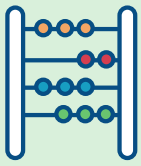
HELP CHILDREN LEARN TO VIEW AND DESCRIBE THEIR WORLD MATHEMATICALLY[1]

This recommendation and the supporting strategies are excerpted from the What Works Clearinghouse practice guide for *Teaching Math to Young Children*. This resource is part of a series of instructional briefs designed to help families, afterschool providers, and other caregivers support their students' early mathematics instruction while learning at home or in a hybrid learning environment.[2]

Families and caregivers can encourage children to describe mathematics ideas in the world around them.

At first, children can use informal tools such as their fingers, tally marks, or other concrete objects to represent math ideas. Once children are comfortable using math informally, families and caregivers can help them link their informal knowledge to formal math vocabulary and representations, such as math symbols, and use open-ended questions to prompt children to think about how to describe their ideas mathematically. Encourage children to look for opportunities to use their developing math skills throughout the day.

1 Encourage children to use informal methods to represent math concepts, processes, and solutions.



Young children must develop a conceptual foundation for understanding math ideas before they can use formal math methods.

- **Use** tangible, familiar objects to teach whole numbers and collections of familiar objects to teach concepts of equal/unequal and addition/subtraction.
- **Use** terms that represent children's informal understanding of addition, such as "more" and "all together," as opposed to the more formal, symbolic representation.

2 Help children link formal math vocabulary, symbols, and procedures to their informal knowledge or experiences.

It is important to teach children math terms so that they can connect their experiences to formal terms. Making these connections enables children to understand and more readily learn formal terms, symbols (such as + or –), definitions, and procedures.

- **Emphasize** math vocabulary (such as, "more" and "fewer") when speaking to children throughout the day. For example, while the child is drawing pictures of his or her family, discuss the "number" of family members and who is "older" or "younger."
- **Connect** numerals to both quantities (for example, a collection of five buttons) and verbal representations (for example, the word "five").

5  five

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3 Use open-ended questions to prompt children to apply their math knowledge.

There is evidence of a positive relationship between math-related talk and children's math knowledge.[3] Using open-ended questions can help prompt children to apply their math knowledge.

- **Ask:**
  - How are these the same/different?
  - What patterns do you see?
  - How can we find out who is taller or shorter?
  - What can we do to find out who has more/fewer?
  - How else can you show your answer?

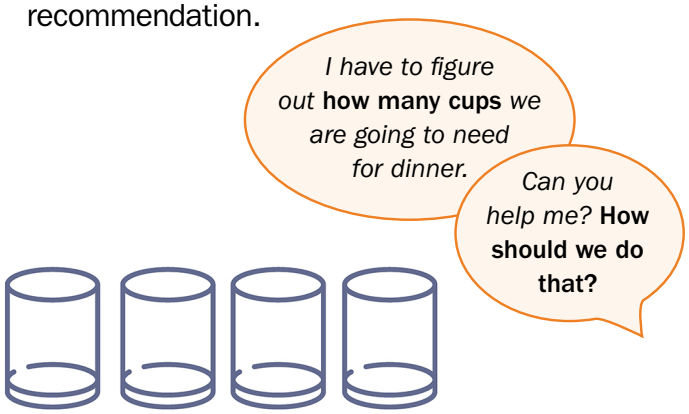
- When you **ask** an open-ended question, be sure to allow enough time for the child to think of an answer. If the child simply says "yes" or "no" quickly, try asking, *"How do you know?"* to encourage further discussion and reflection on math strategies.

4 Encourage children to recognize and talk about math in everyday situations.

It can be helpful for children to talk through everyday math problems. With practice, children begin to develop the skills they need to communicate about the problem solving that they or their peers are doing.

- **Encourage** math thought and conversation by asking children for their help with problems that arise throughout the day.

- **See** Finding Math Around You and Math Talk for more ideas of how to carry out this recommendation.



Use progress monitoring to ensure that math instruction builds on what each child knows.[4]

Observing throughout the day: Children develop knowledge at different times and at different paces. Understanding what your child knows and building on that knowledge helps to ensure that the activities you do are meaningful, engaging, and keep your child learning.

handout: https://ies.ed.gov/ncee/edlabs/regions/central/resources/teachingearlymath/materials/Rec5_Observe-and-Build.pdf

video: https://ies.ed.gov/transfer.asp?location=youtu.be/Jx9A7jA0YK0

Family members and caregivers can make these observations throughout the day while children are eating, playing, and following their regular routines.

1 See https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/early_math_pg_111313.pdf#page=48. The recommendation reflects a systematic review of the available literature along with the expertise of a panel of specialists. The supporting research provides a *minimal* level of evidence for the recommendation.

2 Some examples reflect modified versions of the examples included in https://ies.ed.gov/ncee/edlabs/regions/central/resources/teachingearlymath/4-describe.asp.

3 Klibanoff, R. S., Levine, S. C., Huttenlocher, J., Vasilyeva, M., & Hedges, L. V. (2006). Preschool children's mathematical knowledge: The effect of teacher "math talk." *Developmental Psychology, 42*(1), 59–69; Levine, S. C., Suriyakham, L. W., Rowe, M. L., Huttenlocher, J., & Gunderson, E. A. (2010). What counts in the development of young children's number knowledge? *Developmental Psychology, 46*(5), 1309–1319.

4 This recommendation and the supporting strategies are excerpted from the *Teaching Math to Young Children* practice guide at https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/early_math_pg_111313.pdf#page=42. The recommendation reflects a systematic review of the available literature along with the expertise of a panel of specialists. The supporting research provides a *minimal* level of evidence for the recommendation.