

Mathematical ConceptsContents Page

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Activity Plan		
Activity: Cooking Pancakes		
Number of Children:	Age of Children:	Number of Adults:
Two Children	Five years old	One Adult
Location:	Preparation time:	Activity time:
Indoors	Thirty minutes	One and a half hours
Resources:		
• Apron • Eggs • Plain Flour • Milk • Oil		

- Whisk
- Jug
- Bowl
- Weighing Scales
- Plate
- Pan

Aim/s of activity:

The aim of the activity is to support children's curiosity through a play-based cooking activity that will teach mathematical skills and help a child develop new skills for example, the activity will encourage children to use counting, weighting, estimation, division, and quantity. This will encourage children to learn how to count from 1 – 20, the activity teaches children how to use their fine motor skills and their gross motor skills. It can teach children that if they have two different ingredient that weigh the same the quantity can be different. This can help them solve problems for themselves by adding and taking away.

Links to Outcome:

The Foundation Phase (2015) suggest children ages five to six can develop and understand Mathematical skills. The activity will provide the opportunity for children to engage in counting 0 - 20, they learn how much an ingredient weighs and whether they need to add or subtract an ingredient, this can support children solve problems for themselves. Children can identify the differences of 2D and 3D with shapes, they can identify different temperature hot or cold and use fractions like halving during cooking.

Donaldson (2015) the four purposes within the Mathematical skills should include problem solving skills, adding, subtracting, and multiplying skills, using data, exploring and the use of their own skills to understand how they can adapt or improve. It encourages children to understand how to solve problems for themselves and helps them evaluate and improve their skills.

Differentiation:

If a child has additional need's, they are required to have a 1-1 support worker who will help to ensure the child is able to do the activity. If a child has a physical disability their support worker will ensure there is a space in the environment and adapt the environment to help support a child's participation.

Children who are more able to do an activity should have the opportunity to self-direct and follow instructions independently without an adult.

Health and Safety:

To ensure that a risk assessment is carried out in the environment and there are minimum risks to the child's wellbeing, a Keyworker should be aware of the risks in the environment.

Health and safety should be followed by both Adult and Child to ensure there is minimum risk of a child getting injured. All participants should ensure they wash their hands and wear an apron to ensure there is no cross contamination.

Role of the Adult:

An adult's role is to plan out the activity and to ensure a risk assessment is carried out in the environment. An adult should follow the health and safety guidance, due to the risks, an adult should use the cooker to avoid any serious harm to the child, however this should be the only role the adult should participate in as a child learns through self-direction. An adult should observe the child and used sustained-shared thinking, if the child has any questions to ask, which supports a child's curiosity and help them get the knowledge of Mathematical concepts.

The Activity:

A child will be encouraged to sit at a table with a cookbook and discuss different types of cooking methods, so they can decide for themselves if they would like to participate in making pancakes.

The child will collect all the equipment and ingredients they require, each of the items will be child sized and put at a height that the child can reach.

The child and adult will both wash their hands and put on an apron for health, safety, and hygiene as there can be cross contamination and ensure clothes do not get damaged.

The adult should supervise the child as they weigh and count the ingredients, this encourages a child to use their fine motor skills and their gross motor skills.

The supervisor should ensure if the child has any questions there can be a promotion of sustained-shared thinking skills by discussing problems and solutions.

The child should mix the ingredients self-directed to encourage them to participate in the activity.

When the baking is finished the child should have the opportunity to decide how many they would like and what they would like on them as this can help their counting skills for example how many banana slices would like this can encourage them to count the banana slices themselves.

Evaluation

The planned activity supports a child's development in mathematical concepts. The Welsh Government (2015) states mathematical skills should be apart of a child's experiences and their lives. Children should be hands on learners, it should be fun for them, it can support them to explore and enhances their curiosity with the ingredients, it supports their problem-solving skills, and supports them in learning to understand mathematical concepts, such as putting ingredients in a bowl in order of which the book suggests. Howard and McInnes (2012) agrees with the Welsh Government (2015) that children should be hands on learners through self-directed play and have the opportunity to engage in free flow play as these experiences support children when they solve problems and therefore support mathematical skills. Burnett (2021) suggests Piaget agrees with the Welsh Government (2015) and Howard and McInnes (2012) that children in the Foundation Phase need "action, objects, pictures and symbols" to understand maths, Piaget calls this the "Material language" (Burnett, 2021). Therefore, children need to be provided with hands on activities and experiences to teach them to understand and develop mathematical concept skills.

Welsh Government (2017) states that children should be provided with the opportunity to do activities as it enhances their ability to learn patterns, symmetry, and sequences. It can help them to understand 2D and 3D shapes, it can support them to understand how to use fractions such as halves and the differences between hot and cold temperatures, during the cooking activity. Tucker (2014) supports the Welsh Government (2017) explaining that children provided with the opportunities to do activities can develop mathematical concepts through engaging in problem solving during play and exploring 2D and 3D shapes, height, weight, and lengths.

Donaldson (2015) suggests it is important for children to be provided with experimental learning, when a child participates in the cooking activity, they can add or subtract ingredients, which supports them to develop mathematical concept skills by. Donaldson (2015) believes children learn how to problem solve while making. According to Topmarks (1998-2021) cooking provides children with the ability to learn maths. When children weigh out ingredients, they learn how to use words such as “more than and less than”. (Topmarks, 1998-2021) If children hold packages with ingredients in, they can learn estimation skills. Early Years Wales (2020) supports Donaldson (2015) and Topmarks (1998-2021) children in the Foundation Phase should be supported and given the opportunity to take part in creative and making, therefore supporting the cooking activity as they learn mathematical skills, it is effective and fun, it teaches them how things work and how too problem solve.

Tucker (2014) believes children should have a range of maths choices in their environment and they should be taken advantage of. The activity provides this as it gives a child different choice in what type of toppings they would like and the option of how many they would like, it teaches children fine motor skills, construction, and gross motor skills. Donaldson (2015) agrees with Tucker (2014) explaining that children should have a choice in their learning, as it encourages them to become motivated, it encourages them to be more engaged which can support their understanding of mathematical concepts.

The activity plan reflects on children with disabilities and how to adapt the environment to cater for their needs. Hogan (2017) believes all children should be provided with equal opportunities and every child has their own unique way of learning. Children that have disabilities may require one to one support. With this support a child with disabilities can learn new strategies and they can learn to do maths through play. Early Education (no date) suggests Froebel supports Hogan (2017) every child should have the opportunity to participate in the planned activity as it supports their development. Donaldson (2015)

agrees with Hogan (2017) and Early Education (no date) every child has the right to learn through play as it provides them with the opportunities to be curious, to explore and make mistakes, therefore supporting problem solving that enables their mathematical concepts and skills to be developed..

Helen (2013) discusses how Bruner believed children go through three stages when learning mathematical skills, they are the “enactive, iconic, and symbolic”. The role of the adult with-in the planning enables a child to follow the three processes of mathematical learning. The cooking activity plan supports Bruner’s thinking as explained by Helen (2013) I gives children the opportunity to explore and manipulate ideas, leading to problem-solving and the opportunity for a child to learn mathematical concepts.

Discussion

Tucker (2014) discusses how children should be hands-on learners and use natural materials, Tucker (2014) suggest when children use natural materials, they learn 2D and 3D, shapes, heights, and lengths through reasoning and problem-solving, this can extend their Mathematical concepts and skills by being creative and participating in risky play. Risk is important to a child as it gives children the opportunity to give them hands-on experiences and supports their problem-solving skills further.

Kimberley (2016) discusses natural resources encourage children to be creative which teaches them how to problem solve and enhances their mathematical skills, where plastic can restrict a child’s thinking skills. Natural resources can help children with their development of fine motor skills, as children explore and manipulate the resources. Plastic is mainly for the colour and it is easy to keep clean. However natural resources offer open-ended play as Kimberley (2016) suggests during the activity, a child should be offered equipment that suits their needs as it encourages children to participate in the activity which can encourage them to use their fine motor, gross motor skills and problem solve which can enhances they maths skills.

Montessori Academy (2018) suggests Montessori believes children should use miniature “house-wear and cook-wear” materials, which should be accessible to a child. While cooking with a child it can become a teachable moment, children can learn mathematical and science skills, such as by measuring how much water they need and how does water boil. However, Montessori Academy (2018) believes when children use miniature items such as glass jugs or Knifes children learn to be more responsible and have an

understanding to the risks. Murphy (2018) suggests Piaget agrees with Montessori Academy (2018) children should be hands-on learners and use real objects that provide contextual understanding which supports them using their thinking skills and enhances their mathematical concepts and skills.

Play Wales (2021) suggest children should be provided with loose parts while baking as it supports a child's play, they can decide what loose parts they would like to use to do the activity, for example, what size spoon they would use to transfer an ingredient therefore supporting a child with their problem-solving skills. Playvolution HQ (no date) agrees with Play Wales (2021) as Froebel suggests children should play with natural materials which are loose parts children it is important as it enhances a child's outdoor and indoor experiences and allows them to problem solve and encourages their understanding of mathematical concepts.

The activity plan is supported by The Imagination Tree (2017) although the mud kitchen is prepared in the outdoor environment, children will proceed to do the activity in the same way they did prior to the indoor environment. A child will proceed to do the same things by using their imagination, children can use nature materials found in the outdoors and they can use them to pretend to cook, they can do this by being messy and guessing how much ingredients they need it can enhance their problem-solving skills and support their mathematical concepts and skills. Goodwin University (2020) agrees with The Imagination Tree (2017), as Goodwin University (2020) discusses the Reggio approach, which focuses on both the indoor and outdoor environment, children should have free flow play because it enables them to make choices with which natural material they would like to use. Goodwin University (2020) suggests an adult should facilitate a child's development of mathematical concepts by ensuring children have space in the environment and to ensure they have the opportunities to make their own choices when they choose an activity they wish to participate in.

Excelsior (2017) suggests children should play with plastic, as plastic can be more beneficial to children as it is safer than wooden resources, plastic reduces the risk of a child becoming ill as it is easier to clean and more sterile, where as wood is harder to clean and keep sterile.

Explanation

Kimberley (2017) suggests in the Foundation Phase setting the teacher can encourage maths by introducing children to different shapes, sizes and lengths within the

environment, the teacher should ensure the items are accessible for the children and they can make suggestions such as putting games in size order to encourage a child with their learning of mathematical concepts.

Taylor (2013) discusses how adults will draw children to understand maths as they point out and talk about “numbers, quantities, shapes and sizes”, which is a part of everyday life. Taylor (2013) suggests that Vygotsky believes children need guidance from an adult or a peer who has more knowledge, Vygotsky theory is the “zone of proximal development” children learn mathematical concepts through a more knowledgeable person. Howard and McInnes (2012) agrees with Taylor (2013) children can learn an understanding of mathematical concepts when the environment is prepared by an adult, an adult can provide support for a child and ensure they can have the opportunities to participate in the activity. Howard and McInnes (2012) suggest that an adult should understand how they should be involved in a child’s play and whether they need to be involved with the activity and if a child needs support to understand mathematical concepts.

The role of the adult as explained within the Foundation Phase (2015) directs practitioners to complete risk assessments. Sayers (2019) suggests an adult should supervise a child during a cooking activity while they are preparing the ingredients, as children can stop paying attention to the activity or can be distracted, this can affect the health and safety of the child which puts them at risk. Early Years Resources (2018) Tucker (2014) and the Foundation Phase (2015) suggest children should take risks and be provided with the opportunities to explore as this teaches them mathematical concept skills. Childcare (2021) agrees with Pilcher (2021) a risk assessment should be carried out in the kitchen. Childcare (2021) suggests children can help with the assessment, they can do this by drawing a picture and using different colours to show where the risks are, this allows children to control the risks for themselves. Drawing is considered as “messy play” when a child draws and copies what they see they can count items for example, how many knives, forks and spoons there are and draw them all, it can support a child’s development of mathematical concept skills.

Montessori Academy (2018) suggests an adult can simplify the cooking activity instructions so a child can understand it and they should encourage a child to cook self-directed, as it teaches them fine motor and gross motor skills, they learn to solve problems, which can support a child’s mathematical concept skills. An adult should observe a child and answer any questions a child may have. Montessori Academy (2018) suggests

Montessori believed children from the ages of three and up, can follow instructions and use equipment on their own. A child should be able to participate in the cooking activity on their own. However, Batt (2013) suggests adult led play is important for a child's development, it allows children to participate in activities they can not manage themselves, an adult should be the lead in the kitchen while a cooking activity is taking part, this is because there is equipment in the kitchen such as a hot cooker or sharp knives, that can be harmful to children if they are not used properly. A child can learn mathematical concepts skills when they participate in the cooking activity, with the support of an adult children can learn how to count and weigh out ingredients which supports their fine motor and gross more skills.

Welsh Assembly Government (2008) also known as (WAG) believes while a child is participating in the cooking activity, an adult should observe and assess a child, this should be done to recognise if a child needs support with understanding and problem solving with in the cooking activity, when children solve problems it can help support them with their mathematical skills. Azilo Training (2019) supports Welsh Assembly Government (2008) also known as (WAG) when observing a child during the cooking activity an adult can assess a child's abilities, if an adult thinks a child needs support with their development skills, a plan can be set out with-in the guidance of the foundation phase procedures and all parties involved in a the child's life can help support the plan, as it will encourage the child to learn and support their development of mathematical concepts and skills.

Reference List

Azilo Training (2019) *The Importance of Observation in Childcare Settings* Available at: <https://azilotraining.com/2019/08/16/the-importance-of-observation-in-childcare-settings.html> (Accessed: February 22, 2021).

Batt, D. (2013) *How Play is Structured in Early Years Settings to Promote Development* Available at: <https://www.pearsonschoolsandfecolleges.co.uk/FEAndVocational/Childcare/BTEC/BTEC-Firsts-in-Childrens-Play-Learning-and-Development-2013/Samples/BTECFirstsinCPLDDraftStudentBookSamples/BTECFirstsinCPLD2013S BUnit2DRAFT.pdf> (Accessed: February 21, 2021).

Burnett, J. (2021) *Making a Change for Good: Part 3* [Blog] Available at: <https://www.origoeducation.com/blog/piagetian-approach-to-teaching/> (Accessed: February 14, 2021).

Childcare (2021) *Cooking with Children* Available at: <https://www.childcare.co.uk/information/cooking-with-children> (Accessed: February 21, 2021).

Donaldson, G (2015) *Successful Future: Independent Review of Curriculum and Assessment Arrangements in Wales*. Cardiff: Welsh Government.

Early Education (no date) *Friedrich Froebel* Available at: <https://www.early-education.org.uk/about-froebel> (Accessed: February 15, 2021).

Early Years Resources (2018) *The importance of Risky Play in Childhood* Available at: <https://www.earlyyearsresources.co.uk/blog/2018/10/risky-play-importance/> (Accessed: February 19, 2021).

Early Years Wales (2020) *What is the Foundation Phase?* Available at: <https://www.earlyyears.wales/en/foundation-phase> (Accessed: February 14, 2021).

Excelsior (2017) *The Advantages of Plastic for the Education Industry* Available at: <https://www.excelsior-ltd.co.uk/blog/the-advantages-of-plastic-for-education/> (Accessed: February 19, 2021).

Goodwin University (2020) *A Look Inside the Reggio Emilia Classroom Environment* Available at: <https://www.goodwin.edu/enews/reggio-emilia-classroom-environment/> (Accessed: February 22, 2021).

Hogan, J. (2017) *5 Maths Strategies to Support a Child With Learning Challenges* Available at: <https://www.scholastic.com/parents/school-success/learning-toolkit-blog/5-math-strategies-to-support-child-learning-challenges.html> (Accessed: February 15, 2021).

Howard, J and McInnes, K. (2012) *The impact of children's perception of an activity as play rather than not play on emotional well-being* Available at: https://moodle.uwtsd.ac.uk/pluginfile.php/324468/mod_resource/content/1/Howard%20and%20McInnes.pdf (Accessed: February 14, 2021).

Kimberley (2016) *Are Natural Resources Better than Plastic Toys?* Available at: <https://www.earlyyearscares.com/eyc/enabling-environment/are-natural-resources-better-than-plastic-toys/> (Accessed: February 20, 2021).

Kimberley (2017) *Could Your Setting do More to Promote Maths?* Available at: <https://www.earlyyearscares.com/eyc/learning-and-development/setting-promote-maths/> (Accessed: February 20, 2021).

Montessori Academy (2018) *Montessori in the Kitchen: Cooking with Your Child* [Blog] Available at: <https://montessoriacademysharonsprings.com/montessori-in-the-kitchen-cooking-with-your-child/> (Accessed: February 17, 2021).

Murphy, S (2018) *The Classroom* Available at: <https://www.theclassroom.com/apply-piagets-theory-classroom-7741298.html> (Accessed: February 20, 2021).

Pilcher, M. (2021) *Health and Safety in the Nursery* Available at: <https://www.teachearlyyears.com/nursery-management/view/health-safety-in-the-nursery#:~:text=Early%20years%20providers%20are%20required,and%20are%20updated%20whenever%20necessary.> (Accessed: February 21, 2021).

Playvolution HQ (no date) *Fredrich Froebel* Available at: <https://playvolutionhq.com/glossary/fredrich-froebel#:~:text=Froebel's%20occupations%20were%20loose%20parts,sand%2C%20beads%2C%20and%20rope.&text=Another%20of%20Froebel's%20most%20important,play%20as%20essential%20in%20education.> (Accessed: February 18, 2021).

Play Wales (2021) *Loose Parts Play Toolkit* Available at: <https://www.playwales.org.uk/eng/publications/loosepartstoolkit> (Accessed: February 18, 2021).

Sayers, J. (2019) *Pros & Cons of Letting Kids Help in the Kitchen* Available at: <https://www.moms.com/pros-cons-letting-kids-help-kitchen-cooking/> (Accessed: February 19, 2021).

Taylor, H. (2013) *How Children Learn Mathematics and the Implications for Teaching* Available at: https://www.sagepub.com/sites/default/files/upm-binaries/59230_Taylor_&_Harris.pdf (Accessed: February 20, 2021).

Topmarks (1998-2021) *What can children learn through cooking?* Available at: <https://www.topmarks.co.uk/parents/learning-maths-through-cooking> (Accessed: February 17, 2021).

The Imagination Tree (2017) *The Benefits of Mud Kitchens!* Available at: <https://theimaginationtree.com/benefits-mud-kitchens/> (Accessed: February 22, 2021).

Tucker, K. (2014) *Mathematics Through Play in the Early Years*. 3rd ed. London: Sage.

Welsh Assembly Government (2008) *Observing Children*. Cardiff: WAG

Welsh Government (2015) *Foundation Phase Framework*. Cardiff: Welsh Government.

Welsh Government (2017) *Foundation Phase Profile Handbook*. Cardiff: Welsh Government.