

Measurement Mastery

Promoting Understanding and Recall

Month 1

Linear Measurement ~ Non-standard

Vocabulary Development ~ arrange(d), compare, cube, equal, estimate, few, fewer, fewest, less, long, longer, longest, measure, more, order(ed), place(d), rod, short, shorter, shortest, tall, taller, tallest, same, unit

Kindergarten ~ Compare two objects with a common measurable attribute to see which object has more of/less of the attribute and describe the difference. (longer/shorter than or the same). **SE K.7B**

A minimum of twice a week during the first month implementing the routine, compare two classroom objects according to their lengths. Eventually facilitate a discussion and comparison of three classroom objects ordering them from shortest to longest and vice versa.

Students engage in a tactile task by constructing a rod using the same colored Unifix cubes. (Limit the number of cubes they may access to five or less.) Once each student has constructed a rod, select two students to present their rod and decide whose rod is tallest and whose rod is shortest. Ask them how they know. Direct the students to place their rod on a flat surface horizontally and compare their lengths. Ask them to decide whose rod is longer and whose rod is shorter. Ask them how they know. Select several pairs of students to repeat the task. Press for vocabulary acquisition and application. Highlight the use of taller to shorter when the rods are displayed vertically versus the use of longer to shorter when comparing the rods horizontally. Reinforce the difference between height and length.

If appropriate, ask students to count the number of Unifix cubes they used to make their rods and prompt the student to use the quantity as a means of justifying which rod is taller and/or shorter when displayed vertically and longer and/or shorter when displayed horizontally.

First Grade ~ Compare and order two or more concrete objects according to length (from longest to shortest). (Review of) **SE K.7B**

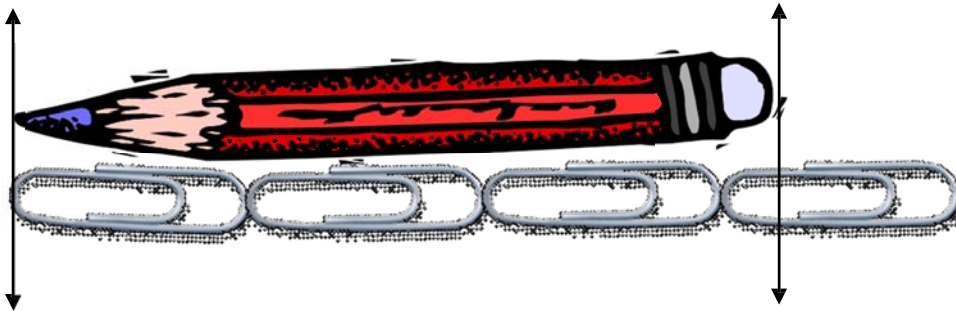
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Students engage in a tactile task by constructing a rod using the same colored Unifix cubes. (Limit the number of cubes they may access to twenty. To explore an additional concept, suggest the rod must be an odd number or even number of cubes.) Once each student has constructed a rod, select two students to present their rod and decide whose rod is taller and whose rod is shorter. Ask them how they know. If students refer to the number of cubes used, ask them to think of another way to prove which is taller/shorter. Press students until they compare the rods. Next direct the students to place their rods on a flat surface horizontally and compare their lengths. Emphasize the difference between heights when the rods are held vertically, versus length, when the rods are placed horizontally. Ask them to decide whose rod is longer and whose rod is shorter. Ask them how they know. Select several pairs of students to repeat the task. Emphasize the vocabulary of comparison.

Ask students to count the number of Unifix cubes they used to make their rods and prompt the student to use the quantity as a means of justifying which rod is longer and/or shorter. Press for a connection between comparison, such as “How many cubes long is your rod? Whose rod is longer? How many more cubes longer? How do you know?” The same line of questioning is repeated using the comparative, shorter.

Second Grade ~ Find the length of objects using concrete models for standard units of length. **SE 2.9A.** ~ Describe the inverse relationship between the size of the unit and the number of units needed to equal the length of the object. **SE 2.9B**

A minimum of twice a week during the first month implementing the routine, select an object and an attribute of that object to focus on for the week, for instance, the length of a piece of paper, the length of a book, or the length of a new unsharpened pencil—something to which all students have access. On at least two separate occasions during the week, use the object and two different manipulatives such as large paper clips and Unifix cubes to measure the length of the object. Before student measure the selected object, ask them to estimate how many paper clips long they think the object is. Discuss the purpose of estimation. Record the estimates for comparison and discussion of accuracy to actual measurements.



When students measure the object the first time, emphasize the beginning point, the ending point and the alignment of the measurement tool (paper clips). If the object and measurement tool do not align perfectly, discuss how to round up or down to give an approximate measurement. In the illustration above, students decide whether enough of the last paper clip is used in order to say the pencil is approximately 3 paper clips long or 4 paper clips long. Emphasize the same concepts when measuring with the alternate manipulative (cubes) later in the week, but discuss the difference in the number of paper clips needed versus the number of Unifix cubes needed. Press for students to generalize what the relationship is between the size of the unit and the number of units needed to measure the length of an object (SE 1.7C).

Alternate between having multiple non-standard units (i.e. paper clips) and having only one unit to measure an object's length. When students only have one paper clip, the focus is on the process of measuring by marking intervals. Students are to be proficient with both methods.