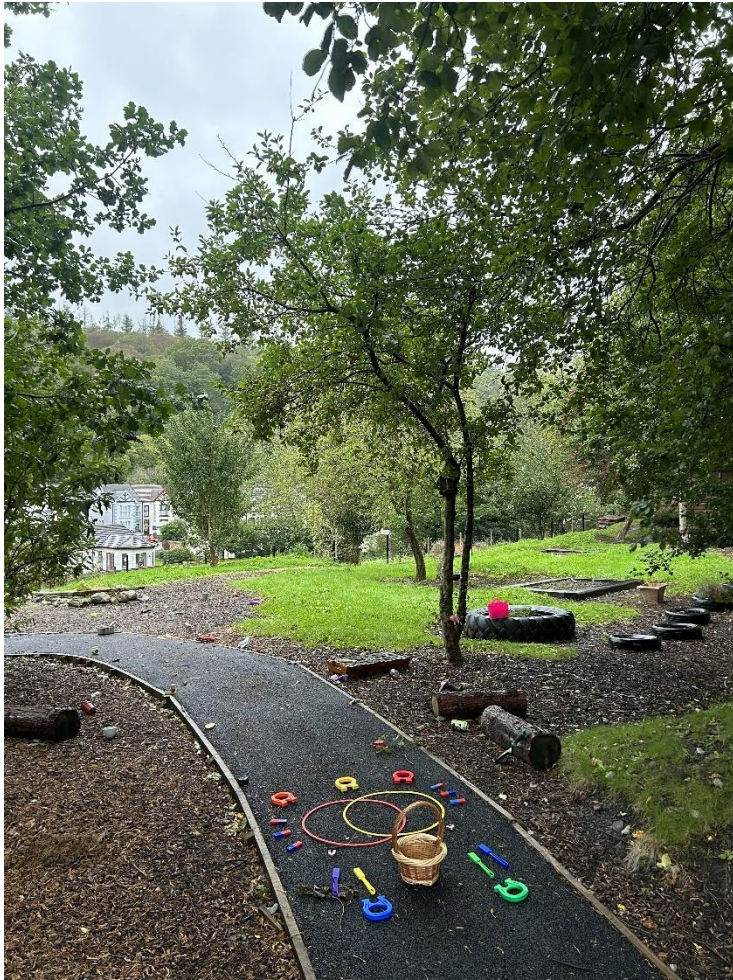


Awe and wonder, science, mathematics and the outdoors Portfolio

Section 1: An outdoor space, with opportunities for children to explore through play.



Section 2: How can the environment in the photograph could be used by young children to develop specific scientific or mathematical concepts.

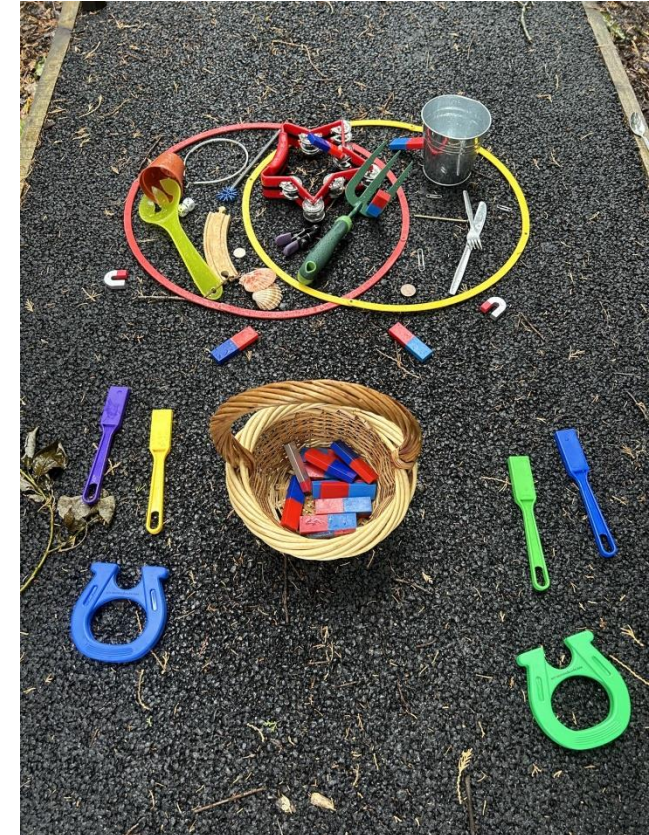
In the photograph shown above, children aged six to seven years of age will be visiting this rich and enabling outdoor environment, supported and encouraged by key workers from the school.

The environment is a secure wild life area within the school grounds, a large outdoor area enriching the opportunity for free play and learning.

In the photograph I have scattered many different loose parts and objects around the natural environment, some natural objects and loose parts for example sticks, rocks, acorns, leaves etc. and man made objects such as toy cars, metal spoons, china mugs, hair brush etc.

I have added these loose parts into this rich, enabling enviroment to reflect many objects children would come across in their day to day lives, at home, in school, or out in their community.

By adding these familiar objects into the provision seen in this environment, I aim to encourage the childrens enthusiasm and curiosity of what the random variety of objects are for.



On the floor directly in the middle of the photograph is a basket of magnets, the children will be given the choice of a variety of magnets of all shapes and sizes to experiment and explore freely with on their hunt around the outdoor environment for objects that are attracted to their magnets and objects that repel their magnets. Through providing these magnets to the children free play opportunities for learning and exploration of scientific and mathematical ideas relating to forces can be enabled in the outdoor environments such as the one shown in this photograph.

The children may firstly experiment with the magnets alone and interact with each other, by exploring the forces of attraction and repulsion between the magnets themselves.

Practitioners could ask the children to describe what they felt and could encourage and support this learning opportunity by asking open ended questions such as “”.

Practitioners could also encourage the children to predict and study the magnets behaviour towards other objects in their environment to promote exploration and experimentation allow their childrens curiosity to flourish in an outdoor real life learning environment through play.

Practitioners could support the childrens learning by discussing and asking why they think the spoon and the paper clip is attracted to the magnet but the hair brush and pencil is not drawn to the magnet.



How different materials are affected by the power of the magnetic force can be explored, by encouraging children to experiment with the distance and orientation of the magnets to the objects. Encouraging the children to estimate the strength of the magnetic force at various distances from their magnets could provide opportunity for children to learn and develop mathematical skills for example measuring and analysing data.

Children may be able to understand scientific and mathematical concepts such as forces better through experiencing the learning process in a natural and hands on outdoor environment when combined with magnets and different materials.

Opportunities such as calculating magnetic strength can be provided through encouraging children to use the variety of magnets to estimate which magnets are the strongest.

Observe the children while they compare which magnet can pick up the most paperclips or other small magnetic objects to test their predictions.

Children may also play counting games by counting how many magnetic objects for example paperclips their magnet is able to attract.

Practitioners could use natural forces to explain how magnetic forces occur, for example through comparing how things are moved in water by currents like in the sea, explaining and relating the forces of magnets are those of a similar concept as those which forces affect motion.



Practitioners could spend time with the children discussing the characteristics and properties of the different materials found around the environment that were are were not attracted to their magnets.

Directly below the basket containing magnets are hula hoops creating a venn diagram. The children will be encouraged to bring the items they find, to sort and catagorise them into magnetic and non magnetic groups.

This activity aims to foster early mathematical thinking and classification, by encouraging the children to sort and classify the different objects depending on their magnetic qualities.

Section 3: RISK BENEFIT ASSESSMENT

Location / Activity:				Date:	
Assessor:				Review date:	
Experience exploring outdoor space in photograph	How will young people BENEFIT from this activity?	Hazards and associated risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk after precautions RATING: L/M/H
Outdoor play and exploration on uneven ground, hills, dips, slopes	Children can naturally improve fundamental motor skills including dexterity, coordination, balance, and agility through a variety of outdoor activities. When	Injuries such as trips, slips, stumbles, and falls caused by uneven or unstable ground. This includes slippery surfaces, damp or muddy spots, tree roots,	everyone	Explain to the children to be mindful of uneven foundations. Ensure children and adults are wearing suitable clothing and footwear to avoid injuries or slipping. Ensure correct ratios are maintained throughout to ensure the safety of children. Ensure cautious supervision and observation of the children while they are engaged in the outdoor activities. While stressing the significance of remaining on established pathways while avoiding dangerous areas. Inform children	M

Experience exploring outdoor space in photograph	How will young people BENEFIT from this activity?	Hazards and associated risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk after precautions RATING: L/M/H
	children are given the opportunity to investigate their surroundings outside, they will put their skills to the test and learn new ones through trial and error.	and uneven or rocky ground.		about the significance of remaining on designated pathways, keeping a watch for unstable surfaces, and being aware of hazards that could cause trips while engaging the outdoor activities. Establish a procedure for reporting that enables children to alert practitioners of any potential trip hazards they observe while engaging the outdoor activities. To lessen the chance of stumbling on uneven ground, it strongly encouraged that children wear proper footwear, such as closed-toe shoes with adequate grip.	
Enclosed wildlife area, with a fence allowing opportunity to see the community.	Allowing the children to explore the outdoors in a secure enviromenment.	Stranger danger - Open outdoor areas may draw unauthorised people.	children	In order to prevent unauthorised access and teach children about the dangers of strangers, practitioners must establish a secure and monitored environment. When engaging in outside activities, practitioners must keep a close eye on the children, practitioners can assure successfully monitoring and oversee the children, make sure there is a suitable adult-to-child ratio. Establish precise reporting procedures for any suspicious people or activity to the appropriate staff members or authorities.	L
Providing suitable magnets for experimentation of the magnetic force.	New learning oportunities.	Could jam fingers in the magnets and choking hazards	everyone	Explain to the children to be mindful of catching their fingers in the magnets. Consider the types and strengths of the magnets that will be available to the children and also find the possible hazards that could result in finger jamming. Speak with the children using age-appropriate, straightforward guidance on how to handle and use the magnets safely. Show and model to the children safe handling methods, such as holding magnets by their edges and avoiding putting them close together where fingers could get caught in between them and encourage them on these techniques. Practitioners can avoid this hazard by ensuring they pick and provide magnets that are suitable for the age group, to ensure the magnets are large enough to be managed without difficulty, and are not choking hazards. Small, strong magnets shouldn't be used around young children.	M

Experience exploring outdoor space in photograph	How will young people BENEFIT from this activity?	Hazards and associated risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk after precautions RATING: L/M/H
Exploring the wildlife area in the school.	Improved wellbeing, exploration opportunities, learning and developing skills and physical exercise. Outdoor learning can promote critical thinking, curiosity and creativity. Helps children to become aware of boundaries and limits.	Loosing children from the area	Children	Establish boundaries for the outside learning area and ensure staff and children know what the boundaries are. Put up signs or other markings show the boundaries clearly to the children. Create an organised plan for supervision that assures adult-to-child ratios during outside activities. Keep thorough attendance records to monitor each child's presence and whereabouts when participating in outdoor activities, practitioners can make sure all children are present and accounted for by completing frequent head counts. Practitioners can assure no children are lost by securing this outdoor enclosed environment by ensuring all surrounding gates are closed.	L
Plants, insects.	Gives children opportunities to develop their knowledge on science and biology through real life experiences, for example learning about ecosystems and how they work.	Children might have allergies or other underlying health issues that outside factors like pollen, plants, or insect bites could aggravate.	Everyone	It is crucial to be knowledgeable about children's health issues and have access to the right medical equipment and facilities. Determine which environmental allergens, such as pollen, particular plants, or insect stings, may cause allergic reactions in children. To ensure awareness of any known allergies or sensitivities, Practitioners can request and gather health histories and allergy information for each child. Practitioners could keep these documents accessible at all times. Consult with medical experts for example paediatricians or nurses to gain insight into possible reactions to allergens and the best preventative measures for children who have known allergies. Educate the children and staff about allergies by describing typical triggers and symptoms through lessons. Teach children how to identify and treat allergic reactions quickly. To reduce direct contact with insects, practitioners could advise and encourage children to wear long sleeves, trousers and suitable footwear for example trainers or wellies instead of sandals. Use insect repellents that comply with 'suitable for children' regulations.	M

Experience exploring outdoor space in photograph	How will young people BENEFIT from this activity?	Hazards and associated risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk after precautions RATING: L/M/H
				For children with known allergies, create individualised action plans. Inform staff members about the plans, and ensure all staff have access to and understands them.	
Exploration and experimentation of magnets and materials.	New learning oportunities, and development of knowledge.	Falling objects	Everyone	When used incorrectly or without following the correct safety recommendations, handling objects or equipment for outdoor activities, such as gardening equipment, can be dangerous, as they can be heavy and accidentally dropped on feet. To prevent falling object incidents, practitioners can make sure that children utilise age-appropriate tools and equipment and teach them basic handling and storage techniques. Children should be given clear instructions on the activity's safety rules, with a focus on the significance of the need to avoid applying too much pressure on the equipment. Practitioners can design a safe and interesting outdoor magnet activity for children that minimises the danger of injuries from falling objects and guarantees an engaging and enriching educational opportunity by carefully evaluating risks, putting preventive measures into place, and keeping constant monitoring.	M
Play and learning outdoors.	Physical exercise, and improved wellbeing. Outdoor play can promote curiosity critical thinking and creativity.	Extreme weather exposure, for example heavy rainfall cause the childrens clothes to become wet which can be harmful. Or sunburn from exposure to the sun in hot weather.	Everyone	Practitioners can risk assess the hazard of exposure to extreme weather conditions by keeping up to date with weather forecasts to be prepared for any extreme weather, by checking updates on weather apps or web pages. Practitioners can control and prevent these hazards by ensuring that the children dress suitably for the weather. For example wearing breathable clothing and hats for warm weather or raincoats and wellies for days when it's expected to rain. Before engaging in outdoor activities practitioners can reduce the risk of sunburn by ensuring the children are wearing sun cream with a high SPF and continue to reapply	L

Experience exploring outdoor space in photograph	How will young people BENEFIT from this activity?	Hazards and associated risks	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk after precautions RATING: L/M/H
				as necessary to ensure effective sun protection while learning outdoors and encouraging the children to put on their hats and sunglasses for extra sun defence. Practitioners can create shaded places by setting up tents, parasols or using existing shelter, for children to find cover from intense heat or unexpected showers. To avoid dehydration, practitioners could remind children to keep drinking plenty of water, particularly in warm weather. Explain and discuss with the children the importance of staying hydrated and make sure water easily accessible to them.	
Exploration outdoors.	Provide children the chance to discover more about science, biology and nature through real life experiences and help them to appreciate it.	Wild life encounters	Everyone	During outdoor activities, children may come into contact with wild animals or insects. Although most wildlife is harmless, some types are dangerous or can spread infection. Explain to the children to be mindful and ensure they are taught appropriate behaviour and safety precautions by professionals. Provide opportunities for local wildlife professionals to lead educational programmes that will teach children about the local wildlife, their habitats, and how to behave around them. Children should be taught to distance themselves from wildlife and to refrain from bothering or upsetting it. Teach children that if they come across wildlife, to remain calm and walk slowly.	M

Section 4: Adults working with early years children support and encourage children engage with mathematical and scientific concepts in an outdoor environment.

Waite (2011) and Richardson (2013) imply that the early years is an significant period for the development of the fundamental scientific and mathematical ideas. Children can interact with these learning concepts in an effortless and valuable way when playing outdoors, offering them an enabling and exciting environment. (Williams, 2022)

Throughout this section, analysis of the most effective approaches that practitioners use to support children and encourage their learning and interest in science and mathematics while playing outside will be explored and discussed.

Two theorists in the study of growth and learning in the early years are Bruner and Piaget. Their beliefs and understanding offers viewpoints on the efficient development of knowledge in young children. (Conkbayir and Pascal, 2014)

According to Piaget's (1950) concept, children continuously build their skills by interacting with the world around them. Conkbayir and Pascal (2014) implies that Piaget beliefs are supported by the evidence that children build on their scientific and mathematical knowledge and understanding in the outdoor environment through engaging and exploring. (Waite, 2011) and Richardson, 2013). Children who spend time in the outdoor environment are more likely to absorb new knowledge and incorporate it into their pre-existing concepts, which is supported by Piaget's constructivism ideas.

According to Conkbayir and Pascal (2014) Bruner's view, children's learning should take place through spontaneous exploration and experimentation. Outdoor environments offer a setting for educational exploration, allowing children to investigate the scientific qualities of water or learn about the mathematical structures in flowers through child led play. (Williams, 2022)

Waite (2011) and Richardson (2013) discuss that children build their knowledge through exploration the outdoors by investigating their surroundings, gathering inquiries, and forming opinions. As children learn scientific and mathematical

ideas by engaging in hands-on activities, this supports Bruner's theory. (Conkbayir and Pascal, 2014) (Ginsburg, Lee, and Boyd, 2008) and (Lindsey, and Colwell, 2013)

Brodie (2014) and Siraj, Kingston, and Melhuish (2015) agree that Sustained Shared Thinking emphasises the significance of relationships between children and adults throughout moments of learning. Through significant conversation and collaborative investigation, this method promotes the growth in intellectual and interpersonal skills. Sustained Shared Thinking implementation outdoors may be very effective in fostering interest in mathematics and science. (Brodie, 2014) and (Siraj, Kingston, and Melhuish, 2015)

To encourage children to think back on what they have experienced, Sustained Shared Thinking entails asking them open-ended questions. When teaching outside, practitioners can ask pupils questions for example "Why do you think the leaves have changed colours?" This method encourages scientific investigation and involves children analysing the outdoor environment. (Brodie, 2014) and Siraj, Kingston, and Melhuish, 2015)

Bradbury and Swailes (2022) discuss that collaborating, discussion, and active engagement in learning are heavily emphasised in the Reggio Emilia approach. The Reggio Emilia approach can link to the concept of sustained shared thinking, which entails significant discussions and meaningful encounters.

Bradbury and Swailes (2022) say that the approach known as Reggio Emilia views nature and outdoor spaces as the "third teacher" and frequently includes them as part of the educational process. As they give children chances for investigation,

sensory exploration, and interaction with nature, playing and learning outside are essential components of the Reggio Emilia Approach.

The natural setting is considered as a valuable setting for learning in the Reggio Emilia approach, allowing children to connect with their natural world, play imaginatively, and deepen their knowledge of many mathematical and scientific ideas through real life experiences while playing. (Bradbury and Swailes, 2022) , (Saracho and Spodek, 2008) (Ginsburg, Lee, and Boyd, 2008) and (Lindsey, and Colwell, 2013)

Following the Reggio Emilia method, practitioners guide in-depth discussions, ask the children open-ended questions, and participate with children in ongoing conversations involving their personal encounters and discoveries. This links with the idea of sustained shared thinking, which places the importance of thoughtful and cooperative discussion at the centre of the child's learning journey. (Bradbury and Swailes, 2022)

Conkbayir, M., Pascal, C. (2022) discuss the Constructivist theory of Piaget emphasises how children develop an understanding through engaging with the environment, which is supported by the sustained shared thinking concept. (Brodie, 2014) and Siraj, Kingston, and Melhuish, 2015). Constructivist method is supported by sustained shared thinking through promoting discussion and letting children build their knowledge of scientific and mathematical concepts outside. (Saracho and Spodek, 2008) and (Williams, 2022)

Bradbury and Swailes (2022) imply that constructive concepts, are at the core of the Reggio Emilia approach, they are also consistent with Piaget's concept of cognitive growth. Conkbayir and Pascal (2014)

Conkbayir and Pascal (2014), explains Piaget emphasised that interactions with the children's surroundings help them develop understanding. Similar to this, Bradbury and Swailes (2022) say that the Reggio Emilia method encourages involvement and hands-on learning, enabling kids to build a knowledge of their environment through encouraging them to engage in real life experiences.

Siraj, Kingston, and Melhuish (2015) and Brodie (2014) suggest that Sustained Shared Thinking focuses on expanding the views and interests of children. For example, practitioners may discuss the plant life cycle, if the child shows interest in the growth of plants, which successfully combines biological and mathematical learning objectives. (Williams, 2022) (Saracho and Spodek, 2008) (Ginsburg, Lee, and Boyd, 2008) and (Lindsey, and Colwell, 2013)

The constructivist theory of Piaget links to the Reggio Emilia approach because it places such an intense focus on working together, discovery, and the importance of the outdoors. Children who connect with the outdoors are better able to contribute and generate information that is reinforced by significant conversations and communications, which strengthens this positive impact on development. (Waite, 2011) and (Richardson, 2013)

Bradbury and Swailes (2022) explain that using the Reggio Emilia method in outdoor settings enables practitioners to take advantage of natural environments as an enabling resource for developing sustained shared thinking, developing understanding, and using Piaget's constructivist concepts in early childhood education. (Conkbayir and Pascal, 2014)

The Reggio Emilia approach, continuous shared thinking, Piaget's theory, and play and learning outside can all be combined by practitioners to establish a comprehensive and stimulating learning environment that supports children's intellectual, social, and developmental milestones.

This strategy links to Bruner's principle of learning through discovery, which promotes active investigation and ideas on discovering through real-life situations. Utilising a discovery driven approach children may investigate and learn scientific and mathematical ideas through Sustained Shared Thinking through playing outdoors. (Saracho and Spodek, 2008), Brodie (2014) and (Waite, 2011) and Richardson, 2013)

A child's individuality and interests are prioritised in child-led learning and play, which puts children at the centre of their education. This method allows children to investigate ideas at their individual rate, in methods which are important to the individuals.

Children may participate in free spontaneous play when open-ended resources such as loose parts, building blocks, measurement equipment, or natural materials are available to them outside. This encourages the use of several

mathematical ideas, including measuring, sequence detection, and spatial reasoning, aiding their development and knowledge growth. (Daly and Beloglovsky, 2020) and (Williams, 2022)

According to Conkbayir and Pascal (2014) Piaget's theory children interact with their surroundings to adjust and develop their understanding. Children may incorporate new scientific and mathematical ideas into their current knowledge using open-ended play resources such as loose parts in the outdoors. (Saracho and Spodek, 2008) and (Daly and Beloglovsky, 2020)

Children can observe and engage with their surrounding outdoor environment when they have the opportunity to investigate. They may gauge a tree's height, watch a caterpillar's movements, estimate the number of petals on a flower which can help children to develop their scientific and mathematical knowledge. (Saracho and Spodek, 2008), (Ginsburg, Lee, and Boyd, 2008) and (Lindsey, and Colwell, 2013)

Conkbayir and Pascal (2014) explains that the concept of 'enactive to iconic to symbolic representation' put forward by Bruner correlates well with field research. Young children first engage in direct contact (enactive), secondly they progress to iconic representation (for example, visualising a flower in their minds), and finally to symbolic representation (for example, drawing a picture of a flower), fostering intellectual growth by investigation of the outdoors. (Waite, 2011) and (Richardson, 2013)

Welsh Government (2020) shows that the Welsh curriculum, especially the Foundation Phase in Wales, and the Reggio Emilia method share a number of key concepts. (Bradbury and Swailes, 2022)

One similarity is that the child is emphasised as a key contributor in their educational journey in both the Foundation Phase and the Reggio Emilia approach. Both concepts value the child's interests, circumstances, inquiries and centre educational decisions on their curiosities and needs.

Bradbury and Swailes (2022) suggests that the Reggio Emilia method is firmly based on child-led learning, in which children possess an essential role in deciding how and what they learn. In a comparable manner, early years practitioners who promote child-led learning and play provide children the freedom to direct their own educational adventures in accordance with their curiosities and interests.

Both strategies promote cooperation and discovery, encouraging children to explore, enquire, and participate. In the Reggio Emilia method, practitioners frequently take on the role of facilitators, directing children's investigations while promoting and encouraging their sense curiosity, awe and wonder.

Bradbury and Swailes (2022) show that open-ended questions are frequently used in the framework of Reggio Emilia to encourage problem-solving, greater understanding and critical thinking skills. Children are inspired to investigate critically, form hypotheses, and articulate their views when they are asked open-ended questions.

Welsh Government (2020) The Foundation Phase of the Welsh curriculum, in particular, reflects the usage of open-ended questions also. Open-ended questions are used as a method to pique curiosity, stimulate dialogues, and direct children in researching subjects further in depth. It places a strong emphasis on learning through inquiry.

Practitioners may establish an effective environment for learning by including the Reggio Emilia approach, the utilisation of open-ended questions and child-led learning and play. Through using these concepts children are given the freedom to take charge of their education, investigate their interests, and participate in meaningful conversations sparked by unresolved questions.

Each of these methods can be combined to establish child-centred, curious atmosphere for learning that is in line with the child-led theory, the Reggio Emilia approach and the foundation phase of the Welsh curriculum. (Welsh Government, 2020) and (Bradbury and Swailes, 2022)

Child centred approach to learning and play, The Reggio Emilia approach, and open-ended questions combined together may offer a strong foundation for learning that values children's independence, supports active involvement, and fosters an enjoyment of learning in accordance with the Welsh curriculum. (Welsh Government, 2020) and (Bradbury and Swailes, 2022)

The two strategies place a high priority on the holistic growth of a child, taking consideration not only for their academic performance but also their emotional, social and physical well-being. They promote education through play and engagement with nature, and real-world experiences.

In conclusion, implementing a natural setting into the teaching of science and mathematics to young children produces an influential combination that is consistent with basic educational principles and concepts. Both Bruner's theory of discovery learning and Piaget's constructivist theory place emphasis on the child's active engagement in building understanding. Children learn through doing, when they are immersed in an rich enabling outdoor environment, investigating their environment outside and building an awareness of science and mathematics from engaging directly with their surroundings. Conkbayir and Pascal (2014) This is consistent with Piaget's and Bruner's theories that learning is an active process centred around conceptual investigation, identification, and integration into pre-existing cognitive understanding.

These beliefs are heavily supported by the Reggio Emilia approach, which is founded on child-led learning and open-ended inquiry. This method respects the child's individuality and fosters their curiosity by utilising their natural surroundings as an evolving learning environment. According to the concepts of child-directed play and learning, the child takes a lead position in developing understanding, just as Piaget and Bruner suggested, while being directed by their individual curiosities and interests.

Bradbury and Swailes (2022) share that the Reggio Emilia approach, that is based on open-ended questioning and child-led learning, strongly supports these viewpoints. This approach values each child as a unique person and encourages wonder

by using the outside world as a classroom. The ideas behind child-directed learning and play involve the child taking the lead on comprehending growth and development, much like Piaget and Bruner recommended, whilst being guided by their unique interest and curiosities. (Conkbayir and Pascal, 2014)

Combining scientific and mathematical education outside promotes critical thinking, creates an enthusiasm for learning and encourages a child's intrinsic interest. Conkbayir and Pascal (2014) shares that it incorporates Piaget's constructivist theory, Bruner's theory of discovery learning, Bradbury and Swailes (2022) the Reggio Emilia approach's which all focus on the child, the concepts of child-led learning and play, and Welsh Government (2020) the Welsh curriculum's inquiry-driven attitude. This comprehensive method establishes a solid basis for holistic learning that encourages children to take ownership in their own educational path. It is supported by and continuous shared thinking and open-ended questions. An outdoor environment acting as rich and enabling classroom, provides an area for unlimited opportunities, enhancing the learning process and developing young minds for a future of constant discovery.

For young children to learn scientific and mathematical ideas from play, the outdoors offers an interesting, varied and fascinating setting. Children's involvement with the core ideas can be successfully supported and encouraged by practitioners by prolonged child-led play, sustained shared thinking and educational activities. (Brodie, 2014), (Waite, 2011) and Richardson, 2013)

Conkbayir and Pascal (2014) The perspectives from theorists such as Bruner and Piaget emphasise the value of active engagement and real-life experiences in the development of knowledge. Practitioners may provide a foundation for

a lifetime's enjoyment of learning in the areas of science and mathematics through instilling a sense of curiosity, awe wonder and individuality from a young age by allowing the children to engage in free child led play outdoors. (Williams, 2022), (Waite, 2011), (Richardson, 2013) (Ginsburg, Lee, and Boyd, 2008) and (Lindsey, and Colwell, 2013)

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