

Awe and Wonder - Science, Mathematics and the outdoors

Part 1



Photograph taken by Rhian Moore

Part 2

Today, myself and another staff member headed out with 12 of our year 1 class of children aged 5-6years old to our nearby woodland area for outdoor learning. We do not have a set plan in place of what we want to do. It is completely child-led as we mainly want this outing to be of new discoveries and interests. The children are dressed appropriately for this outing, as parents have been made aware beforehand to provide suitable shoes and coats for their child.

These outdoor experiences provide the children with rich visual, auditory and kinaesthetic learning with the various activities that take place; these are all exciting and flexible which the children absolutely love about these sessions. The outdoor space we visited gave the children a range of physical experiences where they could run, climb, jump, balance, roll and slide. The hill, space, trees and logs gave the children plenty of opportunities for them to move their bodies in a variety of ways. The excitement from the children as we arrived in the area was wonderful to see, it is familiar to them as we have all been numerous times but every time is just as exciting for them. Before we left the classroom today, we all collected some items to take with us that were rope, balls, pots, magnifiers and some gloves and loaded it all into our pull along trolley.

On our walk down the path to the woodlands, we can hear the children talking to each other where they want to go first when we arrive and remembering the fun they had. Some of the children pointed out how they could hear the birds tweeting loudly and how they could see a group of the birds flying together and landing on a nearby fence as we walked past. "Where are they going now?" – one boy asked as they flew away. One other child said, "Maybe they are going for dinner?" I responded by asking, "What do we think birds like to eat?" At this point, we entered the woodland area and all stopped to sit on the large log, the children all spoke about the possible different things birds might like to eat, looking up still noticing some birds in the trees. "Worms! Spiders! Berries! Plants!" We spoke about different birds and how they all eat different things. With this still in their minds, some of the children head off to look for insects, searching inside the logs, lifting up rocks, looking amongst the leaves using sticks to move and poke around. I reminded the children what we had brought with us in the trolley – they immediately run and collect the magnifiers and pots to help them find the insects and take a closer look. As one child lifted a stone, she shouted "I can see a worm moving, it is wriggling around?" I asked her how she it felt as she held it in her palm feeling it moving. "It's tickly and slimy," she said. As the children continued to discover and find

different insects, we spoke about habitats and what we thought the insects might eat, and what else they needed to stay alive. “I think they hide under there to stay alive, so the birds can’t find them” one child observed. We also counted together how many insects we found as we moved around and the children collected some in their pots. The children are using their curiosity whilst exploring their environment by asking questions, communicating their ideas and using predictions of living things. They have learnt about animals, living things and the life cycles. These link well to the curriculum for Wales area of learning Science and Technology progression steps 1 and 2 (Welsh government, 2020).

It is important for us as adults to allow the children the time and freedom to explore the woodlands. They are safely exploring their surroundings, trying new things and challenging themselves. Some of the children run up and down the hill then sliding back down, taking the ball with them to watch it roll down and the difference it makes pushing it back up the hill. “It moves faster going down” one boy said. I ask what would happen if we push the ball a bit harder up the hill. “Do we think with some more force it might go faster up the hill?” another staff member asks. “Shall we try it?” The children then begin to experiment with more force using their hands and feet – some tried to kick the ball to the top as they could see that made it go faster that way. “If we kick the ball its goes really fast up the hill” one boy shouted. The encouragement we used allowed the children to discover and test out different ways of forces and movement. They investigated and made predictions of the effects they made using their own bodies and energy, then communicated this back as they made the discovery. This was covering areas of learning within the Science and Technology progression steps 1 and 2 (Welsh government, 2020).

Two of the children wanted to climb the tree nearer to the top of the hill shouting, “I want to see how high I can go?” The children are learning about what their bodies can do, taking risks to see what they are capable of, and building confidence. We all come together and talk about how to stay safe climbing trees – I ask the question “do we think it is safe to climb trees?” This is allowing the children to think and make judgements. To demonstrate this I climbed up on to the tree to test the branches and show the children where to climb up to. We had a conversation and negotiated together where we thought was the safest area on the tree to climb, using a piece of material found in the trolley to mark this. It is beneficial for children’s well-being and learning to experience some risks however, safety issues must always be provided and talked about with the children for risk taking to be well managed. To help the children understand how tall the tree is we began measuring using the rope we had brought. We paired the children up to measure each other and then they compared their own height to the height of the tree. The children used objects to measure to understand the

concept of height and length. This is found in the area of Maths and numeracy from the Curriculum for Wales. (Welsh government, 2020).

(Part 3 sent in email as unable to attach)

Part 4

According to Reggio Emilia when children have good relationships with teachers, practitioners and parents it shows that these interactions are at the heart of their learning (Maynard, Waters & Clement, 2013). Likewise, Froebel recognised the importance, and the impact adults have on children's natural curiosity. This shows that where they become in tune to these interests, that lead on to engagement of what they are doing rather than interfering. This can generate conversations that are significant to the child (Tovey, 2015). This was key to Froebel's approach - standing back and observing, allowing the adult to know when they should intervene in children's play that can help support and extend it where needed (Tovey, 2015). When adults maintain this, it can have a positive impact on children's well-being that encourage and support children's own natural curiosity with use of appropriate teachable moments that follow further learning experiences to plan for (Welsh government, 2022). Children need adults who listen attentively to their ideas and understanding of their world to hear their delight and see how inquisitive they are. By doing so children can progress and thrive through fun engaging learning activities that are enriching, stimulating and open-ended (Bottrill, 2018). For instance, when adults have observed what the children have been absorbed in one day, they can think about what materials, resources and equipment could be needed to set up in preparation for the next day's experiences and opportunities that have responded to the children and their interests for outdoor learning (Bilton 2010). The outdoor environment is an ideal arena that promotes social and scientific learning that enhance and develop scientific concepts. Where children are able to explore and discover new findings by investigating natural occurrences and observing living things. Furthermore, through the encouragement of adults to observe these things helps with children gaining knowledge and learn about how things work and spark interest in the world around them (Sargent, 2015). Vygotsky believed that the foundation for scientific learning was the foundation to all children's learning (Campbell and Speldewinde, 2020). Additionally, children need frequent need to learn about the natural world with plenty of experiences outdoors in nature. These positive influences not only develop children's

interest with nature but support early scientific thinking (Ernst & Tornabene, 2012). Also, adults are said to be more relaxed and appear to relate to children differently. Where they can be more physical, boisterous and loud without being told not to (Maynard *et al*, 2013). One cannot ignore the fact that outdoors offer many freedoms to children as they have bigger spaces that allow them to move around more with a more relaxed feeling. In addition, offering engaging experiences with plants, trees and mini beasts and are gaining understanding of what is real. Such as with natural materials like soil, sand and water whilst gaining the concepts of weight and volume. Adults are able to engage better with children in a more relaxed situation that the children become a lot more responsive that could be more reluctant to engage in an indoor environment (Richardson, 2014). Froebel believed that when children know that adults are interested in them, they are more likely to participate in learning. Children need to know their ideas are being listened to and adults can show this by asking open ended questions that focus on their interests and are timed well. Froebel continued stating that by adjusting resources with these questions can challenge children's thinking that shows an insight into their understanding of ideas and problem solving (Tovey, 2013). Likewise, Vygotsky agreed stating how children should be supported with information by the adults that are keen observers, this will support children in their learning that allows them to make sense of it. Vygotsky maintained that the importance of observation from adults will support children's development (Mooney, 2013). For instance, when an adult needs to support children with their maths learning, then this would be to really engage and include them in through conversations. Adults can encourage children to collect natural materials for counting and matching games (Skinner, 2012). Children discover more about the world by playing with loose parts learning about different materials that have different textures, colours and shapes. This also helps with counting and how to identify patterns and colours. Loose parts are open-ended and can be moved about easily offering endless possibilities. Larger items for outdoor play such as tyres and crates can be taken apart and built up. Nicholson theory of loose parts was that it would empower children's creativity and experimentation in a fun and inventive way (Play Scotland, no date). Loose parts support the discovery of imagination in children where a twig can become a wand or cardboard box becomes a car. For loose parts to be successful adults must refrain from interference to allow the children to fully enhance their play experience. If children want the support, they will invite the adult into their play. Observations from the adult where they respond 'in the moment' to extend children's learning. Adults can fully understand when to respond to play is when to look out for play cues children give, these could be an action or a gesture or it could be by throwing a ball at someone. (Casey and Robertson, no date). Therefore, if the adult wants to enhance mathematical development the physical environment and materials used should be interesting, with opportunities to enhance their

creativity and curiosity of mathematical play as they work out what it means to them such as what tool can help them dig or mix materials and what loose parts can help them with construction. Adults including children in the setting up of these outdoor activities, by helping them make choices that are sensible to their learning. For children to gain early mathematical awareness they need to be given the time by adults to naturally explore and try new things with the different materials on offer. As a result, adults who give time in an unhurried way their confidence will grow. For children to progress in maths this is vitally important to know they have supportive adult (Keith, 2017). Froebel beliefs that children will thrive when there is a close partnership with adult and the connection is fundamental to children's learning. Through their experiences with nature through engagement with life cycles, plant growth making dens and climbing trees is what children must do to learn as doing, playing and exploring is how they will fully understand the world they live in. Children learn best through independent discovery of their environment. Piaget always put great emphasis on the importance of environments and to give children every possible opportunity to do things for themselves without an adult intervening. This will keep children curious and wonder how to problem solve to overcome challenges on their own developing resilience. Furthermore, according to Piaget he believed that children's intellectual growth was through physical development and time outdoors will allow for this (Mooney, 2013).

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