# 4th Grade Math: Line Plots with Fractions in a Unit

**Lesson Objective:**

By the end of this lesson, students will be able to:

- Create and interpret line plots that involve fractions.
- Use line plots to represent data where measurements are in fractions of a unit (e.g., $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$).
- Solve real-world problems by analyzing data on a line plot.

## 1. Introduction to Line Plots

**What is a Line Plot?**

- A line plot is a graph that shows frequency of data along a number line.
- Each "X" above a number represents one occurrence of that data point.

**When do we use fractions on a line plot?**

- Sometimes measurements are not whole numbers. For example, if we measure the length of different objects, some might be $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{3}{4}$ of a unit long.

## 2. Creating a Line Plot with Fractions

**Example 1:**

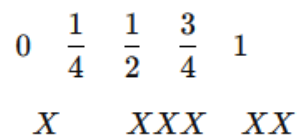The table below shows the lengths of different ribbons measured in feet:

| Ribbon | Length (feet) |
|--------|---------------|
| A | $\frac{1}{2}$ |
| B | $\frac{3}{4}$ |
| C | $\frac{1}{4}$ |
| D | $\frac{1}{2}$ |
| E | $\frac{3}{4}$ |
| F | $\frac{1}{2}$ |

**Step-by-Step:**

1. **Draw a number line.** Include all the fractions that appear in the data: $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1$.

2. **Mark an "X" above each fraction for every ribbon length that matches it.**

| Length (feet) | Number of Ribbons (X) |
|---|---|
| $\frac{1}{4}$ | X |
| $\frac{1}{2}$ | XXX |
| $\frac{3}{4}$ | XX |

**Line Plot:**

$$0 \quad \frac{1}{4} \quad \frac{1}{2} \quad \frac{3}{4} \quad 1$$
$$X \qquad XXX \quad XX$$

## 3. Interpreting a Line Plot with Fractions

**Key Questions:**

- **Which ribbon length appears the most?**

  - $\frac{1}{2}$ feet appears 3 times, so it's the most common length.

- **How many ribbons are longer than $\frac{1}{4}$ feet?**

  - Ribbons that are $\frac{1}{2}$ feet or $\frac{3}{4}$ feet long are longer than $\frac{1}{4}$, so there are $3 + 2 = 5$ ribbons.

- **What is the total number of ribbons?**

  - Add up all the X's: $1 + 3 + 2 = 6$ ribbons.

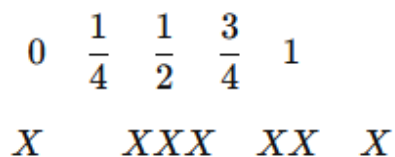## 4. Solving Real-World Problems Using Line Plots

**Scenario:**

Students in a class measure the length of their pencils. The lengths are recorded in inches:

| Pencil | Length (inches) |
|--------|-----------------|
| A | $\frac{3}{4}$ |
| B | $\frac{1}{2}$ |
| C | 1 |
| D | $\frac{1}{4}$ |
| E | $\frac{3}{4}$ |
| F | $\frac{1}{2}$ |
| G | $\frac{1}{2}$ |

**Step-by-Step:**

1. **Create a line plot** with the data.

2. **Answer questions** about the data.

**Line Plot:**

$$0 \quad \frac{1}{4} \quad \frac{1}{2} \quad \frac{3}{4} \quad 1$$

$$X \qquad XXX \quad XX \quad X$$

**Questions:**

1. **How many pencils are shorter than 1 inch?**

   - All the pencils measured $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ are shorter than 1 inch.

   - So, there are $1 + 3 + 2 = 6$ pencils shorter than 1 inch.

2. **Which pencil length is most common?**

   - $\frac{1}{2}$ inches is the most common length, with 3 pencils.

## 5. Practice Problems

1. **Make a Line Plot:** The lengths of different sticks are measured in feet: $\frac{1}{4}, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \frac{1}{4}, \frac{1}{2}$.

   - Create a line plot to represent the data.

   - How many sticks are shorter than $\frac{1}{2}$ feet?

2. **Interpreting a Line Plot:** A line plot shows the weights of different fruit baskets in pounds:

| Weight (pounds) | Number of Baskets (X) |
|---|---|
| $\frac{1}{2}$ | XXXX |
| $\frac{3}{4}$ | XXX |
| 1 | XX |

   - How many baskets weigh more than $\frac{1}{2}$ pound?

   - What is the total number of baskets?

## 6. Class Discussion

- **Why is it helpful to use a line plot when working with fractions?**

- **Can you think of other situations where fractions would be useful on a line plot?** (Examples: Measuring height, time spent on different activities, or amounts of ingredients used in a recipe.)

## 7. Review and Wrap-Up

- **Key Points:**

   - A line plot is a useful way to represent fractional data visually.

   - Line plots can help us quickly understand which values are most frequent and allow us to solve real-world problems.

**Exit Question:** Create a line plot with the following data: $\frac{1}{2}, \frac{1}{4}, \frac{1}{4}, 1, \frac{3}{4}, \frac{1}{2}$. How many values are equal to or greater than $\frac{1}{2}$?