

Core Content

Cluster Title: Represent and interpret data.

Standard 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.

MASTERY Patterns of Reasoning:**Conceptual:**

Students will understand when it's important to measure precisely to a half or quarter inch.

Students will understand that measurement data can be shown through the use of a line plot.

Students will understand the concept of equivalence—that $\frac{2}{2} =$ a whole, that $\frac{4}{4} =$ one whole, and that $\frac{2}{4} = \frac{1}{2}$ —and understand the markings on a ruler.

Students will understand how to gather data and graph the data on a line plot.

Students will understand what a line plot looks like and how it represents data.

Students will understand the concept of fractional parts of an inch, especially whole, halves, and quarters.

Procedural:

Students can demonstrate accurate measurement to the nearest half inch and quarter inch using a ruler.

Students can collect a linear measurement data set and plot the data on a line plot marked with whole, half and quarter inches.

Representational:

Students can generate data by measuring and create a line plot to display findings.

Students can explain, both verbally and in writing, how to accurately measure to the nearest half-inch and/or quarter inch, and how to put measurement data on a line plot.

Supports for Teachers

Critical Background Knowledge	
<p>Conceptual: Students will understand the concept of fractions as part of a whole, specifically halves and fourths. Students will understand the concept of measuring length to the nearest inch. Students will have a basic understanding of how data can be represented in graphs.</p> <p>Procedural: Students can use the tools of linear measure. Students can measure to the nearest unit.</p> <p>Representational: Students can explain, both verbally and in writing, how to measure to the nearest unit. Students can create a giant ruler</p>	
Academic Vocabulary and Notation	
fraction, whole, half, quarter, fourths, line plot, data, linear, length, measure, “, $\frac{1}{2}$ $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, equivalent, length markings, scale	
Instructional Strategies Used	Resources Used
<p>Create a “giant inch” by taking a strip of paper (standard copy paper cut in half the long way), and folding it first in half, then in half again to show the fourths. With these “giant inches” it is easier to talk about the parts of an inch using a model that’s large enough to work with. Construction paper pieces can be cut in sizes to match the “giant $\frac{1}{2}$-inch, and $\frac{1}{4}$-inch” for manipulation.</p> <p>Have a scavenger hunt where you ask kids to find items in the classroom that are certain lengths (e.g., $4\frac{1}{4}$ inch, $8\frac{3}{4}$ inch, etc.).</p> <p>Have students cut a square blue piece of construction paper in half (rectangles), labeling each piece. Have them cut a second piece in half</p>	<p>Adler, David A. <i>How Tall, How Short, How Far Away</i>. Holiday House, 2000.</p> <p>Leedy, Loreen. <i>Measuring Penny</i>. Henry Holt, 2000.</p> <p>Briggs, Raymond. <i>Jim and the Beanstalk</i>. Putnam and Grosset, 1997.</p> <p>Murphy, Stuart. <i>Super Sandcastle Saturday</i>. HarperCollins, 1998.</p>

<p>(triangles), labeling each piece. Then have them cut red squares in fourths (repeat three times, 1 in squares, 1 in triangles, 1 in rectangles), labeling each piece. A third color square is cut into eighths (two ways, rectangles and triangles), and the pieces are labeled. Then the students are given a square template the same size as the construction paper squares. They place the pieces on the template, mixing and matching to see equivalences of a whole. Optional extensions include writing number sentences (e.g., $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{8} = 1$).</p> <p>Students gather measurement data (e.g., the length of everyone’s pencil to the nearest quarter inch). Have students create a line plot, marking the appropriate lengths on the horizontal line and plotting the data.</p>	
<p>Assessment Tasks Used</p>	
<p>Skill-Based Task:</p> <p>Students are able to precisely measure items to the nearest whole, half and quarter inch.</p> <p>Accurately interpret data presented on a line plot, having the horizontal scale marked off in whole, half, and quarter inches.</p> <p>Students can find items that measure a given length, (e.g., a 3-1/4 inch crayon).</p> <p>Given a data set, students can successfully draw a line plot with appropriate labels, whole, half and quarter inches, and accurately plot data.</p>	<p>Problem Task:</p> <p>Brock has a collection of insects. For a science fair project, he needs to create a line plot of their lengths. He measured them using a ruler marked in inches. On the following page is a picture of his collection. Measure the insects and create a line plot of their lengths to the nearest quarter inch.</p>

