UNIT 6: *Things that Grow*

Empowering Young Mathematicians: Habits of Mind for School Success

It is clearly not useful for a child to learn skills if, in the process of acquiring them, the disposition to use them is lost… Lillian Katz in *The Art of Leadership: Cultivating an Early Childhood Curriculum in Early Childhood Organizations.*

What would you say are the most important things for young children to learn about math as they develop in the preschool years? Is it reciting numbers or naming shapes? Is it experimenting with manipulatives or games? Perhaps it is exploring counting books, or sorting and grouping toys by attributes?

Math for ME includes all of these important concepts and activities, and many, many more. The most important factor for building enthusiastic and capable mathematicians, however, is not found solely within a lesson on the number path, or playing a grid game or a creating a graph using people math. *Helping children to create mathematical mindsets and instilling a positive approach to math* are the most crucial elements for lifelong mathematical learning, competency and future school success. As you continue your work with young children, keep these **C**s in mind:

Curiosity and **C**reativity: Apply children's natural curiosity about how the world works to expand ideas about *what math is and where we find it.* Hone your own observation skills in the light of your own growing math knowledge. You will see children's play as inherently mathematical. Although science is most often associated with math, music and art are particularly suited to math concepts. *Math for ME* includes many art and music/SWPL activities to reinforce math in creative ways. There are 1000s more!

Context: Solving real problems using math is the best way to visualize math as useful and integral to every single day of our lives. It is not possible for anyone from the tiniest baby to the most senior of citizens to go through 24 hours without using math—from asking for "more" or recognizing differences in strange or familiar faces, to setting alarms, adjusting our speed, or navigating around the block, math is in every part of our world. Helping children recognize mathematical concepts and use them is the best way to combat poor attitudes or fears about math.

Collaboration: Experimentation, struggling with "wrong" answers, working together, and finding many ways to solve a problem are the bywords for successful mathematicians of any age. These mathematical practices lead to creating vigorous math-thinkers. Perseverance, as in continuing to work on a math-problem over time, is an important math- processing skill that can be overlooked if we focus on speed drills or finding the right answer the first time we try. Honoring all children's work and levels of understanding is essential in helping children enter kindergarten with positive images of themselves as capable math thinkers.

Concrete to Abstract: We are familiar with the importance of using manipulatives to demonstrate math concepts prior to introducing more abstract concepts. Developmentally appropriate math instruction typically starts with the use of concrete objects. However, there are two important things to remember:

- Manipulative play by itself does **not** ensure that children are learning math concepts. Manipulatives are an important starting point. Intentional teaching accompanies and directs that play in order to make the most effective use of carefully chosen manipulatives.
- It is a myth that children are only concrete thinkers. Children are both concrete **and** abstract thinkers. Number, twoness, for example, is an *idea*, not a "thing". Children apply this abstract idea very quickly and early in their lives. They understand that when their teacher asks them to find "two shoes" that they are not looking for a "2" but an amount of a specified object. Look for ways that children are already making connections between the concrete to the abstract and support their learning.

And Finally:
Curriculum- Children as young as 3- years- old can express their "dislike" of math or their belief that they are "not good" at math, perhaps imitating attitudes or comments from older siblings or adults. Ensure that your plan for learning, your Curriculum, prioritizes the pure pleasure and enjoyment of mathematics. Here are **some selected** highlights from the *Math for ME* principles for establishing excellent, engaging and positive early math programs: (see Foundation Documents for complete list, August 2018)

Assumptions and Approach:

- All children are natural mathematicians.
- Learning should be accessible for all learners.
- Depth of understanding is emphasized over breadth.
- Problem-solving using mathematical thinking and tools is essential for school success.
- Experiential, active learning is the basis for learning activities.

Objectives:

- Associate math with enthusiasm and practical application to everyday life.
- Effectively communicate mathematical ideas.
- Establish environments that support math learning.