

Vertical Progression:

3rd Grade	<p>3.MD.B Represent and interpret data.</p> <ul style="list-style-type: none"> ○ 3.MD.B.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.
4th Grade	<p>4.MD.B Represent and interpret data.</p> <ul style="list-style-type: none"> ○ 4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.
5th Grade	<p>5.MD.B Represent and interpret data.</p> <ul style="list-style-type: none"> ○ 5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots.
6th Grade	<p>6.SP.B Summarize and describe distributions.</p> <ul style="list-style-type: none"> ○ 6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Students will demonstrate command of the ELG by:

- Collecting, displaying, and formulating conclusions in regards to data that is presented in fractions of $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$.
- Constructing a line plot of consistent scale using fractional quantities.
- Interpreting data in a plot to solve problems.
- Identifying the unit of measurement that is appropriate for the situation.
- Demonstrating and explaining precision in measurement and choosing appropriate tools and measurement.

Vocabulary:

- fraction unit
- line plot

Sample Instructional/Assessment Tasks:

1) Standard(s): 5.MD.B.2

Source: Illustrative Mathematics

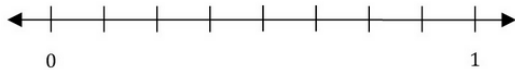
<https://www.illustrativemathematics.org/content-standards/5/MD/B/2/tasks/1563>

Item Prompt: Fractions on a Line Plot

You and your partner will need fraction cards made from this set:

$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

a. Label the line-plot below with $\frac{1}{8}$'s. Cut out and divide the cards evenly between the two players, laying them face-down. Each partner will choose one of their face-down cards and turn it over. The team will then add their fractions together. For each turn, each team will record their sum on the line plot.



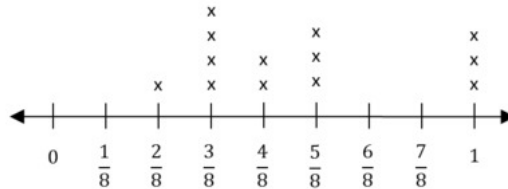
b. Look at the line plot. Which values came up the most? Which values did not come up?

c. The tick marks on the number line correspond to eighths. Which of the eighths will never come up as a sum of two of these cards? Why?

d. You want to improve the game so that it is possible for two fractions to sum to $\frac{7}{8}$. Name one fraction card that you could add to the deck and explain why your new card would now make it possible to have $\frac{7}{8}$ as a sum of two cards.

Correct Answer(s)

There should be 12 “x”s marked on the line plot and these “x”s should only be above the values $\frac{2}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, $\frac{5}{8}$, $\frac{6}{8}$ or 1. One possible example is shown below:



b. Answers may vary, but in the example line plot above, $\frac{3}{8}$, came up most frequently and 0 , $\frac{1}{8}$, $\frac{6}{8}$, and $\frac{7}{8}$ did not come up. Fifth grade students are not expected to work on concepts of probability. The purpose of this question is to prime students to think about which answers cannot come up at all rather than to explain why some possible sums are more likely than others.

c. The values that cannot come up are 0 , $\frac{1}{8}$ and $\frac{7}{8}$ because none of the combinations of the cards will sum to these values, as we saw above.

Students might also note that 0 and $\frac{1}{8}$ are both less than or equal to one of the addends. Since 5th graders have not yet worked with negative numbers, they could not start with $\frac{1}{8}$ and add a non-zero value and end with a sum less than or equal to $\frac{1}{8}$ (and none of the cards have negative numbers).

There are 3 possibilities for new cards, $\frac{3}{4}$, $\frac{5}{8}$, or $\frac{3}{8}$:

$$\begin{aligned} \frac{1}{8} + \frac{3}{4} &= \frac{7}{8} \\ \frac{1}{4} + \frac{5}{8} &= \frac{7}{8} \\ \frac{1}{2} + \frac{3}{8} &= \frac{7}{8} \end{aligned}$$

Students should be able to show how they found the sums above.

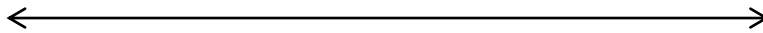
2) Standard: 5.MD.B.1

Source: EngageNY Module 4 Lesson 1

<https://www.engageny.org/resource/grade-5-mathematics-module-4-topic-lesson-1>

Item Prompt:

A meteorologist set up rain gauges at various locations around a city and recorded the rainfall amounts in the table below. Use the data in the table to create a line plot using inches.



- Which location received the most rainfall?
- Which location received the least rainfall?
- Which rainfall measurement was the most frequent?
- What is the total rainfall in inches?

Location	Rainfall Amount (inches)
1	$\frac{1}{8}$
2	$\frac{3}{8}$
3	$\frac{3}{4}$
4	$\frac{3}{4}$
5	$\frac{1}{4}$
6	$1\frac{1}{4}$
7	$\frac{1}{8}$
8	$\frac{1}{4}$
9	1
10	$\frac{1}{8}$

Correct Answer(s)

- Location 6
- Locations 1, 7, and 10
- $\frac{1}{8}$ in.
- 5 in