

Measurement Mastery

Promoting Understanding and Recall

Month 3

Linear Measurement ~ Non-standard and Metric (grade 2 only)

Vocabulary Development ~ arrange(d), centimeter, compare, cube, equal, estimate, few, fewer, fewest, length, 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**

At least twice a week, 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.

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 longer and/or shorter.

First Grade ~ Measure the same object/distance with units of two different lengths and describe how and why the measurements differ. **SE 1.7C**

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. To develop understanding of student expectation 1.7C, use the following:

First week of the month: small and large paper clips

Second week of the month: centimeter (small) cubes and Unifix (large) cubes

Third week of the month: review past two weeks

On at least two separate occasions during the first week, use the object and the two different sized paper clips suggested to measure the length of the object. Before student measure the selected object, ask them to estimate how many **small** 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. Next students estimate how many **large** paper clips long they think the same object is. Discuss both estimates before doing any actual measurements:

Which paper clips is longer, the small paper clip or the large paper clip?

Which paper clip takes up more space?

Will you need more small paper clips or large paper clips to find the length of _____? Why do you think that?

Review the process of measuring. 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 below, 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 (see graphic on the next page).

On at least two separate occasions during the second week, use the object and the two different sized cubes suggested to measure the length of the object. Before student measure the selected object, ask them to estimate how many **small** cubes long they think the object is. Discuss the purpose of estimation. Record the estimates for comparison and discussion of accuracy to actual measurements. Next students estimate how many **large** cubes long they think the same object is. Discuss both estimates before doing any actual measurements. Facilitate a discussion focusing on the same questions listed above.



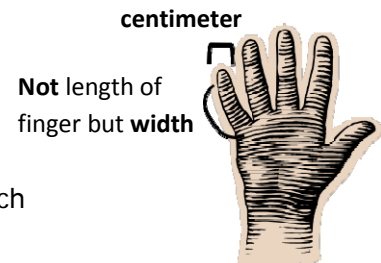
Alternate between having multiple non-standard units (i.e. paper clips) and having only one unit to measure and object's length. When students only have one paper clip, the focus is on the process of measuring by marking intervals. Students are to be proficient with both methods.

Second Grade ~ Find the length of objects using concrete models for standard units of length. **SE 2.9A**

At the beginning of the month, introduce the term and concept of a centimeter. Ask students to display their baby finger. Explain the difference between the length of their baby finger and its width. The width of a baby finger is the “body benchmark” for a centimeter. Borrow metric Master Rulers from a grade 3-5 mathematics teacher if possible to introduce the visual of a centimeter. A standard ruler may be confusing for a student to interpret. Facilitate a discussion that solicits the students’ observations about the size of a centimeter and its relationship to the size of an inch.

At the beginning of each measurement task, refer students to their own personal “body benchmark” for a centimeter. This is a “concrete model that approximates a standard unit of length”. Solicit suggestions from students of other objects that approximate a centimeter.

Each week in December, select two objects and an attribute of each 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, direct students to estimate the length of the object in centimeters. Record the students’ estimates and press each student for the reasoning behind his/her estimate.



Review the process of measuring. Emphasize the beginning point, the ending point and the alignment of the ruler. If the object does not measure exactly to a whole centimeter, discuss how to determine the measurement to the nearest whole centimeter (see graphic on next page). Compare the students’ estimates to the actual measurement of the object. Facilitate a discussion regarding whether each students’ estimate was an over estimation or an under estimation.

