

## **Awe and wonder science, mathematics and the outdoors.**

Google images: Accessed 19<sup>th</sup> September 2021.



**Features.**

Feature 1 – Exploring – During this activity the children will be allowed to lead their own learning and be able to freely explore the environment with having clear boundaries set. I will provide the children with equipment such as buckets, nets magnifying glass and an ipad. These will allow the children to explore the environment to be able to look under rocks, look at the wildlife in the stream and to investigate the different plants and trees in the environment. The children will be able to collect insects, leaves and different natural resources from the environment and will be able to use the ipad to take photos and document their exploration. The ipads will also be used independently by the children to be able to research objects they have found whether it might be researching a type of animal or insect they have found or identifying the name of different types of trees and plant. By allowing children free time in the environment it allows time for children to lead their own learning, simply being in such an environment may be a new experience for some children. It will allow for the children to access the environment using their senses of smell, sight, hearing and touch. Identifying if rocks and other natural resources are rough or smooth and being able to hear the flowing stream and the wildlife that lives there will create opportunity for the children to be intrigued and wonder what certain features do or are and to investigate independently. A key element of feature 1 – exploring is that the children will be able to engage in risky play. Even though a perimeter will be identified children will have the opportunity to go where they wish in that perimeter and as far as they feel comfortable. Also the children clambering on rocks and climbing trees will allow time for risky play and for the children to realise what is safe and unsafe and also what their own personal limits are and how they can differ from different children in their group.

Feature 2 – Creativity – Being in the environment above will allow for plenty of opportunity for children's creative development. While in the environment children will be able to study the environment and be able to investigate key creative features such as colour, shape, textures and shadows. A creative box will be provided for the children to access which will include creative resources such as pencils, paints, crayons, sketch books. Children will have opportunity to be able to paint still life pictures of the environment they are in, children will be reminded to sketch out their pictures first pressing lightly with the pencil in order to be able to erase any mistakes easily. Paints will also be available with a colour pallet which will allow the children time to experiment

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with trying to re-create certain colours of the environment by mixing different colours together in order to get the right shade of colour. Children can explore different textures by using paper and wax crayons. By putting their paper on top of objects such as leaves, bark and pebbles, then using crayons to colour over the top will allow the textures of the objects to be transferred onto paper. Children will also be directed to investigate different objects in the environment and how the sun affects them – looking closely and the angle of the sun and the shade in which it creates being different objects such as trees and how the sunlight peers through the leaves. Children will have a brief demonstration of how by using just their pencil they can shade their drawings to create a more real-life effect. Through the option of creativity children will also be able to study whether something is symmetrical, by investigating butterflies and moths it will allow them to see that the two different wings are symmetrical, and there will be opportunity for children to recreate these using paper and paint, painting on one side of the paper and then folding over. While there will be a brief explanation of each creative activity from an adult the children will then be independently creating themselves.

Feature 3 – Floating and sinking – This will allow children to develop their scientific development. Children will be using the stream to investigate whether different natural materials float or sink. They will need to collect different materials such as, leaves, sticks, pebbles, acorns and pinecones. They will then have the opportunity to place these objects in the stream. The activity will be child led which some intervention from an adult to enhance the children's learning and to introduce key vocabulary. The children will be encouraged to talk about the weight, surface area, and shape of the objects and whether these factors affect their ability to float. Through this activity it will allow for scientific thinking such as predictions, observations, comparison, reasoning, data gathering, experimentation and evaluation. The children will be able to predict if the objects are going to float or sink and why they think that, comparing different objects and even though some may weigh the same one may float and one may sink and what are the possible causes for that. To enhance the activity further the children will look more closely at the objects that are able to float and by making changes to their appearance or their weight whether they are still able to float. This will allow children to understand that objects such as large leaves, even though they are delicate, while sat on the water their own surface area is able to support the weight of much more hence why large boats can float on water. Children will be taught through all activities how to be responsible and sustainable members of the community by caring for the environment they are working in, not

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damaging the plants and trees around them and only use natural materials that are on the ground or have already fallen from trees and plants. This activity will provide children with a greater understanding of how things work in the world around them.

**RISK BENEFIT ASSESSMENT**

|                             |                      |                     |  |
|-----------------------------|----------------------|---------------------|--|
| <b>Location / Activity:</b> | Woodland stream are. | <b>Date:</b>        |  |
| <b>Assessor:</b>            |                      | <b>Review date:</b> |  |

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<br>BENEFIT from this<br>activity? | Possible hazards | Who is<br>at risk? | PRECAUTIONS in place to reduce the risk of injury | Overall<br>risk<br>RATING:<br>L/M/H |
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| Exploring woodland environment | <p>The activity will allow children to engage with child led learning allowing them to explore a natural environment and engaging their use of their senses. The activity will provide children with opportunity to collect natural materials which will aid their learning in further activities. The activity will also allow children to develop their ability to balance on different objects such as rocks and logs.</p> | <ul style="list-style-type: none"> <li>• Slipping on wet surfaces</li> <li>• Falling from climbing on different objects such as trees and rocks</li> <li>• Allergies and medical conditions of children</li> <li>• Sunstroke</li> <li>• Lost children</li> <li>• Children with physical disabilities</li> <li>• Low hanging branches</li> <li>• Children going missing.</li> </ul> | Children and Staff | <ul style="list-style-type: none"> <li>• Children will be encouraged to wear suitable footwear while exploring and will be made aware of the possible risk of slippery surfaces and reminding to be careful. Children's behaviour will be monitored by staff at all times to ensure activities are carried out appropriately and safely.</li> <li>• Even though children will not be discouraged from climbing, children will be advised that they need to be aware of their own limits and abilities while climbing and to only climb where and how high they know they can do safely.</li> <li>• All staff will be aware of any children's allergies or medical conditions. If there is need more medication, it will be kept in a central location where staff can access if needed. Such as Asthma pumps, epi pens etc. A copy of children's emergency contact information will be held by the leader of the trip.</li> <li>• Children and parents will be informed prior to the visit that suitable clothing needs to be</li> </ul> | M |
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|  |  |  |  | <p>worn depending on the weather conditions. Waterproof clothing for the stream and if it is raining. Sun hats and sun cream need to be worn and provided if it is a warm day.</p> <ul style="list-style-type: none"><li>• Any children with physical disabilities will be accompanied with their 1-1 and an additional risk assessment will be carried out on them personally and provided to relevant staff. If a child is reported missing the missing child protocol will be strictly followed.</li><li>• Children will be reminded of the “safe” perimeter of the environment and reminded not to travel to far away from staff and the site. Registers will be taken before and after the activity with regular headcounts being carried out throughout.</li><li>• Children will be advised to be aware of their surroundings and encouraged to be vigilant and not run where there may be possible risks.</li></ul> |  |
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| Exploring stream area | <p>Exploring the stream area will allow children to gain knowledge of the wildlife of the stream and the importance the stream has to wildlife. It will allow children to engage in different learning experiences such as creativity and scientific by exploring how objects float and sink and the factors that affect this. Children will also develop their independence by taking care when around the stream and making sure they are aware of the risks and that they engage appropriately and ensure that they are wearing suitable clothing.</p> | <ul style="list-style-type: none"> <li>• Drowning in open water</li> <li>• Waterborne diseases</li> <li>• Slipping on rocks</li> <li>• Saturated clothing</li> </ul> | Children and Staff | <ul style="list-style-type: none"> <li>• Children will be advised on safety precautions while around the stream and deeper water areas will be highlighted. The correct adult: child ratio will be adhered to at all times.</li> <li>• Children will be advised not to drink any water or not to put their hands in their mouths and hands will be washed after having contact with the water.</li> <li>• Children to be made aware of the possibility of slippery rocks and advised to take precaution.</li> <li>• Parents will be reminding to provide children with appropriate clothing such as wellies and waterproof clothing. It will also be advised that a spare pair of clean/dry clothes are provided.</li> </ul> | M |
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| Collecting natural materials and insects | Children will be able to learn about safe and dangerous materials such as plants and fungi. It will allow them opportunities to use their senses and to explore the environment and the natural materials it has to offer. Children will use the materials to further aid different activities at the site. Children will learn how to be sustainable and responsible citizens of the community and will be taught how to safely handle the materials they collect as well as insects. | <ul style="list-style-type: none"> <li>• Contact with potentially poisonous or harmful fungi or plants</li> <li>• Stings or bites from insects</li> <li>• Moving/dropping heavy objects such as rocks.</li> <li>• Damaging the environment.</li> </ul> | Children and Staff | <ul style="list-style-type: none"> <li>• Children's attention will be brought to potentially dangerous and poisonous plants and fungi and will be told not to eat anything from the woodland area or put their hands in their mouths until they have been washed thoroughly.</li> <li>• Children will be advised of the potential harm that can be caused from relevant insects. Adults will be available at all times sticking to the correct ratio. A first aid box will be available, and all staff will be aware of allergies of children. Staff who have up to date first aid training will be present. Children will be advised on how to safely catch, handle and release insects.</li> <li>• Children will be advised on how to safely move heavy objects such as rocks and logs. Support from adult will be available if needed.</li> <li>• Children will be reminded that we need to take care and remain respectful of the environment. In order to be sustainable</li> </ul> | M |
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| ACTIVITY | How will young people<br>BENEFIT from this<br>activity? | Possible hazards | Who is<br>at risk? | PRECAUTIONS in place to reduce the risk of injury                                                               | Overall<br>risk<br>RATING:<br>L/M/H |
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|          |                                                         |                  |                    | children will be advised to only collect<br>natural resources that have already fallen<br>off trees and plants. |                                     |

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The use of the outdoors in the early years is increasingly being highlighted as a fundamental part of children's early years and education. By children using and more importantly playing in the outdoors provides children with the learning experiences needed for healthy child development. (Alremalm-Hangser, 2010, p. 516). The use of the outdoors to enhance numeracy and science is hugely supporting by the Welsh Government's 2015 – Foundation phase curriculum, where they believe that the use of the outdoors across the curriculum is significant in positive pupil outcomes.

Practitioners have thought for many years that the learning experiences that children have outdoors are more beneficial than those in the classroom. This is a result of children have more appreciation for the topics that they learn outdoors and often leads to a more environmentally conscious behaviour, often having positive effects on the attitude to the outdoors and things around them and in some cases positive changes to children's behaviours. (Loyd, 2000). Piaget suggested that by children being immersed in an environment that they become familiar and comfortable with it which as a result enhances their learning experiences. He believed that it was only when children had explored and were comfortable in their environment that it would create a strong foundation for children's learning. (McLeod, 2018)

By children using the outdoors it often provides them with more opportunities for them to take charge of their own learning. Juster (2015) believes that the outdoors provides great opportunity for children to engage in self directed play. Self-directed play allows children to choose what they want to play and how to play it and as a result of this engages children's learning. However Juster also states that this can be a rare opportunity for children as settings and practitioners are not always giving enough opportunities for child led learning and play.

Even though child led learning is highly encouraged in the outdoors much research suggests that the role of the adult in an outdoor environment is just as poignant as that of inside the classroom. By children being supported during a child-led activity it allows for further developmental gains, understanding and commitment. (Learning Through Landscapes, No Date). This belief would be supported by Froebel as he strongly believed that when children learn it is because of a mixture of meaningful tasks, play and movement however, all supported by a highly trained practitioner. (Joyce, 2012, p.60).

While outdoor learning is deemed as extremely beneficial to children and their development it has been found that the majority of reasons that practitioners use the outdoors in settings is for Literacy and Physical Education. This was found under a research paper of the use of the outdoors for learning and it was found that 49.2% of outcomes based on outdoor learning were that of Literacy and PE. Only 12.9% of outcomes

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were based on numeracy and out of all the practitioners asked none of them stated that they used the outdoors for outcomes in science. (Bilton and Waters, 2016).

Numeracy can be taught in the outdoors in many ways. To develop mathematical understanding a variety of techniques can be used such as stories, songs, games and imaginative play. This can all be completed using the outdoors. Number hunts, shape searching, sorting materials are all keyways to develop a child's mathematical ability. Loose parts can be used to match up with numbers written in sand or soil in a mud kitchen for a simple number recognition activity. (Learning through landscapes, no date).

Rios and Brewer 2014 state that children do not have enough opportunities to learn science using the outdoors in their settings. This can be down to lack of natural and scientific resources within the setting and down to teacher efficacy. Nevertheless the positive impact the outdoors can have for children in scientific attainment is evident especially when delivered by a trained teacher in an environment where the child feels comfortable. Teachers need to embrace the outdoors and discover ways in which they can efficiently use the available resources to aid children's learning for their scientific development.

Science is a significant part of a child's development as recognised as one of the new six areas of learning and experience in the Donaldson 2015- Successful Futures. The paper explains the importance of science as it allows young people to learn about the natural and physical world they live in through explaining, understanding and investigating.

Using the outdoors to teach science has clear benefits when teaching children about insects and habitats using the outdoors allows them to be there with the insects, to see the habitat for themselves with their own eyes and allows children to understand these are actual living things and part of our world on not just something on an interactive whiteboard. However, teaching science outdoors also has its downside for some children the outdoor environment could be too stimulating with too much going on and therefore take away from the enriching learning opportunity and provide more distractions. (Cutting and Kelly, 2014, p.130).

Gonczy 2013 states that child-led learning is beneficial to children however, the benefits to a child's academic development after child led initiatives is only apparent short after the activity. It was found that child-led activities were beneficial if a child was being assessed soon after however, the affect of the child led learning wasn't showing anymore development at a later date in some children. Gonczy goes on to suggest that children who have had an upbringing where they have been in an environment with enriching learning opportunities benefit more for child-led learning as they have had the learning opportunities previously. But

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children that come from an environment with less parental involvement and learning opportunities need and benefit more from high quality learning opportunities supported by an adult in a group session in a setting.

Donaldson 2015 states:

In order to fully engage with learning, children and young people require rich, stimulating environments where they can explore and experiment with ideas and resources, collaborate actively with their peers and make dynamic connections with a clear sense of purpose to construct meaning.

As well as learning through the outdoors one key benefit for practitioners is also assessing children in the outdoors. However, Davies and Hamilton 2016 suggest that the use of assessing children outdoors is not used to its full potential and this could be down to the lack of use of the outdoor classroom. Factors affecting the use of the outdoor classroom could include insufficient resources, staff that are not trained to a high enough standard and changes to the current curriculum which looks at assessment in a more formal way. While the benefits for using the outdoors it is obvious more training needs to be available to practitioners to be able to obtain the knowledge they need to get the most of the outdoors especially assessment in the outdoors.

The Reggio Emilia approach is a curriculum that focuses on children leading their own learning and also has strong links with the outdoors. The approach does not support the idea of planning their curriculum with government standards or outcomes at the centre, they believe that children's learning is more efficient when the children themselves are listened to. (Wallace, 2009, p.1). Even though there is great emphasis on the outdoors in the approach it is not always as obvious as it may seem. With the approach originating in Italy, Italian parents would always be cautious of the cold damp weather leading to the outdoors not being used efficiently however, the approach insisted on incorporating the outdoors and decided to bring the outdoors in. Natural materials are used daily, and settings are filled with plants as the approach believes that nature is vital in aiding children's development. (Early education, 2018). The use of dens and canopies are used outdoors in the Reggio Emilia approach however Williams-Siegfriedsen doesn't agree with this method of using the outdoors as she believes that children need to be aware of their outdoor environment and all the elements that come with it to fully benefit a child's development. (Williams-Siegfriedsen, 2012, p.17).

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To enhance children's learning experiences in the outdoors the use of loose parts can be incorporated. Loose parts allow children 's learning to become fuller and providing them with loose parts gives them the resources they need to do what they need. The loose parts to children can be anything they want them to do for example a stick just is not a stick to a child it could be a fishing rod or a magic wand. By children being exposed to areas where there are more natural loose parts such as woodlands rather than normal play parks allow children a much more enriched learning environment. It is also a lot more sustainable and affordable than buying "natural" resources. (Casey and Robertson, 2016).

Spencer, et al, 2019 states:

Loose parts or open-ended materials are natural or synthetic resources that can be used in more than one way, thereby allowing children to experiment through play. By incorporating loose parts into children's play spaces and giving them little or no instruction, children are provided with the opportunity to engage with objects how they choose. Loose parts play allows children to create their play experiences based on their ideas and goals rather than materials with one purpose predetermining their play. Loose parts can encourage children to explore their environments, take risks during play, and develop confidence and motivation. Several studies have explored the benefits of outdoor loose parts play within early years settings, finding a wide range of cognitive and socio-emotional benefits, including happiness at school, social benefits and enhanced exploratory, creative and dramatic play. Others have noted loose parts have potential to promote physical development as well, through the encouragement of active play and development of physical literacy and fundamental movement skill. Importantly, others have noted children preferred loose parts play than play with structured toys

(Spencer, et al, 2019, p.461-476)

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