# Facilitator Guide: Estimate Fractions on a Number Line

## Lesson Overview:

*Big Idea:* Estimating fractions on a number line helps students develop fraction number sense. They build a sense of the relative magnitude of fractions (halves are bigger than eighths) and reason about the meaning of fractions by developing and discussing estimation strategies. The lesson focuses on using 0, 1/2 and 1 as benchmarks for estimating fractions. This strategy helps students reason about the meaning of fractions:

- 1/8 is closer to zero than 1/5 because they are smaller pieces
- 3/8 is almost half because 4 eighths would be halfway and 5/8 is a little past a half
- 5/6 is almost 1 whole and 7/6 is a little bit (1/6) past one whole

Students apply their experiences from the previous two lessons to solve Mismatched Tick Mark problems. These require students to interpret unlabeled tick marks and plot fractions with a different denominator: interpret ticks on a number line ticked in thirds and reason about where 2/6 and 5/6 would go.

*Lesson Flow:* Open a separate tab in your browser, log in to your ST Math account and click on the ST Math Chats. Launch the 3rd grade *Estimate Fractions on a Number Line* Math Chat. Have students play puzzles and facilitate discussion puzzles as a whole class. Skip the conclusion and return to the Agenda page for this lesson. Direct students to click the first student link and play puzzles asking them to partition line segments into equal distances. As students finish playing the puzzles, click on the teacher link to facilitate a class discussion. Hand out the Estimate On a Number Line Problem Sheet and have students work independently. Click on the sample problem link to facilitate the second and final class discussion.

## **Warm Up:** Number Line Estimation

Part 1: Launch ST Math Chat *Estimate Fractions on a Number Line* (15 min)

- Log in to your ST Math account and click on Math Chats link at the bottom of screen
- Launch Third Grade Estimate Fractions on a Number Line
- After students play puzzles, facilitate discussion puzzles as a whole class
  - Focus discussion on using 0, 1/2 and 1 as benchmarks (see *Big Ideas* above)

## **Activity One:** Mismatched Tick Marks

Part 1: Students solve Mismatched Tick Mark problems (7 min)

- Students play puzzles where the fraction denominators do not match how the number lines are ticked, e.g., number line is ticked by halves and fractions are fourths
- *Promote Mathematical Reasoning*: This activity extends the estimation task by having students reason about different denominators. Unlabeled tick marks force students to reason about the meaning of tick marks based on the unit whole (0 to 1); for example, if there are 3 segments from 0 to 1, each tick mark a one third the distance from 0 to 1. When

the given fractions do not match the unit fraction of the ticks, students must reason about the relationship between the different denominators.

Part 2: Teacher projects Mismatched Tick Mark problems for whole group work and discussion (7 min)

- Give students time to think on their own, then share with a partner before having a whole class discussion
- The number line is ticked by sixths and the fractions given to plot are in thirds, 2/3 and 5/3
- Focus discussion on identifying the ticks as sixths and then on how to use the existing tick marks to find 2 and 5 thirds
  - What unit fraction do the tick marks represent? How do you know?
  - If the tick marks represent sixths, how can you find where thirds go? (Skipping every other tick mark)

.

## **Activity Two:** Estimate on a Number Line Problem Sheet

Part 1: Students work in pairs to solve **Estimate on a Number Line Problem Sheet** (10 min)

- Tick marks between whole numbers are not labeled, so students should be asked to identify the unit fraction used to set the ticks and how the can help solve the problems
- Monitor students as they solve problems encouraging them to articulate their strategies by reasoning about the relative magnitude of the fractions or by benchmarking to 0, 1/2 and 1

Part 2: Teacher projects problems for whole group work and discussion (7 min)

- *Focus* on reasoning about where to plot 4/3 on a number line ticked by halves.
  - Since 4/3 is greater than 1, the point labeled with the square can be eliminated. The point closest to 2 can also be eliminated since thirds are less than half
- *Discussion Tips*: Engage students who do not offer strategies by asking them to ‘restate’ a strategy shared by a classmate or to ‘agree or disagree’ (and why) with the reasoning shared in the discussion.