CONSTRUCTING TASK: MEASURING TO THE HALF AND QUARTER INCH

Adapted from a Learning Task from K-5 Math Teaching Resources
Suggested Time – 4 Class Periods

Students will measure objects to the nearest ½ and ¼ inch. Students will order their measurements from shortest to longest and will create a line-plot graph to represent their data.

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.

MCC3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

b. Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

MCC3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

Understand two fractions as equivalent (equal) if they are

a. The same size or the same point on a number line.

b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Fractions and measurement can be very difficult concepts for children to understand. This task helps to combine fraction and measurement skills in a concrete and tangible activity geared toward learners of every type. By using fractions while measuring objects, children will be able to reason that fractions express a relationship between a part and a whole. Encourage students to consider the fact that a ruler is simply a number line used as a measuring tool. They will begin to see and apply fractions in their everyday lives as well as other areas of mathematics.

COMMON MISCONCEPTIONS

Students do not count correctly on the number line. For example, students may count the hash mark at zero as the first unit fraction. This can hinder their ability to read a ruler.

ESSENTIAL QUESTIONS

- How can I organize data measured to the half inch?
- How can I organize data measured to the quarter inch?

MATERIALS

- Half-Inch and Quarter-Inch Ruler Templates
- Unlined Paper

GROUPING

Individual/Partner Task

NUMBER TALKS

By now number talks should be incorporated into the daily math routine. Continue utilizing the different strategies in number talks and revisiting them based on the needs of your students.

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part 1 (SMP 1, 2, 4, 5, and 6)

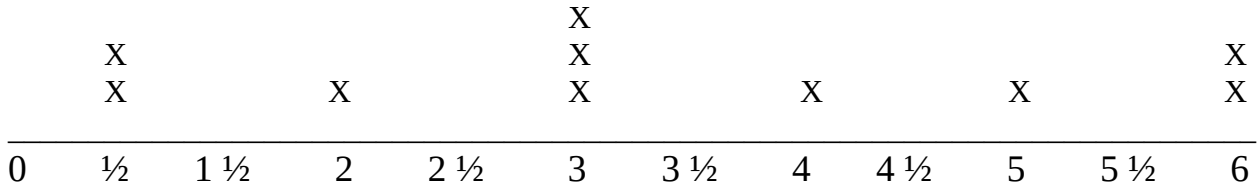
To begin the lesson, give each child a half-inch ruler template. Instruct students to label their rulers to show all half-inch measurements. Working individually or in small groups, have students use the rulers to measure ten objects in the classroom to the nearest half-inch.

On a sheet of paper, students should sketch and label each object they measured. Then ask students to number the objects in order from shortest to longest. Discuss how students decided which objects were smaller and which objects were larger. Encourage discussion about comparing the physical size of each object as well as comparing the fractional measurements of each object.

Part II (SMP 5)

Students use their data to create a line plot where the horizontal scale is marked off whole numbers and halves. Completed line plots should be shared with small groups or entire class.

Classroom Objects Measured to Nearest Half-Inch



Part III (SMP 1, 2, 4, 5, 6)

Repeat the activity using quarter-inch measurement. Give each child a quarter-inch ruler template. Instruct students to label their rulers to show all quarter-inch measurements. Ask students to write both measures (ex. 2/4 and ½) for equivalent fractions on the ruler. Include discussion about equivalent fractions in measurement. Working individually or in small groups, have students use the rulers to measure ten objects in the classroom to the nearest quarter-inch.

On a sheet of paper, students should sketch and label each object they measured. Then ask students to number the objects in order from shortest to longest. Discuss how students decided which objects were smaller and which objects were larger. Encourage discussion about comparing the physical size of each object as well as comparing the fractional measurements of each object.

Students use their data to create a line plot where the horizontal scale is marked off with whole numbers, halves, and quarters. Completed line plots should be shared with small groups or entire class.

FORMATIVE ASSESSMENT QUESTIONS

- In what ways is your ruler similar to a number line?
- How did you label your number line to the half inch and quarter inch?
- Which measure is more exact?

DIFERENTIATION

Extension

- Measure around the classroom to the nearest ¼, ½, and whole inch using a broken ruler.

Intervention

- Spend additional time with the original strip from part one.

- Have students create an additional strip that is a different size and determine the ¼, ½, and ¾ marks. Have students compare the two strips and lead a discussion of the importance of standard measuring tools.

<u>Half-Inch and Quarter-Inch Ruler Templates</u>