

Teaching Math in Preschool Classrooms

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Math Expectations:

1. Children demonstrate an understanding of number and numerical operations.
2. Children develop knowledge of spatial concepts, e.g., shapes and measurement.
3. Children understand patterns, relationships and classification.
4. Children develop knowledge of sequence and temporal awareness.
5. Children will use mathematical knowledge to represent, communicate and solve problems in their environment.

Topic:

Math is everywhere in the classroom. Early childhood educators may have difficulty facilitating math activities within their daily routine because of a lack of understanding of children's development in mathematics, past experiences with mathematics, etc. The Mathematics Expectations, *Preschool Teaching and Learning Expectations: Standards of Quality*, provide guidelines for a quality math-enriched program. Educators need to thoughtfully plan children's environment and activities to support children's mathematical development throughout each day. Providing these meaningful math experiences will enhance preschooler's mathematical thinking in and outside the classroom.

Suggested Time: Approximately 2.5 hours – 3 hours (depending on the selection of activities)

Objectives:

To help educators gain the knowledge, comfort and skill needed to understand preschool mathematics by:

- Becoming familiar with the New Jersey Mathematics Expectations
- Understanding developmentally appropriate mathematical teaching practices and learning outcomes in a preschool classroom
- Integrating math concepts into the daily preschool routine

Materials Required:

- PowerPoint: Mathematics in the Preschool Classroom (Mathematics Expectations)
- New Jersey Department of Education *Preschool Teaching and Learning Expectations: Standards of Quality* - Mathematics section
- Chart pad, markers, tape, easel
- *Integrating Math Concepts into Classroom Schedule* matrix
- *Integrating Math Materials into Classroom Areas* matrix (optional)
- Index cards labeled with mathematical concepts
- Preschool Mathematical Play Vignette
- The Napping House by Audrey Wood
- Bright Eyes Brown Skin by Cheryl Willis Hudson (optional)
- 10 wooden blocks
- Noise maker for attention-getting purposes

Handout List:

- Agenda
- New Jersey Department of Education *Preschool Teaching and Learning Expectations: Standards of Quality*, Mathematics Expectations
- *Integrating Math Concepts into Classroom Schedule* Matrix
- *Integrating Math Materials into Classroom Areas* Matrix (optional)
- Preschool Mathematical Play Vignette
- NAEYC & NCTM Position Statement
- Reference List

Suggested Reading and Resources:

- Andrews, A.G. & Trafton, P.R. (2002). *Little kids – Powerful problem solvers*. Portsmouth, NH: Heinemann.
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- Baroody, A.J. (2004). The developmental bases for early childhood number and operations standards. In D. Clements & J. Sarama (Eds.), *Engaging Young Children in Mathematics: Standards for Early Childhood Mathematics Education* (pp. 173-219). Hillsdale, NJ: Lawrence Erlbaum Assoc.
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- Ginsburg, H.P. (1999). Mathematics in children's thinking. *Mathematical Thinking and Learning*, 1(2), 113-129.
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- Kamii, Constance. (1982). *Number in preschool & kindergarten*. Washington, D.C: NAEYC.
- National Association for the Education of Young Children and the National Council for Teachers of Mathematics (2003). *Early Childhood Mathematics: Promoting Good Beginnings*. www.naeyc.org/about/positions/pdf/psmath.pdf
- NAEYC/NCTM. (2004). *Early childhood mathematics: Promoting good beginnings*. Position Statement Booklet. Washington DC.
- National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. <http://standards.nctm.org>
- Rousselle, L., Palmers, E., & Noel, M. (2004). Magnitude comparison in preschoolers: What counts? Influence of perceptual variables. *Journal of Experimental Psychology*, 87, 57-84.
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Detailed Agenda

I. Warm-up Activity (10 minutes)

Ask the educators what recent math activities they have seen or done in the classroom(s)
Chart their responses.

Review responses and then hand out the Mathematics section in the *Preschool Teaching and Learning Expectations: Standards of Quality*.

Briefly review the Mathematics Expectations.

Ask participants to connect their responses to the Mathematics Expectations.

Refer to the overview in the Mathematics section in the *Preschool Teaching and Learning Expectations: Standards of Quality* to give participants a foundation for the Mathematics Expectations. (Prepare talking point in advance.)

II. Welcome and Logistics (5 minutes)

Introduce yourself and have others introduce themselves (if appropriate).

Review the agenda and the session objectives.

III. Opening Activity: Guess the Math Concept (10 minutes)

Open the session by having the educators break into groups of four or five. Give each group an index card labeled with a mathematical concept found in the expectations (i.e., classification, seriation, measurement, spatial relations, geometry, counting, adding/subtracting, reading and writing numbers, patterning, one-to-one correspondence, etc.).

Each group has several minutes to discuss and develop a nonverbal role-play to describe the mathematical concept to the audience (similar to charades).

Each group presents their role-play to the audience. The audience guesses the mathematical concept.

Or

Read *Bright Eyes Brown Skin* by Cheryl Willis Hudson. Tell participants to think about the Math Expectations while the story is read.

After reading, ask participants what mathematical concepts can be addressed while reading this book with children.

You may have to reread several pages of the book and give ideas to help initiate the activity. (For example: In the book, “Long hair. Short hair.” - relates to comparing lengths *measurement.)

Write participants’ responses onto chart paper. Discuss the importance of understanding the Mathematics Expectations in order to encourage mathematical thinking in children.

IV. Introducing the Topic: NJ Mathematics Expectations (20 minutes)

Use the PowerPoint presentation: Teaching Math in Preschool Classrooms. Show and read PowerPoint slides 1 through 3.

Ask participants to look over the Mathematics Expectations. Again, reviewing the teaching practices and student outcomes for each math expectation.

Explain that the *Expectations* are divided into teaching practices and learning outcomes. The *Expectations* also provide examples of mathematical materials as well as mathematical concepts that should be integrated into classroom activities. Emphasize that teachers should encourage mathematical thinking throughout the day that is meaningful to children.

Show PowerPoint slides 4 through 14.

Discuss each slide by referring to the notes on the bottom of the picture and ask, periodically, if participants have questions.

View pictures and have participants briefly discuss what math concepts are being addressed in each picture by referring back to the Mathematics Expectations. (Refer to the notes in the PowerPoint under each picture for talking points.)

V. Application Activity: Integrating Math Concepts into the Classroom Schedule (15-20 minutes)

Hand out the *Integrating Math Concepts into Classroom Schedule Matrix* to each participant. Give chart paper and markers to each table/group.

Explain the directions. In groups of four or five, brainstorm ideas on how to integrate math concepts into the assigned part of the day. (You may want to keep them in the same groups as the first opening activity.)

Give each group a specific part of the day to focus on. For example: transitions, small group, large group, center/work time or outside.

For example, one group may be assigned “Transitions” on the matrix and will chart examples of integrating math concepts during transitions.

Have each group write their selected part of the day on top of the chart paper.

While groups are brainstorming ideas, circulate to answer questions and/or give feedback.

As the groups are charting their ideas, give them a five minute reminder to complete their work (when you see they’re almost finished).

Hang the charted responses around the room.

Discussion (15-20 minutes)

Recommend that participants use their own matrix to write other ideas for integrating math concepts in the classroom based on the sharing of ideas from each group.

Have a presenter from each group report their ideas.

After each group presents, allow time for others to ask questions or give feedback/comments/clarifications or add ideas from their classroom experiences.

VI. Application Activity (optional): Integrating Math Materials into Classroom Areas
(15 minutes)

Explain directions: As a group, brainstorm and record math materials that can be integrated into the classroom.

Divide the classroom areas so each group concentrates on one area: art, book/library, house, small toy/manipulatives, block, and sand/water.

Each group will chart their ideas.

Hand-out the blank *Integrating Math Materials* matrix for participants to record ideas for the future whole group discussion.

Discussion (10 minutes)

As a whole group, have participants present their ideas.

Remind the participants that the posted chart papers around the room are there to offer ideas and for participants to note those ideas on their matrix.

VII. Application Activity: Preschool Mathematical Play Vignette (20 minutes)

Explain directions. Read vignette and determine the math concepts that are addressed in the story. Focus on the Mathematics Expectations and record findings.

Hand out Preschool Mathematical Play Vignette.

Circulate to provide assistance and clarification.

Discussion (15 minutes)

Have volunteers read aloud the vignette, stopping after each paragraph for time to share findings among all. Refer to the presenter's copy for the concepts addressed.

VIII. Implementation Plan (5 minutes)

Explain to participants that at the end of a training session, it is helpful to take a little time to reflect on what each person learned and any activity or idea that he/she plans to implement as a result of the workshop. Have some participants share what their next steps will be based on this workshop. Have them write down two implementation ideas that relate to both student learning and teaching practices.

Invite several volunteers to share their plans/next steps.

IX. Closing Activity (10-15 minutes)

Trainer reads Napping House. (You or Trainer may want to use the blocks to represent the characters in the story.)

Invite comments on how preschool math can be integrated within the story.

Summarize by reinforcing the importance of using mathematics every day, throughout the day, in a way that is meaningful to children.

Ask if anyone has any other questions or comments.

X. Resource Review and Evaluation (10 minutes)

Highlight those books and resource listings that you have brought. Encourage participants to share their resource list with parents.

Review contents of packet and answer any remaining questions.

Ask participants to complete workshop evaluation form.