measuring the width of different trees to conclude largest and smallest all of which will further endorse the mathematical concept of size. Trees are beneficial for long term exploration since they change throughout the seasons therefore mathematically, the tree could be revisited during a different season and the young child can

discover whether there are more or less leaves on the tree at that time compared to their previous visit.



(Source: Google, no date)



(Source: Google, no date)

Scientifically trees present an example of natural life and young children's curiosity can be stimulated through exploring the different species of trees becoming familiar with their varied barks and leaves for identification. Trees will encourage young children to investigate living creatures that use them as their habitat as well as discovering life cycles and how trees help to keep them healthy. The concepts of light and dark and shadows can also be introduced to activate the young child's imagination. They could also build bug hotels from the raw materials they find around the trees as well as materials that will be brought to the setting, for example, string, rope, paper straws, pebbles and wooden tubes. These activities will meet with the statement of what matters that 'the World around us is full of living things which depend on each other for survival' outlined in the Curriculum for Wales 2022.

Furthermore, trees are an adventure playground all of their own since the possibilities are endless for play and imagination which is highlighted by Early Years Matters (2020). The young children will be able to climb the trees, make swings with rope, play hide and seek as well as making dens using the branches as the main structure with the tarpauline being provided. This will develop their fine and gross motor skills in addition to their personal, social and emotional skills as they will need to communicate with their peers and think of alternatives if their original idea is not successful.

Feature 3

Slope

The slope visible in this environment will enable the young child to develop an understanding of the mathematical concept of gradient, by encouraging them to run up the slope they will be to see how more difficult it is than when they run down the slope. Providing different objects, for example, ping pong balls, tennis balls, toy cars, they will be able to investigate which objects are the fastest and slowest to travel down the slope.



(Source: Google, no date)

The young child can draw number lines on the slope and use stones to see if they can throw to a certain number. This will also assist the young child to count upwards and downwards. This will support the Early Years Foundation Stage Framework (2012) in terms of mathematical development which states that the early learning goal is that children can count reliably with numbers from one to twenty.

In terms of scientific concepts, the slope affords learning about forces and that the World is not flat. By adding varied lengths of different surfaces to the slope, for example, carpet, sandpaper and wood, the young children can investigate which surface does an object move over the quickest and slowest and what causes the object to roll down the slope as well as forces and friction. From an holistic development aspect, the slope is key to allowing the child to gain more of an understanding of their whole body, for example, the control they need to apply to their body to prevent them from falling over when running down the slope and their ability to take risk. The additional energy required when running up the slope as well as using the sense of touch when feeling different surfaces allowing the young child's physical and sensory development to be supported.

SECTION 3**RISK BENEFIT ASSESSMENT**

Location / Activity:	Community Park	Date:	10 September 2021
Assessor:	Sarah Waby	Review date:	15 March 2022

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**

ACTIVITY	How will young people BENEFIT from this activity?	Possible hazards	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk RATING: L/M/H
Exploring water stream	Young children will develop an understanding of the World around them. They will be able to make links with the water they use at home and at school. Develop hand and eye coordination when measuring water. Discover creatures living in the water. Stimulate the senses of touch, sound and smell	The risk of drowning in the water. Possible cuts and bruises as a result of the children and adults touching sharp stones or debris in the stream. Sickness due to ingestion of water from the stream.	Children and adults	Discuss with the children how to act safely around water prior to activity. Explain to children that when stepping into the stream that the bottom of the stream will feel uneven and slippery and that they should not run. There will be a maximum of four children allowed at the stream at any given time. Adult presence will be more heavily weighted in this area of the outdoor environment compared to the other areas. Adult to ensure children are wearing suitable waterproof clothing including wellington boots.	H

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Collecting and sorting natural resources, for example, pinecones, leaves and twigs that have fallen near trees	Children will develop recognition of shapes of the varied objects found in the natural environment. The development of both gross and fine motor skills from picking the objects up from the ground and placing into sorting containers.	Children may cut themselves on thorns or pinecones and possible debris on the ground. Children may fall on the uneven ground when collecting the objects from the ground. The possibility that the children may move away from the area without informing an adult. Branches at a lower position on the trees may injure the eye if the children are not focussing when walking.	Children and adults	Prior to undertaking the activities, the adult will discuss with the children the potential of objects that maybe unfamiliar and that they may feel different to what they are used to. The adult will outline the boundaries of the area as to where the children can explore and they will be able to mark the area with flags that they have made. Adults will play a game with the children that will ask the children to describe to the adult or one of their peers who is blindfolded how they should walk over uneven ground to assist them in understanding different surfaces.	M

ACTIVITY	How will young people BENEFIT from this activity?	Possible hazards	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk RATING: L/M/H
Movement of tree stumps and using tree stumps to create stairs to number and step across	Children will develop the ability to balance accurately as they step across the tree stumps. Children will gain an understanding of their bodies as a whole through the vestibular sense as they will be making a range of movements with their limbs. This will also aid physical development. Children will be able to visualise mathematical concepts through the use of the natural resources available.	Loss of control when carrying the tree stumps causing possible injury to the arms, legs and feet. Possible slips and falls due to loss of balance when children are stepping across tree stumps causing cuts and bruising. The potential for splinters from moving the tree stumps to create the numbered stair steps.	Children	Discuss with children how objects can be carried safely, for example, they should be carried by more than one person. Adult to demonstrate posture for picking up objects from the ground, for example, bending knees. Adult to highlight how the whole body is to be used when stepping across the tree stumps to encourage balance. Ensure that appropriate outdoor clothing is worn including wellington boots to assist in protecting the body.	M

ACTIVITY	How will young people BENEFIT from this activity?	Possible hazards	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk RATING: L/M/H
Walking and running up and down slope Using different materials to move objects down the slope	Children will develop understanding of gradient, forces and energy and how different surfaces affect the speed of how an object moves. Positive reinforcement as to how their bodies control their movement when they walk or run up and down the slope, for example, the additional energy required to run up the slope and the control required to work against the force as they run down the hill to prevent them from falling over. Children will develop the concept of moving over ground that may be uneven.	Children may fall on uneven ground or from the force of running downhill and injury may be caused such as cuts and scrapes or possible head injury. The different materials used on the slope may cause injury such as cuts when placing them on the slope or picking them up. Children with respiratory problems may experience difficulty during running uphill.	Children and adults	Talk with children as to how they may feel when they run down a slope and that may want to experiment first by walking slowly in order for them to understand how they should move up and down the slope. Discuss with children how different materials feel, for example, sandpaper can feel rough and therefore requires more care when handling it	L

Section Four

In order for outdoor learning to be most effective, it is necessary for the educational setting and practitioner to give it the same level of value and importance as that of indoor learning. Froebel (no date) visualised young children as being learners who are curious and creative who learn and live in nature and the outdoor environment, for example, parks and woodlands can stimulate these factors effectively through providing rich mathematical problem solving opportunities as displayed in the photograph. In addition to scientific exploration he believed that there are significant links between all living things. Furthermore, he considered the role of the adult in this learning experience and highlighted that this role should be supportive and observational as opposed to leading and telling. As a result of this approach young children will have the freedom to explore and discover both mathematically and scientifically whilst expanding their vision of the natural world around them. This approach to outdoor learning and the role of the adult is also supported by Bilton (2010) who outlines that the practitioner should ensure that the outdoor learning environment is sufficiently resourced for effective learning to take place and that the time spent in the outdoors should not be viewed as an opportunity to reduce their participation but that they should utilise the time effectively to observe the young child and expand their mathematical and scientific thinking. The Curriculum for Wales (2022) pays particular attention to the support necessary from the practitioner to assist young children in becoming ambitious, capable learners, ready to learn throughout their lives; ethically informed citizens; enterprising creative contributors and healthy confident individuals. In order to achieve this positive outcome, the areas of learning for both science and technology and mathematics and numeracy outline the progression steps that the practitioner should endeavour to achieve with the young child, for example, early stage learning in science and technology will be typified by a holistic approach to asking questions and exploring the world around the learner, with increasing specialisation at later stages.

However, according to Rickinson et al (2004), outdoor learning presents challenges to many practitioners in that they lack confidence in teaching in the outdoor environment and moreover, limitations on time due to the increasingly demanding curriculum prevents them from fully engaging in this rich learning opportunity for young children. Nevertheless, practitioners who are facilitating outdoor learning need to ensure that it is significant and relevant and that the interactions that occur between practitioner and young child should encourage development of higher order functioning as outlined in Vygotsky's Model of Social Learning (1978). This suggests that the practitioner would enable interdependence of thinking and movement.

Following successful achievement of higher order functioning the young child will be armed with an essential tool which will remain with them throughout their learning journey. Employing effective language is important at each stage of this movement to higher order functioning for example, metacognitive talk such as, the car is moving more slowly now, why do you think that is?

Similarly, the promotion and engagement of sustained shared thinking from the practitioner is key to transitioning the young child through the stages in their learning journey and this positive interaction and sharing of knowledge with one another, adult and the young child is highlighted in Vygotsky's zone of proximal development and Bruner (1966) and his theory surrounding the scaffolding of children's learning. The practitioner through being led by the young child's conversations will be able to have meaningful discussions and develop links with mathematical and scientific concepts in the outdoor environment which is essential to the young child's effective learning as outlined in Development Matters (2017). Instigating thinking by the use of questions, for example, what do you think we will find in the stream? and where does the stream flow to? will enable the young child to share their ideas and explore which will create further discussion.

It is important that the practitioner, or adult carefully considers a setting in the outdoors that will provide a wide and varied mathematics and science learning experience. Many young children will be unfamiliar with extensive open spaces since they may be living in accommodation that does not have a garden or that has limited space and they may not regularly explore these interesting areas with family outside of the school day. Alternatively, they may not have previously visualised these open spaces as settings to learn and develop their mathematical and scientific minds. Therefore, the opportunities to utilise outdoor spaces as open ended learning and play environments should be made available as frequently as possible (Skinner and Dancer, 2014). Furthermore, the Open Up to Mathematics Outdoors project (2011) discusses how the practitioner's role is key to unlatching the possibilities the outdoors offers and fostering the mathematical imagination and creativity of the young child. The practitioner should skilfully identify the times when they need to collaborate with the young child and act interactively to facilitate learning and play where this will be of benefit to their development. This type of refinement will require careful judgement and this should not become the main source of involvement with the young child. Nevertheless, when sensitively implemented they can potentially progress their thought process and learning. According to Waller (2005) the practitioner's role as supporter can be present in many forms, for example,

reflectors, thinkers and working cooperatively with the young child to construct a knowledge base. At the same time they need to ensure they know who requires assistance by continuously scanning the outdoor setting and foreseeing any problems whilst still maintaining the young child's privacy.

Furthermore, the natural materials available should afford the young child to utilise them in many different experimental ways, since according to Gibson (1979) each individual perceives the World differently and therefore variety will allow each young child to determine their own interpretation and learning. Whilst considering the natural resources that are available in the chosen outdoor setting, the practitioner should contemplate the addition of loose parts to the environment which will provide support to the natural resources available and achieve a more fulfilling learning experience. Nicholson (1971) highlights that providing variables in a learning environment will enable young children to be creative and innovative to the point where they will be seen to have actually designed the outdoor setting themselves. It is vital that the use of the loose parts in developing their mathematical and scientific thinking is determined by the young child and not the adult since this will have a more substantial impact on their overall development. In terms of additional resources to benefit mathematical and scientific activities, learning and imagination, the adult needs to ensure the resources compliment the natural materials already present and furthermore, that they serve a purpose to the overall learning objective, for example, measuring cylinders, if their purpose is to allow the child to measure water from a stream, this activity should be conducted and measurements should be recorded with the objective of developing the young child's measuring skills. Additionally, the loose parts should be open ended, easily transported and space forming in order for them to be most effective. The positive outcomes from the use of loose parts in the learning environment is supported by the research conducted by Flannigan and Dietze, 2018, p.52 – 55) which demonstrated that loose parts contribute to increased mathematical and scientific language use in addition to social interaction, play and gender inclusivity.

The practitioner should provide opportunities for the young child to experience mathematics and science with the use of their senses including touch, smell and sound as this will widen the knowledge they will gain as evidenced in the photograph. The collection and sorting of natural resources found on the ground around trees, for example, twigs, cones, stones and feathers as a mathematical activity will stimulate the senses and enrich the learning experience. Similarly, using the stream to look for living creatures as well as allowing the water to run over the young child's hands will create a more fulfilling sensory and scientific exposure and this will also

have a positive impact on the use of scientific language development as expressed in the Foundation Phase Outdoor Handbook (2009).

When considering facilitating learning in the outdoors, the practitioner should also make provision for the movement of the young child, since they gain knowledge through their actions. According to Robinson (2012) movement enables the young child to link concepts to action and to learn through experimenting which in turn allows them to become increasingly aware of their bodies as a whole through the vestibular sense and their proprioception sense. In addition, the provision of movement also enables the young child to build their coordination and balance. The outdoor space in the photograph provides the opportunity for experiential learning through movement in both the mathematical and scientific activities, for example, the movement across the created stair steps from the numbered tree stumps and the movement upwards and downwards on the slope. It allows for larger movements by the young child such as running, jumping, kicking and throwing which positively impact their physical health and development and also their self confidence. Furthermore, they can enhance the young child's gross motor skills since they are able to use their limbs in a way which they are unable to do in the indoor setting. Moreover, learners who are kinaesthetic can find the indoor setting restrictive for effective movement and therefore, the outdoor environment provides the scope to allow them more control on their physical movements and in turn this has positive effects on their self esteem which was identified by the early work of McMillan (1911). This factor should be considered by the practitioner when selecting an appropriate outdoor setting and this can be achieved by having an awareness as to those young children who struggle with movement during indoor activities. White (2018) also supports this thinking since she believes that the physical development of the young child is fundamental to their perspective on the World through increased opportunities to explore, interact and query whilst also improving memory.

The practitioner should encourage the young child to take photographs of their experiences since this will stimulate learning when they return to the indoor setting which enables a continued learning experience. Furthermore, when the young child revisits the outdoor setting they will be able to compare and contrast as to how the environment has changed between visits. This is particularly advantageous from a scientific aspect when investigating seasonal changes, for example, Summer and Winter and leaf distribution and colour.

In order for the outdoor setting to be as effective as possible and provide a rich learning environment for the young child, the practitioner needs to fully prepare and ensure their planning for mathematical and scientific activities meets with the requirements of the curriculum. The outdoor environment should be a valuable resource to the practitioner and in the instance where they feel less confident in using the outdoors, they should seek further development and training through their line manager to ensure that all young children experience the positive learning that can take place in the outdoors as outlined by Outdoor Matters (2007).

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