Making Math Meaningful

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Gee Whiz Education

What does math mean to you?

Math is Part of Our Daily Lives

For example:

- Preparing food – measurement
- Paying bills/balancing the checkbook
- Calculating a tip
- Staying healthy – healthy weight, reading a thermometer, heart rate, calories
- Weather – reading the thermometer
- Time – reading a clock, watch
- Running a business (financials, taxes)
- Price comparisons

Why is Math Important?

Research on children's learning in the first six years of life demonstrates the importance of early experiences in mathematics. An engaging and encouraging climate for children's early encounters with mathematics develops their confidence in their ability to understand and use mathematics. These positive experiences help children to develop dispositions such as curiosity, imagination, flexibility, inventiveness, and persistence, which contribute to their future success in and out of school (Clements & Conference Working Group, 2004).

Clements, D. H., & Conference Working Group. (2004). Part 1: Major themes and recommendations.In D. H. Clements, J. Sarama, & A.-M. DiBiase (Eds.), *Engaging young children in Mathematics: Standards for early childhood mathematics education*, pp. 7–76. Mahwah, NJ: Lawrence Erlbaum.

Take a minute to think about your own early experiences with math. Were they positive or negative? How did these experiences affect your confidence in your ability to do math?

Math Should be Fun!

Some of the latest research indicates that *playful math* is the way to go when working with young children.

Abundant research has demonstrated that young children enjoy learning math and can learn far more than was previously assumed—without a single flash card or worksheet (National Research Council 2001; Clements & Sarama 2014; Carpenter et al. 2016).

National Research Council. 2001. *Adding It Up: Helping Children Learn Mathematics*. Eds. J. Kilpatrick, J. Swafford, & B. Findell. Mathematics Learning Study Committee, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

Move & Learn!

What Is Math Knowledge in Early Childhood?

- Counting Skills
- Number Recognition
- Geometry
- Spatial Concepts/Positional Concepts
- Patterns
- Sorting/Grouping
- Estimation
- Measurement (including graphing)
- Time & Money (advanced children)

Which of these math concepts is this child exploring as she plays?

Counting?
Positional Concepts?
Sorting/Grouping?
Geometry?
Measurement?
Estimation?
Spatial Concepts?
Patterns?
Number Recognition?

Can You Make Math Fun?

You Could…

- **Counting Skills** – Count the number of pumpkins that fit in a wagon
- **Number Recognition** – Talk about the numbers while reading the prices of pumpkins
- **Geometry** – What shape is a pumpkin?
- **Spatial Concepts/Positional Concepts** – Where do pumpkins grow? (on the ground)
- **Patterns** – Use small gourd pumpkins in different colors (orange & white) to make patterns
- **Sorting/Grouping** – Sort pumpkins by size (big/small, big/medium/small)
- **Estimation** – How much do you think the pumpkin weighs?
- **Measurement** – Use a tape measure to measure the circumference of several pumpkins. Graph the results.
- **Time & Money** – How long does it take to get to the pumpkin patch? How much do the pumpkins cost?

Let's Try That Again!

You Could…

- **Counting Skills** – Count out loud as the children pop bubbles OR they could count out loud
- **Number Recognition** – Put number cards in a bag. Pull a number. Children identify and pop that many bubbles.
- **Geometry** – What shape is a bubble?
- **Spatial Concepts/Positional Concepts** – Where do the bubbles go? (up in the air, down to the ground, over the bush, under your hand, etc.)
- **Patterns** – Make patterns while popping (pop with hand, pop with hand, pop with foot)
- **Sorting/Grouping** – Try different types of bubble wands. Group by how well they work.
- **Estimation** – How many bubbles do you think you will be able to blow with one breath?
- **Measurement** – Use a tape measure to measure how far a bubble goes before it pops.
- **Time & Money** – Use a stopwatch to see how long it takes for a bubble to pop.

Adapting Math Experiences for Mixed-Age Groups

It Is Easy to Adapt!

Water Bottle Bowling

Materials Needed: 10 empty plastic water bottles and a ball

Toddlers/Twos: As you set up the bottles, count out loud. Then, these children can push balls toward the bottles. As the bottles fall, count how many fell over.

Describe the shape of the ball (sphere).

Use positional concept words as you describe the children's actions and the actions of the ball and pins (e.g., the ball rolls on the floor, the bottles fall over, some bottles are behind others when setting them up, etc.)

Threes/Fours: These children can help set up the bottles… counting as they do so (with some support from you if needed).

Each time the children roll the ball and the bottles fall, count with them to see how many are standing and how many fell down.

Talk about the shape of the ball noting that it is a sphere and not a circle.

Utilize positional concept words as the children play, just like you did for Toddlers/Twos. But, then incorporate more advanced positional words like around, between, left and right.

OPTION: If you wanted to also incorporate patterning, you could use a mixture of green (e.g., Sprite/7Up bottles) and have the children help you arrange them in a pattern (e.g., clear/green/clear/green).

Advanced Preschoolers: Each time the children roll the ball and the bottles fall, challenge these children to count the number that are standing and the number that fall. Have them write these numerals on paper. Then, write them as an addition fact (e.g., 3 + 7 = 10). You could also do as a subtraction fact (e.g., 10 – 4 = 6).

See if these children know that a ball is a sphere and not a circle. Can they name other objects that are spheres?

Before rolling the ball, challenge these children to estimate the number of bottles they think will fall. Then, have them count to compare their estimations to the actual results.

To add an element of measurement, have the children use a tape measure to measure the distance from where they roll the ball to the bottles. Then, have them change that distance and challenge them to compare how this affects the number of bottles that fall.

Questions?

To learn more about Gee Whiz and how our curriculum makes math fun, please visit our website www.geewhizeducation.com

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