

This document provides a summary of Recommendation 3 from the WWC practice guide *Teaching Math to Young Children*. Full reference at the bottom of last page.

CONTENT: *Mathematics*

GRADE LEVEL(S): *preK–K*

LEVEL OF EVIDENCE: *Minimal*

Recommendation

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

Progress monitoring is a helpful method for making sure that math instruction is deliberate and useful for children. Teachers can monitor progress to tailor lessons and instruction based on children’s current math skill levels. This method helps to ensure that children are receiving math instruction that is difficult enough so that they are always learning.

How to carry out the recommendation

1. Use introductory activities, observations, and assessments to determine each child’s existing math knowledge, or the level of understanding or skill they have reached on a developmental progression.

Instructional strategies from the examples

- Use introductory activities to determine children’s ability in working with a new concept.
- Carefully observe children during a math activity, asking questions that require children to think out loud and describe their problem-solving process.
- Use formal assessments to guide planning and instruction.

South Carolina standards alignment

MATHEMATICS: No direct alignment

TEACHERS: INST.MS.2, PLAN.IP.3, PLAN.SW.3

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

To begin progress monitoring, teachers should find each child's level of skill and knowledge in math through *introductory activities*, observations, and formal assessments. Teachers can use introductory activities to present new concepts and determine what children can complete independently. For example, after instructing children on shapes, teachers can include an activity in which the children cut out shapes such as circles and triangles from magazines. Teachers can then ask the children to discuss the shapes and their different sizes. Such activity allows teachers to see whether the children know shapes and can talk about them.

Observations include addressing specific math competencies through activities and watching children in their process of completing the activities. While children are engaged in the activities, teachers can ask questions to see if they can verbalize their process for completing the activity. If children can complete the activity correctly and explain their process verbally, they can move on in the lesson.

Teachers can plan instruction and lessons by looking at children's overall performance on *formal assessments* to identify their skill levels. Teachers can also look at children's answers to specific questions or in specific sections of assessments for a deeper understanding of their knowledge and skills. This information can be valuable in selecting appropriate goals for instruction.

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

2. Tailor instruction to each child's needs, and relate new ideas to their existing knowledge.

Instructional strategies from the examples

- Use information collected from Step 1 above to guide instruction.
- Build activities based on the next level of development and connect them to children's interests.

South Carolina standards alignment

MATHEMATICS: PS.1a, PS.2a

TEACHERS: PLAN.IP.3, PLAN.SW.3

Teachers should use learnings from introductory activities, observations, and formal assessments to identify where children's knowledge and skills place them in the developmental progression. Doing so will help teachers determine the next steps in the learning process and create instructional activities aligned to the next levels. For example, when children demonstrate they can use subitizing to determine which set of objects has more (for example, a set of four has more than a set of three), they can use meaning counting to determine which collection contains more. Once children can count a set of 10 objects, teachers can include a set of 11 or more objects to increase the difficulty. See Table 3 on page 13 of the practice guide referenced on the last page of this document for a sample developmental progression related to number knowledge.

Teachers should not only create activities aligned to the next level in the learning progression but also connect new knowledge to children's interests. For example, if children like art, teachers can create activities that include drawing, such as having children draw eight dogs and 10 dogs and then describe which set has the most dogs.

Children might be at different levels in a learning progression, so it's helpful to group them by level for some activities. For example, some children might be able to count sets of 10 objects, whereas others might be able to count sets of eight. Teachers can group children who can count to 10 and group those who can count to eight. Then, they can observe the groups and increase the difficulty of the activity as the child's ability levels rise.

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

3. Assess, record, and monitor each child's progress so that instructional goals and methods can be adjusted as needed.

Instructional strategies from the examples

- To understand children's learning, use repeated cycles of implementation, assessment, and planning.



South Carolina standards alignment

MATHEMATICS: No direct alignment

TEACHERS: PLAN.IP.3, PLAN.SW.3, PLAN.A.2

Teachers can use progress monitoring to assess children's progress through introductory activities, observations, and formal assessments. Progress monitoring involves first selecting an activity using a developmental progression, then repeatedly cycling through a process of implementing the activity, assessing child's levels (using the developmental progression), and planning or selecting additional activities. Teachers might use a checklist such as the one below to monitor progress during a sample activity.

Progress monitoring checklist

Activity: Which set has the most triangles?	Child	Date	Counted Correctly?	Decided Correctly?	Errors Made
Set 1: 	Suzy	November	Yes	No	Selected set 1 as having more triangles
Set 2: 	Billy	November	No	Yes	Counted eight twice for set 2

Note. Adapted from Example 8 on page 40 of the practice guide.

When assessments show that children's math knowledge and skills are growing, teachers can plan activities, following the developmental progression, that are increasingly more difficult and continually assess children's math levels as they complete the new activities.

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

Potential roadblocks and how to address them

Roadblock	Suggested Approach
<p><i>I already use solved problems during whole-class instruction, but I'm not sure children are fully engaged with them.</i></p>	<p>Ask questions, and be sure to include all children in the discussion to motivate them to think critically. Model think-aloud questions (for example, "Will the strategy work for every problem like this?" "Why or why not?" "How would you modify the solution, if you can, to make it clearer to other children?"). See Examples 1.1 and 1.2 in the practice guide.</p> <p>Additionally, use solved problems beyond whole-group settings to be sure they are scrutinized in more meaningful ways. Include solved problems in class assessments to make whole-class work relevant to children. See Examples 1.9, 1.10, and 1.11 in the practice guide.</p>
<p><i>I do not know where to find solved problems to use in my classroom and do not have time to make new examples for my lessons.</i></p>	<p>Find sample or worked problems in published curricular materials. Use past or current de-identified child work (such as homework, projects, and assessments) as other examples, particularly for unique solution paths or incorrectly solved problems. Share across classrooms to increase your access.</p>
<p><i>I'm worried that showing children incorrectly solved problems will confuse them.</i></p>	<p>Although children may not be familiar with examining incorrectly worked problems, doing so can help them build important critical-thinking skills. Be sure that children are clearly aware that a problem contains an error, then focus on the steps to understand the process and where it went wrong. Fully discuss each step to prevent confusion and build recognition and understanding of how the error occurred. See Examples 1.5, 1.6, and 1.7 in the practice guide.</p>

Reference: Frye, D., Baroody, A. J., Burchinal, M., Carver, S. M., Jordan, N. C., & McDowell, J. (2013). *Teaching math to young children* (NCEE 2014-4005). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.
<https://ies.ed.gov/ncee/wwc/PracticeGuide/18>