



**EAST LOS
ANGELES
COLLEGE**

**CD 4: CREATIVE
EXPERIENCES
FOR CHILDREN
II**

INSTRUCTOR: ROKEYA RAHMAN

TOPIC: MEASUREMENT



AGENDA

- **Welcome**
- **Math in Early Childhood Classroom**
- **Areas of Math**
- **Measurement**
- **Math Talk: Open-ended questions about measurement**
- **Upcoming Assignment**
- **Questions & Answers**



OBJECTIVES: EARLY MATHEMATICS (MEASUREMENT)

- **The student will be able to:**
 - ✓ Define key terms related to math especially Measurement
 - ✓ Familiar with concept of Measurement
 - ✓ The concepts of Math Talk and Example
 - ✓ Measurement Activity ideas in promoting math experiences in the classroom

REVIEW ECE DOMAINS: ACCORDING TO PRESCHOOL LEARNING FOUNDATION, VOL # 1,2,3

There are several standards/domain in ECE field in California:

- Social-Emotional Development
- Language and Literacy
- English Language Development (for English Learner)
- **Mathematics**
- Visual and Performing Arts
- Physical Development
- Health
- History and Social Science
- Science



CURRICULUM AREAS:

- Language and Literacy
- Art and Music
- Social studies and Dramatic Play
- Sensor Play
- Science
- Math
- Fine motor and Manipulatives
- Gross motor and outdoor Play
- Construction: Blocks and Wood Working
- STEAM education

WHAT IS EARLY MATHEMATICS?

■ Early Math Knowledge

- Includes skills and concepts related to number, geometry and spatial sense, measurement, and patterns.
- It is rooted in children's everyday experiences, and interactions beginning in infancy.
- It is interconnected with all areas of early learning and development.
- (Frye et al., 2013; Ginsburg et al., 2008; NAEYC & NCTM, 2002; National Research Council, 2009; Sarama & Clements, 2009)

EARLY MATH IN THE ECE

- ▶ Math is everywhere
- ▶ Daily living provides a math-rich environment
- ▶ Math must be hands-on and DAP
- ▶ Teach math in a context that has a purpose to the child
- ▶ Focus on conceptual math, not pencil-and-paper
- ▶ Not limited to a specific period or time of day
- ▶ Relationships and repetition are key to math learning

(Beaver, Wyatt, and Jackman, 2017, p. 261)



DEVELOPMENTAL STAGES OF MATH

□ **Early Math Knowledge includes skills and concepts related to**

- Number and Operations
- Geometry & Spatial Sense
- **Measurement**
- Patterns, Functions, and Algebra
- Data Analysis and Probability
- Problem Solving (Beaver, Wyatt, and Jackman, 2017, p. 263-269)

MEASUREMENT IN THE EARLY CHILDHOOD CURRICULUM

- **What is Measurement for Young Children?**
- For young children, measurement is primarily about comparing.
- They evaluate and compare things based on attributes like length or area.
- They tend to use perceptual cues to compare.
- They enjoy measuring with rulers and other tools, but it's not standard measurement yet.

GENERAL LEARNING PATH AND DEVELOPMENT OF MEASUREMENT SKILLS

■ Developmental Benchmark of Measurement Skills in Children

■ Length:

- Children begins to recognize length as an attribute by the age of 3
- By age 4 they directly compare the length of two objects
- Around age 6, they order lengths, place units end to end to measure length
- By age 8 children can use a ruler with understanding.

GENERAL LEARNING PATH AND DEVELOPMENT OF MEASUREMENT SKILLS (CONTINUED)

■ Area:

- ✓ An understanding of area begins at age 4
- ✓ At age 4, they attempt simple comparison and covering areas with shapes.
- ✓ By age 8, they progress to making rows and columns with accuracy in order to measure area and make arrays. (Copley, J., 2010, p.124)

■ Volume:

- ✓ The concept of volume (capacity) begins with children as young as 2 or 3.
- ✓ Children can directly compare capacities of containers at age 4.
- ✓ By age 5, they can make indirect comparison by pouring water from 2 containers into a third container by age 5.
- ✓ By age 8, children can compute the capacity by adding or multiplying to find the total volume.

STEPS IN COMPREHENDING MEASUREMENT

- ❑ **An effective teaching sequence for measurement skills and concepts follows the five basic steps in children's learning about measurement:**
 1. Recognize that objects have measurable properties and know what is meant by "How Long" or "How Heavy"
 2. Make comparison (shorter than, longer than etc.)
 3. Determine an appropriate unit and process of measurement
 4. Use standard units of measurement
 5. Create and use formulas to help count units (Copley, J., 2010, p.105)

PROMOTING DEVELOPMENT OF KEY SKILLS AND CONCEPTS

☐ Comparison and Ordering:

- ✓ Comparison is the core activity and concepts that starts children on the path of to fully developed understanding and use of measurement.
- ✓ Children should have opportunity to compare two things with respect to:
 - length (longer, shorter)
 - Area (covers more, covers less)
 - Capacity (hold more, hold less)
 - Weight (heavier, lighter)
 - Time/duration (longer, shorter)
 - Temperature (warmer, colder) (Copley, J., 2010, p.125)

PROMOTING DEVELOPMENT OF KEY SKILLS AND CONCEPTS

■ Comparison and Ordering:

- ✓ To compare objects, children begins to use non-standard units (My table is more than four hands long)
- ✓ Then move to using standard units (the table is almost 3 feet long)
- ✓ Comparing fairly is an important concepts for young children. (Copley, J., 2010, p.125)

PROMOTING DEVELOPMENT OF KEY SKILLS AND CONCEPTS (CONTINUED)

□ Length and Area

- ✓ For young children length concepts involve *how long, how far, how wide, how far around* something is.
- ✓ Rulers, measuring tapes, meter sticks provide numerical measurement for lengths.
- ✓ Area concepts much more difficulty for children
- ✓ With appropriate learning experiences, children can grasp that measure area they need to use a unit of area, such as a square tile. (Copley, J., 2010, p.125)

PROMOTING DEVELOPMENT OF KEY SKILLS AND CONCEPTS (CONTINUED)

Capacity and Volume

- ✓ Capacity describes the maximum amount that can be held by a container, such as a bucket.
- ✓ It often refers to liquid measurement.
- ✓ Volume is the space occupied by a 3-dimensional object (its heights, weights, and lengths)
- ✓ Volume is often described as the number of cubic units it takes to fill a figure (such as a wooden blocks) or a container. (Copley, J., 2010, p.125)

PROMOTING DEVELOPMENT OF KEY SKILLS AND CONCEPTS (CONTINUED)

Weight:

- ✓ Weight is determined by the mass of an object and the effect of gravity of that object.
- ✓ With young children, comparing the weight of objects to see which one is heavier or lighter should be the primary focus.
- ✓ Balances provide good measuring tools for comparison.
- ✓ Scales allow children put a numerical value to a weight (I am weight 20 pounds) (Copley, J., 2010, p.126)

PROMOTING DEVELOPMENT OF KEY SKILLS AND CONCEPTS (CONTINUED)

Time:

- ✓ Teacher often do not emphasize time measurement in the early years.
- ✓ Children should have opportunities to engage in exploring aspects of time, such as relationships of time, distance, and speed.
- ✓ Teachers can use various types of time vocabulary, example-
 - **General words**- time, ago
 - **Specific words**- morning, afternoon, evening, night, day, noon
 - **Relationship words**- soon, tomorrow, early, late, a long time ago etc.
 - **Specific duration words**- minutes, second, hours, day of the week, months, year etc. (Copley, J., 2010, p.126)
 - **Specific day words**- birthday, Thanksgiving, vacation, school day, weekend etc.

PROMOTING DEVELOPMENT OF KEY SKILLS AND CONCEPTS (CONTINUED)

Temperature:

- ✓ Temperature should be taught in the context of the young child's world.
- ✓ Teacher may use some temperature word, such as hot warm, cold, and freezing when describing food or weather.
- ✓ Measurement vocabulary used in context is critical to children's understanding of temperature and to their ability to make comparisons. (Copley, J., 2010, p.126)

PROMOTING DEVELOPMENT OF KEY SKILLS AND CONCEPTS (CONTINUED)

Conservation:

- ✓ Piaget's term conserve describes a child's cognitive ability to understand that even if an object changes shape, its fundamental attributes stay the same.

Unit:

- ✓ In measuring and comparing, young children tend to consider how many units.
(Copley, J., 2010, p.126)

OPEN-ENDED QUESTION ABOUT MEASUREMENT

☐ Lengths

- Can you find something that is longer/shorter than this? How can show me?
- Which one is longer/shorter? How do you know?

☐ Area:

- To cover this book, would it take more cubes or more blocks? How can we find out?

☐ Weight:

- Which is heavier/lighter? How do you know?
- How can you tell me which block is the heaviest?

☐ Capacity:

- Which of these two containers holds more/less? Why do you think so?
- How can you find out which container holds more water?

☐ Time:

- What do you do when you come to school?
- What do you do after or before lunch?

☐ Temperature:

- Is the room warmer or colder than yesterday? Why do you think that?
- You are measuring how hot and cold the window is. Can you show me how you are measuring?

MEASUREMENT ACTIVITY IDEAS

- Waking the Circle
- Family Links
- Measuring Me
- Water Graph
- Balance Scale Graph
- Measuring Earthworms
- Shoe Store
- Lego Lengths
- Sorting by size
- Coin Match
- Actual Size Footprints
- Oobleck
- Sand Babies
- Cup Drips
- Snapping
- Scavenger Hunt
- High and Low Collage
- Measure Hunt

PROVIDING A MATHEMATICS-RICH ENVIRONMENT

- Children should be given opportunities to explore with balances, weights, scales, clocks, rulers, meter, sticks, grid paper, measuring cups, gallon containers, cups, teaspoons, tablespoons etc.
- These are standard measuring materials.
- A variety of nonstandard measuring materials should be available.
- Children can use yarn, ribbon, blocks, cubes, timers, ice cubes, and wide variety of containers to compare and measure to make sense of their world. (Copley, J., 2010, p.126)

UPCOMING ASSIGNMENTS:

- ✓ Read the textbook chapter 7
- ✓ Read the lecture slides on measurement
- ✓ Visit Modules for updates and announcement
- ✓ Complete weekly activity/discussion/assignment