

# Fractions in Measurement

NCTM Standards 1, 2, 6, 7, 8, 9, 10  
Common Core State Standards 4.MD 4

## Lesson Planner

### STUDENT OBJECTIVES

- To make a line plot to display a set of measurements in fractions of a unit
- To solve problems involving subtraction of fractions with a line plot

## 2 Teach and Practice

### MATERIALS

Extended Activity

**A Measuring Lengths** (CCRG pp. CC 32–CC 34)

**B Ordering Lengths** (TG p. 566)

**C Fractions in Measurement** (TG p. 567)

-  SH pp. 114–115

## Lesson Notes

Replace the current Teach and Practice Activity A in **Lesson 7.10** with this extended activity.

### About the Activity

In Activity A, students measure lines to the nearest quarter inch and use those measurements to make a line plot. Students also use the line plot to find the difference between two measurements.

# 2 Teach and Practice

## A Measuring Lengths

whole class



15 MIN

**Purpose** To explore fractions in the context of measurement

**Introduce** Have students work independently on Explore: Measuring Lengths. Before they begin, ask them to give the distance between adjacent marks on the measuring tape at the top of the page.  $\frac{1}{4}$  inch Then count by quarter inches from 0 inches to 3 inches. Make sure students understand that the mark between 1 and  $1\frac{1}{2}$ , for example, indicates  $1\frac{1}{4}$  inches, rather than simply  $\frac{1}{4}$  inch.

**Task** Direct students to find the lengths asked for on Explore: Measuring Lengths. The pieces of strings that students must measure at the top of the page have their left ends at 0. At the bottom of the page, some of the lines do not have their left ends at 0.

Top of page

Chapter 7 **EXPLORE**  
Lesson 10 **Measuring Lengths**

Use this measuring tape to find the lengths of the pieces of string.

1  $\frac{1}{2}$  inches  
2  $\frac{1}{4}$  inches  
1  $\frac{3}{4}$  inches

Record the lengths of these lines.

A: 1 inch  
B:  $1\frac{3}{4}$  inches  
C:  $1\frac{1}{2}$  inches  
D: 1 inch  
E:  $2\frac{3}{4}$  inches  
F:  $\frac{1}{4}$  inches  
G:  $1\frac{1}{4}$  inches  
H:  $\frac{1}{2}$  inches  
I:  $1\frac{1}{4}$  inches

114 Chapter 7

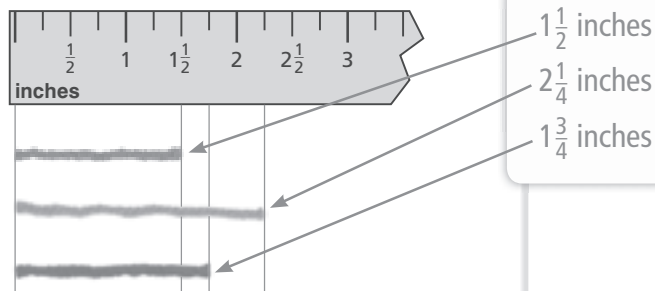
**Student Handbook p. 114**

**Materials**

- For the teacher: transparency of SH p. 114 (optional)

NCTM Standards 1, 2, 6, 7, 8, 9, 10  
CCSS 4.MD 4

Use this measuring tape to find the lengths of the pieces of string.



The left end of each string is at 0, so the length of the string is the ruler mark directly above the right end of the string.

**Ongoing Assessment**

- In measuring lengths with a ruler, do students understand that if one end of an object is at the 0-mark on the ruler, the mark at the other end of the object indicates the length of the object?
- In measuring lengths with a ruler, do students understand that if neither end of an object is at the 0-mark on the ruler, the length of the object is the distance between the marks at the beginning and the end of the object?

Record the lengths of these lines.

A: 1 inch	D: 1 inch	G: $1\frac{1}{4}$ inches
B: $1\frac{3}{4}$ inches	E: $2\frac{3}{4}$ inches	H: $\frac{1}{2}$ inch
C: $1\frac{1}{2}$ inches	F: $\frac{1}{4}$ inch	I: $1\frac{1}{4}$ inches

### Bottom of page

Lines H, C, and A have their left ends at 0, so the length of each line is the ruler mark directly below the right end of the line.

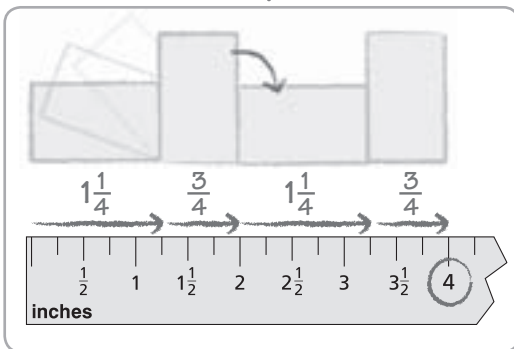
For the other lines, students may turn to several possible strategies for determining the lengths of the lines. They may count the number of quarter-inches in the length of a line, then convert the number to a single length. Line B, for example, is 7 quarter-inches in length. Four of those quarter-inches equal 1 inch, with 3 quarter-inches left over. So, B is  $1\frac{3}{4}$  inches long.

Other students may count up to find the length of B: from  $1\frac{1}{2}$  to 2 is  $\frac{1}{2}$  inch; from 2 to 3 is 1 inch, giving a total of  $1\frac{1}{2}$  inches; from 3 to  $3\frac{1}{4}$  is  $\frac{1}{4}$ , giving a total of  $1\frac{3}{4}$  inches.

**Share** Ask students to share their answers and strategies for finding the lengths. During the discussion you might wish to record the lengths of the lines on the board or overhead for use in the next activity.

### Talk Math

? A rectangle has a length of  $1\frac{1}{4}$  inches and a width of  $\frac{3}{4}$  inch. What is the perimeter of the rectangle? Explain how you found the answer? 4 inches; Possible explanation: I thought of starting at 0 and placing the 4 sides of the rectangle end-to-end on a ruler. I made a drawing to find the total length:



? A pencil is  $5\frac{1}{4}$  inches long. Its left end is at the  $1\frac{3}{4}$  inch mark on a ruler. Where is the right end of the pencil? at the 7 inch mark

**Extend** Invite volunteers to the board to make a line plot using the measurements from the Explore page. You may wish to review with students how to make a line plot. Once the line plot is complete, ask students to find the difference between the shortest line and the longest line.  $2\frac{1}{2}$  inches

