

Section 1



(Source: The Beach Guide, no date)

Section 2

Feature 1 – Sand

Fisher (2013) believes that when children play in the sand, building and digging, learning about depth and volume, is where sensory meets science. Children will learn what happens when they try to build a sandcastle with dry sand and following guidance from the New Curriculum for Wales (2020b) make a prediction as to what will happen when they add water. These predictions and curiosity are essential for children understanding and familiarising themselves with the world around them. There is also physics involved in sandcastles, for example, how tall can the children stack the buckets of sand? Or is it easier to use small or large buckets? Children can experiment as they build and feel the sand with their hands and feet to experience the different textures (Welsh Government, 2015).

Hoggan (2017), Mom for all Seasons (2017), Fisher (2017) and Horvath (no date) have similar views that when visiting the beach there are many objects to count. Collecting shells, pebbles or sticks and counting them one-by-one forwards or backwards, group them to count in 2's, 5's and 10's. Another way to organise the shells is smallest to largest, or largest to smallest, this will help the children practice and compare measurement. The New Curriculum for Wales (2020a) and The Foundation Phase Framework (2015a) state children should experience cardinal, nominal and ordinal numbers in an outdoor environment and use mathematical language. Children develop their knowledge and understanding of mathematics and science through practical or play activities, children learn through experiences first-hand. Most of the children's work will be oral, and through these discussions children learn to communicate about their work.

Children can compare size, shape and colour and they can also discuss what animals could hide inside them if they are in danger, or what has lived inside them. Collecting objects will also help children develop their fine motor skills and verbal counting helps to develop children's mathematical language. Children could practice writing numbers in the sand with a stick, or they could read the number the practitioner writes in the sand, or the children could write the number the practitioner says out loud. Children can go on a shape hunt, can they find any circle objects, for example, a beach ball? Or can they find any rectangle objects, an example of this would be a beach towel, as well as other shapes. Children could also roll down the gradient, using their bodies to negotiate space, play with the environmental features for moving their bodies and being physically active, and develop resilience and stamina over time, this will help children to learn about forces and energy (White, 2014). All these activities are educational, fun, and link in with the Curriculum for Wales (2020a and 2020b).

Feature 2 – Sea

The science of ocean tides! Fisher (2013) suggests explaining the tidal changes to the children by marking a spot on the beach, placing a stick in the sand and during the day the children check on the stick to see if the sea is getting closer. Practitioners could also get the children to explore the environment and look for rock pools, this links to the New Curriculum for Wales (2020b), under Science and Technology, where children can show interest and question how the tides work. Hogan (2017) and Horvath (no date) point out that children could count the seconds in between waves, this will help develop their sense of time and this incorporates mathematical development as part of the Foundation Phase Framework (2015a). Furthermore, Gift of Curiosity (2013) believes practitioners could discuss with children how the Oceans cover most of our planet and for the children to understand the difference between the fresh water we drink and the salt water in the sea. Further discussions with the children about how the wind causes the waves in the sea. This will help the children's knowledge and understanding of the World which is part of the Foundation Phase Framework (2015a). Practitioners could then play games with the children to see how many waves they can jump over, or how many steps it will take to walk down to the sea, counting out loud to further strengthen their mathematical language.

Children can look for objects on the beach that would sink or float. Practitioners could encourage the children to look out at the sea to see if anything is floating, some examples would be boats and seaweed. Then the children could look out for items that would sink, for example, shells and pebbles. Predictions and discussions can be made as to why some items float and why some sink, exploring size, weight, and other properties of the objects to determine how quickly it sinks to the bottom or rises to the top. In addition to this, practitioners can discuss how the waves push items (Mom for all seasons, 2017). All these activities Practitioners will be doing at the beach, they will be covering areas of Mathematics and Science in the New Curriculum for Wales (2020).

Feature 3 – Habitats (Fauna)

As part of the Foundation Phase Framework (2015a) and the New Curriculum for Wales (2021) children should be given experiences to enhance their understanding about living things, habitats, and life cycles. Investigate and interrelate directly with the animals and insects in their natural habitats (White, 2014). There are usually three areas for habitats at the beach. First area would be the sand, here children could look for crabs and other insects, practitioners could enhance this experience by giving the children magnifying glasses. The second area would be the sea, children could look for fish and jellyfish. And the third area would be the grassland, where children would see seagulls, or other types of birds and plants. Children could be encouraged to explore the environment for rock pools, where they may find starfish and crabs, and compare the difference between animals and plants, and the differences, the children could group them into different categories. Practitioners can provide buckets for this task, for children to collect any animals they find. Or an iPad could be provided for the children to take photographs of the animals and their habitats.

The New Curriculum for Wales (2021) and the Foundation Phase Framework (2015a) have stated that children should be able to use mathematical language to estimate and to make comparisons including 'more than' and 'less than'. When the children have collected their animals, children can estimate how many crabs are in the bucket, does a different child have more or less in their bucket, or how many starfish were photographed during the day. Further discussions can be made about how estimations are not always accurate.

Patrick and Tunnicliffe's (2011) study found that when children experience animals in their natural habitats and the environment is rich with opportunities for the children to explore, these experiences contribute to the children's knowledge and understanding about the animals they found and helps the children to retain that information.

All three features will incorporate the four purposes of the curriculum for Wales (2015b). The children will be capable and ambitious learners who are creative contributors, they will be confident and healthy individuals and ethical informed citizens.

Section 3**RISK BENEFIT ASSESSMENT**

Location / Activity:	Beach	Date:	11 th September 2021
Assessor:	Helen Westermarck	Review date:	11 th April 2022

ACTIVITY	How will young people BENEFIT from this activity?	Possible hazards	Who is at risk?	PRECAUTIONS in place to reduce the risk of injury	Overall risk RATING: L/M/H
Walking on uneven ground.	Walking on sand uses different muscles compared with walking on hard surfaces, this will help with balance and muscle control which supports children's vestibular sense. Children will become aware of gradients and slopes; this will help them to understand about forces and energy.	Children may fall or trip, causing a cut, sprain or another injury.	Children and adults.	Discuss with the children how the sand feels different to hard surfaces. They may want to try walking on the sand with shoes on first and walking slowly until they are confident, and then they can try with their shoes off. Appropriate clothes and shoes for the beach, for example sandals or wetsuit shoes.	L

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
Children exploring the rock pools.	Children have a chance of learning about living things. Children have opportunities to explore animals in their natural habitats. Children will improve their fine motor skills when reaching out or bending and stretching, this will help with their physical development. Become ethical citizens by being aware and considerate of other living things.	Children may have to climb on to a rock pool, they could slip or trip and this could cause a cut, bruise or another injury. Children could slip into the rock pool water and become wet. Sharp rocks or shells could cut their feet if they are not wearing shoes. Animal/insect bites or an allergy to animal/insect bites. Children may become lost if they wander off.	Children and adults.	Practitioners could carry a small first aid kit with antibacterial wipes and plasters. Children can be advised to bring a spare set of clothes from home when going to the beach. Children will be made aware of the boundaries, where they can go without an adult and where they can go. Children are made aware of litter and objects on the beach which are not suitable to be collected. Children are advised not to put anything in their mouth and to wash their hands at the end of the experience. Children are made aware of stranger danger procedures.	L

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
Collecting materials.	This will support children's learning and development of numbers, including ordinal, cardinal and nominal. Children can learn about ordering in size. Children can choose different shape, size and colour shells or pebbles for a specific use. Children can explore the differences between the properties and materials. Children can listen to the shells to see if they can hear anything and smell them, using their own senses.	Buckets can become heavy when children are carrying them full of shells or pebbles, they have collected. Children may trip or slip whilst collecting materials causing a cut or bruise or another injury. Children may collect inappropriate items, such as rubbish.	Children and adults.	Children will be made aware of items not suitable to collect. Discuss with children the items they may find could be new and surprising. Practitioners could carry a first aid kit with antibacterial wipes and plasters. Discuss with children how not to overfill their buckets so they become too heavy to carry.	L

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
Outdoors in different weather conditions.	Children will become familiar with words hot, dry, wet and will be aware of different temperatures. Children will learn to recognise things in the environment which could become harmful to themselves and others and become aware on how to reduce the risk. Children will gain knowledge on self-care and monitoring risk.	High winds will blow sand in the children's eyes which can be painful. Children may be too cold or too hot. This can cause hyperthermia or hypothermia in extreme cases. Children could become wet causing them to be distressed and uncomfortable. Exposure to sun can cause heat stroke or sun burn.	Children and adults.	Practitioners should monitor the weather conditions with the Met Office. The beach trip would not go ahead in extreme weather conditions such as high winds, stormy weather or extreme heat. Appropriate clothing should be worn by the children and the adults, for example hats and sunglasses. A jumper or jacket would need to be taken, even on a warm day as the children can become cold with the sea breeze. Appropriate shoes should be worn. Sun cream should be applied at least thirty minutes prior to sun exposure. A bottle of water to prevent dehydration.	L

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
Children playing with sand and water.	Water play introduces mathematic and scientific concepts. Develops children's gross and fine motor skills. Promotes creativity and imagination. Multisensory experiences. Hand and eye coordination. Social and emotional development. Cognitive skills, this is because water allows children to make discoveries and explore.	Children could trip or fall on the sand, causing a cut or bruise or another injury. The children will need to be always supervised when near the sea. Rock pools the children could be bitten by a crab.	Children and adults.	Discussing with children the dangers of the sea and making sure an adult is always with them when they are near there. Making sure the children use nets to collect any crabs or other animals rather than their hands, this will prevent any bites. Discuss with the children how to take their time and walk sensibly around the beach.	L

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
Children exploring the environment independently.	Children can explore the environment, communicate their ideas, and observe. Children can recognize things in the environment which could be harmful and take action to reduce the risk to themselves and others. Supports holistic development of the child. Nurtures children's health and wellbeing.	Children may wander off and get lost. Children may become frightened if they see for example, a crab and an adult is not nearby.	Children and adults.	Although children will be exploring the environment independently, an adult will be always nearby. Adults will take smaller groups of seven children to go and explore. Making sure the adult to child ratio is correct before the children leave to go on the beach trip.	L

Section 4

Tucker (2010) states that when children are learning, the environment plays a crucial role. Similarly, Waite-Stupiansky and Cohen (2020) suggest practitioners should provide environments which are stimulating and plan experiences with the natural world. Early Education (no date) have stated that Friedrich Froebel emphasized the importance of being outside with nature. He believed children understand the world through direct experience, his ideas about learning through nature have spread throughout the world. Grigg and Lewis (2016) argue that not all practitioners share the same enthusiasm for learning outdoors. Children will pick up on practitioner's who are inattentive in their approach as this will diminish the quality of their learning experience. In addition to this Forest School Association (no date) claim forest schools have been around since the nineteenth century, it is a child-centred learning process that promotes holistic growth through attending regularly. However, Wood Learn Forest School (no date) have stated that beach school is a new concept. Each environment offers different learning opportunities and potential for discovery. Beach experiences can be planned to link with all aspects of the curriculum, from mathematics and science to health and well-being.

According to Richardson (2014) the beach offers children direct experiences which are engaging especially with animals, plants, and natural materials. The quality of the relationships between children and practitioners' changes when exploring outdoors, this is because practitioners can get involved in the exploration or observe and listen to the children's interactions. Enthusiastic and knowledgeable practitioners are vital to unlocking the potential of the outdoors, and young children thrive when they have real experiences in stimulating environments, such as the beach, which are filled with opportunities for learning mathematical and scientific concepts that can intrigue and engage the child in real-life problem solving (McLennan, 2017) and (White, 2013). Furthermore, McLeod (2020) believes this links with Vygotsky's theory that children acquire strategies and problem-solving skills through social interaction and knowledgeable members of society. Gealy *et al* (2020) study shows that practitioner and child interactions to support scientific and mathematical concepts are crucial. However, the practitioners may have concerns about responding to the questions from the children due to lack of subject knowledge. Further training could be provided for practitioners to enable them to support children's learning and development further.

Skarstein and Skarstein (2020), Hoisington (2018) and Learning Lift off (2018) have similar views that practitioners who are knowledgeable about the environment and species, can help promote children's curiosity which will expand their knowledge and understanding of nature. Children learning about the environment are motivated through curiosity and discovery which is a fundamental scientific attitude. Eva (2018) says it is beneficial to children when practitioners model and encourage curiosity and discovery. Walden University (no date) further strengthen this by saying it is important to show children enthusiasm and curiosity, the more practitioners demonstrate this the more likely the children will become curious. Practitioners can encourage children's scientific and mathematical learning through nurturing their curiosity. Jirout and Klahr (2012) agree that curiosity in the natural environment such as the beach, leads to children's exploratory behaviour. Additionally, Cherry (2020) points out that Jean Piaget's theory that children actively participate in their own learning process, acting like little scientists as they experiment, and learn about the world around them. Similarly, Aungst (2019) believe children with curious brains are better at learning. Although practitioners can persuade children to become curious about what they want them to learn. However, practitioners should provide opportunities for the children to make their own connections through exploration and discovery. Walden University (no date) agree that curiosity is vital to learning when children are curious about what they are learning they are more likely to remember the information. Hassinger-Das and Hirsh-Pasek (2018) point out there is a link between curiosity and academic achievement. However, Shah *et al.* (2018) study shows there is a gap in the market to see if curiosity and effortful control in children is linked to academic achievement.

Mclennan (2017) and Wilson (2012) have similar views that when practitioners encourage children to collect natural materials like shells, it is a way to combine mathematics and science into outdoor play. Creative Star Learning (2017) maintain that Simon Nicholson's loose parts theory where the children can be creative and inventive and that everything is place-specific, what works at the beach will be different in the woodland. Once children have collected their natural resources for instance, shells or pebbles, practitioners can encourage mathematical and scientific concepts, for example counting them one by one, sorting them by colour, patterns, and size. Children can even create number games together (Wilson, 2012). Moreover, White (2014) believes practitioners can encourage mathematical and scientific language through play, they could use descriptive language for the shells they have found and when the children hear the practitioners describe what is happening during play and exploring. According to Tucker (2010) these natural resources will be appealing to children as they are tactile, and they provide links to other areas of learning. For example, science (materials, growth), Language (Descriptive language, discussions about similarities/differences), geography (environment, places of origin). Vocabulary and problem solving have meaning when children apply them to real situations. Practitioners should be responsive to children's wondering and observations.

According to White (2014) children will develop their mathematical and scientific cognitive skills at the beach. When children play with natural resources, for example, shells as shown in the picture in section one, they can be used in a variety of ways. Sorting the shells, ordering them, and observing the details, recognising similarities and differences. Construction and patterns support mathematical thinking for size, number, and shape. Some of the best resources for children are natural materials, which are easily found at the beach and are free. These resources can be used for many stimulating opportunities which supports children's learning across the whole curriculum. The beach is the ultimate learning environment for children. Natural materials are effective in supporting children's schema interests. Closely observing children whilst they work on their schema will give practitioners an idea of their interest and what they are working on. Schemas help children make sense of the world whilst they work like scientists building on their own ideas and understandings. This will help the children enhance their learning and thinking mechanisms which lay the foundations of future concepts and their attitudes towards learning (White, 2014). McLennan (2017) further strengthens this by saying natural patterns can be complex, which will require children to think abstractly and interpret the environment in a different way.

Grigg and Lewis (2016) and Lan (no date) have similar views that when children learn in outdoor environments, for example, the beach in section one, they are learning about the natural environment and their heritage, this is done through first-hand experiences and play. Practitioners can educate the children how to care for the environment and all living things. This will help them to develop their critical thinking skills and assist with their problem-solving skills in real-life contexts. Children will start to gain knowledge about the environment and scientific concepts, for example, how things work and link together through experiments and trial and error. When the children are exploring the plants in the sand dunes as shown in section one, practitioners can discuss how water moves up the stem of the plant. Adding additional items, for example, celery, water, a small plastic pot, and food colouring. Practitioners could experiment with the children by putting the food colouring in the water and adding the celery to show the children how the water travels up the celery stick, the children can then see how plants absorb nutrients. This will link theory to practice. Children need time to experiment and think on their own, practitioners should wait before correcting the child, so they have enough time and space to discover and explore themselves (Lan, no date).

Resources for Early Learning (no date) suggest as children investigate scientific concepts they need to explore independently. Practitioners can discuss what they are doing, what they are thinking and wondering as they do it. This models scientific enquiry for children, and the practitioner is providing examples of how to explore, engage in discussions and ask questions. However, White (2014) states that children learning about scientific concepts at the beach, the outcomes are more successful when children share the experience with other children and knowledgeable practitioners. Children need relevant and real experiences with direct contact and playful exploration. They also need opportunities to imitate, repeat and revisit all experiences. Waite-Stupiansky and Cohen (2020) believe when children explore the environment it is important for the practitioner to encourage and guide them, this will strengthen their understanding. Practitioners should mentor, challenge, model, and guide the children.

Purdon (2014) says that sustained shared thinking has been recognized in the Teachers standards Early Years as contributing to children's progress. Additionally, Tucker (2010) says that practitioners should support sustained shared thinking through open-ended questions. Giving children the opportunity to talk to practitioners and the other children will emphasize to the child the importance of the activity and their interpretation and involvement in it. However, Allen and Whalley (2010) point out there is still confusion about the meaning of the term. The Early Years Training Hub (no date) claims that effective adult-child relationships and high-quality environments are essential for sustained shared thinking. Children learn through pursuing their interests through play. The way adults support this learning is how sustained shared thinking occurs. Practitioners can participate in sustained shared thinking with children by showing interest, asking open-ended questions to support the learning process and enjoyment of the child's achievement. Learning Journals (2011) believe when practitioners engage in conversations and activities with the child at the beach, they learn through verbal interactions. This enables the child to build on their existing skill set and improves their communication and critical thinking. Brodie (no date) says sustained shared thinking is free and can be achieved by experienced practitioners. Children who see and hear thoughtful sustained conversations will replicate these.

Additionally, Rainbow Nursery (no date) believes sustained shared thinking provides opportunities for the practitioner to understand the child's cognitive development and schemas. The child could be learning social interaction and how to think creatively. Practitioners could engage in open-ended questions and model appropriate behaviour. Furthermore, Learning Journals (2011) suggest questions will make a child think about what they are doing and why. Similarly, Parenta (2020) claims that the conversations practitioners have with children help them to think through their ideas or problems they are discussing, which in turn embeds in their learning. Verbal interactions which incorporate sustained shared thinking has been proven to be successful in supporting children's development. When practitioners are encouraging mathematical and scientific concepts at the beach, sustained shared thinking will help the child think deeply and critically about the topic. The process encourages children to link different ideas and find solutions to the problems (Learning Journals, 2011).

Early Learning (no date) believe it is important for the practitioner to observe the children when taking part in mathematical and scientific activities at the beach to determine what they have understood, what ideas they have, and what issues they are trying to solve. The best way to support children learning science is to encourage, facilitate and interact which will stimulate their thinking, instead of reciting the facts. Early Education (no date) have stated that Friedrich Froebel believed observation is key to understanding children. Additionally, Spreeuwenberg (2020) and Churchill Park (2018) claim practitioners help children meet developmental milestones and through observations is how they learn about the child, understanding their strengths and weaknesses. When practitioners observe children, they get to know them better and understand their interest and needs. This information will help practitioners to plan to further support children's learning and development in Mathematics and Science. Smidt (2015) agrees that observation is paramount for planning further learning for children.

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