

Portfolio – The Young Mathematician

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Cynllun Gweithgaredd <i>Activity Plan</i>		
Gweithgaredd: Activity: Sink or float Activity		
Nifer o blant: Number of children: 3 children	Oed y plant: Age of children: 3 – 5 years old	Nifer o oedolion: Number of adults: 1 adult
Lleoliad: Location: Indoors	Amser paratoi: Preparation time: 15 Minutes	Amser gweithgaredd: Activity time: 25 – 30 Minutes
Adnoddau: Resources: • Clear 20 Litre tub measuring 35.5 cm • 2 small clear tubs (both the same size) • Labels with the word's 'sink', 'float' and 'does it float or sink' • 3 A4 pieces of paper with seven different images of the objects each. • Water • Variety of real objects - Coins - Pencil - Stones - Toys cars - Lego - Plastic balls - Sponge - Plastic cup - Fork - Scissors - Cork - Peg - Plastic bottle lid		

- Popsicle stick
- Leaf
- Feather
- Plastic block
- Stick
- Straws
- String of wool
- Animal toys

Amcan/ion y weithgaredd:

Aim/s of activity:

To ensure all children understand the term sink and float.

To recognize the different objects that sink or float in the water, by observing the object and trying to guess whether the object is too heavy to float or too light to sink.

Discuss the findings of the activity at the end and ask children for their opinions and thoughts regarding the activity.

Cysylltiadau â deilliannau:

Links to outcomes:

Develop numerical reasoning –

Use maths skills in play and in activities inside the setting.

Show work orally.

Use checking schemes to decide if the answers are rational.

Using number skills –

Use terms like ‘first’ ‘second’ and ‘last’ during play and activities.

Understand and use the concept of one more and one less in play.

Using measuring skills -

Show an understanding of following two-step instructions for simple actions during an activity.

Understand length, weight/ mass capacity.

(Foundation Phase Framework, 2015)

Throughout this activity the children's development also links to the four purposes of the New Curriculum. Children are ambitious and capable learners as they are enjoying the challenge of having to guess whether the object will sink or float once in the water. They are also enterprising and creative contributors as all children can communicate effectively throughout the activity expressing their opinions efficiently. The children are healthy and confident individuals as they develop emotional and social well-being gaining confidence and resilience to give their personal opinions on what they think will happen once the objects are placed in the water. All children are ethical and informed children as they respect the views and values of all the other children throughout the activity.

(Welsh Government, 2015)

Gwahaniaethu:

Differentiation:

This activity is suitable for all children and will be presented to meet the individual needs of the children involved. However, if there is a child in the setting who uses a wheelchair, adults need to ensure that there is room under the table for the wheelchair to be placed and in the area where the activity is being carried out so that the child has enough space to move around comfortably during the activity.

During the activity a child may find it difficult to understand the instructions and mathematical language that is used, for example, heavy, sink or float. If this is the case, adults need to ensure that there is an extra practitioner during the activity to support the individual child, while still allowing the child to interact with the other children during the task, without singling them out.

Iechyd a diogelwch:

Health and safety:

A full risk assessment will be taken into action in line with the policies in the setting. Keeping an eye on all children to ensure they do not place any objects in their mouths as this is a choking hazard.

Water spillage can happen indoors when placing the objects in the water, and water may splash onto the floor, this is a risk for falling and must be cleaned up straight away to avoid any injuries.

Suitable protective clothing will be worn by the children to avoid them getting wet.

Suitable flooring will also be put into place to prevent non-slips, for example, non-slip mats will be placed in the area used to carry out the activity.

Rôl yr oedolyn/oedolion:

Role of adult/adults:

During the activity the adult needs to be enthusiastic and excited as this engages children in sustained shared thinking and supports practitioners to observe and follow children's cues. Through the engagement of both the adult and the child, participation and a better understanding of the activity will be shown, minimizing any inappropriate behaviour. Adults must ensure they respect the opinions and feelings of all the children. If the conversation goes off topic during the activity adults should allow children to explore their own interests, this provides them with a safe and comfortable environment to learn in. The adult must always ensure they are supporting the children to be independent learners giving them the opportunity to lead the activity and work as a team with minimal support unless the children need it.

Y weithgaredd:

The activity:

Firstly, all the materials and objects must be gathered by the children. An A4 piece of paper with a variety of pictures of the objects that are to be collected will be given to each child, having these images will allow the children to not pick the

same objects. While collecting objects the children may pick up objects that are not on the list, that is okay as it allows children to explore other objects that are curious to them.

Secondly, we need to set up the 20L tub with water on a suitable and safe table that does not wobble to avoid any water spillages. Also place the two small clear tubs on either side of the 20L tub with water, as the objects that float will be placed in one tub and the objects that sink will be placed in the other. Ensure that each label is placed on a tub.

Thirdly, place the objects on the table ensuring they are in the children's view.

Then, gather all the children around the table and give them a demonstration of the activity, this will give them a clearer understanding of the activity.

Finally, allow the children to begin the activity independently, always ensuring assistance if needed. During the activity children may change the idea of whether one object sinks or floats and that is okay as it allows them to explore their curiosity. For example, they may explore how many objects they can balance on an object before it sinks or how many need to be taken out for it to float.

Allow children to review their thoughts and feeling of the activity once they have finished.

Section 2

The activity plan offered an understanding experience that will engage the children, as indicated by the Foundation Phase (2015) all children require opportunities to play that will encourage their problem solving and discussion, when planning to support mathematical development. The activity offers children the chance to investigate and be curious as they need to make predictions, according to Tucker (2014) children are more likely to be innovative, this stimulates their mathematical thinking. Children are given the opportunity to understand the mathematical terms through communicating with others, as stated by the Foundation Phase (2015) asking questions allows children to freely explore their findings and develop their reasoning. The plan shows a development in understanding measurement and weights as suggested by the Foundation Phase (2015) children can explore their curiosity of which objects are too heavy to sink or too light to float. The plan provides children with a safe and explorative learning environment allowing choice and free movement that invites children to be creative, according to Tucker (2014) and Maria Montessori (2020) this encourages children to build up their self-esteem and self-belief giving them the opportunity to learn independently. The planning gives children the opportunity to lead the activity, as suggested by the Foundation phase (2015) this supports children to work independently as a team providing them with the opportunity to experience teamwork. Tucker (2014) points out, that working together children can discuss and collaborate their own ideas and thoughts to problem solve and this supports their mathematical development.

However, the health and safety section of the plan needs to be reconsidered, as further risk and challenge could have been incorporated into the activity plan. As Tucker (2014) indicates, taking maths outside enables children to explore and take risks freely without any indoor restrictions. Tucker (2014) also suggests that being outdoors encourages children to make useful mathematical links in their learning. The plan suggests that by the activity being indoors, children don't have the opportunity to explore any objects that are curious to them in the outside environment, according to Nursery World (2004) children become curious to explore and investigate when being

outdoors gaining the chance to learn about the world around them. Also, if the plan took into consideration in making use of the outdoor environment, spillages and slips would have been removed as they would dry out quickly. Being outside provides children with both the risk and challenges for significant learning as Tovey (no date) states through risks and challenges children can develop their imagination and creativity skills, for example, building a den to hide the objects.

The planned activity was suitable for all children, however further consideration of children with ALN may have been beneficial. The plan shows the consideration of space for children who use a wheelchair, nonetheless, providing the child with a safer and free environment would improve the child's development, Tucker (2014) and Knight (2011) suggest that children have more freedom outside where they can adapt to the environment where children are encouraged to explore and take risks. Planning the activity outdoors would provide the child to collect the objects independently, according to Tucker (2014) and Pratt (2011) children would understand that maths is all around them, enabling them to make associations in their learning as well as experiencing the natural materials of nature. Furthermore, the planned activity considers the key person approach for a child with ALN, more thoughts on this would support the child's holistic needs. As stated by Goldschmied and Jackson (2004) having this relation between the child and key person will effectively support the child's mathematical development as they would feel comfortable in an environment where they can express their language and opinions.

Section 3

According to Mediterranean Journal of Social Sciences (2013) resources in settings should be of high quality and innovative to support children literacy and numeracy skills. They suggest that all resources should be able to suit a variety of settings to create a stimulating environment for the children. The Mediterranean Journal of Social Sciences (2013) suggests, that for educational settings to be able to accomplish their objectives, it is essential to have resources that will support them to do so. Victoria State Government (2019) points out, children learn from engaging with the world around them. They can learn new skills and experiences through problem solving, modelling and demonstration. In settings practitioner should encourage 'learning activities by using mathematical language that helps children to explore, describe and understand the world around them' (Victoria State Government, 2019) and ensure children are making a stronger foundation to support their upcoming learning in mathematics. Victoria State Government (2019) states that there is evidence that suggests that using resources with a good quality together with the pedagogy that adapts to the needs of the child leads them to better engage and enhance outcomes.

Back (2013) indicates how manipulatives are used by practitioners in hands on learning to support children's mathematical development. Back (2013) explains that, manipulatives are practical resources that are used within the setting, for example, dominoes, bead strings, counters and many more. Manipulatives are also practical objects which can be picked up by the children that helps them to learn to understand the number system. TTS (no date) suggests that through the manipulatives research children can represent various math's concepts with objects we use daily, children will be able to visualize and explore these objects providing them with an approach to new knowledge and understanding of mathematics. TTS (no date) points out that manipulatives give children the opportunity to communicate their thoughts, however, they are only beneficial and effective to children's mathematical understanding if facilitated by the adult.

Thornton (2016) indicates how natural resources encourage children to use their five senses. Natural resources are found in our environment, they involve objects like leaves, stones, sticks or shells. Thornton (2016) and Beckingham (2019) both state that providing children with an environment that interests them, children will become explorative while developing their curiosity as the environment provides them with chance to ask questions and encourage children to talk about their findings. Thornton (2016) points out, that the natural resources used in settings need to be safely checked to ensure they are safe to be used by the children. Through natural resources children can develop heuristic play by developing their creativity and critical thinking skills. Mathematical concepts are also developed as children talk about the objects they have, for example, is the object long or short or is it heavy or light. Beckingham (2019) points out, how small world figures allows children to story tell, this supports them to develop their expression and emotions. The role play area provides children with critical skills, co-operating and compromising as other children will become involved in the same activity where all children must learn to adapt to each other's preferences and experiences. The small construction area enables children to problem solve during explorative play while developing their language and mathematical skills.

Kimberley (2016) suggests that children have very limited thinking skills when playing with plastic toys as plastic toys can only be used for their purpose, for example, a toy car can only be used as a car. According to Funtastic Toy (2019) plastic toys and resources are not eco-friendly. Funtastic Toy (2019) and Valinda (2020) both suggest how children can sometimes bite on plastic toys, this can be harmful for the child as plastic has toxic compounds that can affect the child's internal organ. What to expect (2019) points out that plastic toys that contain BPA (bisphenol A) can have damaging effects on the development of a child as this toxin is 'linked to attention disorder, cancer-cell growth, early onset puberty and obesity' (What to expect, 2019).

Section 4

Rymanowicz (2015) indicates, how adults have the responsibility to support children's experiences by engaging in their learning and explorative play providing them with the opportunity to expand their knowledge through experiences. Baker et al (2012) states that, giving children some responsibility allows them to build up their self-confidence and decision making independently. Curriculum (no date) points out, that adults should support the social and emotional development of children by building positive relationships where the children feel safe and secure allowing them to learn to build trust and confidence. Rymanowicz (2015) suggests that, adults have a role to observe and interact with children, this provides them with the idea of the child's interests and developmental stages in all areas of their learning including their mathematical skills. It also helps adults to recognize the child's play preferences giving them the chance to plan effectively supporting the mathematical needs of all children.

It is important for adults to plan through The Foundation Phase Framework (2015), The New Curriculum Wales (2020) and The Numeracy and Literacy Framework (2017) as it allows them to successfully plan and observe children's mathematical outcomes as all these frameworks support the requirements to meet the child's mathematical development. The Foundation Phase Framework (2015) states that, children learn from hands on experiential play. 'Through their play, children practice and consolidate their learning, play with ideas, experiment, take risks, problem solve and make decisions individually' (The Foundation Phase Framework, 2015: 3). Adults need to support children with hands on learning, the Foundation Phase Framework (2015) suggests that hands on activities allow children to develop an understanding of the world they live in. Children self-esteem and self-confidence are developed through hands on experiences. Adults have the duty to provide children with indoor and outdoor environments that children find safe and stimulating, according to the Foundation Phase Framework (2015) these environments promote children's mathematical development and curiosity for exploration during hands on learning. Assessments are vital as they focus on the child's strengths and areas that need improvement the New Curriculum Wales (2020) suggest that, through these

assessments adults are able to plan the next best steps that will be the most beneficial for the child's learning effectively. Ensuring assessments are carried out daily through activities will engage the learner, the New Curriculum Wales (2020) suggests that doing this will allow adults to be able to support the individual needs of the children within the settings environment. The New Curriculum (2020) states that it is essential for all adults to plan effectively as this will provide appropriate learning experiences for the mathematical development of all children. Adults need to challenge and help children to make an improvement in their learning. The Numeracy and Literacy Framework (2017) states that adults have an obligation to support children's language, literacy, communication skills and mathematical development through child-led and adult-led learning and experiential play that is based within the child's age and developmental stages. The Numeracy and Literacy Framework (2017) supports the pedagogy and principles of the Foundation Phase Framework.

Kelly (2015) points out that, children's progress is achieved and monitored through observations, assessments and planning cycles from the Early Years Foundation Stage (EYFS). Both Early years (2021) matters and Kelly (2015) suggest that, ensuring daily observations take place enables all adults to understand the child's individual needs effectively as well as their preferences and interests. Kelly (2015) suggests that, observations are vital and monitor the needs of the child and can be used in different ways, for example, understanding both the child's strengths and weaknesses in their development. Through observations adults can become aware of the child's preferences during play-based learning, City Guilds (2019) states that, observations contribute professionally to an approach that considers the well-being of all children. Through observations adults can learn how important it is to keep records of the developmental stages of all children as evidence for any future references. City Guilds (2019) also points out that adults can develop further knowledge of other assessments and monitoring methods that can be used to show children's progress.

According to Coughlan from the BBC News (2019) the UK was placed in 17th placed for the maths ranking in PISA tests compared to China who were placed 1st. The Conversation (2014) states that, children in China begin to understand and learn

maths concepts at the age of seven years old, which is different compared to the UK as children begin to learn about mathematical concepts at the age of four years old. China believes that routine practice is the most effective way for children to learn and have very little teaching materials for children to use. As the UK use resources to support the mathematical development of all children. The Conversation (2014) points out that, China engages all children in material and encourages feedback. They suggest that this is different to the UK as they are more attentive on small groups and children individually.

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