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Professional Learning Module
Mathematical Thinking: Rethinking Calendar Time

Teach Children to View Their World Mathematically

Teaching Math to Young Children, Practice Guide, WW Clearinghouse*;* Pages 42-46.

Recommendation 4: Teach Children to view and describe their world mathematically.

The practice guide outlines the steps teachers can take to help children view and describe the world mathematically.

1. **Encourage children to use informal methods to represent math concepts, processes, and solutions.**
   For example, teachers should use terms that represent children's informal understanding of addition, such as "more" and "all together," as opposed to the more formal, symbolic representation. An example of informal understanding might be "Bill had three carrots, and his mother gave him one more. How many carrots does bill have all together now?

2. **Help children link formal math vocabulary, symbols, and procedures to their informal knowledge or experiences.**
   Teachers should explicitly teach children math words so they have the vocabulary needed to connect their informal knowledge to formal terms. Teachers can then use this math vocabulary when speaking to children throughout the day. Vocabulary that is used during math instruction does not need to be restricted only to math activities. The goal is to have math words become part of the child's vocabulary so they can think and talk about math as they explore and engage in activities. The more teachers use math vocabulary the more children will begin to use them too.
   > For example, when walking by a group of children playing in the construction area, you notice they have created a group of objects. You would say, "I see you have made a group of objects, that's a set." This is an intentional use of the word *"set."* This type of *in the moment* teaching will help children understand the concept (they made a group of objects) as well as the vocabulary around the concept (set).

   Each math concept has its own specific vocabulary, for example when talking about number operations you want to be sure that children understand the words *more, fewer,* and *equal to*.

3. **Use open-ended questions to prompt children to apply their math knowledge.**
   Another component of mathematical language is asking children questions like:
   - How do you know that?
   - Tell me more…
   - Why do you think…?
   - What makes you think that?
   - Explain it to me.

   These questions encourage children to think about math and not just focus on getting the right answer. We ask children different questions to help them think about math.

   > For example during morning meeting a teacher might ask: "How many boys are here today? How many girls are here? How many total children are here today?" Mike says, "ten!" The teacher says, "Why do you think that?"

If the teacher stops after a child answers, which may be a good *guess* that happens to be the "right " answer, then it is not known by the teacher or child how they came up with that answer.

If "ten" is the "wrong" answer, then instead of the teacher saying, "No", or "You're wrong", or asking another child to tell Mike the correct answer the teacher asks the question "Why do you think that?" which encourages Mike to think about his answer.

What is important is that the child understands why or how they came up with an answer, regardless of if the answer was correct or not. Children will also begin to use the vocabulary specific to a math concepts as they talk about and explain their thinking about math.

4. **Encourage children to recognize and talk about math in everyday situations.** *Nurturing Knowledge* Susan B. Neuman and Kathleen Roskos, Scholastic 2007, pg. 110. Five suggestions that can stimulate math talk.
    a. Use the Language of Mathematics in everyday talk. For example use math terms like *longer, shorter, fewer, less than, more than, taller, shorter* to compare and contrast things and provide information about what's happening.
    b. Wonder aloud as you go through daily routine. For example, I wonder how many more boys we have a school today? How could we find out? Or ask a child to pass out the plates, cups and napkins with a reminder to be sure every child has each of the items.
    c. Support play conversations by seizing opportunities during play experiences to build on children's ideas by inserting math words and ideas. I see you made a castle, how many blocks do you think it took? Could we group each block and then count them? Which one has more?
    d. Take a pretend role that shows mathematical thinking. In the Housekeeping area, you may ask, "if everyone gets a hat, how many hats do we need?
    e. Ask "puzzler" questions that are stimulating and lead to big mathematical investigations that provide many opportunities for children to count, sort, measure, and solve problems using numbers. How many tadpoles do we have in our tank?