Preschool/TK/K

Using M^5 to Support Learning About Measurement

This handout provides specific examples for each practice in the M^5 Early Math Approach to help educators support children (ages 3–6) in their understanding of measurement.

Mutual Learning

Observe and learn about children's languages, cultures, strengths, and needs related to measurement.

- **Every child—regardless of language, ability, or background—can reason mathematically when given meaningful, supported opportunities.**
- **Notice the languages and vocabulary children use when communicating about the size, capacity, or weight of objects.**
  - Children who are multilingual learners may understand or use some measurement vocabulary in their home language, English, or both.
- **Observe how children engage with measurement concepts during free play.**
  - Do they compare the building heights?
  - Do they fill and empty containers in the sensory table, experimenting with volume?
- **Notice the different ways children may show knowledge of measurement.**
  - Provide children with ways to learn about and express their knowledge of measurement based on their development and varying abilities.
  - Some children may use measurement words when comparing objects, while others may express their growing understanding of measurement nonverbally. For example, a child may use gestures (arms wide to signify "bigger," arms up to communicate "tall") to show their knowledge about measurement.

- **Notice how children begin measuring using various tools.**
  - Standard tools such as tape measures, balance scale, and measuring cups.
  - Nonstandard tools such as blocks, yarn, hands, feet, or even their bodies to measure length.

- **Notice how children use nonstandard tools such as blocks, yarn, hands, feet, or even their bodies to measure length.**
- **Use culturally relevant materials or examples in measurement activities drawing from children's experiences at home.**
  - Use traditional clothing, pottery, or food from children's cultures to compare size, shape, and weight.
  - Ask about culturally relevant ways that children measure in their own communities and families, for example while cooking or while gauging how warm it is outside.

Meaningful Investigations

Provide opportunities for children to explore size, weight, and volume, and learn about measurement.

- **Use children's play as opportunities to investigate measurement concepts such as height, size, speed, and distance.**
  - "What happens when we make the ramp higher?"
  - "Which ball goes faster down the ramp? Let's find out!"
  - "Let's see which ball rolls the farthest down the ramp."

- **Introduce measurement activities that are meaningful to children, drawing from their experiences at home and in their community.**
  - Ask children to draw pictures of family members, comparing their heights or drawing them in order by height.
  - Children may show an interest in building structures ranging in size that they see in their neighborhood.
- **Invite children to compare, order, and measure objects using different measurement tools.**
  - "Let's put those pumpkins in order from lightest to heaviest. I wonder if you could use the balance to investigate."
  - "How wide is the pumpkin? Let's measure it with unit blocks!"
  - "Which pumpkin is taller? What tool might we use to figure that out?"

- **Offer children opportunities to measure and compare as part of their science observations and investigations.**
  - After planting seeds, encourage children to track and measure the growth of plants.
  - Compare the sizes of different plants, encouraging children to use their hand for comparison.
  - Encourage children to collect leaves, rocks, and sticks, and sort or order them by size.
  - Use a thermometer to measure and record the daily temperature.

Materials and Learning Environment

Provide objects varying in size and a variety of measurement tools so children can measure and compare objects.

- **Some appropriate materials for this age group may include the following:**
  - Materials of varying sizes and weights that can be measured, compared, and ordered such as blocks, balls, vehicles, and toy animals.
  - Sensory tables with different size measuring cups, containers, and spoons that children can fill and empty with sand, water or pompom balls.
  - Paperclips, yarn, craft sticks, and crayons that children can use as nonstandard measurement units.
- **Offer materials that reflect children's cultures and languages:**
  - Art materials such as clay and beads for designing pottery and jewelry of varying sizes inspired by different cultures.
  - Meaningful objects brough in by families for children to pass around and measure.
  - Measuring tools (rulers, scales, cups) labeled in children's home languages alongside English.

- **Introduce age-appropriate standard measurement tools for children to use when measuring.**
  - Balance scales to place objects of varying weights and observe how the scale shifts in response.
  - Large measuring tapes and flexible rulers that children can use to measure objects of interest.
  - Timers such as visual sand timers that children can use as a visual representation of how much time has passed.
  - Measuring cups and spoons to use for make-believe play, snack time, sensory table, and cooking activities.
- **Read books that discuss size relationships in children's home languages, English, or both. Some examples of books include:**
  - *Just a Little Bit* (or *Solo un poco* in Spanish) by Ann Tompert
  - *Biggest, Strongest, Fastest* (or *Más grande, más fuerte y más rápido* in Spanish) by Steve Jenkins
  - *Bee-bim Bop!* by Linda Sue Park

Math Vocabulary and Discourse

Use measurement vocabulary during daily routines, interactions, and play. Encourage children to use words to compare quantities (for example, "bigger" and "smaller") in their home languages, English, or both.

- **Model using measurement vocabulary during daily routines, interactions, and play. Encourage children to use these words in their home languages, English, or both.**
  - "Which one is longer, your bracelet or necklace?"
  - "The climbing structure is even taller than the slide!"
  - "Let's line up these buildings from shortest to tallest."
  - "Your shadow was much longer this morning than it is now."
- **Use open-ended questions and prompts to discuss objects and their size.**
  - "The scale went down on this side. Why do you think it is lower? What can you do to make the two sides equal?"
  - "Those pumpkins are all different sizes. How can you figure out which is heaviest?"

Measurement Vocabulary

- Size: Big, bigger, biggest, little, littler, littlest, small, smaller, smallest, long, longer, longest, short, shorter, shortest, high, higher, highest
- Capacity: full, fuller, fullest, empty, emptier, emptiest
- Weight: heavy, heavier, heaviest, light, lighter, lightest
- Distance: near, nearer, nearest, far, farther, farthest
- Temperature: cold, colder, coldest, hot, hotter, hottest, warm, warmer, warmest

Multiple Representations

Offer multiple ways for children to measure, order, and compare size, weight, speed, and volume.

- **Encourage children to explore different ways to represent measurement.**
  - During music and movement activities, encourage children to use gestures (arms wide to signify big) and their body movements (dancing fast or slow) to compare sizes.
  - Measure and compare the size of objects using unit blocks, rulers, tape measures, and balance scales.
  - Use nonstandard measurement tools like hands, shoes, paper clips, craft sticks, and yarn to measure and compare the sizes of objects.

- **Encourage children to measure the same object using a variety of different measurement tools.**
  - Offer unit blocks, paper clips, and a measuring tape to measure the length of a book.
  - Ask children to measure the weight of an apple using a scale and its length using a tape measure.