TeachME Professional Development

Teaching Math to Young Children

Levels of Evidence for Practice Guides

1. The Institute of Education Sciences (IES) publishes practice guides in education to bring the best available expertise to bear on current challenges in education, and provides recommendations for interventions based on strong, moderate, and minimal levels of evidence.

A. True
B. False

Introduction

2. Each of the following accurately describes what research says about early math learning and achievement EXCEPT:

A. Devoting time to specific math activities as part of the school curriculum is effective in improving children's math learning before and at the beginning of elementary school
B. Children's math achievement when they enter kindergarten can predict later acquisition of critical thinking and general problem-solving skills
C. Children who begin with relatively low levels of math knowledge tend to progress more slowly in math and fall further behind
D. Differences in achievement between American children and students in other countries can be observed as early as the start of kindergarten

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Scope of the Practice Guide

3. One of the common themes for teaching math to young children is that they should have _____ opportunities to learn and use math.

A. Frequent and consistent
B. Innovative and productive
C. Regular and meaningful
D. Creative and substantial

Summary of the Recommendations

4. Although experts recognize the importance of following a developmental progression to organize the presentation of material in each early math content area, they recommend waiting until kindergarten to introduce geometry and measurement skills, rather than doing so in preschool.

A. True
B. False

Recommendation 1: Teach Number and Operations-Table 3

5. During the developmental process for acquiring number knowledge, subitizing refers to a child's ability to immediately recognize the total number of items in a collection and label it with an appropriate number word.

A. True
B. False

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6. In order to demonstrate "number-after knowledge" a child should be able to enter a counting sequence at any point and specify the next number instead of always counting from one.

A. True
B. False

How to Carry Out the Recommendation

7. Experts recommend providing opportunities for children to practice recognizing the total number of objects in collections of _____ items and labeling them with a number word without needing to count them.

A. One to three
B. Three to five
C. Five to seven
D. Seven to nine

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8. One way to help children define the limits of a number concept is to contrast examples of a number with nonexamples, such as labeling three toys as "three," and labeling four toys as "not three."

A. True
B. False

Example 1. The Basic Hiding Game

9. When using math talk in a classroom of very young children, the terms 'more' and 'less' are considered informal language and 'add' and 'subtract' are formal words to describe changing the number of objects in the set.

A. True
B. False

Promote One-To-One Counting

10. By learning one-to-one counting with small collections that they already recognize, children can see that the last word used in the counting process is the same as the total.

A. True
B. False

Table 4. Common Counting Errors

11. Which of the following is recommended when young children are struggling with the counting sequence past twelve?

A. Highlight and practice exceptions, such as fif + teen, as fifteen and thirteen are commonly skipped because they are irregular
B. Help students recognize that a nine signals the end of a series and that a new one needs to begin
C. Teach children that each new series (decade) involves combining a decade and the single-digit sequence, such as twenty, twenty plus one, twenty plus two, and so on
D. All of the above

Provide Opportunities for Children to Use Number Words and Counting to Compare Quantities

12. Once children are comfortable making verbal comparisons between two groups of numbers, the next step is to compare the size of the two collections by showing that number words further along in the counting sequence represent larger collections, which is known as the _____ principle.

A. Greater significance
B. Increasing magnitude
C. Incremental rise
D. Sequential degree

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13. A number list is a series of numerals beginning with 1 and continued in sequence, and although similar to number lines, they do not include 0 and are an easier tool for young children to use when counting and learning numerals.

A. True
B. False

Encourage Children to Solve Basic Problems

14. Problem solving challenges children to use their math knowledge to answer and explain math-related questions, but should not be attempted until children have completely mastered fundamental number skills.

A. True
B. False

Potential Roadblocks and Solutions

15. When teachers want to provide a strong math foundation for their students but aren't necessarily comfortable with math themselves, each of the following is recommended EXCEPT:

A. Looking for opportunities to teach math in regular activities or familiar situations
B. Using sports as an opportunity to practice math
C. Sharing their own interests with children and highlighting whatever math is involved
D. Partnering with another grade level teacher who is comfortable with math so that he or she can teach some of the important concepts

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How to Carry Out the Recommendation

16. After children are able to recognize and compare shapes with ease, the next step should be to:

A. Help children identify and discuss attributes of various figures
B. Encourage them to explore how shapes can be combined and separated to form new shapes
C. Observe and note each child's ability to describe a shape's attributes
D. Have children talk about and describe shapes in the environment inside and outside the classroom

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17. Students should be encouraged to experiment with basic repeating patterns and notice the patterns in the world around them, and then taught to _____ patterns.

A. Extend, correct and create
B. Describe, manipulate, and evaluate
C. Construct, classify, and connect
D. Interpret, illustrate, and represent

Promote Children's Understanding of Measurement

18. Once children become comfortable making direct comparisons between and among objects, they should be provided with opportunities to measure objects using nonstandard tools and informal units, such as children's own hands and feet, or classroom items.

A. True
B. False

Potential Roadblocks and Solutions

19. Since teachers may find trying to teach new math concepts such as geometry and measurement overwhelming, it is recommended that they stick to one math content area within each activity rather than trying to cover multiple concepts at one time.

A. True
B. False

Recommendation 3: Use Progress Monitoring

20. Incorporating individual differences through progress monitoring and the tailoring of instruction can help ensure that all children learn math concepts and skills that are appropriately challenging and just beyond their current level of understanding.

A. True
B. False

How to Carry Out the Recommendation

21. Which of the following is NOT one of the three primary methods of determining children's level of math understanding?

A. Introductory activities
B. Self-report
C. Observation
D. Formal assessments

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22. While providing activities that are only slightly above the child's level of understanding can help ensure that the child does not feel frustrated, experts recommend focusing on more difficult activities that provide a greater challenge, as this will be more beneficial in the long run.

A. True
B. False

Recommendation 4: Teach Children to View and Describe Their World Mathematically

23. To encourage math-related talk, teachers can use open-ended questions to prompt children to think about how to describe their ideas mathematically and to increase the amount of math-related dialog in the classroom.

A. True
B. False

How to Carry Out the Recommendation

24. When teaching math concepts, teachers should initially link math ideas to familiar experiences, terms, or _____, resisting the urge to use more formal methods until children have a conceptual foundation for understanding them.

A. Images
B. Tasks
C. Analogies
D. Meanings

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25. Once children are comfortable using informal methods and representations to describe math ideas, teachers should teach math words so children have the vocabulary needed to connect their informal knowledge to formal terms.

A. True
B. False

Recommendation 5: Dedicate Time Each Day to Teaching Math

26. Researchers agree that it is generally most effective to introduce a math concept for the first time in a small group setting, as this enables students to be grouped by ability level and allows them time to practice the skill more effectively.

A. True
B. False

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27. When integrating math instruction throughout the school day, the expert panel recommends each of the following EXCEPT:

A. Highlight math within topics of study across the curriculum
B. Create a math-rich environment where children can recognize and meaningfully apply math
C. Use games to teach math concepts and skills and to give children practice in applying them
D. Show students how they can continue learning after school by embedding math into household routines and activities

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Table 10. Examples of Tools that Can be Useful in Each Math Content Area

28. Teachers should provide a variety of tools throughout the classroom to allow children to explore each of the five math content areas, and specifically, different colored cubes, clocks, stamps and markers are helpful when trying to teach concepts related to data analysis.

A. True
B. False

Potential Roadblocks and Solutions

29. Although trying to provide literacy, science, art, and math-rich environments can be a difficult task, it may help be helpful for teachers to:

A. Rotate activities and materials in the classroom rather than trying to include all aspects of all subjects at one time
B. Try to coordinate the use of materials and activities to meet multiple goals
C. Select the learning objectives ahead of time in order to plan activities and modify the classroom environment to support those objectives
D. All of the above

Glossary

30. End-of-chapters test or state developed tests where the results document a child's performance are examples of formative assessments.

A. True
B. False
