

Section 1:

Activity Plan		
Activity: Making and cooking pizza		
Number of children: 6	Age of children: 5-6	Number of adults: 3
Location: In the school	Preparation time: 30 mins	Activity time: 1 hour
Resources: cooking tools: rolling pin, non-stick pan, oven gloves, oven, mixing bowl, spoon, knife, cutter. Ingredients: flour, tomato sauce, cheese, toppings, salt, raising flour.		
Aim/s of activity: • Time managements • Following instructions • Learning measurements • Learning quantities (light, heavy) • Problem solving • Looking at patterns		
Links to outcomes: Can the children reach the curriculum targets for example, can 5-6-year old's count reliably up to 10 objects, and can they remember them and write them down.		
Differentiation: Making the activity easier or harder for the individual depending on their needs, for example if a child has learning difficulties the activity can be made easier for them, or if the child is doing well how can practitioners challenge them further, for example can the children make a pizza in a different shape and work out how to cut it equally.		

Health and safety:

- *Make sure there are no allergies for example nuts or dairy*
- *No sharp objects*
- *Be careful by the oven*

Role of adult/adults:

- Support the children
- Help them understand quantities
- Help cut the pizza and help with the oven
- Supervise the children

The activity:

1. Use the ingredients to make the pizza base while thinking about quantities needed.
2. Put the sauce and toppings on the pizza
3. Supervise the children while they cut the pizza into equal sizes.
4. If the task is too easy, increase the difficulty by making a more complex shape to cut into equal sizes. And if the task is too difficult support the child by making the quantities smaller, for example cut the pizza into 4 pieces rather than in 6 pieces.
5. Once they have cut the pizza into equal sizes, let the children eat the pizza they have made.

Section 2:

The Activity plan supports mathematical development through the use of measurements. By measuring the ingredients, the children will learn about quantities, such as weight and volume, as well as the textures of the ingredients. This is important because measurements play a big part in everyday life, for example pouring a cup of water, or making cereal in the morning. Another benefit of the Activity plan is that when followed correctly children will learn to follow instructions, by having a step by step recipe the children will have to follow the steps correctly in order to make the pizza. When counting and measuring ingredients mathematics will come into play. According to an online article, 'The benefits of cooking with preschoolers' (no date) when cooking and following a sequence such as a recipe it improves a child's cognitive development and it also encourages children's thinking and problem solving. The article, 'Fine motor skills predict math's ability better than they predict reading ability in the early primary school years' discusses cognitive development and how it links heavily with motor skills. The article also states that in a recent review with children aged 4 to 16 years old, they found that when looking at their development the link between motor and cognitive domains could be explained better by the relationships between fine motor skills and higher order cognitive skills.

Another benefit of making pizzas as the activity plan is that children will learn about quantities. When dividing the dough for the pizza base the children will need to learn how to share it out equally and this is important in day to day activities, such as when learning about quantities, children will also learn about fractions which is very important in improving their mathematical development. When the children are cutting the pizza they will need to understand fractions in order to cut the pizza into 6 equal pieces; an online article, 'the growing room – Kids in the kitchen; the benefits of cooking with children' (no date) talks about how the kitchen is like a learning laboratory for children, where they will learn and practice mathematical skills through following recipes, learning about fractions, measurements and contemplating quantities. Another skill that making pizza will teach children is symmetry, for example when making pizza and using toppings, children may want to make patterns and symmetry will link in. An example is if a child wants to make a smiley face, where will the eyes go? The open university book 'supporting learning in primary schools' discusses how

children react better to practical learning where they are having fun as children do not usually find mathematics enjoyable, but when doing a task like cooking, where the children can get involved and learn in a fun environment, it is less daunting and easier for them to take the information in.

The new curriculum supports creative play (no date), lets schools design their own curriculum making it easier for them to teach life skill such as role play tasks and it is down to the school at what age things should be done. According to the welsh government the outcomes of the task should be that the children have learned about quantities, fractions and sharing by the age of 6. The old curriculum states that children should be able to use direct comparison with weight/mass, for example heavier or lighter objects, so the children should be able to measure the ingredients. And then they will learn about quantities while undertaking the task.

Because making pizza requires using sharp knives and hot ovens, there is a certain element of health and safety involved, for example oven gloves must be used and children will need help cutting object and when near the oven. This can then become a limitation as an adult will need to help and this will then interrupt independent learning. A book written by Debbie Diller (2011) discusses how children thrive from independent learning and when children can work independently it then frees the teacher to be able to observe and take notes. If children are not allowed to use the sharp objects supervised, they will not learn about safety and potential dangers. This is problematic as it is important to allow children to be independent and to be aware of the dangers involved. Another limitation is that because of the risk involved with the number of children, the ratio of adults per child must be high, meaning that there are more staff members required during tasks like these. Not every school has a kitchen suitable for children, and not every classroom has an oven and this can then become another limitation. In order to make sure the task can be completed, the practitioner will need to check that there are resources available to them or change the task to something that's pre made so that the limitations are not there.

If a child has a learning difficulty the task should still be able to be completed, but there may be some differentiation involved. An example would be simplifying the instructions to help the child understand and assisting them where and when necessary. Every child should be treated equally and should not be made to feel left out. It may be that

the practitioner extends the time of the task in order to fully explain and help the individual to understand. In the book 'Child Care and Education' written by C.Meggitt, T.Bruce and J.Grenier, 2012, it explains to practitioners that children with disabilities need to be encouraged to live up to their potential and this can only be done if they are treated as an individual. Although it may be harder for a child with learning difficulties to learn, it does not mean that they will not comprehend the requirements of the task at all. Given the opportunity, it is possible that they would surprise many with their capabilities, but they just need a little more time to understand. Some children may also be at a more advanced level, and may need encouragement to learn further, a practitioner could make the task harder by showing fractions in number forms such as decimal places and not in pictures.

In an online article, 'Simply Psychology' written by Saul Mcleod (2019), a theory named the Vygotsky theory is discussed, which essentially claims that the people around children build the scaffolding for their development. In this theory there is an element of the More Knowledgeable Other (MKO). The online report defines this as 'someone who has a better understanding or a higher ability than the learner', normally this would be a teacher or Adult but it can also be a peer, so by grouping children in activities together they will model each other and learn more.

In a different article Mcleod S discusses the Bandura- Social learning theory (2016) it states that children observe the people around them which includes teachers, helpers, peers and will often mimic their behavior, which is why when undertaking tasks like pizza making it can make a big difference doing the tasks in small groups as they will encourage one another and help each other without realizing so, making them feel independent.

Section 3

Schools have many different kinds of resources inside and outside the classroom with some resources being there all the time, for example tables and chairs. Some resources will need to be obtained, such as cooking ingredients, blocks and sand. But what resources are there to encourage and promote children's mathematical development? In an online journal 'Mathematics Learned by Young Children in an Intervention Based on Learning Trajectories: A Large-Scale Cluster Randomized Trial'

(2011), it studies a group of 1,375 children from 106 different classrooms and compares learning through the Building Blocks mathematics curriculum and congruous professional development. The study showed that children who were in the building blocks group learned more mathematics than the children in the controlled group. The journal discusses how children need mathematical education in preschool and that every school should have a set of tools and resources in order to better their pupils understanding of mathematics. There should be resources available for every school to help better children's mathematical development, a good resource to have is number frames or number beads as these will help children count and see what numbers look like. School's may need to buy these resources, however there are resources that are readily available in every classroom such as pens, paper, pencils, whiteboards and so on, and it is down to the teacher what and how you can use them to promote mathematics. According to the book 'Childcare and education' (2012), every setting should have an agreed policy that includes the obtaining of resources. Resources like pens, pencils and whiteboards support children's mathematical development as children can practice mathematics by drawing, for example drawing shapes. Sometimes resources might not be available, for example if the teacher wanted to do a cooking activity like baking a cake, there might not be an oven available for the class and this will restrict them from doing the activity.

A YouTube video, 'Create a rich mathematical environment' (2016) discusses how children should have a rich mathematical environment and should have resources available to them such as numerical shapes and structured imagery around them everywhere. These should be available for children to play with and should draw the attention of the children, inviting them to play. A classroom should have activities all around for the children to play with, such as shapes on the wall or shaped blocks. Numerals work along side structured imagery help children make connections from classroom experiences to the everyday world. In a classroom items should be labeled, for example numbers on the draws, this way children will learn and improve their development without realizing so. All resources should be reachable to children and all activities should be at head level so that the children have full access to them.

There are also resources available that are usually used outside, for example a sand or water pit. These are used to teach children about sensory play, for example how

the sand feels and the density of the water. In a book 'Messy Math's: A playful, outdoor approach for early years' (2017), there is discussion about how children's mathematics is not just a cognitive process but a social, emotional and physical experience, and that doing mathematics outside makes it feel real to children. However, because of the size and weight of these resources and the mess it can create, they are usually not transportable, meaning that children don't use them as often. Most the time it is these kind of resources that children learn the most from as they enjoy it more, children do not have free access to these kind of resources, teachers often worry about the mess it may create and some schools will avoid having these types of learning resources all together.

Classrooms should have a range of sources, for example plastic and natural resources. The book, 'maths is all around you' (2014) states that children need plenty of time and space to play indoors and outdoors, the book also talks about how resources can be things you would have lying around such as coins, buttons. Teachers need to use the resources available to them to the best of their ability. According to a Journal written by Tucker, K (2014) Natural resources are normally found outside and are the best kind as they are creative and help encourage cross-curricular activities. A few examples are conkers, plants, acorns, water, dirt and so on. and they are created by the environment so normally they do not cost to use, whereas other resources such as capital resources are things like plastic blocks or metal and these normally cost. There are many different types of mathematical features, for example play trays, small world dramas, role play, graphic areas, construction areas, ICT, reading and listening areas and these should be placed all around the classroom inviting children to use different types of play. In a YouTube video 'Plastic vs natural toys' (2019) it talks about how it is good that children have a variety of plastic and natural toys, such as wood, because it gives children different experiences and an opportunity to develop. The video also discusses that it is what teachers do with the resources that matters, for example teachers could use resources that are already there, such as leaves outside, and that way the school will have a bigger budget for un-natural resources that are needed, such as pens, paper and other items.

Section 4

The adult's role is to help children's development and this could be through making an activity plan or making worksheets for the children. Adults plan a number of things, such as what activities the classroom will do and how many children can participate, but they also plan the worksheets and the homework. Teachers would get their lesson plan from online resources given to them by the school. To help teachers understand what skills they need to teach the children, they could look at relevant documentation such as the Gov wales website and search for the foundation phase (2015). It will tell them about what children should be learning and what targets children should be reaching. Teachers can see the curriculum framework and approaches to learning and teaching. Although the curriculum will be changing from the old one to the new one, teachers will have more control on what they think the child should be doing for the level they are at, and children won't have pressure to reach targets by a certain age.

It is also the adult's role to differentiate the work, for example make it easier for those who struggle or have learning difficulties and make it harder for those who may be developing at a faster rate. Teachers could help by looking over the work with the child and explaining it better by breaking it down, or they could make it more difficult by giving the children a more difficult task, for example a harder book to read.

It is an adult's role to mark and give feedback to the children so that the children can take it on board and improve their work next time. It is the Teachers role to keep everyone in line and inform the headmaster or parents/guardians if there is an issue that needs resolving. Children's progress should be monitored and assessed by adults in order to know how to help them further and in order to know at what levels they are at. Children will be assessed by classroom tests or by simply observing the way they learn and solve problems. Children should be assessed and observed by a compact profile. By observing these skills adults can then put a plan into place for children who may need additional support or an extra push to help their development further.

Adults need to know when to step back and observe to allow play to continue uninterrupted because a child should try and work out the task for themselves first and then be prompted or encouraged further if they can not do it, that way the child will

have the best opportunity to develop and adults will be able to observe children at their full potential.

In an online article by 'Simply Psychology' written by Saul Mcleod (2019) as mentioned previously, Les Vygotsky believed that the way children see the world is shaped by their families, communities, education, culture and socioeconomic status. The people around the children build the scaffolding for their development. The practitioner/adult with that child is responsible for encouraging the individual to engage with the world, for example roleplay; using a kitchen and getting the child to learn from it. Practitioners need the children to be in the Vygotsky zone of proximal development in order to reach their full potential. If the child believes he/she can do the task on their own they will be more likely to remember the lesson they have learned and achieve the tasks given, but they need to be given an achievable task, something they are capable of doing without assistance.

When looking at Pisa test results the UK are lagging behind other countries as it fails to even get in the top 10 countries for reading and mathematical skills. According to an online article by Sean Coughlan (2016) the UK government are obsessed with structural change which has led to there being no progress in the UK Pisa results. The UK ranked 27th in mathematical skills, and 22nd in reading skills, where as Singapore and China are ranked at the top for everything, so why is this? 'The OECD education chief highlighted concerns about the impact of teacher shortages, stating that schools struggle to give proper education as they do not have the staff numbers, and the staff they do have are not highly trained. Whereas Singapore have invested in highly trained quality teachers; these teachers are in the top 5% of graduates in a competitive system, and 'all teachers are trained at the National Institute of Education' giving the best education for children leading to the most outstanding results globally.

In another article written by Abbie Wightwick (2019) it discusses how the recent Pisa and OECD survey of standards results across the globe although low to compare with other countries such as Singapore, China and Finland, the UK have scored better this time around as they describe it as a positive but not perfect result with a lot of progress to be made. Schools and adults across the UK have been working hard to increase the levels without putting too much pressure on the children and need to now keep up with the progress and better the education and results that the children get.

Clemments, D. H., Sarama, J., Spitler, M. E., Lange, A. A., & Wolfe, C.B. (2011). 'Journal for Research in Mathematics Education', *Mathematics Learned by Young Children in an Intervention Based on Learning Trajectories: A Large-Scale Cluster Randomized Trial*, 42 (2), pp. 127-166. Available at <https://www.jstor.org/stable/10.5951/jresmetheduc.42.2.0127?seq=1> (Accessed 11th February 2020).

Coughlan, S. (2016). *Pisa tests: UK lags behind in global school rankings*. Available at: <https://www.bbc.co.uk/news/education-38157811> (Accessed: 13th February 2020).

Diller, D. (2011). *Math Work Stations: Independent Learning You Can Count On*.

Famly. (2019). *Plastic vs natural toys - Alistair Bryce-Clegg | The Family Interview* [video]. Available at: <https://www.youtube.com/watch?v=yJDOQGJR0CI> (Accessed: 8th February 2020).

Knaus, M. Featherstone, S. (2014). *Maths is all around you: developing mathematical concepts in the early years*. Available at: <https://www.bloomsbury.com/au/maths-is-all-around-you-9781472913395/> (Accessed on 12th February 2020)

McLeod, S. (2016). *Bandura - Social Learning Theory*. Available at: <https://www.simplypsychology.org/bandura.html> (Accessed: 6th February 2020).

McLeod, S. (2018). *Lev Vygotsky*. Available at: <https://www.simplypsychology.org/vygotsky.html> (Accessed: 6th February 2020)

McLeod, S. (2019). *What Is the Zone of Proximal Development?* Available at: <https://www.simplypsychology.org/Zone-of-Proximal-Development.html> (Accessed: 4th February 2020).

Meggitt, C. Bruce, T & Grenier, J. (2012) *Child Care and Education*, 2nd edn,

Oxford Education. (2016). *Tony Wing - Create a Rich Mathematical Environment* [video]. Available at: <https://www.youtube.com/watch?v=tzjN0SI7Ia8> (Accessed: 8th February 2020).

Pitchford, N. J., Papini, C., Gulliford, A. & Outhwaite, L. A. (2016). *Fine motor skills predict math's ability better than they predict reading ability in the early primary school*

years. Available at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2016.00783/full> (Accessed: 11th February 2020).

Robertson, J. (2017). *Messy Maths: A playful, outdoor approach for early years.*

The benefits of cooking with preschoolers. (no date). Available at: <https://www.scoe.org/files/benefits-of-cooking-with-preschoolers.pdf> (Accessed: 3rd February 2020).

The growing room. (no date). *Kids in the kitchen: The benefits of cooking with children.* Available at: <https://thegrowingroom.org/announcements/kids-in-the-kitchen-the-benefits-of-cooking-with-children> (Accessed: 3rd February 2020).

Handcock, R., Collins, J. and Stacey, M. (2013). *Primary Teaching Assistance Learners and learning.* Oxon: Routledge. 2nd edn.

Tucker, K. (2014). *Creating and using a mathematical environment*, in K. Tucker *Mathematics through play in early years.* (Accessed: 13th February 2020).

Welsh Government. (2015). *Foundation Phase Framework.* Available at: <https://gov.wales/sites/default/files/publications/2018-02/foundation-phase-framework-revised-2015.pdf> (Accessed: 13th February 2020)

Welsh Government. (2020). *Curriculum for Wales: overview.* Available at: <https://gov.wales/curriculum-wales-overview> (Accessed: 6th February 2020)

Wightwick, A. (2019). *New international Pisa schools' tables show Wales remains behind other UK nations but is improving.* Available at: <https://www.walesonline.co.uk/news/education/pisa-wales-international-schools-2019-17346247> (Accessed: 13th February 2020).