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## Section 1

| <b>Activity Plan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                     |                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Activity: 'Shape Hunt'.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     |                                                                                                                                |
| <b>Number of children: 8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Age of children: 3-4</b>         | <b>Number of adults: 1</b>                                                                                                     |
| <b>Location: Outdoor Classroom Area and nursery Yard.</b><br>Note: if the weather is deemed too severe the activity can take place in and around the school.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Preparation time: 15 minutes</b> | <b>Activity time: approx. 30 minutes</b><br>10 minutes – story time and task explanation<br>20 minutes for task and conclusion |
| <b>Resources:</b> <ul style="list-style-type: none"> <li>• iPad for photo evidence</li> <li>• Round is a Mooncake: A book of Shapes by Roseanne Thong storybook</li> <li>• Group names to identify lower and higher ability groups</li> <li>• Plastic 2D shapes</li> <li>• Outdoor environment</li> <li>• Coloured chalks (Extension)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |                                                                                                                                |
| <b>Aim/s of activity:</b><br>To identify and name 2D shapes in the outdoor environment (Circles, triangles, rectangles and squares).<br>To show an awareness of the similarities of shapes in the environment.<br>To use mathematical language to identify and describe 2D shapes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                     |                                                                                                                                |
| <b>Links to outcomes:</b><br>Links to Shape in the Foundation Phase Profile, (Compact Profile).<br>Ladder of Skills: Outcomes 1, 2 and 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |                                                                                                                                |
| <b>Differentiation:</b><br>Lower ability groups: <ul style="list-style-type: none"> <li>• This group may benefit by focusing on one shape at a time. For example, when going on the shape hunt, search for only circles at first and then move onto searching for squares.</li> <li>• Provide assistance when the children are hunting for shapes. Assist them by finding a shape and ask them questions. For example, "Is this tyre a square? (No) what shape do you think it is? How do you know it's a triangle?"</li> <li>• Focus on identifying simple 2D shapes, circles, triangles, squares and rectangles.</li> </ul> Higher ability group: <ul style="list-style-type: none"> <li>• This activity can be extended by introducing more variety of 2D and 3D shapes.</li> <li>• This group could go on to discuss the properties of shapes; how many sides? How many corners does this shape have? Curved or straight lines?</li> </ul> |                                     |                                                                                                                                |
| <b>Health and safety:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                     |                                                                                                                                |

- Suitable outdoor clothing should be worn by children and adults.
- A risk assessment on the outdoor area being used during this activity is recommended to ensure the environment is suitable and safe to use.

**Role of adult/adults:**

- The role of the adult is to introduce the activity and highlight objectives of the task clearly to the children.
- To use professional knowledge on whether to extend the activity or not.
- The adult should scaffold the correct and appropriate mathematical language of shape.
- Take photos of the children discovering the shapes. This can be used to revisit and evidence their work.

**The activity:**

Find a quiet spot under the sheltered area of the outside classroom for the introduction and story. Explain that today the children will be going on a shape hunt to find different shapes in the outdoors.

Introduce and read the book (*Round is a Mooncake: A book of Shapes*).

Discuss with the children about the different shapes in the book and ask questions about shapes that they might find in their house or in the outdoors.

Whilst sitting ask the children to look around to see if they can identify any shapes, this will be a good example to ensure they have a good understanding of the task.

Show the children the different plastic shapes and discuss the properties of each shape.

For example, “a square has four straight sides and four corners, that window over there is a square”.

Next, explain the shape hunt. Walk with the children to different areas of the outdoors and allow them to explore and share their findings with you. Ask open questions to extend their knowledge and understanding. Promote their mathematical language.

Allow children time at the end to discuss their findings.

Extension: if there is excess time, allow the children to create mark makings of the shapes they have discovered, using the coloured chalks on the outside ground.

## Section 2

The following is an evaluation of the activity plan. This activity was chosen to encourage children to identify shapes in the outdoors and to enhance their knowledge and understanding of different shapes. The intention of the activity is to give children the opportunity to make relations between visualising shapes in their mind and experiencing shapes in the world around them.

The role of the adult in this activity is to actively support the children's learning by 'scaffolding' the mathematical language, which links into Vygotsky and Bruner's theories of the adult taking a more interactive role of constructing the children's knowledge (Rose and Rogers, 2012). Anghileri (2006) notes that scaffolding allows children to gradually build confidence in their understanding. The three-level hierarchy scaffolding practise can help support mathematical development in the classroom. The activity plan provided fits well into these levels, allowing the practitioner to provide good practice of scaffolding to support the children's learning. Level one; scaffolding learning through the use of the environment. Providing the children with a stimulating environment with relevant resources is at the base of scaffolding their learning. The outdoor environment chosen in this activity provides endless possibilities with regards to finding shapes in the world around them. Level two; explaining, reviewing and restructuring. In contrary to constraining a child's learning by telling and showing, the scaffolding approach allows children to develop their own understanding of mathematics by adults encouraging them to review problems. In this particular activity plan reviewing can be encouraged by prompting the children and asking probing questions. This can encourage the children to problem solve and reach their own understanding. Restructuring requires the adult to pay close attention to how the children are thinking and what they are saying. This is where the adult can consolidate the children's understanding by "providing meaningful contexts to abstract situations" or by simplifying the problem. Level three is the development of conceptual thinking. Making connections plays an important role in mathematical development. This activity

promotes the children to make connections between shapes of everyday objects and explore their characteristics, supporting their conceptual thinking.

The location of the chosen activity stays within the Foundation Phase ethos of learning in the outdoors. Pound and Lee (2015) highlight the benefits of bringing maths outdoors noting that it presents opportunities for children to acknowledge mathematics in nature. Bringing mathematics to the outdoor classroom is found to be beneficial to children's holistic development. Allowing children to experience maths beyond the indoor classroom allows them to have access to limitless resources that the outdoors provide, which results in more motivation and curiosity to explore more effectively. The activity being outside will allow the children to apply meaningful problem-solving techniques and make links between theory and reality (NCETM, 2015). The activity plan states that if the weather is deemed too severe then the activity can take place indoors, although this provides the practitioner with an alternative option, it leaves the decision up to the practitioner to make their own judgement on whether the activity should take place indoors or not with regards to the weather at the time. The highly debated topic of whether children should play outdoors whatever the weather is ongoing, although there are many benefits of learning outdoors in all types of weather as long as precautionary action is taken, for example, it is the responsibility of the adult to ensure that all children have the appropriate clothing when undertaking activities outside. With regards to this particular activity it is up to the practitioner to use their knowledge of the importance of outdoor learning and make the necessary judgement and embrace the challenges of the outdoors to enhance the learning experience and holistic development of the children (Kelly, 2016).

The number of children in the grouping of the activity stays within the childcare regulation ratios of one adult to eight children aged 3-7 years (Protheroe, 2016). Smaller group activities show benefits for both the practitioners and children. Nursery aged children are still developing their cognitive and social skills; therefore, they benefit from working in small groups. The shape hunt activity will promote cooperation within the group allowing the children to work together to reach a common goal, resulting in developing their conversation and language skills. Working with a smaller group of children will provide the adult with opportunities to observe the children more closely and manage behaviour effectively (Vickers, 2019). The activity grouping is set for different ability levels, allowing the practitioner to

differentiate the task to meet the specific needs of the children. Differentiation is to modify resources or instructions to meet the diverse needs of the learner (Logsdon, 2019). Although the activity plan differentiates the lesson for the different ability groups, it does not state additional adaptations for children with learning difficulties. Therefore, the plan could be seen as less inclusive to all diverse needs. On the contrary, it is argued that by grouping children in ability groups, children may lose out on Vygotsky's concept of 'the more knowledgeable other', therefore they are at risk of not being exposed to the stimulus of discussions with children with different levels of understanding. This could potentially lead to children self-labelling themselves as to not being very good mathematicians. All children are developing mathematicians; therefore, it is important they perceive mathematics with a Growth Mindset and confidence (Dabell, 2019).

The activity does support outcomes one, two and three in the Foundation Phase Profile for Shape as it allows children to explore shapes and their properties. The task promotes the recognition of shapes and the use of mathematical language to describe them. Although the skills ladder points out that some children with language difficulties may struggle to verbalise their knowledge of the shapes during the activity but may show a deeper understanding when experimenting with shapes during their play. This should be noted and taken into consideration when making observations and assessments about 'Shape' (Welsh government, 2017). The Shape Hunt activity also links to the 'What Matters in Mathematics and Numeracy' statement in the New Curriculum for Wales which states, "Geometry focuses on relationships involving properties of shape, space and position, and measurement focuses on quantifying phenomena in the physical world" (Welsh Government, 2019). The activity not only focuses on the ability to recognise and name simple shapes, but it encourages the learner to explain 'how' they know it is a particular shape by asking open questions, whilst building on supporting their mathematical vocabulary.

The book chosen for the lesson introduction is Round is a Mooncake by Roseanne Thong. It is a culturally diverse book focusing on a little girl discovering shapes in her hometown in China. This book would be a good choice if the class was studying Chinese New Year as a way to integrate mathematics. Many of the objects are Asian

therefore the book provides a glossary to explain the cultural significance of the objects. While the book focuses on circles, square and rectangles, it does not cover triangles therefore this would have to be discussed further by the practitioner, part of the task is that the children are able to recognise triangles as well as the other shapes. The cultural diversity of this book is age appropriate for nursery children making it fun and meaningful. It is important that resources and lessons reflect on the cultural diversity of the school setting in order to be inclusive and raise an awareness of the different culture's societies are made of. It would offer any children from the same culture to relate and share their knowledge of objects discussed in the book, strengthening their own self-esteem and social connections (Buckinghamshire County Council, no date). Although this book offers social benefits, it is important to remember to stay focused to the lesson objective about different shapes found in everyday environments.

### Section 3

There are a wide range of resources used in Foundation Phase settings which support mathematical development. Numicon, plastic money, abacus and counting blocks are amongst many resources that can be found in Foundation Phase classrooms. The use of manipulatives within the classroom such as Multilink cubes, bead strings and Dienes apparatus, can allow children to have a more hand on experience when learning mathematical concepts. Manipulative resources “are objects designed to represent explicitly and concretely mathematical ideas that are abstract. They have both visual and tactile appeal and can be manipulated by learners through hands-on experiences”. It is important for children to become familiar with and have full access to a range of manipulatives to support their mathematical concept development (Back, 2013). Once the children are familiar with the manipulatives offered in their setting and know how to use each one effectively, it is then down to the practitioners to allow full access to the resources. This way children are encouraged to become independent learners when they have a choice of which resource to use, to best suit their particular task (Liu,2019).

There should be the right balance between natural and plastic resources offered in the classroom. Where plastic toys can offer one specific purpose: open ended resources present endless opportunities for learning. Open ended resources encourage children to use their imaginations in their learning and improve their cognitive skills. Froebel believed that open ended resources provided children with the freedom to choose, take control and expand on their creativity and imagination. Rich, stimulating resources with no limits allow children to discover that one material can be used to symbolise something else, strengthening their understanding of the world around them (Little Rascals, 2020).

Montessori believed in offering children a classroom with easily accessible resources. This was done in order for the children to feel like the classroom belonged to them rather than to the teachers. Keeping resources child centred, Montessori adapted resources to the interests of the children. Montessori developed a set of math materials which has inspired educators to this day. Montessori math begins with

concrete materials, and then slowly progresses toward abstraction (Montessori Group, no date). A prime example is the material used to introduce the concept of the decimal system and place value is The Golden Beads. Through using these beads children begin to understand the meaning of place value and that number consists of units, tens, hundreds and thousands. Once the children have a good understanding of quantities, they move on to learning how to associate the quantities to their numerical symbols (Seemi, 2015).

The use of natural resources provides learners with a range of opportunities. Natural, open ended and loose parts allow children to explore the materials not only for what they are but what they could be, allowing the children to express themselves through play. Plastic resources have the ability to limit the child's learning experience. For example, a plastic telephone restricts the play to be a plastic telephone, whereas a wooden block presents endless possibilities, from being a telephone, building a rocket or a castle. Natural open-ended resources allow children to use their own imaginations to extend their learning experience and develop their creativity (TTS, 2017).

## Section 4

The Welsh Government document: Foundation Phase Profile Handbook, explain how schools in Wales plan, monitor and assess mathematical development of children in the early years. The National Literacy and Numeracy Framework (LNF) became a statutory curriculum requirement for schools in September 2013. The mathematical development section in the handbook was revised to include the numeracy component of the LNF. This was done to raise the standards of children's mathematical skills. Practitioners throughout Wales follow the handbook by planning mathematics into the continuous, enhanced and focused provision of the setting. It is a statutory requirement for practitioners to formally assess children's numeracy skills across the curriculum using the LNF. The children's progress and next steps in learning should be shared with parents/carers on an annual basis (Wales Government, 2017). Whilst applying the National Literacy and Numeracy Framework, practitioners must keep within the ethos of the Foundation Phase pedagogy. There must be a balance between adult-led and child-led activities through a play-based curriculum (Welsh Government, 2017a).

It is during good quality play that children practice and refine their skills and understanding of maths. The practitioner's role is to all understand and provide the opportunities for children to consolidate their mathematical skills through play-based learning. Rich mathematical experiences are part of many play experiences, for example, in the construction area a child may be building a house out of bricks. This type of play offers numerous mathematical skills: experimenting with shape, size and measure. It is the professional knowledge of the adult to recognise the play cycle of the child and when to assist them in their play. Adults can then enhance their mathematical vocabulary. This can be done by modelling new words, repeating key words in context when the child is playing and by also using sustained shared thinking technique to encourage problem solving (NCETM, no date).

Although mathematics is one specific area of the Foundation Phase, maths activities are planned into several areas of the classroom. Practitioners incorporate mathematical development into everyday play activities and should provide enabling

environments, allowing resources are accessible to the children to encourage independent learners.

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