# Facilitator Guide: Word Problems

## Lesson Overview:

*Big Idea:* The three word problems posed in this lesson are an opportunity for students to apply what they've learned from the previous lessons. By using number lines to solve these problems, students create a context for the quantities represented on a number line and create meaning for partitioning them into specific unit fractions. Students may not initially think of applying number lines to these problems. That's ok. After they've solved the problem, ask them to try using a number line to see if they can apply them. Until now, students have used number lines as a model to represent fractions, but have not truly *modeled* with number lines. The latter requires students to apply an abstract representation to a context and recognize the relationships between the two.

*Lesson Flow:* Project the warm up prompt, Number Line Comparison. Discuss how the two number lines are similar and how they are different (they are ticked the same, but use different length unit wholes). Project the first word problem, How Far Will JiJi Swim?, and have students work independently to solve it. Facilitate a class discussion on strategies students used. Project the next two word problems and have students work independently on the two word problems. Choose two or three student work samples and facilitate a class discussion analyzing and comparing these strategies.

## Warm Up: Number Line Comparison

Project Number Line Comparison and discuss student observations (10 min)

- Record student observations over projected image or on the board
- How are these number lines similar?
  - Both show numbers 0 to 2 and are ticked by fourths
  - All the numbers are the same on both number lines
- How are these number lines different?
  - Number line B is longer, the spaces between the tick marks are longer
  - 0 to 1 is shorter in A than B, B is longer than A...
- What patterns do you notice?
  - The unit whole in Line A is half of the whole in Line B, so all measurements will have this ratio

## Activity One: How Far Will JiJi Swim?

Part 1: Teacher projects *How Far Will JiJi Swim?* while students solve problem independently (7 min)

- If JiJi swims 1/3 of a mile in an hour, how far will JiJi swim in 4 hours?
- While this is a multiplication problem, students can model it using a number line
  - The number line units are hours 0 - 4 ticked by thirds of an hour
- How can you use a number line to model this problem?
  - What do the numbers on the number line represent?
  - How can you show how far JiJi swims in 1 hour, 2, 3….?

Part 2: Whole class discussion analyzing various strategies (5 min)

- Select students who used a number line to demonstrate the process they used to model the problem
- Compare the number line model with another representation
  - Skip counting with or without a list or table: 1 hour 1/3 mile→ 2 hours 2/3 mi….
  - Addition 1/3 + 1/3 + 1/3 + 1/3
  .

## Activity Two: Problem Solving With JiJi Problem Sheet

Part 1: Students apply strategies to solve two new problems in pairs or alone (10 min)

- Word Problems:
  - JiJi ran a 2-mile race and drank water every 1/3 of a mile, how many times did JiJi stop?
  - How many 1/8 of a yard bows can you make with 2 yards of silk?
- *Monitor* students as they develop and apply strategies. Look for…
  - Number line models
  - Counting strategies
  - Addition strategies
- How are you representing the story problem?
- What does this (student representation) represent in the story?
  - How are you showing where the cold water is? Where the bow ties are?

Part 2: Whole class discussion analyzing various strategies (10 min)

- Select students who used a number line to demonstrate the process they used to model the problem
- Compare the number line model with another representation