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The Young Mathematician

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Activity Plan

Activity Plan / Cynllun Gweithgared		
<u>Activity</u> A woodland bug hunt – with incorporates Mathematics and Early Years Numeracy Skills.		
Number of children: 6	Age of children 3-4 years old	Number of adults: 2 adults
Location: Woodland	Preparation time: 1 Hour	Activity time: 2 Hours
<u>Resources:</u> There are a number of resources needed for this activity such as: - - Tally Chart - Clip Boards - Pencils - Telescope - Magnifying glasses - Viewing chambers / Jars - Tape measure or Ruler - Binoculars - Net - Paint brush – to brush insect into jar Other items needed for this task are: - Warm clothing, which includes hats and gloves - Waterproof clothing (Such as muddy puddles wet suits) - Wellington Boots		
<u>Aim/s of activity:</u> - To incorporate early years numeracy into nature and the outdoor environment and promote mathematics. - To encourage the children to choose their own equipment to explore a variety of bugs and insects through identifying, counting, measuring, and looking at sequence, length and shape. - To record calculations through use of a tally chart and record the data found whilst also allowing opportunities to enhance and further their learning.		

Links to outcomes:

Foundation phase

- Select appropriate equipment and resources
- To present work and use a variety of different ways to collect data
- To recognize that anything can be counted
- Sort objects in terms of size and similarities
(Welsh Government, 2015a)

Four core purposes of the Curriculum Wales

- Set themselves standards and seek challenges
- Think creatively to solve problems
- Are knowledgeable about culture, community and the world
- Have the confidence to participate
(Welsh Government, 2015b)

Differentiation:

All children will be considered in this activity should they have additional learning needs (ALN) or disabilities and it will be adapted for the child accordingly.

Health and safety:

Letters to be given out to parents with a consent form attached, notes should be added to this to ensure children bring any medication such as Asthma pumps and to take any medication such as Anti Histamines before they arrive.

Full risk assessment be carried out which includes being aware of allergies for example bites or stings.

First aid kit to be checked to ensure its all restocked and is in date.

One adult is to hold a valid and up to date first aid certificate

Accident book to be at hand.

Role of adult/adults:

The activity is to be mainly child led, adults to facilitate the activity and offer open ended question through discussion in order to enhance the child's vocabulary through mathematical concepts.

Children to be split into two groups where each adult will be responsible for three children. Adults to have different responsibilities such as: - one to supervise bug hunting and the other the be in charge of the microscopes.

The activity:

To search for a variety of different insects within their habitats and record the number found on a tally chart. For example, - 1 centipede, 2 snails, 3 Woodlice, 4 Worms, 5 Spiders. Multiply the total number of bugs seen.

Choose some bugs to observe and investigate further under a microscope.

Identify how many legs the creature has.

Are they long, short, big or small?

What colour are they?

Sort the creatures into groups, which ones have legs which ones don't.

Make use of a ruler or measuring tape, how big are they?

Which one is bigger in size and which one is smaller in size?

Can you find a caterpillar or a lady bird?

How many spots does the lady bird have?

How many legs do the caterpillar have?

Enhanced and Extended Learning Opportunities

Stories and Rhymes: -

- The very hungry caterpillar
- The very greedy lady bird
- The ants go marching one by one
- Five little lady bugs
- Five little speckled frogs

Extended learning

- Look at life cycles
- Collect tadpoles
- Draw some insects
- Make a bug hotel
- Butterfly garden
- Fairy garden
- Talk about habitats
- Parts of the insect
- Fun facts
- Have a snail race

Evaluation

On close inspection of the above activity plan, this seems to have both strengths and weaknesses. The title of the plan is a woodland bug hunt which will take part outdoors. Even though the heading specifies the woodland, the outdoor environment is not evident within the title.

Durant (2021) states that outdoor play is important as it gives children another environment to explore, this allows them to become independent learners, some children become more confident when outdoors. Playing outside is just as crucial as playing indoors as it allows children space and fresh air which is essential to their wellbeing. Under the equality act 2010 it is a legal requirement for childcare practitioners to provide children with access to the outdoors.

Tovey (2017) supports the work of Froebel who promotes outdoor learning which allows children unique experiences and direct contact with nature which is essential in children's play. Froebel described how children enjoy exploring wildlife in their habitats and explains how fascinated children are with finding and observing small creatures. Froebel also expressed that children are seekers who are constantly looking for new problems and challenges. Adventurous outdoor play allows children to become capable and confident learners (Tovey, 2017).

The woodland is a prime location to spot bugs and insects (The Woodland Trust, 2019) and the ages of the children involved seems to be correct in relation to the activity, the plan reflects the correct adult to child ratio based on the National Minimum Standards for childcare Wales, which refers to standard 15, cited in (The Welsh Government, 2016).

The time allocated to the task is sufficient however the strength of the plan is that there is room to further extend the activity at a later date which is evident within the content. This allows children time to explore which is essential when carrying out any activity. Play Wales (2013) agree with this statement and express that adults need to allow children adequate time to explore activities and play. Play Wales clarify that research in the United States of America was carried out in 2002 and they discovered that children's time to play had significantly reduced

to 12 hours less per week than 20 years ago, they also found that time to play was decreased by 25% and outside play by 50%.

There is a large variety of resources outlined on the plan which are beneficial to the children in order to inspect, identify, count and measure the insects. Tucker (2014) states that by giving children a variety of appropriate resources for any kind of task, will allow them to stay motivated. It is important that they can select their own tools in order to carry out the task, choosing the n available resources allows a child to be creative within their work.

There is a clear explanation of the aim which involves incorporating numeracy into nature and the outdoors where calculations are made through use of a tally chart and mathematical concepts such as identifying, counting and measuring. (Creative Star Learning, 2016) and there are substantial links to outcomes which support the Foundation Phase and the Four Core Purposes of the Curriculum Wales. One of the main strengths of the activity plan is that it does not just concentrate on one area of the National Curriculum such as mathematics, it also connects with other areas such as language, literacy and communication skills, knowledge and understanding of the world, physical development and creative development (Welsh Government, 2015a).

Children with additional learning needs have been considered on the activity plan however the information provided on this is brief. According to the additional learning needs transformation programme, (ALN) is much more varied. (Welsh Government, 2018)

Health and Safety is an important aspect to consider when carrying out any activity. The activity plan has clearly highlighted important points within the plan such as risk assessment. However, the health and safety executive (2020) express that under the Health and Safety at Work Regulations 1999, risk assessments are required by law in order to protect people from harm. Risk assessment allow practitioners to identify the hazard, look at the risk and take any necessary action. However, Tovey (2017) makes it clear that although risk should be assessed the health and safety executive's intentions are not to eliminate the risk completely but to look at the risk and weigh it up as children will not learn if they do not participate in any thing risky. The activity plan also emphasises the importance of consent forms, accident forms and first aid

kits and states that at least one adult should be first aid trained, which are all requirements of the National Minimum Standards for Childcare Wales (Welsh Government, 2016).

The childcare practitioner emphasises, that the activity is to be child initiated and adults are only there to organise resources and offer open ended questions related to mathematical concepts and to further extend the child's vocabulary. Conkbayer and Pacal (2014) refer to the work of Piaget who agreed with this and highlighted that children are constructors of their own learning and the adult role within activities are mainly just to facilitate them, which is to encourage independent learning. He states that children are born naturally curious and have the instinct to motivate themselves to learn. Vygotsky cited in (Conkbayer and Pascal 2014) also agreed that the adult's role is mainly to facilitate activities but also deems that it is good to offer open ended questions to expand on the child vocabulary. Vygotsky firmly believed that by asking open ended questions it helps the child to process their thoughts.

There is an in-depth description of the activity on the last section of the plan which gives a clear explanation on what the activity is all about, it describes mathematical concepts and gives examples of how the childcare practitioner can develop children's learning through open ended mathematical vocabulary and enhance this through story, rhyme and also by further extending learning. The activity plan has provided a detailed list of examples of extended learning which is in line with the Foundation Phase Framework requirements (Welsh Government, 2015a).

Resources

In correspondence with the activity plan in this portfolio, there are a number of resources which can be used to explore wildlife and nature such as binoculars, magnifying glasses, viewing chambers, telescopes and nets. Such resources help children to identify insects using mathematical vocabulary through discussion. For instance, by looking at size, length, shape colour. These are just some of the resources that can be used to develop mathematical skills and concepts, the resources that can be used in mathematics is far more varied and the list is endless (Tucker, 2014).

Wisbey (2015) states that children enjoy playing outdoors with all kinds of resources, they love building dens out of sticks and old materials, and they like to discuss their ideas such as how

tall to build the den, how big is it going to be and how many people will fit inside. Children also enjoy creating obstacle courses. Where they can build, walk on, go under, balance and jump. Mud Kitchens are also great for developing numeracy such as mixing, measuring, and pouring, they create are an invitation to explore and develop the child's curiosity and imagination (Ranson, 2017).

In 1972, Nicholson an architect developed the theory of loose parts cited in (Pacey, 2019). Loose parts are the means of using everyday objects in play as opposed to toys. Children enjoy playing with loose parts such as planks of wood, tyres, bricks, sticks, pinecones shells buttons and cotton reels etc. Such items have many benefits which include learning about shape, size and sequence.

Macintyre (2010) expresses that children enjoy messy play such as sand and water. Sand and water are important resources in developing the child's mathematical skills. Children enjoy selecting the right resources for the job such a buckets and spades' for filling, pouring, tipping and making structures. They also enjoy exploring with jugs, cups and funnels which are good for measuring volume looking for opposites like full and empty and for experiments such as colour mixing with water. Frozen water can also be great fun where children can learn science such as melting and also by looking at temperatures. Resources that encourage floating and sinking such as boats, pebbles corks and bottles are great way of investigating differences between light and heavy. Arnerich (2019) states that water channelling out of old guttering and pipes is another fun activity that children enjoy, discussions can be made on speed, distance and flow.

Role play is an effective way in developing children's mathematical understanding for instance, children may make a shop, with tills, money and price tags where they can use addition and subtraction in order to give the correct change or a coffee shop where they have to take orders and look at quantity such as two cups of coffee. Play food, plates, cups and cutlery can be used to lay a table or to have a teddy bears picnic, which allows children to match, sort, count and sequence. Resources such as clocks and phones in a dental role play area, can be used for telling the time, number recognition and communication (O'Connor, 2011).

There are a variety of construction toys on the market such as Duplo blocks, Lego, Knex, Inter Stars, Gears, Train Sets and Jigsaws which are beneficial to children in play. Construction gives children challenges and allows them to be creative. This is where children get to think outside the box, building allows children to categorise, sort, sequence, order, count, explore shape and solve problems (Early Years Recourses, 2021).

Numicon is an ideal resource for teaching children numeracy skills, Numicon allows children to become familiar with shape and be able to visually link the shapes to numbers. Numicon supports early years mathematics in allowing the child to learn counting skills, through matching numbers ordering and pattern. It allows them to make calculations and discuss the concepts of one more and one less (Oxford Primary, 2020).

Gascoyne (No date) clarifies that there are a number of resources that could be useful for some children with ALN such as sensory resources. Stimulation through sensory equipment helps to increase the child's focus and attention so they are able to occupy themselves. A dark room with resources such as coloured lights, bubble lamps and trickling water can make a real difference in children's lives as it creates a calming effect. Such resources allow the child to identify colours and shapes. Children on the autistic spectrum can sometimes struggle with being over or under stimulated, so a quiet room could be beneficial to them.

Treasure baskets are another useful sensory resource, baskets can be filled with a whole range of natural resources, allowing children's curiosity to investigate shape, colour, texture, size and categorise objects by putting them in order (Poppenborg, 2020).

ICT resources such as clocks, calculators, stop watches, electronic tills, remote controls and computer programs will support numeracy, through number recognition, time and value. Playing cards, spinners and dice are also vital resources as they help generate numbers (Beckley et al. 2010).

Role of the adult

The role of the adult within the activity plan is mainly to provide the resources, and to take part in any mathematical discussions through the use of metacognitive talk. Piaget cited in

(Conkbayer and Pascal, 2014) believed that children are constructors of their own learning and are naturally curious and agrees that the adult's role is to mainly facilitate the activity. Gifford (2020) describes Bruner's spiral curriculum which he developed in 1960. Bruner believed that any activities should be designed to be revisited as this way the child has the time to build on their knowledge and create new learning experiences. Intervention can be introduced by childcare practitioners through mathematical vocabulary in order to build on what the child has learnt previously.

Brodie (2021) talks about sustained shared thinking which was developed from the EPPE research with Siraj-Blatchford, sustained shared thinking can be described as two or more adults working together in order to solve problems for example to look at concepts, evaluate and extend communication, the study found that the children developed the best outcome when the adult interacted and used questioning. It is important that the environment is set up in order to provoke conversation, areas can be sectioned off and that items of provocations can be left within the sections for instance plates and cutlery in a role play area and money in a till. Once conversations are established the childcare practitioner can use sustained shared thinking to understand the child's interests, the environment can then be modified or extended in relation to this and additionally future plan on the child's interests. Thornton and Brunton (2014) states that Reggio Emilia supports provocations which are important in mathematics, as it invites curiosity, wonder and investigation, the practitioner can ask questions and then a silence may follow to allow children time to come up with a theory of ideas.

It is critical that the childcare practitioner plans for mathematical lessons appropriately if a childcare practitioner fails to prepare, then they are potentially preparing to fail. It is important to be able to deliver a lesson effectively and steer the lesson in the right direction without any plans this would be difficult and even impossible (Jones, 2018). When planning for open ended maths it is vital that the childcare practitioner has some kind of idea of what the children are meant to learn, it is key that planning allows room for further spontaneity. Learning objectives are important but this also needs to balance with the child's extended interests (Thornton and Brunton, 2014). The ethnical and diversity in childcare centres in schools is increasing, lessons plans need to cater for this and also include information of how to support children with (ALN) additional learning needs. A lesson plan does not necessarily need to be detailed however it needs a clear overview of its aims and outcomes (Jones, 2018).

Childcare practitioners need to be aware that there can be various cultural differences within settings, therefore each setting needs to observe and plan for this accordingly. Vygotsky believes that children will learn about culture off other children and he points out that the children will absorb the culture they are immersed in (Conkabayir and Pascal, 2014).

Early Years Wales (2020) express that mathematical development is fundamental as it is one of the seven areas of learning within the National Curriculum. It is essential that the childcare practitioner not only plans effectively for mathematics, but also makes clear evaluations through observation and formative assessments in order to produce clear and concise outcomes.

Early Years Matters (2021) state there are two different types of assessments within the foundation phase, ongoing assessments and summative assessments. Ongoing assessments are what childcare practitioners do every day to look at what the child can do already, what they have learnt that day and how they can move forward. Summative assessment takes part twice within the foundation phase, the childcare practitioner uses this information to identify the strengths and the weaknesses within the child's learning. This information gets added to the child's record of achievement.

According to the OECD (2018) the Programme for the International Assessments looks at student's knowledge in reading, maths and science. It provides the most accurate assessment of outcomes. A snapshot of the 2018 Pisa results showed that United Kingdom scored above average in reading, maths and science. However, there were other countries that scored slightly higher therefore it is important that childcare practitioners continue with the current pedagogy methods in order to remain in the same bracket or whereby possibly make further improvements.

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