This document provides a summary of Recommendation 5 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

# Dedicate time each day to teaching math, and integrate math instruction throughout the school day.

Each school day should have time set aside for math. Teachers should connect math concepts to familiar objects so children can see the relationship to everyday situations. It is also helpful to incorporate math concepts into lessons for other subjects so children begin to understand how those subjects are connected to math. Including math-related items, such as games, in the classroom can help children apply the math concepts they have learned in new contexts.

## How to carry out the recommendation

### 1. Plan daily instruction targeting specific math concepts and skills.

#### Instructional strategies from the examples

- Explicitly plan time during each day for children to develop math skills.
- Provide opportunities throughout the school day for children to apply their math concepts.

#### South Carolina standards alignment

**MATHEMATICS:** No direct alignment
**TEACHERS:** PLAN.IP.3, PLAN.A.2

Children in the lower grades should have explicit time for developing math skills during each school day. During this time, children can learn specific math concepts

through whole- and small-group activities. Then, teachers can provide opportunities throughout the remainder of the day for children to apply the math concepts they have learned. Children may be at different math levels, so teachers should consider how best to group them for each activity. For example, teachers might introduce a new math concept as a whole group and then divide children into smaller groups by math level to strengthen the learning through an activity or game.

**Linking large groups to small groups**

| | |
|---|---|
| **Objective** | Understand the differences and similarities among triangles, rectangles, and squares. |
| **Materials needed** | • Book: *Bear in a Square*, by Stella Blackstone<br>• A variety of other objects (based on availability, but could include the following):<br>  ○ Large pieces of paper cut into various shapes for painting<br>  ○ Lunch trays and a small amount of sand<br>  ○ Geoboards with rubber bands |
| **Directions: large group** | Read the book in a large group, highlighting the names of all the shapes but focusing specifically on the difference between the number and length of sides and types of angles in triangles, rectangles, and squares. |
| **Directions: small group** | Once children are divided into small groups, highlight the number and length of sides and types of angles in each of the shapes the children create during activities like the one below. Children should be encouraged to use informal terms to describe the shapes. Provide paint, chalk, or other art materials so that children can add a stripe around the edge of a large paper cutout of a triangle or rectangle. Then, have the children continue to add more of the same shapes inside the original shape to create a design with concentric shapes. |
| **Early math content areas covered** | Geometry (shapes and attributes of shapes) |
| **Integrating the activity into other parts of the day** | Take a group walk outside to collect sticks of different sizes, and then use them to make and identify shapes. |
| **Using the activity to increase math talk in the classroom** | When children locate a shape in the classroom environment, ask them to explain it to the group: "How can you tell that shape is a ___?" Prompt the children to identify the number and length of sides and type of angles. |

*Note.* Adapted from Example 9 on page 49 of the practice guide.

## 2. Embed math in classroom routines and activities.

### Instructional strategies from the examples

- Look for ways to embed math into everyday classroom routines and activities.

### South Carolina standards alignment

**MATHEMATICS:** No direct alignment
**TEACHERS:** INST.MS.2

Teachers can use opportunities within classroom routines and activities to allow children to practice the math concepts they have learned during math lessons. For example, teachers can have children count the number of children in attendance at snack time and then count out enough apples for each child to have one. Teachers could extend this activity and have the children keep track of the counts over two different days, then make comparisons between the two days. See Example 10 on page 50 of the practice guide referenced on the last page of this document for more detail about how math might be integrated into snack time.

# 3. Highlight math within topics across the curriculum.

### Instructional strategies from the examples

- Look for ways to integrate math into other content areas as it makes sense.

### South Carolina standards alignment

**MATHEMATICS:** No direct alignment
**TEACHERS:** INST.MS.2, PLAN.SW.3

Teachers can provide children with opportunities to apply math concepts in other content-area lessons. Depending on where children are in their learning process, teachers can include time for counting, looking at shapes, or using other math concepts during instruction in other content areas.

**Examples of how a teacher can incorporate math into other content-area lessons**

| | Math Content Area | | | | |
|---|---|---|---|---|---|
| | **Number and Operations** | **Geometry** | **Patterns** | **Measurement** | **Data Analysis** |
| **Literacy** | *We All Went on Safari*, Krebs | *Bear in a Square,* Blackstone | *A Pair of Socks,* Murphy | *How Big Is a Foot?* Myller | *It's Probably Penny,* Leedy |
| **Science** | Count collections of natural objects. | Describe objects from nature in geometric terms. | Find and identify patterns in nature. | Measure the growth of a plant in the classroom each day. | Graph the amount the classroom plant grows each day. |
| **Art** | Count how many objects appear in a piece of artwork. | Identify shapes in artwork. | Use patterns to make pictures or frames for pictures. | Measure to make frames for art out of poster board or card stock. | Make a graph of the children's favorite colors. |
| **Health and Safety** | Count the length of time it takes to wash your hands. | Use traffic signs to recognize shapes. | Jump rope or play hopscotch with an alternating pattern. | Measure your body's growth over time. | Graph your height or foot size. |

| | Math Content Area | | | | |
|---|---|---|---|---|---|
| | **Number and Operations** | **Geometry** | **Patterns** | **Measurement** | **Data Analysis** |
| **Social Studies** | In a unit about families, order people by size or from youngest to oldest. | Identify squares, straight lines, curved lines, and other shapes on maps. | Study patterns in clothes from different parts of the world. | Make a map of the neighborhood, using measuring, geometry, spatial thinking, and positioning words. | Graph the size of the children's families. |

*Note.* Adapted from Table 9 on pages 51–52 of the practice guide.

## 4. Create a math-rich environment where children can recognize and meaningfully apply math.

### Instructional strategies from the examples

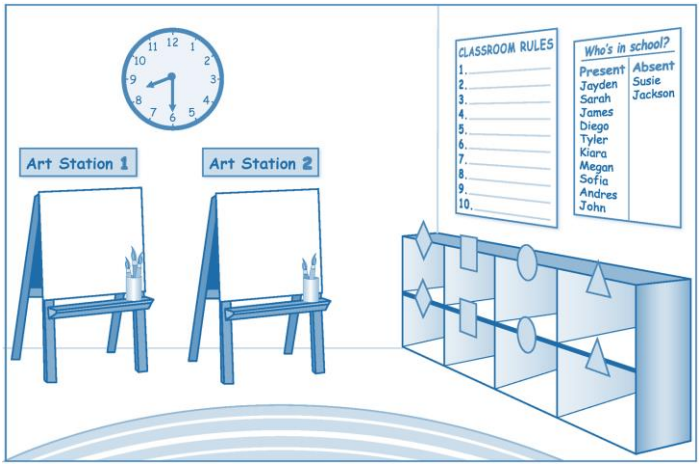
- Provide accessible objects and tools throughout the classroom that are related to math concepts learned in the class.
- Encourage children to think about how to apply math concepts to everyday activities.
- Engage children in labeling tools and materials that can be used for math activities.

### South Carolina standards alignment

**MATHEMATICS:** No direct alignment
**TEACHERS:** INST.MS.2

Teachers can create a classroom environment that is well-supplied for children to apply math. As an option, teachers can have accessible objects and tools in the classroom that are related to learned math concepts. Teachers might also have children apply math concepts to everyday activities and tools that are already part of the classroom routine, including number lists, blocks, beads, rulers, sorting bins, and so on. Children may not directly know how to use the tools to think about the math concepts they have learned, so teachers might model how to use them during instruction and group work. The tools should be labeled and placed in locations accessible to children. Teachers should also consider including children in the labeling process so they understand what each label means. Labeling is also an excellent opportunity for children to apply math concepts such as counting.

**Example of a math-rich environment in the classroom**




*Note.* Taken from Figure 7 on page 53 of the practice guide.

# 5. Use games to teach math concepts and skills, and to give children practice in applying them.

### Instructional strategies from the examples

- Use games to engage children in math.
- Align games with the math concepts children are learning in class and their level of understanding of these concepts.

### South Carolina standards alignment

**MATHEMATICS:** No direct alignment
**TEACHERS:** No direct alignment

Teachers can use games to immerse children in math concepts. Games might motivate children to engage in math in a fun way. Games should align with the math concepts being learned in class and with the children's levels. Curricula will often include games, but individual games can also be purchased elsewhere. Additionally, existing games can be used to apply math concepts. An example of a math game is provided below.

**The *Animal Spots* game**

| | |
|---|---|
| **Objective** | Practice one-to-one correspondence and cardinality. |
| **Materials needed** | • Pictures of small animals or materials children can use to draw their own animals<br>• Small circles of paper to use as spots<br>• Glue<br>• A die or spinner to determine the number of spots to place on each animal |
| **Directions** | Have each child draw the outline of an animal on a piece of paper, or provide handouts with large outlines of animals. Each child should take a turn throwing the die to determine how many spots to place on their animal. The children should count out the number of dots on the face of the die, and then they should choose the same number of "spots" from a bowl of paper circles in the center of the table. After children have selected the correct number of spots, they can glue them onto their animals. Teachers can tailor the *Animal Spots* game for use with the entire class, a small group, or individual children. |
| **Early math content areas covered** | • Counting using one-to-one correspondence<br>• Cardinality |

| | |
|---|---|
| **Monitoring children's progress and tailoring the activity appropriately** | • Observe the play, noting each child's ability to count the number of dots on the die and count out the same number of spots from a larger pile.<br>• Use one die or a spinner at the beginning; then, use two dice to increase difficulty. |
| **Integrating the activity into other parts of the day** | Have children count out objects from a larger set. For example, a child can choose 10 blocks for building or five shapes from a larger collection to use for a collage. |

*Note.* Adapted from Example 11 on page 54 of the practice guide.

## Potential roadblocks and how to address them

| *Roadblock* | Suggested Approach |
|---|---|
| *The school is on a limited budget and cannot afford to purchase many classroom materials or games.* | To enhance instruction without having to spend money, teachers can use existing opportunities throughout the day, objects already in the school environment, and tools that others have created, such as those found online. When teachers or schools decide to purchase items, they should be strategic by thinking about what will best engage children in their current learning. |
| *I am told that it is important to provide literacy-, science-, art-, and math-rich environments. It is difficult to keep all subjects in mind at all times.* | When planning lessons, think about how to incorporate aspects of various content areas into each lesson. All content areas do not need to be incorporated at one time; math can be included in different subjects at different times. Be strategic about how to meet the learning goals of the day across content areas. See Table 9 on pages 51–52 of the practice guide referenced on the last page of this document for ideas. |
| *I do not have my own space because multiple classes use the same classrooms throughout the day.* | If teachers cannot easily change the classroom, they can consider how to use mobile objects to enhance the environment, such as transportable games or charts. |
| *Parents may wonder why their children are playing games in school.* | Teachers can be strategic about choosing games to enhance math instruction and learning. They should connect games to specific learning objectives. Doing so will help parents see the connections between the games and instruction and learning. Additionally, teachers should explain how important play is in the development of young learners. |

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