

Embedding math instruction in the preschool classroom



Mary Swingle, M.Ed.
mpswingle@vcu.edu

OBJECTIVES

For this session participants will gain a better understanding of

1. How to plan for instructional opportunities using daily routines and schedules
2. How to use typical early childhood materials available to teach math-based concepts
3. Determine what strategies to use when teaching within the routines of the classroom, based on the needs and ability level of your students

Rationale-Math

- Early Math skills are the biggest predictor of children's math achievement in later school years
- Sequential and cumulative in nature
- Strengthens problem-solving skills and higher level thinking

Taken from:

<http://www.pbs.org/wgbh/misunderstoodminds/mathbasics.html>

Let's take a look at...

- ❖ Environment
- ❖ Curriculum
- ❖ Schedule
- ❖ Activities
- ❖ Materials
- ❖ Evaluation

Environment

- *Physical as well as social-emotional*
- *Availability, condition and variety of materials*
- *Number of children*
- *Number of adults*
- *Space for 1:1, small group, and large group activities*

Curriculum

- What to teach
- When to teach
- Scope & Sequence

*Virginia's Foundation Blocks for Early Learning:
Comprehensive Standards for Four Year Olds (2012)*

http://www.doe.virginia.gov/instruction/early_childhood/preschool_initiative/foundationblocks.pdf

Schedule



- Duration of activities
- Number of transitions
- Instructional time
- Teacher-directed
- Child-directed
- Zone defense (staffing)
- Static vs dynamic
- Flexibility

Schedule

- Arrival and Dismissal
- Circle or large group instruction
- Meal times
- Learning centers
- Small group activities
- Outdoor or gross motor play
- Music
- Story time

Activities

- Focus on helping children understand concepts
- Encourage children to use analysis and reasoning skills
- Help children apply concepts to their everyday world
- Help children to think about their own process of thinking

Math Materials

- Quantity, Quality, & Variety
 - Enough for everyone
 - Matching toys to encourage parallel play
 - At or slightly above skill level
 - Accessible, adapted
 - Rotate on regular schedule
 - Developmentally, functionally, culturally, and age-appropriate

Math Materials

Organization and storage

- Easily accessible
- Clearly visible
- Clearly labeled
- Tactile cues



Evaluation

How will we know if it works?

- Take data on child progress, methods, materials and outcome
- What do I need to change?
- Was it developmentally appropriate for this age group?
- Can I build on this activity for greater skill development?

Mathematical Concepts

- Number words in songs and fingerplays
- Building understanding of quantity
- Growing understanding of 1:1
- Rote counting (forward and backward)
- Associates number concepts in meaningful ways
- Advancing knowledge of numbers & counting

Mathematical Concepts

- Numbers have meaning
- Comparing numbers with vocabulary
- Counting in sequence
- Shows increased curiosity in numbers
- Solves problems with numbers

Virginia Standards for Mathematics

1. **Number and Number Sense***
2. **Computation**
3. **Measurement***
4. **Geometry**
5. **Data Collection and Statistics**
6. **Patterns and Relationships**

Number and Number Sense

- Children must have daily experiences involving counting, comparison and quantity.
- How can we make counting and quantity personally meaningful for young children?
- How can we challenge them beyond the calendar?
- Where can we incorporate these skills in all areas of our day?

Number sense (counting) prerequisites

To count successfully, a learner must...

- Know the verbal sequence
- Demonstrate one – to – one correspondence
- Keep track
- Say the last number to answer “how many” (cardinality)

Routines & Activities for Number & Number Sense

- Arrival and Dismissal
 - Counting children, steps, ordinal concepts in a line
- Circle or large group time
 - Counting items related to opening activities
- Meal Times
 - One to one correspondence: handing out utensils, plates, napkins
- Music and movement
 - Count tapping or beats, count and compare two sets of instruments



Measurement

- Children must have daily experiences involving comparison and measurement.
- How can we make measurement personally meaningful for young children?
- How can we challenge them beyond just big and small?
- Where can we incorporate these skills in all areas of our day?

Measurement pre-requisites

To measure successfully, a learner must...

- Be able to count sequentially
- Identify numerals
- Differentiate between size comparisons
- Choose best tools for measurement based on size and scope

Routines and Activities for Measurement

- Arrival and Dismissal
 - Measure the length of the sidewalk using a rope
- Meal time
 - Compare the length and weight of food items, utensils, height of cup/milk, etc.
- Small group time
 - Compare length of objects using crayons vs pencils; using scales to compare the weight of objects
- Outdoor play
 - Use a thermometer to look at the temperature of outside vs in the classroom

Measurement







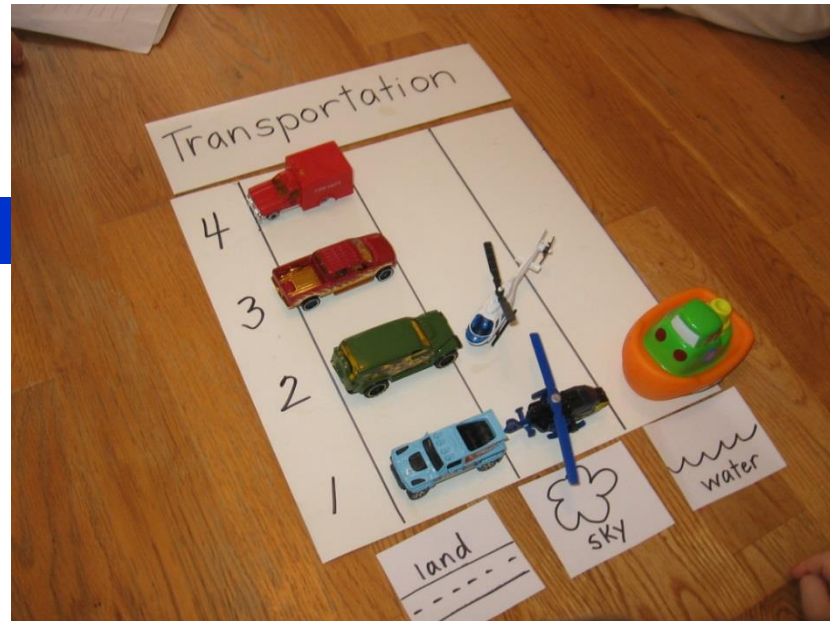
Explore Math Together

- Have variety of math materials/toys/activities
- *Math Around Us* books
- Materials available to make simple math games
- Brainstorm ideas on how you can use math in your classroom

Measurement

How many legos tall ?

item	prediction	actual
 apple juice		
 cup		
 roll		
 apple		



Additional Resources

- Copley, J. (2010). *The young child and mathematics*, 2nd ed. Washington, DC: NAEYC.
- Epstein, A. (2012). *Mathematics*. Ypsilanti, MI: HighScope Press.
- Wilburne, J. et al. (2011). *Cowboys count, monkeys measure and princesses solve: Building early math skills through storybooks*. Baltimore, Maryland: Brookes Publishing.
- " 9 Conclusions and Recommendations ." *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity* . Washington, DC: The National Academies Press, 2009
- Roskos, K.A., Christie, J.F., & Richgels, D.J. (2003), *The Essentials of Early Literacy Instruction*. National Association for the Education of Young Children
- Bailey, D. (2015) What's the point of teaching math in the preschool classroom? Brookings Brief, taken from:
<http://www.brookings.edu/research/papers/2014/11/13-chalkboard-preschool-math-bailey>