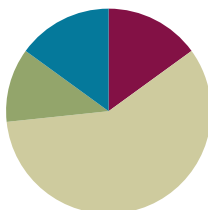# Lesson 15

Objective: Place any fraction on a number line with endpoints 0 and 1.

Related Topics: [More Lesson Plans for the Common Core Math](#)

Suggested Lesson Structure

■ Fluency Practice   (9 minutes)
■ Application Problem   (7 minutes)
■ Concept Development   (35 minutes)
■ Student Debrief   (9 minutes)

Total Time   **(60 minutes)**

Fluency Practice (9 minutes)

- Unit Fraction Counting **3.NF.1, 3.NF.3c**   (3 minutes)
- Division **3.OA.2**   (3 minutes)
- Place Unit Fractions on a Number Line Between 0 and 1 **3.NF.2a**   (3 minutes)

Unit Fraction Counting (3 minutes)

T: (Draw a number line.) Count by fourths from 1 fourth to 8 fourths and back to 0.

S: $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$, $\frac{5}{4}$, $\frac{6}{4}$, $\frac{7}{4}$, $\frac{8}{4}$, $\frac{7}{4}$, $\frac{6}{4}$, $\frac{5}{4}$, $\frac{4}{4}$, $\frac{3}{4}$, $\frac{2}{4}$, $\frac{1}{4}$, 0.

Continue with possible sequence: thirds, halves, and fifths.

Division (3 minutes)

T: (Write $\frac{4}{4} = $ _____.) Say the number sentence and answer.

S: 4 divided by 4 equals 1.

Continue with possible sequence: 4 ÷ 2, 4 ÷ 1, 10 ÷ 10, 10 ÷ 5, 10 ÷ 2, 10 ÷ 1, 6 ÷ 6, 6 ÷ 3, 6 ÷ 1, 8 ÷ 8, 8 ÷ 4, 8 ÷ 2, 8 ÷ 1, 15 ÷ 15, 15 ÷ 5, 15 ÷ 3, 15 ÷ 1, 12 ÷ 12, 12 ÷ 6, 12 ÷ 4, 12 ÷ 3, 12 ÷ 2, 12 ÷ 1, 16 ÷ 16, 16 ÷ 8, 16 ÷ 4, 16 ÷ 2, 16 ÷ 1.

Place Unit Fractions on a Number Line
Between 0 and 1 (3 minutes)

Materials: (S) Personal white boards

> NOTES ON
> **MULTIPLE MEANS OF**
> **REPRESENTATION:**
>
> As students estimate to equally partition fractional units on the number line, guide them to begin by finding the midpoint, first drawing 2 equal parts and then continuing "halving" until the desired unit fraction is created.

- T: (Draw a number line with endpoints 0 and 1.) Draw my number line on your board.
- S: (Draw.)
- T: Estimate to show and label 1 half.
- S: (Estimate the halfway point between 0 and 1 and write $\frac{1}{2}$.)

Continue with possible sequence: $\frac{1}{2}$, $\frac{1}{10}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{6}$.

Application Problem (7 minutes)

In baseball, it is about 30 yards from home plate to first base. The batter got tagged out about half way to first base. About how many yards from home plate was he when he got tagged out? Draw a number line to show the point where he was when tagged out.
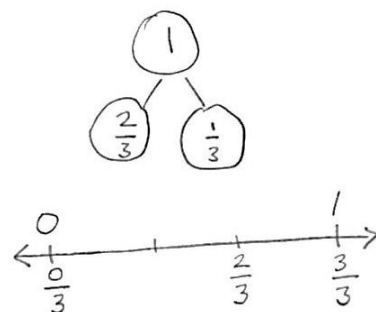
Concept Development (35 minutes)

Materials: (S) Personal white boards

Problem 1: Locate the point 2 thirds.

- T: 2 thirds. How many equal parts in the whole?
- S: Three.
- T: How many of those equal parts have been counted?
- S: Two.
- T: Count up to 2 thirds by unit fractions.
- S: 1 third, 2 thirds.
- T: Show me a 2-part number bond of 1 whole with one part as 2 thirds.
- S: (Students show.)
- T: What is the missing part?
- S: 1 third.
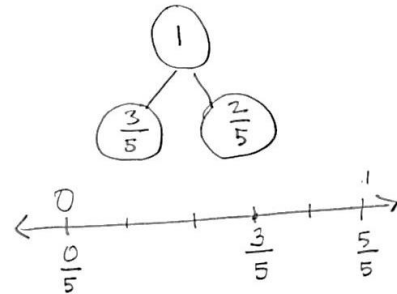- T: Show me a number line with end points of 0 and 1, and with 0 thirds and 3 thirds, to match your number bond.

T: Mark off your thirds without labeling the unit fractions.

T: Slide your finger along the length of the first part of your number bond. Speak the fraction as you do.

S: 2 thirds (Sliding up to the point 2 thirds.).

T: Label that point as 2 thirds.

T: Put your finger back on 2 thirds. Slide and speak the next part.

S: 1 third.

T: At what point are you now?

S: 3 thirds or 1 whole.

T: Our number bond is complete.

Problem 2: Locate the point 3 fifths.

T: 3 fifths. How many equal parts in the whole?

S: Five.

T: How many of those equal parts have been counted?

S: Three.

T: Count up to 3 fifths by unit fractions.

S: 1 fifth, 2 fifths, 3 fifths.

T: Show me a 2-part number bond of 1 whole with one part as 3 fifths.

S: (Students show.)

T: What is the missing part?

S: 2 fifths.

T: Show me a number line with end points of 0 and 1, and with 0 fifths and 5 fifths, to match your number bond.

T: Mark off your fifths without labeling the unit fractions.

T: Slide your finger along the length of the first part of your number. Speak the fraction as you do.

S: 3 fifths (Sliding up to the point 3 fifths.).

T: Label that point as 3 fifths.

T: Put your finger back on 3 fifths. Slide and speak the next part.

S: 2 fifths.

T: At what point are you now?

S: 5 fifths or 1 whole.

T: Our number bond is complete.

Repeat the process with other fractions such as 3 fourths, 6 eighths, 2 sixths, and 1 seventh. Release the students to work independently as they demonstrate the skill and understanding.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

Student Debrief (9 minutes)

Lesson Objective: Place any fraction on a number line with endpoints 0 and 1.
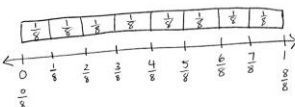
The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- How did the number bond relate to the number line?
- How do the number bond and number line with fractions relate to the number bond and number line with whole numbers?
- Part-part-whole thinking has been in your life since Kindergarten. When might a kindergartener draw a number bond? A first grader? Second grader? Third grader?
- When you think of a number bond, do you usually think of chunks of things? Is using it with the number line giving it a new meaning to you? It is for me. Now I see it also can be about distances on a line, too.
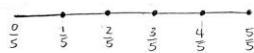

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

The Problem set offers practice of increasing difficulty. Expect and coach students above grade level to complete the entire Problem Set with excellence.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Facilitate math meaning-making for ELLs through discussion. The daily debriefs and frequent turn-and-talks in each lesson benefit the ELLs' understanding of math concepts and language. Build confidence and comfort, and communicate high expectations for the ELLs' participation.

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name _____ Date _____

1. Estimate to label the fractions on the number line from 0 to 1. Make a number bond for each one to the right. This time, the fractions are written above the number line.

$\frac{2}{3}$

$\boxed{\dfrac{0}{3}}$ 　　　　　　　　　　　$\boxed{\dfrac{3}{3}}$

0　　　　　　　　　　　　　　1

Number bond: 1 → $\frac{2}{3}$ and $\frac{1}{3}$

$\frac{3}{4}$

0　　　　　　　　　　　　　　1

$\frac{3}{5}$

0　　　　　　　　　　　　　　1

$\frac{5}{6}$

0　　　　　　　　　　　　　　1

$\frac{3}{10}$

0　　　　　　　　　　　　　　1

2. Draw a number line. Use a fraction strip to locate 0 and 1. Fold the strip to make 8 equal parts. Use the strip to measure and label your number line with 8 unit fractions.

    Count up from 0 eighths to 8 eighths on your number line. Touch each number with your finger as you count.

3. For his boat, James stretched out a rope with 5 equally spaced knots as shown.

    a. Starting at the first knot and ending at the last knot, how many equal parts are formed by the 5 knots? Label each unit fraction at the knot.

    b. What fraction of the rope is labeled at the third knot?

    c. What if the rope had 6 equally spaced knots along the same length? What fraction of the rope would be measured by the first 2 knots?
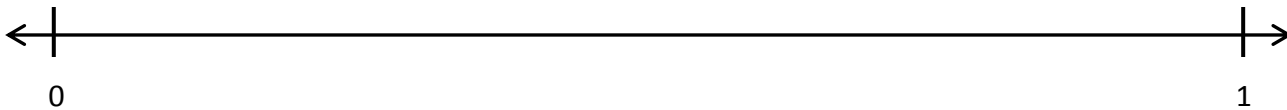
Name _____   Date _____

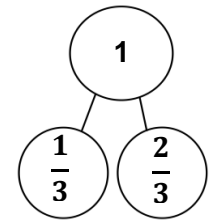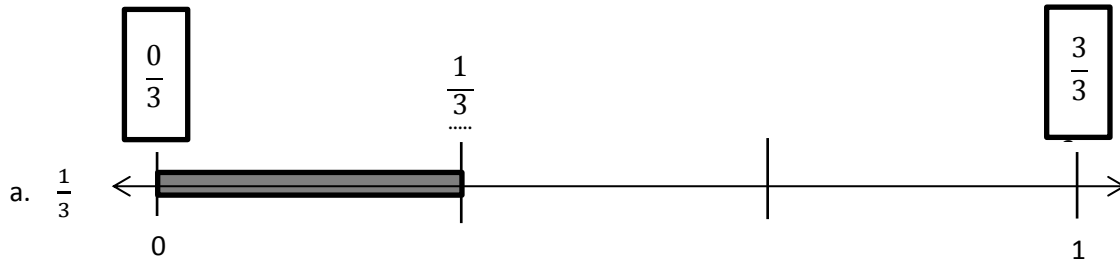1. Estimate to label the fraction on the number line from 0 to 1. Draw a number bond to match your number line.

    [ ]   [ ]

    a. $\dfrac{3}{5}$ ←——|————————————————————————|——→
                           0   1

2. Partition the number line. Then place each fraction on the number line: $\dfrac{3}{6}$, $\dfrac{1}{6}$, $\dfrac{5}{6}$.

    ←——|————————————————————————————————|——→
       0   1

Name _____   Date _____

1. Estimate to label the fractions on the number line from 0 to 1. The first one is done for you. Draw a number bond to match.
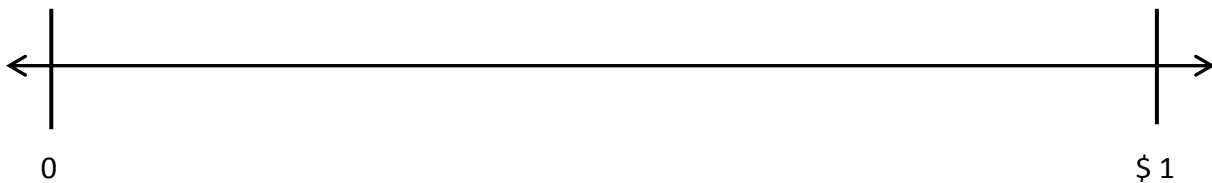
a. $\frac{1}{3}$

b. $\frac{3}{6}$

c. $\frac{2}{5}$

d. $\frac{7}{10}$

e. $\frac{3}{7}$

2. Henry has 5 dimes. Ben has 9 dimes. Tina has 2 dimes.

   a. Write the value of each person's money as a fraction of a dollar:

      Henry:

      Ben:

      Tina:

   b. Estimate to place each fraction on the number line.

   0 $ 1

3. Draw a number line. Use a fraction strip to locate 0 and 1. Fold the strip to make 8 equal parts.

   a. Use the strip to measure and label your number line with 8 unit fractions.

   b. Count up from 0 eighths to 8 eighths on your number line. Touch each number with your finger as you count. Write the number bonds that matches the drawing.