

Teaching maths



**ASSIGN
BUSTER**

Introduction

Mathematics is an essential part of our world and an important life skill. In our society today, we are bombarded by numerous data that requires us to record, sort and organize. We need to use mathematics not only at our work places, but also in our everyday life. Even simple daily tasks like making a purchase or financial recording at home needs mathematical skill. By having a strong understanding of mathematics, it will open doors to a promising career and a productive future (The National Council of Teachers of Mathematics, 2004). Early childhood education sets the foundation upon which future learning is built. Before children enter school, many of them develop number and geometric abilities like counting objects and making shapes (Clements, 2001). Children develop informal mathematical knowledge that is complex and sometimes sophisticated (Clements, 2001). During preschool years, children’s brains undergo significant development as their learning and experience affect their brain structure. Their brains grow most as a result of complex activities and not just from simple tasks. Preschoolers are a special group and therefore, it is important to have developmentally appropriate activities for them (Clements, 2001). In order to help children with mathematics, teachers need to first understand how they learn mathematics. It is also crucial to find out the difficulties they may face during the learning process so that Teachers can use appropriate methods to help them.

How children learn mathematics and their concept development

At a very early age, children start to demonstrate their knowledge of mathematics. Children are curious about their world and this leads them to explore the concept of mathematics (Barbour & Seefeldt, 2000). In the ordinary environment, they experience everyday mathematics involving topics like space, shape, pattern, number and number operations (Ginsburg, Lee & Boyd, n. d.) . Children’s play and interest are the sources of their first mathematical experiences (Clements, 2001). They need different kinds of concrete materials to manipulate and the time to play in order to construct mathematical concepts (Smith, 1997). For instance, when playing with blocks, children spend a lot of time figuring out which block is higher than the other. The blocks also help the children to further explore mathematical concepts such as shapes and symmetries (Ginsburg et al., n. d.) . As children manipulate materials, their action forces some thinking and reaction. Materials allow children with a wide range of interests and abilities to enjoy success (Barbour & Seefeldt, 2000). Interaction with others is another way that children learn mathematics. Through interaction with other children, they are able to question their own view of the world and adjust accordingly. Mathematical group project is an example that provides opportunities for social interaction and can be a strategy for mathematics learning. During project work, children can share different ideas, discuss approach and argue about their suggestions. Children talk and listen to each other when playing and working. They naturally talk about what they are doing. Use of the language is essential to learning about mathematical ideas and procedures (Barbour & Seefeldt, 2000). Besides interacting with others, language also helps children in learning mathematics because it aids in organizing their thinking and experiences. Children are able to learn new concepts better

when they have the ability to describe mathematical ideas and relationships (Barbour & Seefeldt, 2000).

The theory of Piaget and Vygotsky gives teachers information about children's course of mathematical concept development and aid in developmentally appropriate teaching. Piaget proposed a four-stage theory of cognitive development (Barbour & Seefeldt, 2000). From zero to two years old, it is called the sensorimotor period. Mathematical concepts are believed to develop as children grasp, touch or move objects of different sizes and shapes. Classification skills are also believed to develop during this period of time. Preoperational stage is from two to seven or eight years old. During this period, children learn about conservation concept and they develop the understanding that objects remain the same no matter how they are changed in form or arranged in different ways. They acquire language rapidly and are able to use symbols to represent real objects. Concrete operations period is from seven to eleven or twelve years old. As they think, they still need to handle and manipulate objects. However, they start to become more independent from the manipulation of objects. They can think about classes, seriation and numbers (Barbour & Seefeldt, 2000).

Vygotsky's theory consists of natural and cultural development (Smith, 1997). Natural development influences learning. Cultural development occurs when children interact with others and language is improved through interaction. He believed that when children are in their "zone of proximal development", learning takes place. With the help of teachers and peers, they can achieve certain tasks. He also believed that in early learning scaffolding is essential to grasp a task. Later on, the support is slowly

reduced in order for the children to master the skill independently (Smith, 1997).

Role of teachers in helping children learn mathematics

Teachers play an important role in helping children learn mathematics. First of all, the teacher should plan the learning environment in such a way that it is beneficial to mathematical explorations. For example, the classroom should contain a variety of objects related to numbers and concrete materials like blocks and manipulatives (Clements, 2001). Classrooms can also be numbered (Barbour & Seefeldt, 2000). This will help the children learn mathematical concepts through their play. During their play, teachers must observe and intervene when necessary to create teachable moments. But when should teachers intervene? A useful way is to observe whether mathematical thinking is developing or already installed in children. If the thinking is developing, the teacher can take notes and discuss about the experience after they finished playing. On the other hand, if the thinking is installed, the teacher can discuss and clarify the ideas with the children. In this way, the children can clarify their thinking and extend the idea (Clements, 2001). Teachers can work with the children on group projects so that they can be involved in different mathematical ideas like measurements, numbers, space and so on (Ginsburg et al., n. d.).

Developmentally appropriate curriculum is an essential part of developing mathematical knowledge. A curriculum offers planned activities and assumes that mathematics does not need to be always integrated with other activities, but it can also be an interesting subject on its own (Ginsburg et al.,

n. d.). It strengthens children's geometric and number knowledge (Clements, 2001).

Some children may have difficulty in learning mathematics and it is the teachers' role to help them cope with the problem. Some children have math anxiety and it has a negative influence on the children's academic performance (Mazzocco, 2007). Others may have inability to estimate quantity (ScienceDaily, 2013) and spatial difficulty (Mazzocco, 2007). In order to help these children in mathematics, teachers can use different methods to improve the learning experiences. For instance, in order to help children with math anxiety, teachers can enhance the basic numerical and spatial processing. This can be done both in school as well as collaboration with parents. Research shows that the quality of numerical and spatial talk by parents is related to the children's math and spatial skills. Hence, the parents can engage the children in daily activities that are related to math. This will help the children to have more basic knowledge of mathematics when they come to school and reduce the anxiety in them (Beilock & Willingham, 2014). Small group learning is another strategy that the teachers can use to help those children that has difficulties. Small group is where teachers plan the materials and lessons based on the children's interest and their level of development. Teachers can scaffold each child's learning. As children gain confidence in their abilities, they are more willing to take up new challenges. Small group also allows teachers to observe each child in the group through daily interactions and understand more about their abilities and interests (HighScope Educational Research Foundation, 2011). Integrated curriculum is another approach to enhance the children's

learning in mathematics. It emphasizes the holistic development of the child-physical, social, emotional, intellectual and aesthetic development. Stories are a great teaching resource and when used effectively, can promote thinking and new knowledge. For example, the story book “ Pancakes, Pancakes” can be used as a resource for integrated curriculum. Through storytelling and the use of learning centres and group settings strategy, language, math and cooking are learned (Velu, 2012).

Case study

Child’s profile

Name: Jason

Age: 6 years old

Gender: Male

Race: Chinese

Preschool: Little kids kindergarten

Skills: Able to count one to ten. Able to sort, match and compare by one attribute (example size, shape and colour). Able to recognize basic shapes.

Family background: Both parents are busy with work and have little time for him. He has two siblings so the parents cannot give him full attention.

Parents do not communicate with him often and they often use television to keep him occupied.

Siblings: two

<https://assignbuster.com/teaching-maths/>

Parents: Both parents working

Spoken language: English

Activities other than school: Watch Television and play online kids' games

Problems he face in mathematics

This child faces some difficulties in mathematics. He is not able to do more advanced pattern like AAB pattern. During class he has difficulty in number bond and he isn't able to finish his numeracy activities in class. The teacher has been trying to do one-to-one teaching such as helping him to be more familiar with pattern by re-introducing AB pattern using paper and stamp. The teacher also helps him in number bond by pairing him up with another child. However, there is little improvement and the child continues to have difficulties in mathematics. In order to help this child to improve, lessons can be conducted for both pattern and number bond. Both teacher and parents should collaborate to help Jason to improve.

Lessons to help him with pattern and number bond

Lessons for pattern:

The activity is call people patterns (Big Ideas of Early Mathematics, 2014). This is a visual pattern activity and the material is the children in the class. It is a simple pattern activity to help Jason to understand the basic pattern from the environment. The teacher arranges the children in AB pattern: stand, sit; stand, sit; stand, sit. After that, the teacher can ask the children to describe the pattern. Lastly, the teacher ask questions like “ what is the

pattern” and “ what is its rule?”. Each child takes turn to give the answer (Big Ideas of Early Mathematics, 2014). If Jason is not sure, the teacher can explain to him immediately.

At the same time, Jason’s parents can also help Jason to reinforce his pattern knowledge at home. They can carry out activities like shape pattern. His parents can use concrete materials like plain wooden blocks of different shapes to teach him the AB pattern. For instance, three square and three triangle blocks can be used. Then the parents can set the pattern: square, triangle; square, triangle; square, triangle. They can ask Jason to describe the pattern and after that ask him to demonstrate the same pattern.

Once Jason is more confident with the AB pattern, the teacher and parents can use the same materials and methods to introduce AAB pattern. Instead of using paper and stamp for AAB pattern activity, the teacher can try to use concrete material. After Jason has a better understanding of AAB pattern, the teacher can replace concrete materials with paper and stamp.

Lessons for number bond:

The first activity for the number bond can be done at home. Jason’s parents can use material such as raisins to carry out the activity. For example, they can ask him how many raisins are in his hand. He is then allowed to eat some of the raisins. After that, ask him to count again. If he gets the correct answer, he is allowed to eat all the raisins.

After Jason is able to understand the number operations at home, he can go on to the number bond lesson in class. Concrete materials like small

dinosaur models can be used together with the number bond worksheet. The dinosaurs can assist Jason to see the numbers using real objects. For instance, if the numbers are three and seven, the teacher can give Jason three dinosaurs first and ask him to count. Another seven dinosaurs can be given to him. After that ask him to count the total number of dinosaurs and he can write the answer on the worksheet. This activity can use different combination of numbers and is a good way to help Jason to understand the number bond concept better.

Conclusion

References

- Beilock, S., & Willingham, D. (2014). Math Anxiety: Can Teachers Help Students Reduce It?. *American Educator*. Retrieved 10 November 2014, from <http://www.aft.org/sites/default/files/periodicals/beilock.pdf>
- Barbour, N., & Seefeldt, C. (2000). *Early Childhood Education-An Introduction* (4th ed., pp. 449-462). New York: Macmillan College Publishing.
- Big Ideas of Early Mathematics. (2014) (p. 91). Upper Saddle River, New Jersey.
- Ginsburg, H., Lee, J., & Boyd, J. *Mathematics Education for Young Children: What It Is and How to Promote It*. Social Policy Report. Retrieved 10 November 2014, from http://srcd.org/sites/default/files/documents/21-3_early_childhood_education.pdf
- HighScope Educational Research Foundation,. (2011). *Scaffolding Children's Learning at Small-Group Time*. Retrieved 10 November 2014, <https://assignbuster.com/teaching-maths/>

from http://www.highscope.org/file/Trainer%20Page/Preschool/1%20Day%20Workshops/W2006_11-Scaffolding%20SGT%20Booklet%20%239_press.pdf

Mazzocco, M. (2007). Early Predictors of Mathematical Learning Difficulties: Variations In Children’s Difficulties With Math. Exchange. Retrieved 10 November 2014, from <http://msdp.kennedykrieger.org/pdf/42.pdf>

ScienceDaily,. (2013). Preschoolers inability to estimate quantity relates to later math difficulty. Retrieved 10 November 2014, from <http://www.sciencedaily.com/releases/2013/08/130814132508.htm>

Smith, S. (1997). Early Childhood Mathematics (pp. 1-18). Boston: Allyn & Bacon.

The National Council of Teachers of Mathematics,. (2001). Mathematics in the Preschool. Retrieved 10 November 2014, from <http://gse.buffalo.edu/org/buildingblocks/writings/preschool%20math%20in%20tcm.pdf>

The National Council of Teachers of Mathematics,. (2004). A Family’s Guide: Fostering Your Child’s Success in School Mathematics. Retrieved 10 November 2014, from http://illuminations.nctm.org/uploadedFiles/Activities_Home/FamilyGuide_FullText.pdf

Velu, G. (2012). Intergrating Language, Math and Cooking Through Storytelling. Early Educators.