

## Video Transcript: Early Childhood Math Questioning Strategies

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**DOUGLAS CLEMENTS:** Welcome to a brief discussion on how to support math questioning strategies for young children aged two through grade three, using the IES Practice Guide Teaching Math to Young Children. Let's get started.

There are five recommendations in the Practice Guide, and all are based on a systematic review of research conducted by researchers and the wisdom of practitioners with expertise and experience in early mathematics development.

In this video, we will discuss recommendation four, which suggests that we teach children to view and describe their world mathematically. So, what do we mean by teaching children to view and describe their world mathematically?

Expert researchers and practitioners recommend that teachers encourage children to look for opportunities to describe math ideas in the world around them, gradually moving from informal representations and language to formal representations in math vocabulary as children's understanding grows.

By exploring their environment and interacting with manipulatives, children can begin to apply their math knowledge. For example, using concrete objects can support children's progression from verbalizing numerical representations with words, such as a lot or more, to counting. And at first, counting of objects may not be accurate, but over time, children begin to count accurately and then recognize how many.

Expert researchers and practitioners suggest four ways to carry out this recommendation. First, encourage children to use informal methods to represent math concepts, processes, and solutions. Math instruction for young children should begin with informal representations of math ideas. Initially, teachers should link math ideas to familiar experiences, terms, or analogies, resisting the urge to use more formal methods until children have a conceptual foundation for understanding them. Children as young as pre-schoolers can learn to talk about the many strategies they invent. We've got to give them time to think. We have to use self-talk when necessary, and then we have to model. For example, some children might know three plus two by counting three, then two, then five. Whereas others might put up three fingers and two fingers, and then recognize five. The Practice Guide provides some examples of how to teach informal representations of math concepts.

The second way to carry out recommendation four is to help children link formal math vocabulary, symbols, and procedures to their informal knowledge or experiences. Teachers should explicitly teach children math words so that they have the vocabulary needed to connect their informal knowledge to formal terms. Teachers can start with informal vocabulary, and then connect those familiar terms to formal terms. For example, teachers might begin with the informal phrase, take away, and then later explain that subtract has the same meaning.

Vocabulary that is used during math instruction does not need to be restricted to only math activities. For example, teachers can make a comment about which child is standing first in line, or which child has more or fewer objects than another child. As another example, while children are drawing pictures of their family, they can talk about the number of family members, and who is older or younger.

The practice guide provides examples of lessons for linking familiar concepts to formal symbols. The third way to carry out this recommendation is to use open-ended questions to prompt children to apply their math knowledge.

Teachers should ask questions that require children to use math-related term to describe something. For example, asking, how can we find out? How many children are here today? How many snacks we need, et cetera, gives children the opportunity to communicate about a math strategy, and then to practice that strategy.

Additionally, when asking open-ended questions, teachers can employ techniques to encourage math-related conversation. Before calling on a child, teachers might allow enough time for more than just a few children to think of an answer.

When in groups, one child can help another child come up with an answer. Rather than saying yes or no quickly, teachers can allow multiple possibilities to be discussed. For example, a teacher can show an entire class a picture of a mother and a daughter holding hands, waiting for the school bus.

The teacher can ask, “How are these two people different?”

One child may answer, “The mother is bigger than the daughter.

Another child may answer, “The mom is wearing stripes, and the daughter is wearing dots.”

Although the teacher should ultimately focus on correct answers, the best fit of math context, the teacher should acknowledge that there are multiple correct responses. Examples of

questions related to the math content areas that teachers can ask are included in the practice guide.

The last way to carry out recommendation four is to encourage children to recognize and talk about math in everyday situations. Teachers can encourage math thought in conversation by asking children for their help with problems that arise throughout the day. For example, a teacher might say, “I have to figure out how many cups we're going to need for the birthday party. Can you help me? How should we do that?”

Once children solve the problem, teachers can have them describe their method by asking a sequence of questions that prompts them to share the solution and the strategies used to reach the solution. For example, if the problem involves how many orange slices are needed for snack time, a teacher could ask the children for an answer. Then the teacher could say, “How'd you figure that out? What did you do first? Then what did you do?”

During small group time, the teacher and children could have a more formal discussion about the steps used to solve the problem.

For further information related to teaching math to young children, please take some time to review the full practice guide.

Also, visit the REL Central website for more education research and resource to support schools and student outcomes.

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