



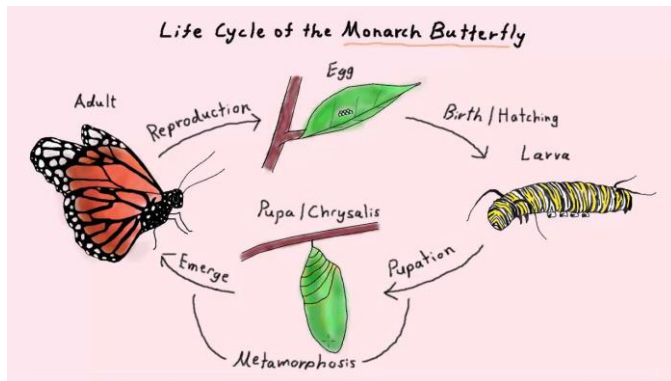
The first element of this photograph that is going to be discussed is the sloped hill. The large area of grass on a sloped hill provides an exciting play area for children where there is an opportunity to explore and play. When they begin to travel up and down the hill, they may begin to understand how they will need to use more energy to run up the hill than when running down thus bringing attention and opportunity for explanation for their heavier breath and warmer body to give them a greater understanding of what happens to their body when exercising. A focussed activity featuring loose parts such as balls or tyres could be used to roll down the hill to aid the understanding of varied sizes and weights and how that may affect how fast they roll down the hill. The loose parts could be ordered by size before the activity as well as a discussion about 'light' and 'heavy' to gain a better understanding of weight. The children could also use stop watches to time them, allowing them to find out if the size and weight of an object affects how fast it travels. This activity could be extended to understand forces such as push, pull and gravity. The children could roll the ball from the bottom of the hill and experience the ball rolling back down towards them. As well as this the children could work in pairs, rolling the ball back and forth at the bottom of the hill (where it is flat) taking one step back each time giving them a perspective of distance and how they need to use more force as they are moving further apart. This will incorporate basic counting skills into this activity whether they go up to 10 or 20 depending on their ability. The curriculum for Wales (2021) states that numeracy and the application of mathematics to solve problems in real world contexts, plays a critical part in our everyday lives and in the economic health of the

nation. The guidance highlights the importance of numeracy experiences being engaging and exciting and accessible for all.

The second element of the photograph that I am going to discuss is the Trees. Trees provide an abundance of opportunities for learning in the outdoors. The first activity to support mathematical and scientific development could simply be leaf collecting which then can lead on to several different activities. The children could order the leaves by size or sort them by colour. The leaves could be kept and used for leaf printing, with paint or oil pastels which allows them to see the patterns on the leaf. This could lead to discussion about symmetry in the patterns and the children could create their own symmetrical patterns. Furthermore, this could prompt a scientific discussion about the purpose of a leaf and how the patterns they can see are the 'vessels' on a leaf. This could be extended to an activity about photosynthesis and the function of these vessels and how they transport water. Another concept to be explored could be light and dark, on bright sunny days much like in the photograph, the trees and bushes would provide a magical play space providing shady areas and magnificent shadows to provide a rich environment and help to develop their natural curiosity. These opportunities allow adults and children to engage in sustained shared thinking and embark on open ended discussions. The shade provided by the trees could prompt such questions as, What is causing the shade? Why is it cool in the shade and warm in the sun? Would there be any shadows if it were a cloudy day? Allowing the child to think broadly and lead to scientific discussions. Being surrounded by so many trees and bushes will proved a perfect environment for den building. Den building supports mathematical development as design skills are crucial key to a successful den. Therefore, children will need to think about the shape and size of the materials they use. If it is too big it may be unbalanced and fall over or if it is too small, it may not support the den. The natural materials and structures could be used, or you could add equipment such as tarpaulin, rope, string, pegs, and a mallet. The curriculum for Wales (2021) acknowledges the importance of play for the early years, in the development of mathematics and numeracy and how it enables learners to solve problems, explore ideas, establish connections, and collaborate with others. Supporting them to become ambitious, capable learners.

The third and final element of this photograph I am going to discuss is the pond. Water has many fascinating properties that children love to explore. The first activity

I am going to explore is 'pond dipping', in small groups with appropriate equipment, clothing and an identification sheet. This activity can provide many opportunities for scientific and mathematical learning. When finding things in the pond, there will be many things to record such as how many there are, the size and the colour. This activity can also be enhanced further to learning about the lifecycles of animals such as a butterfly as seen in the image below by Zager (2015).



(source: YouTube 2015)

Another concept to be explored using the water is floating and sinking. This could be conducted using several different objects such as , pebbles, paper and wood and the language 'floating, sinking and sunk' could be introduced. To enhance this activity, you can demonstrate how to make floating things sink by using a boat and adding weight to it such as figurines or pebbles. The children will be able to see the boat floating lower in the water every time something else is added to it, this will allow them to ask questions and predict what might happen if we keep adding things to it. Hopefully, they will be able to understand that it was the weight added to the boat that caused it to sink. The new curriculum for Wales (2021) encourages curiosity about science and technology and suggests that it leads us to ask questions about the world around us. By being given the opportunity to explore and play, children will be encouraged to use logic, evidence and creativity and inquire into and apply scientific knowledge to further understanding of how our world works.

RISK BENEFIT ASSESSMENT

Location / Activity:	Bryngarw Country Park	Date:	24.09.2021
Assessor:		Review date:	

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
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Tyre Rolling	There will be a range of tyres of varied sizes and weights which will allow the children to understand their own strength if something is too heavy for them, improving confidence and building resilience. When standing the tyre up it will improve their balance and functionality. Rolling the tyre will require the children to be aware of their own bodies and knowing when to let go. When the children are at the bottom of the hill, they will need to make themselves safe from injury and make sure they are not in the way of the rolling tyre. This will provide an opportunity for them to be forward thinking and have spatial awareness.	• Minor injury to limbs/extremities. • Friction burns from tyre. • Falling over and causing grazes, bumps, or bruises.	Adults, children, and members of the public.	The appropriate child to adult ratio for the age group will always be adhered to and the activity will be fully supervised. The children will be working in groups to make sure there are not too many tyres rolling at the same time. There will be the same number of adults at the top and bottom of the hill to protect the members of the public using the country park. The children must be wearing appropriate clothing such as closed toe shoes and long trousers or leggings to prevent severe injury to toes and to protect legs from friction burns. Prior to the activity, adults will demonstrate how to correctly pick up the tyre with their knees bent to protect their back if the tyre was heavy as well as correct hand placement when rolling. The adults will also be responsible for getting the tyres to the top of the hill. A first aid kit will always be with the group. We will also be adhering to the country park educational visit risk assessment.	Low
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Pond dipping	Pond dipping will allow the children to build confidence in entering water safely. It will have physical benefits and improve their agility when using the equipment and transferring their findings to the container. It supports children's independence when preparing their wet weather clothing and making sure the water level stays below their wellies.	• Falling into the water. • Knocks from handles/heads of the net when working in close proximity to each other. • Potential infection from disease via open cuts or putting hands in mouth during dipping.	Adult and children.	The appropriate child to adult ratio for the age group will be adhered to. The children will work in small groups with supervision. There will be appropriate equipment provided for this activity such as the net and container to collect findings. The children must have appropriate wet weather gear and wellies as well as packing spare clothing as we are off site. The children must not enter the water without an adult being in there first. It must be known if the child has any open cuts, they will not be allowed to take part in the activity if they do. They must be reminded not to put their hands in their mouth or anywhere near their face until they have washed them afterwards. A first aid kit will always be with the group. We will also be adhering to the country park educational visit risk assessment.	Medium
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Floating and sinking	This activity will develop and strengthen children's gross and fine motor skills as children enhance their motor skills, coordination, and physical fitness through lifting, carrying, and reaching to place the object in the water. It will also improve their confidence and resilience when entering the water.	• Falling into the water. • Potential infection from disease via open cuts or putting hands in mouth during dipping.	Adult and Children.	The appropriate child to adult ratio for the age group will be adhered to. The children will work in small groups with supervision. There will be appropriate equipment provided for this activity such as the net and container to collect findings. The children must have appropriate wet weather gear and wellies as well as spare clothing as we are off site. The children must not enter the water without an adult being in there first. It must be known if the child has any open cuts, they will not be allowed to take part in the activity if they do. They must be reminded not to put their hands in their mouth or anywhere near their face until they have washed them afterwards. A first aid kit will always be with the group. We will also be adhering to the country park educational visit risk assessment.	Low
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Den building	Den building allows children to interact with nature. They will learn to negotiate, problem solve, resolve, manage and work as a team. As they must work together to make the den it can show them a way to cooperate.	• Trip hazards, children and young people falling. • Tools creating trip hazard/accident. • Sharp branches, nails or splinters in wood collected. • Children carrying items inappropriately and falling on to wood/tripping. • Wood poking young children in the eye. • Strangulation with rope. • Dens falling on young children.	Adults and children.	The appropriate child to adult ratio will be adhered to and the children will work in small groups with full supervision. There will be an appropriate safety talk beforehand and the equipment used in this activity will be demonstrated beforehand and when a child is using any of the equipment, they must be supervised. The children must be wearing appropriate clothing such as closed toe shoes, long trousers, or leggings as well as safety gloves to prevent splinters or more severe injury when collecting equipment. Arrange a safe place for collected equipment and ensure they know the limit on carrying equipment. A first aid kit will always be with the group. We will also be adhering to the country park educational visit risk assessment.	Medium
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Adults Supporting and Encouraging Scientific and Mathematical development in the Outdoors

McLennan (2017) enthuses that the outdoors is filled with rich opportunities for mathematical learning with connections to science. The outdoors can interest and engage children in real life problem solving. McLennan stresses the importance of children needing to spend large blocks of time playing outside.

Bilton (2010) acknowledges that it is vital that children have the support of attentive and encouraging adults who show enthusiasm about the outdoors, understand the importance of outdoor learning and that it is unacceptable to view outdoor play as the time when adults have a break. The attitude and behaviour of the adults has a powerful impact on children's learning. Bilton (2010) affirms that for outdoor play and learning to be effective, children must be presented with the same priority and resources as indoor learning. Adults must approach outdoor activities with the same excitement and professionalism as they do with the indoor classroom. Vygotsky's model of social learning (1978) supports this view by suggesting that the quality, frequency, and timing of interactions between children and practitioners are central to the development of higher order functioning and creating a meaningful learning environment outdoors. Vygotsky defines the Zone of Proximal Development as 'the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or collaboration with more capable peers.' The curriculum for Wales (2022) emphasises the importance of learners having the opportunity to work both independently and collaborating with adults. As well as acknowledging the importance of outdoor play in the early years and how it plays a vital role in the development of mathematics and numeracy. Enabling learners to solve problems, explore ideas and establish connections and collaborate with others. Furthermore, The Reggio Emilia approach (2006) acknowledge that Children oversee their own learning and encouraged by teachers to develop projects and solve problems among themselves, using the teacher as a tool who can 'lend' help,

information, and experience when needed. Reggio educators spend a lot of time observing the children as closely as possible.

Tovey (2012) describes the outdoors as a place for thinking, moving, feeling, imagining, and creating. Tovey (2012) acknowledges that being in the outdoors will provide direct contact with nature which presents the opportunity to simulate senses and provoke wonder, curiosity, and exploration. Children having direct experiences of nature was essential to The Froebelian approach (1978), they should learn in nature instead of about nature. Another key element within the Froebelian approach is the role of the practitioner/educator. As it is the adult who enables children's learning and creates the ethos and expectations of the setting.

The true educator and teacher must be at every moment and in every demand two-sided. He must give and take, unite, and divide, order and follow; he must be active and passive, decisive and permissive, firm, and flexible.

(Frobel, in Lilley 1967)

The Foundation Phase outdoor learning handbook (2008) emphasises how the outdoors is the ideal environment for experiential learning as it offers many opportunities to move around, be creative, to take risks and be noisy. It highlights the importance of special stimuli such as weather, smells, sounds and textures which can enrich a child's learning experience. Like the Norwegian approach where Moser and Martinsen (2010) state that kindergarten's outdoor learning space is essential in supporting children's social development and learning. They highlight the main qualities needed to be an attractive, challenging and stimulating are with opportunities to explore with both children and adults. One of the curriculums for Wales (2022) statement of what matters is that to be curious and searching for answers is essential to understanding and predicting phenomena. Specifically, curiosity about science leads children to ask questions about the world around us and when encouraged and given the opportunity to explore and be creative, children will be supported to inquire into, and apply scientific knowledge to further understanding of how our world works. Sargent (2015) states the importance of children gaining first-hand experience of scientific phenomena. Sargent affirms that children will develop a secure understanding of how the world works through personal exploration, creativity, and curiosity. If they do not have this opportunity,

they are at risk of developing superficial knowledge, misconception and delayed later learning. To support this view, Sargant (2015) recommends the outdoor environment as an ideal setting for scientific enquiry because when they are outside children can investigate a wide range of human processes and natural occurrences. The outdoor environment supports active social learning which supports children in gaining early scientific enquiry skills and developing an understanding of scientific concepts.

Bruner (1966) and Piaget (1952) believed that children internalise the knowledge they gain through first-hand experience which could later lead to more complex thoughts and that physical exploration helps children to understand basic concepts.

Semling (2018) states that open-ended play allows children to express their creativity and prioritize fun. Open-ended play provides an opportunity for a child to engage their imagination whilst enhancing their emotional and social intelligence. Piaget (1952) second stage of development indicated that children develop their memory and imagination from ages three to seven. Semling (2019) affirms that open-ended play is crucial for these initial stages in child development and that open-ended play benefits a child by creating a foundation for a successful future. Research conducted by the University of South Dakota (2019) about the adult perspectives of teacher roles and practice in an outdoor classroom, found that there is tension within early childhood education and outdoor experiences regarding adult's goals for either open-ended play or pedagogical play for children. The findings were that parents stressed their desire for teacher-led outdoor curriculum whilst teachers persisted in their idea of time spent outside being child led and free of imposed structure. However, in the findings they emphasise that it looks vastly different in practice, there was shift in engagement of teachers and more importantly how the outdoor classroom is set up and how they structure and plan for outdoor learning. Montessori (1920) was the pioneer for the idea of unrestricted access between the indoors and outdoors with free choice and self-direction. However, there is criticism that 'choice' may have been restricted, and the outdoor space was not a space for imagination or play. Unlike Froebel who values exploration and imagination, Montessori values more focussed attention or didactic apparatus, having an opportunity to experience the outdoors daily but with structure and purpose. Tucker (2010) acknowledge that young children experience, observe and participate in mathematical events before they even begin nursery. Children are introduced to mathematical concepts through

day-to-day tasks and one of the most effective contexts for mathematics in the home and pre-school is play which can provide a meaningful link with school. It is observed that through play, children can repeat, rehearse, and refine skills and practice what they are beginning to understand. Bruce (1991) argues that 'play' is too broad a term. However, Bennett et al. (1997) emphasises that if play is valued and there is encouraged adult involvement, it can enhance learning and contribute to the raising of standards. Gura (1992) supports this view, and their findings were that children who played with a sensitive adult in a trustworthy child-adult partnership were able to move on to the next stage of their development. Tucker (2010) summarises by stating that to support a child's mathematical development, all outdoor play needs quality adult involvement to some degree and children will benefit from a balance of both adult-led and child-led play.

Nicholson (1971) believed that it is the 'loose parts' in our environment which will ignite our creativity. Nicholson (1971) encourages outdoor environments with loose parts available so that children can explore freely and adapt them as they choose, as it provides a wider range of opportunities rather than solely adult led. Wilding (2020) states that when children are given the opportunity to work both collaboratively and alone with loose parts can support mathematical development significantly. Such as using diverse types and sizes of materials as there is evidence that for most children, there is an intrinsic motivation to be a 'pattern maker.' As humans have been the creators of patterns and sequences long before counting and basic numeracy existed, it is these patterns that our numbers system is built upon.

The Effective Provision for Pre-school Education (EPPE) research by Sylva et al. (2004) revealed sustained shared thinking to be beneficial to all children in all types of settings. Brodie (2014) affirms that sustained shared thinking is the backbone for the development of communication, language, and learning. How conversations and questioning with children, exploring ideas together can inspire new ways of thinking about the world around them. Sustained shared thinking is a two-way process and relies partly on effective communication between children and adults, or children and children. However, that does not mean it is only restricted to older children who can talk. Malaguzzi (2021) discusses the Reggio Emilia approach and their pedagogical strategy 'The Hundred Languages' for the construction of concepts and consolidation of understanding. The Hundred Languages us

recognised as being communicative, cognitive, metaphorical, imaginative, and relational. Although it acknowledges the importance of verbal language as being particularly important, it emphasises how it does not restrict children who cannot talk. Boyd and Bath (2017) recognise The Reggio Emilia approach as 'child-originated' and discuss how Reggio children discuss and negotiate meanings and move together into a level of shared awareness and understanding through trusted partnerships with other children or adults. The Primary Science Teaching Trust (PSTT) (2021) recommends introducing early scientific language as effecting practice as it introduces and consolidates new vocabulary as well as provided children with the opportunity to share ideas and build understanding. When investigating scientific concepts such as floating and sinking, playing with ramps and cars, or exploring shadows, PSTT (2021) recommend combining effective questioning as one of the ways to help develop early scientific talk as well as answering their scientific questions and helping them have a better understanding of how the world around them works. The Curriculum for Wales (2021) guidance encourages sustained shared thinking as it promotes collaboration and cross-disciplinary, learning and teaching, both within and across Areas. The hope is that this will enable learners to build connections and work collaboratively to combine unique experience, knowledge, and skills.

Dowdell et al, (2011) acknowledge that having opportunities to play outside are mostly beneficial. Practitioner observations have shown that most children can be less inhibited in their language use in an outdoor environment, and they can make at least five times as many utterances outdoors as they do indoors. Gray & Burrell (2015) support this view by affirming that outdoor environments function as a rich stimulus for creative thinking and learning and this affords opportunity for challenge, inquiry, critical thinking, and reflection. Qualities that are crucial to both mathematical and scientific development.

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