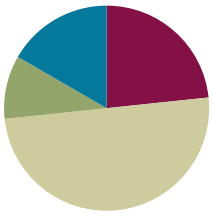
Lesson 26

Objective: Decompose whole number fractions greater than 1 using whole number equivalence with various models.

Related Topics: More Lesson Plans for the Common Core Math

Suggested Lesson Structure

Fluency Practice	(14 minutes)
Application Problem	(6 minutes)
Concept Development	(30 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (14 minutes)

- Sprint: Adding by 8 **2.NBT.5** (8 minutes)
- Write Equal Fractions **3.NF.3d** (6 minutes)

Sprint: Adding by 8 (8 minutes)

Materials: (S) Adding by 8 Sprint

Write Equal Fractions (6 minutes)

Materials: (S) Personal white boards

T: (Project $\frac{1}{2}$.) Say the fraction.

S: 1 half.

T: Draw a picture of 1 half and write the fraction below it.

S: (Draw a picture of 2 equal parts with one part shaded. Write $\frac{1}{2}$ below the picture.)

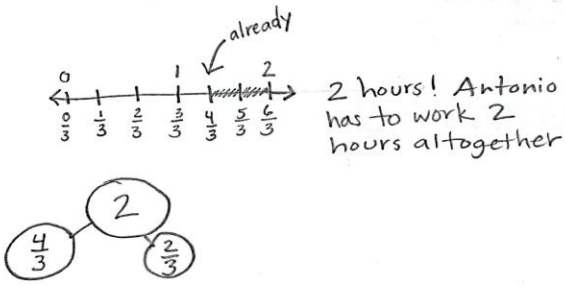
T: (Write $\frac{1}{2} = \frac{\quad}{4}$.) Draw a second picture to show an equal number of fourths. Then complete the number sentence.

S: (Draw 4 equal parts with 2 parts shaded. Write $\frac{1}{2} = \frac{2}{4}$ below the picture.)

Repeat the process for $\frac{1}{3} = \frac{\quad}{6}$, $\frac{1}{4} = \frac{\quad}{8}$, and $\frac{1}{5} = \frac{2}{\quad}$.

Application Problem (6 minutes)

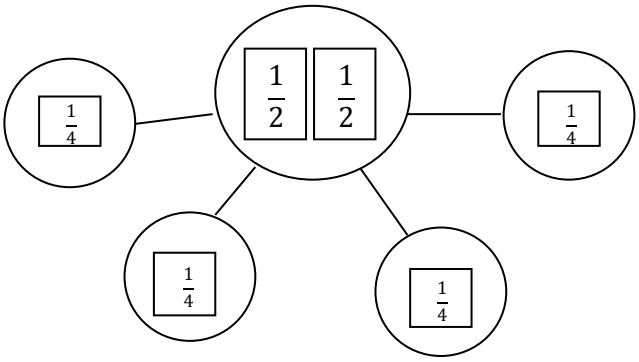
Antonio works on his project for 4 thirds of an hour. His mom tells him that he must spend another 2 thirds hour on it. Draw number bonds and a number line with copies of thirds to show how long Antonio worked altogether.



Concept Development (30 minutes)

Materials: (S) Personal white boards

(Draw or project the following number bond, also used in Lesson 24.)



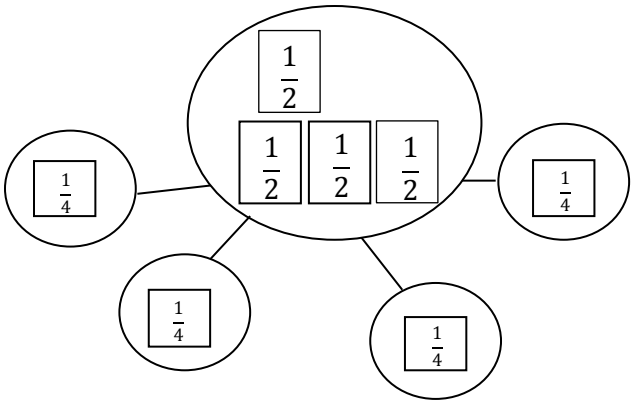
T: Turn and tell your partner why the number bond is true.

S: Because fourths come from cutting halves in 2 equal pieces. → Yeah, so $\frac{2}{2}$ and $\frac{4}{4}$ both equal 1 whole.

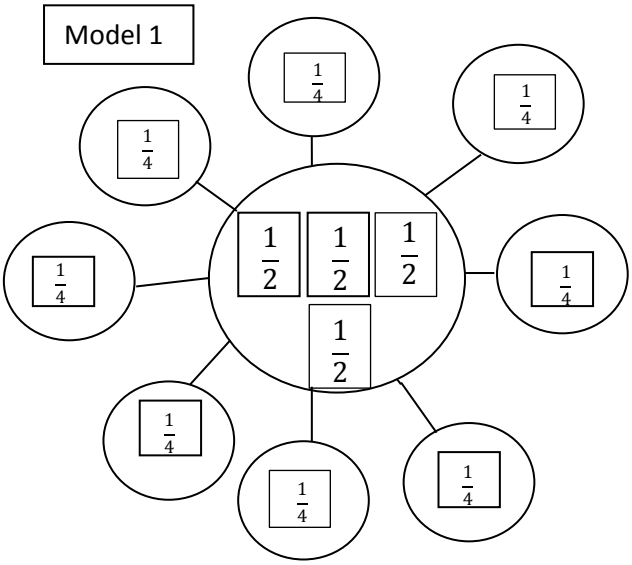
T: How do the parts change if we change the whole to look like this (Add 2 more halves to the whole.)?

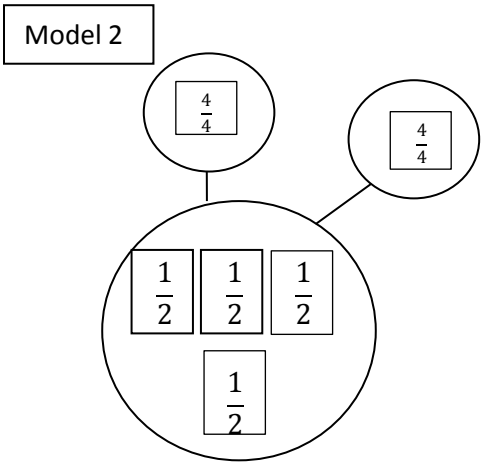
T: Work with a partner to draw the new model on your personal board and change the parts so that the number bond is true.

S: (Students draw.)



T: As I look around the room I see these two models. Discuss with your partner. Are they equivalent?





S: There are many more parts in the first model, so they aren't equal. → There are 8 total parts in both models. → 4 copies of $\frac{1}{4}$ makes $\frac{4}{4}$ and another 4 copies of $\frac{1}{4}$ makes another $\frac{4}{4}$. So they are equivalent. → In the second model they just made copies of 1 whole to show the total as 2 wholes.

T: Yes, Model 2 does show a different way of writing the copies in Model 1. Instead of showing copies of unit fractions, the second model shows copies of 1 whole.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Partner talk is a valuable opportunity for ELLs to speak about their math ideas in English confidently and comfortably. Support limited English speakers with a sentence frame such as, "They are equivalent because Model 1 shows _____ fourths and Model 2 shows _____ fourths."

T: Let's see if we can show the equivalence of the number bonds on the number line. Draw a number line with end points 0 and 2. Label the wholes on top of the number line. Partition the number line into fourths and rename the wholes on the bottom.

S: (Draw.)

T: How many fourths in 0?

S: (Respond chorally.) 0 fourths!

T: How many fourths in 1?

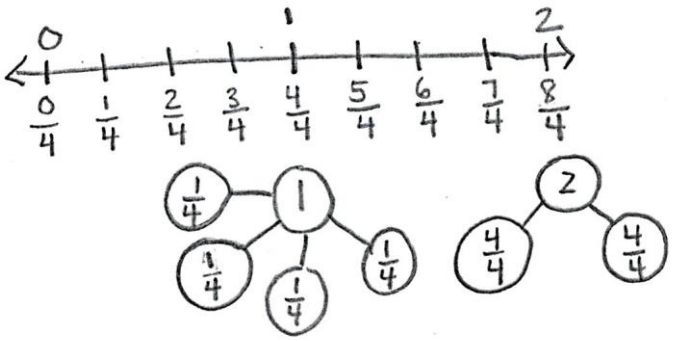
S: (Respond chorally.) 4 fourths!

T: How many fourths in 2?

S: (Respond chorally.) 8 fourths!

T: Below each whole number on your number line work with a partner to draw a number bond. As you draw number bonds, show copies of 1 whole instead of unit fractions if you can.

S: (Draw.)



NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Use the chart on the Problem Set to help students below grade level build understanding. After students have completed the halves and thirds ask, "How is the number of unit intervals related to the number of unit fractions?" Discuss and verify predictions for sixths.

T: What is the relationship between Models 1 and 2 and the number line and number bonds you just drew?

S: Our number bond for 2 on the number line looks just like Model 2! → But Model 2 has halves as the whole. → 4 halves make 2, so they're the same.

T: What about Model 1?

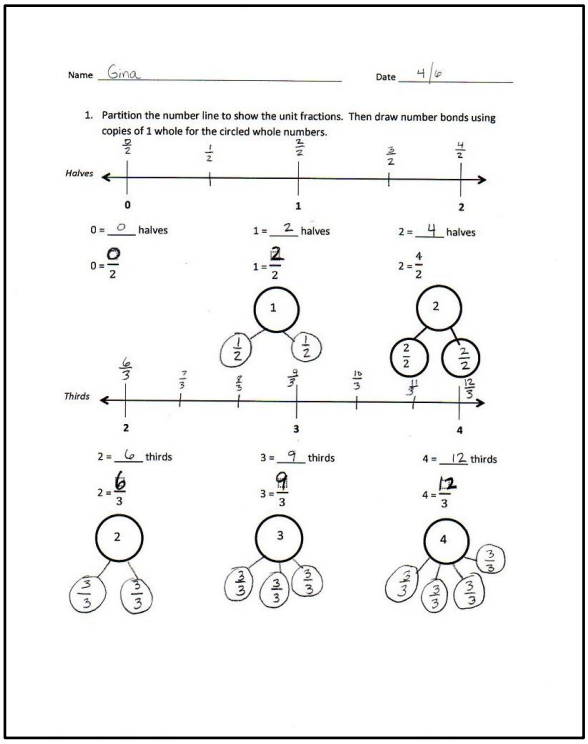
S: There are 8 fourths on the number line, just like Model 1 shows.

T: What is the difference between these 2 ways of showing the number bond?

S: One's way faster to write. → It's also easier to read because you can see the number of wholes inside of 2.

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.


Name Gina Date 4/6

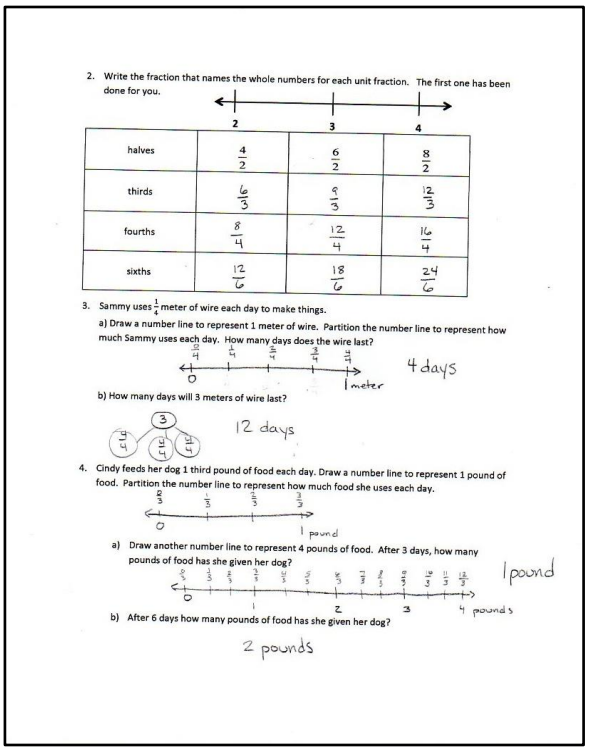
1. Partition the number line to show the unit fractions. Then draw number bonds using copies of 1 whole for the circled whole numbers.

Halves

0 = 0 halves 1 = 2 halves 2 = 4 halves

Thirds

2 = 6 thirds 3 = 9 thirds 4 = 12 thirds


2. Write the fraction that names the whole numbers for each unit fraction. The first one has been done for you.

	2	3	4
halves	$\frac{4}{2}$	$\frac{6}{2}$	$\frac{8}{2}$
thirds	$\frac{6}{3}$	$\frac{9}{3}$	$\frac{12}{3}$
fourths	$\frac{8}{4}$	$\frac{12}{4}$	$\frac{16}{4}$
sixths	$\frac{12}{6}$	$\frac{18}{6}$	$\frac{24}{6}$

3. Sammy uses $\frac{1}{4}$ meter of wire each day to make things.
a) Draw a number line to represent 1 meter of wire. Partition the number line to represent how much Sammy uses each day. How many days does the wire last? 4 days
b) How many days will 3 meters of wire last? 12 days

4. Cindy feeds her dog 1 third pound of food each day. Draw a number line to represent 1 pound of food. Partition the number line to represent how much food she uses each day.
a) Draw another number line to represent 4 pounds of food. After 3 days, how many pounds of food has she given her dog? 1 pound
b) After 6 days how many pounds of food has she given her dog? 2 pounds

Student Debrief (10 minutes)

Lesson Objective: Decompose whole number fractions greater than 1 using whole number equivalence with various models.

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.

- Compare the number line and number bonds. What does each representation help you see?
- On Problem Set Problem 2 what strategy did you use to find the unit wholes without having to partition a number line again?
- Draw number bonds to demonstrate your answers on Problems 3 and 4 using copies of wholes.
- How is the way that we expressed whole number fractions today different from the way we've been doing it?
- Why is it helpful to know how to rename wholes to make number bonds with larger whole numbers?

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.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

As an alternative for the Problem Set, offer students above grade level the option of drawing their own number lines with larger unit intervals (e.g., 6, 7, and 8) and their choice of unit fraction for partitioning (e.g., fifths).

A # Correct _____

Add.

1	0 + 8 =		23	65 + 8 =	
2	1 + 8 =		24	6 + 8 =	
3	2 + 8 =		25	16 + 8 =	
4	8 + 2 =		26	26 + 8 =	
5	1 + 8 =		27	36 + 8 =	
6	0 + 8 =		28	86 + 8 =	
7	3 + 8 =		29	46 + 8 =	
8	13 + 8 =		30	7 + 8 =	
9	23 + 8 =		31	17 + 8 =	
10	33 + 8 =		32	27 + 8 =	
11	43 + 8 =		33	37 + 8 =	
12	83 + 8 =		34	77 + 8 =	
13	4 + 8 =		35	8 + 8 =	
14	14 + 8 =		36	18 + 8 =	
15	24 + 8 =		37	28 + 8 =	
16	34 + 8 =		38	38 + 8 =	
17	44 + 8 =		39	68 + 8 =	
18	74 + 8 =		40	9 + 8 =	
19	5 + 8 =		41	19 + 8 =	
20	15 + 8 =		42	29 + 8 =	
21	25 + 8 =		43	39 + 8 =	
22	35 + 8 =		44	89 + 8 =	

B Improvement _____ # Correct _____

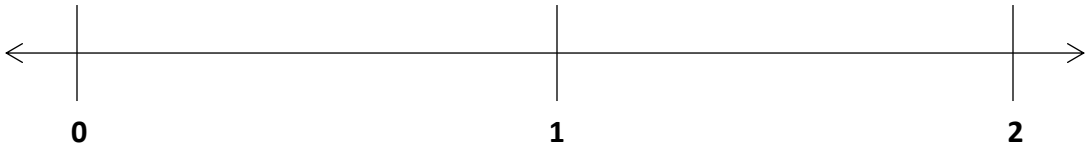
Add.

1	8 + 0 =		23	55 + 8 =	
2	8 + 1 =		24	6 + 8 =	
3	8 + 2 =		25	16 + 8 =	
4	2 + 8 =		26	26 + 8 =	
5	1 + 8 =		27	36 + 8 =	
6	0 + 8 =		28	66 + 8 =	
7	3 + 8 =		29	56 + 8 =	
8	13 + 8 =		30	7 + 8 =	
9	23 + 8 =		31	17 + 8 =	
10	33 + 8 =		32	27 + 8 =	
11	43 + 8 =		33	37 + 8 =	
12	73 + 8 =		34	67 + 8 =	
13	4 + 8 =		35	8 + 8 =	
14	14 + 8 =		36	18 + 8 =	
15	24 + 8 =		37	28 + 8 =	
16	34 + 8 =		38	38 + 8 =	
17	44 + 8 =		39	78 + 8 =	
18	84 + 8 =		40	9 + 8 =	
19	5 + 8 =		41	19 + 8 =	
20	15 + 8 =		42	29 + 8 =	
21	25 + 8 =		43	39 + 8 =	
22	35 + 8 =		44	89 + 8 =	

Name _____ Date _____

1. Partition the number line to show the unit fractions. Then draw number bonds using copies of 1 whole for the circled whole numbers.

Halves



0 = _____ halves

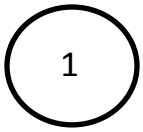
0 = $\frac{\square}{2}$

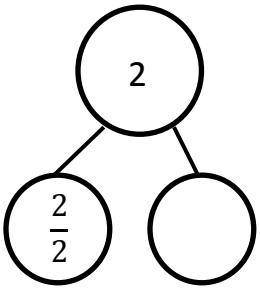
1 = _____ halves

1 = $\frac{\square}{2}$

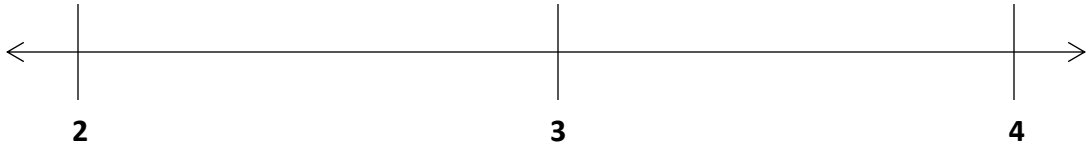
2 = _____ halves

2 = $\frac{4}{2}$





Thirds



2 = _____ thirds

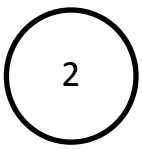
2 = $\frac{\square}{3}$

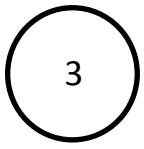
3 = _____ thirds

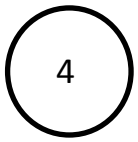
3 = $\frac{\square}{3}$

4 = _____ thirds

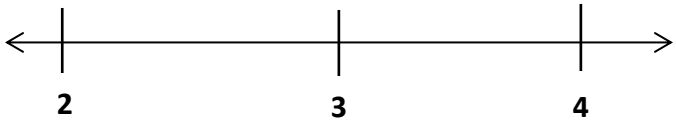
4 = $\frac{\square}{3}$







2. Write the fraction that names the whole numbers for each unit fraction. The first one has been done.



halves	$\frac{4}{2}$	$\frac{6}{2}$	$\frac{8}{2}$
thirds			
fourths			
sixths			

3. Sammy uses $\frac{1}{4}$ meter of wire each day to make things.
   a. Draw a number line to represent 1 meter of wire. Partition the number line to represent how much Sammy uses each day. How many days does the wire last?

   b. How many days will 3 meters of wire last?

4. Cindy feeds her dog 1 third pound of food each day. Draw a number line to represent 1 pound of food. Partition the number line to represent how much food she uses each day.

   a. Draw another number line to represent 4 pounds of food. After 3 days, how many pounds of food has she given her dog?

   b. After 6 days how many pounds of food has she given her dog?

Name _____ Date _____

1. Irene has 2 yards of fabric. Draw a number line to represent the total length of Irene's fabric.

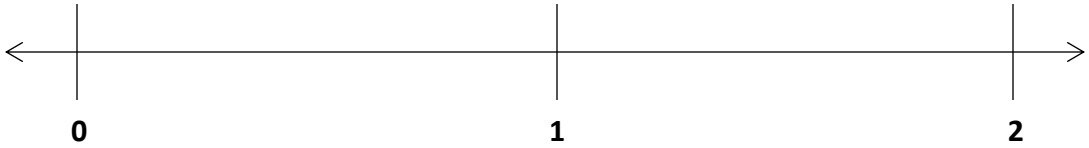
   a. Irene cuts her fabric into pieces $\frac{1}{5}$ yard in length. Partition the number line to show her cuts.

   b. How many $\frac{1}{5}$ yard pieces does she cut altogether? Use number bonds with copies of wholes to help you explain.

Name _____ Date _____

1. Partition the number line to show the unit fractions. Then draw number bonds with copies of 1 whole for the circled whole numbers.

Sixths



0 = _____ sixths

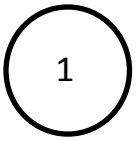
$0 = \frac{\square}{6}$

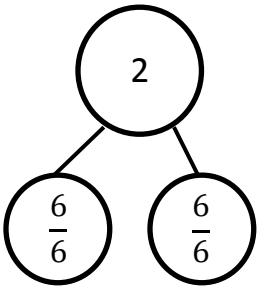
1 = _____ sixths

$1 = \frac{\square}{6}$

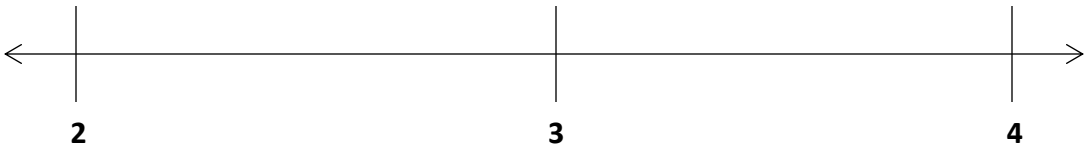
2 = _____ sixths

$2 = \frac{12}{6}$





Fifths



2 = _____ fifths

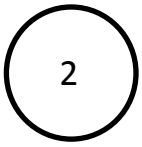
$2 = \frac{\square}{5}$

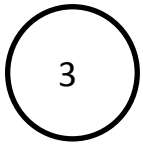
3 = _____ fifths

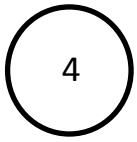
$3 = \frac{\square}{5}$

4 = _____ fifths

$4 = \frac{\square}{5}$







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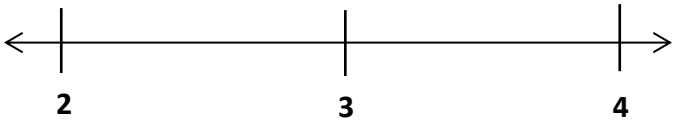

thirds	$\frac{6}{3}$	$\frac{9}{3}$	$\frac{12}{3}$
sevenths			
eighths			
tenths			

3. Rider dribbles the ball down $\frac{1}{3}$ of the basketball court on the first day of practice. Each day after that he dribbles $\frac{1}{3}$ of the way more than he did the day before.

   a. Draw a number line to represent the court. Partition the number line to represent how far Rider dribbles on Day 1, Day 2, and Day 3 of practice. What fraction of the way does he dribble on Day 3?