Lesson 7:

Add and subtract fractions with related units by finding equivalent fractions numerically.

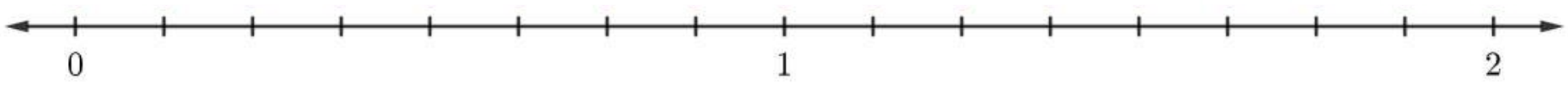
CCSS Standard – 5.NF.A / 5.NF.A.1

FLUENCY (10-min) **Counting on the Number Line**

What FRACTIONAL UNIT does the number line show? Raise your hand when you know.

Eighths

Use the number line to count forward by eighths



Now count forward by eighths again. This time rename the fractions as **whole numbers** when possible.

Now count forward by eighths again. This time rename the fractions as **whole numbers and mixed numbers** when possible.

Notice: Whole numbers and fractional units.

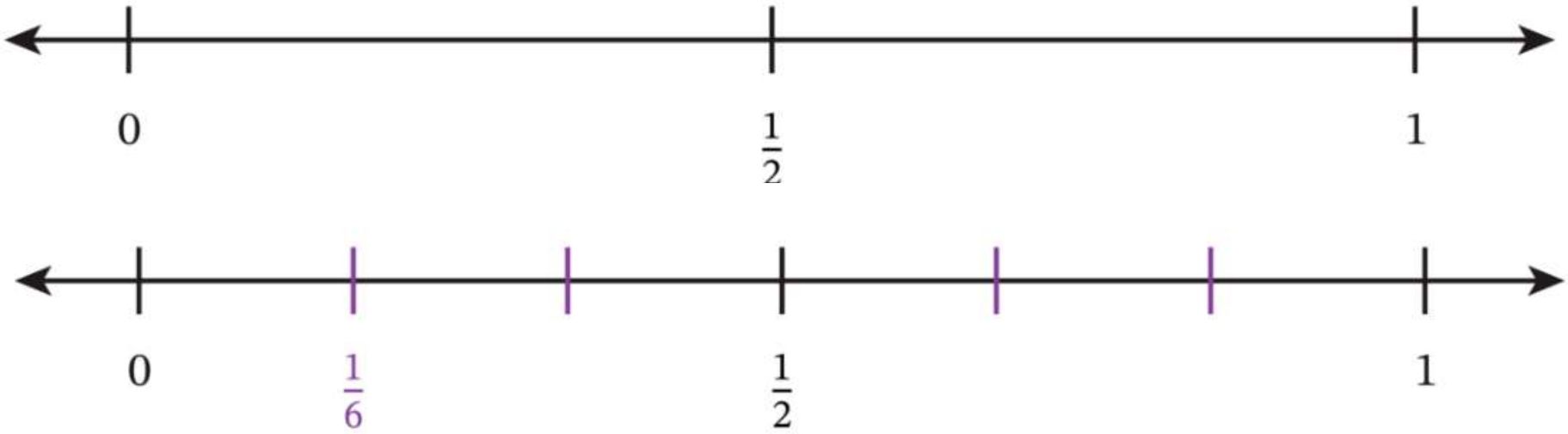
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where 1/6 is located on the number line.
Is 1/6 closer to 0, ½, or 1?

Raise your hand when you know.

$\frac{1}{6}$

Closer to 0



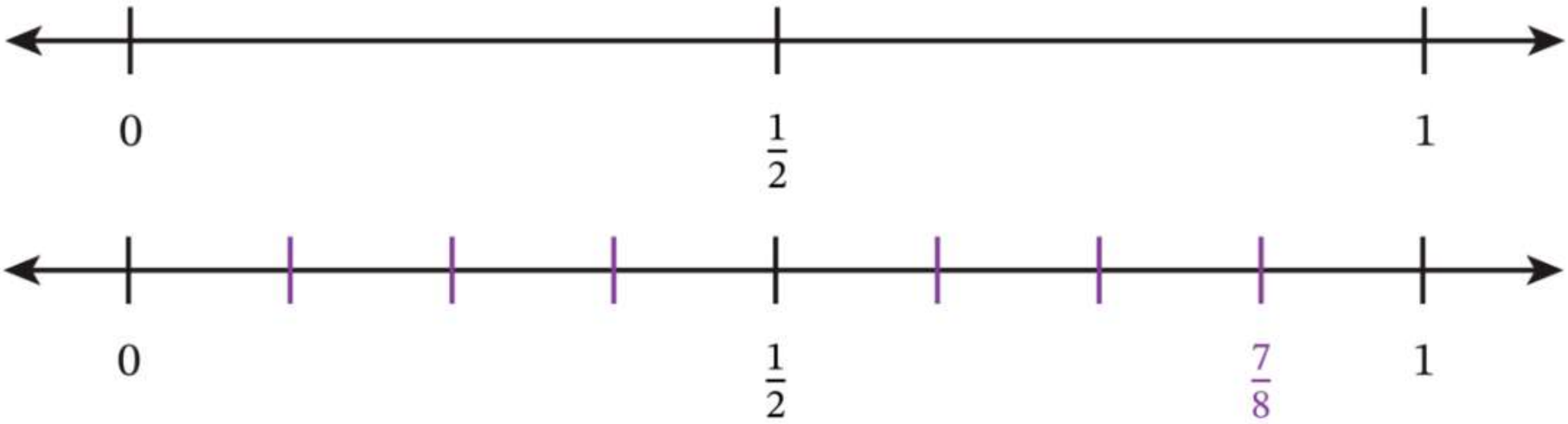
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where 7/8 is located on the number line.
Is 7/8 closer to 0, ½, or 1?

Raise your hand when you know.

$\frac{7}{8}$

Closer to 1



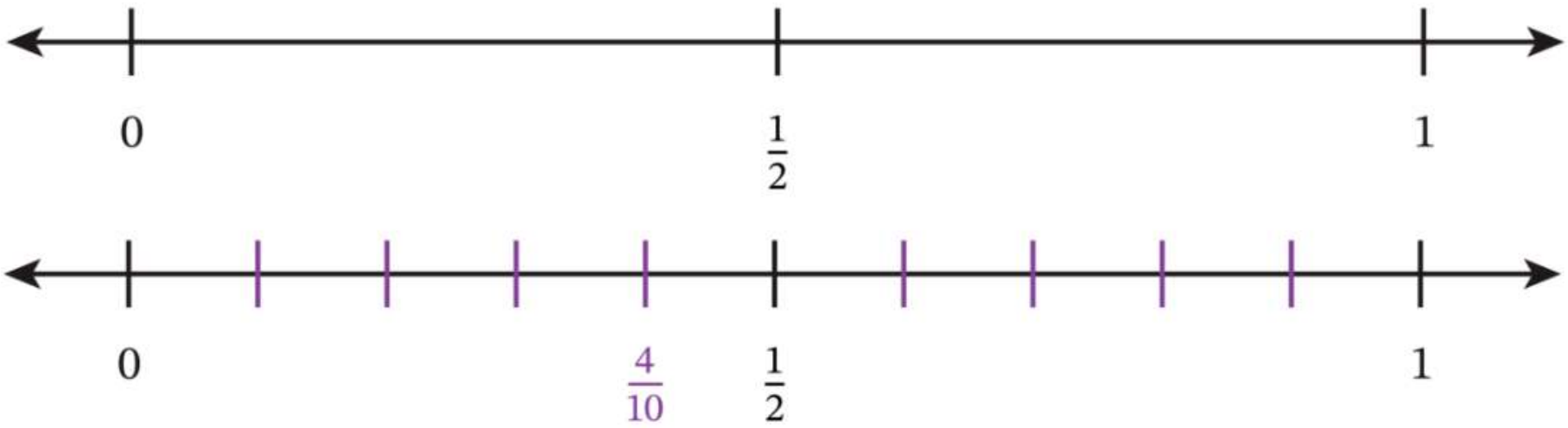
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where 4/10 is located on the number line.
Is 4/10 closer to 0, ½, or 1?

Raise your hand when you know.

$\frac{4}{10}$

Closer to ½



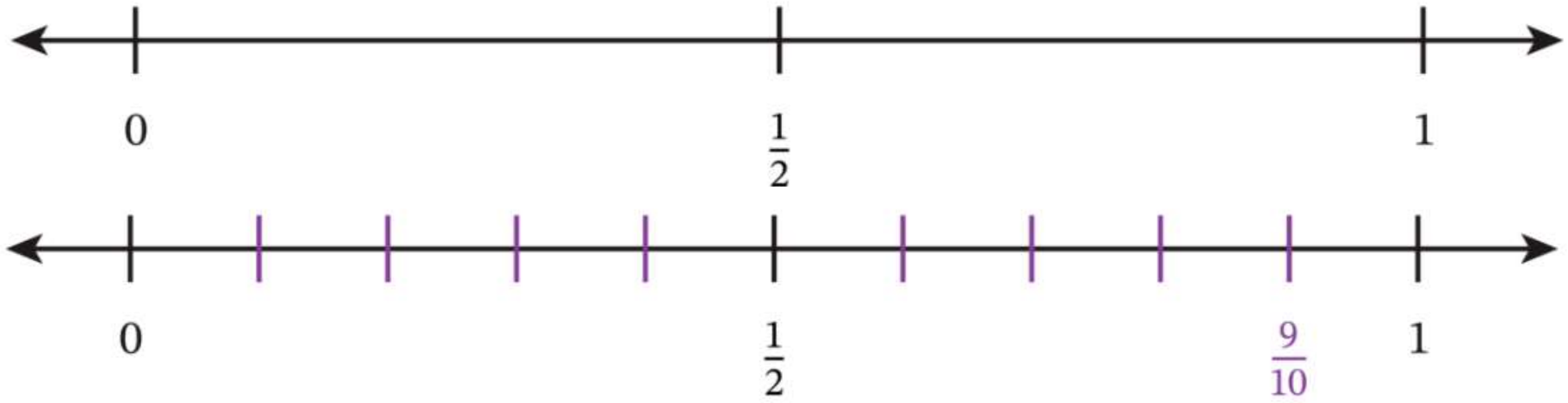
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where 9/10 is located on the number line.
Is 9/10 closer to 0, ½, or 1?

Raise your hand when you know.

$\frac{9}{10}$

Closer to 1



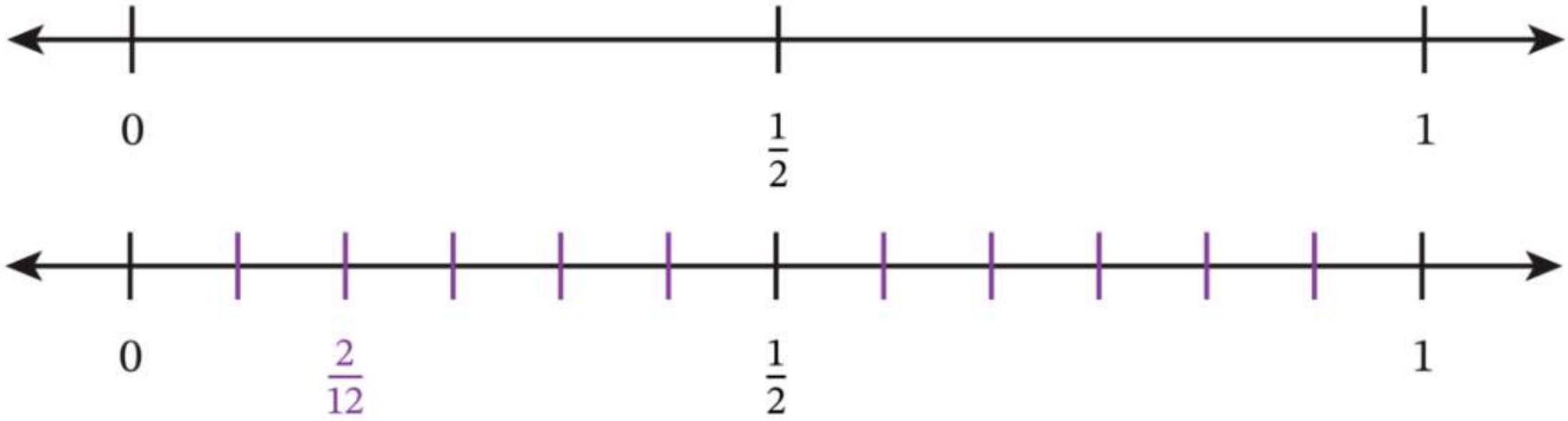
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where 2/12 is located on the number line.
Is 2/12 closer to 0, ½, or 1?

Raise your hand when you know.

$\frac{2}{12}$

Closer to 0



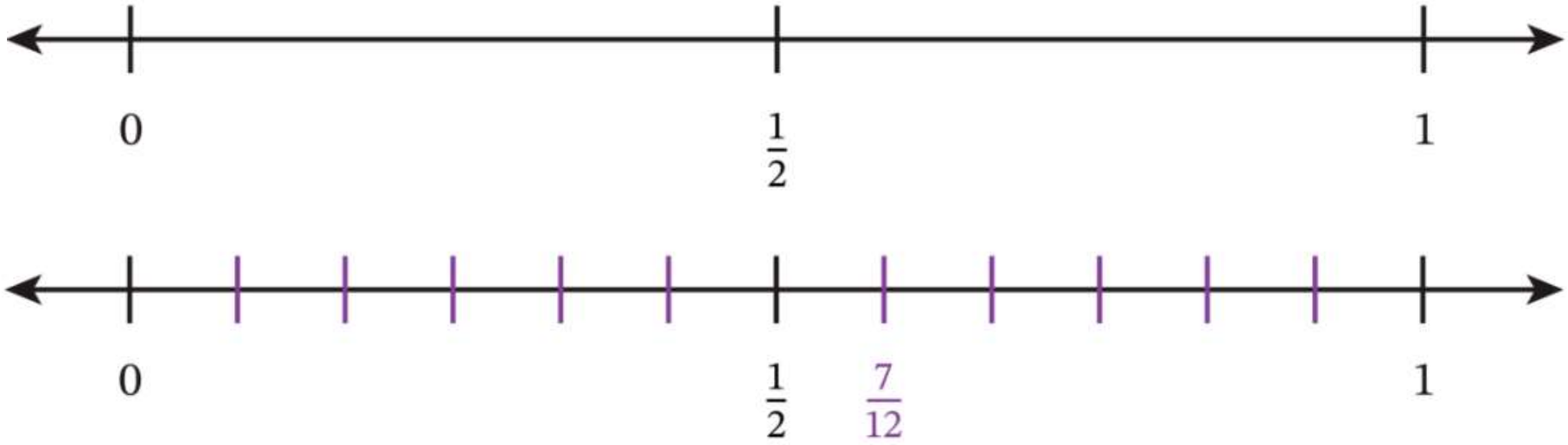
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where 7/12 is located on the number line.
Is 7/12 closer to 0, ½, or 1?

Raise your hand when you know.

$\frac{7}{12}$

Closer to 1/2



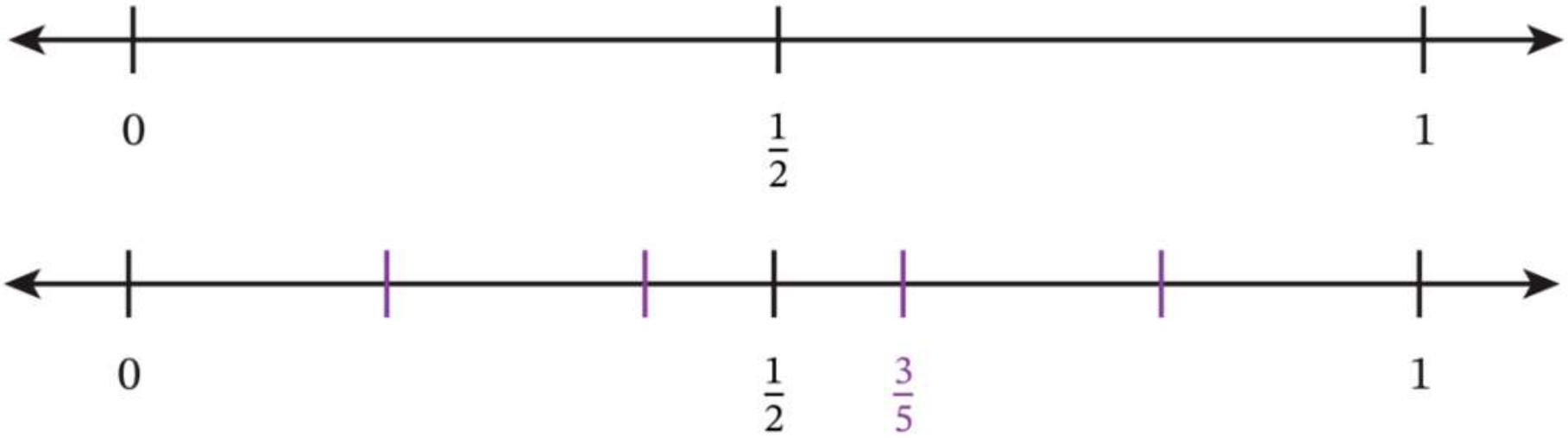
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where 3/5 is located on the number line.
Is 3/5 closer to 0, ½, or 1?

Raise your hand when you know.

$\frac{3}{5}$

Closer to 1/2



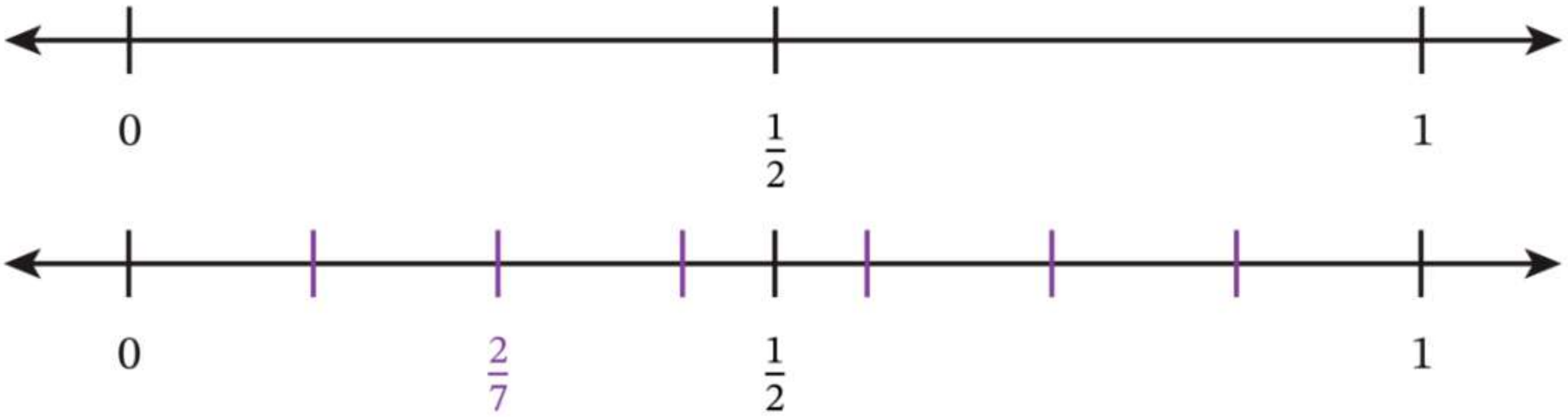
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where 2/7 is located on the number line.
Is 2/7 closer to 0, ½, or 1?

Raise your hand when you know.

$\frac{2}{7}$

Closer to 1/2



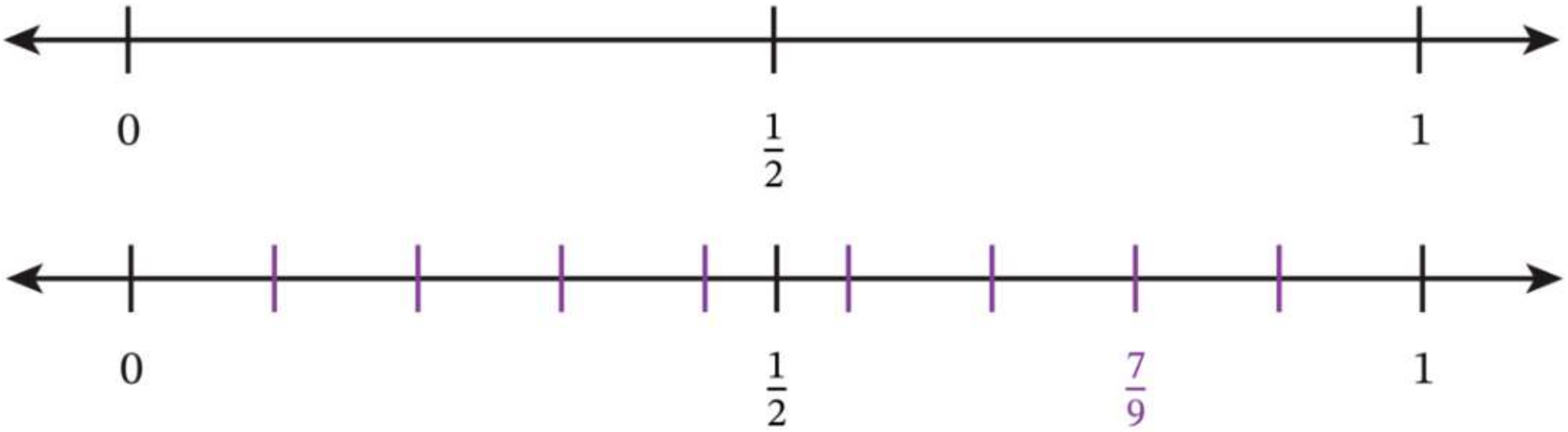
FLUENCY (10-min) **Choral Response: Closer to 0, ½, or 1**

Think about where7/9 is located on the number line.
Is 7/9 closer to 0, ½, or 1?

Raise your hand when you know.

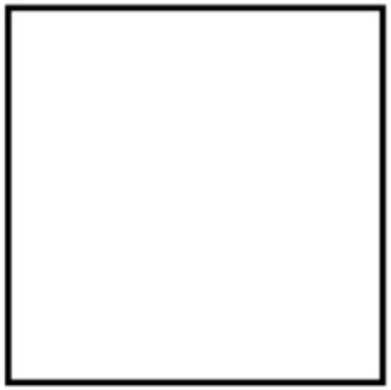
$\frac{7}{9}$

Closer to 1



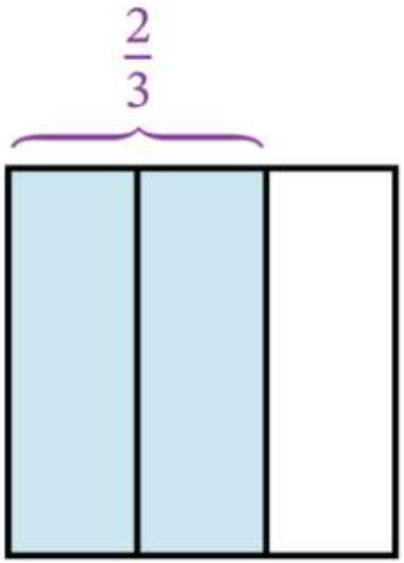
FLUENCY (10-min) **Whiteboard Exchange: Equivalent Fractions**

LEARN Book Page 59.



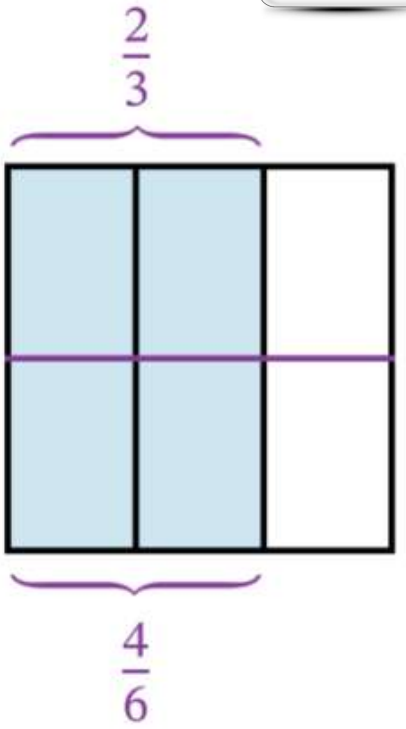
The area of this square represents 1 whole.

Use a vertical lines to partition the whole into thirds, and then shade and label 2/3.



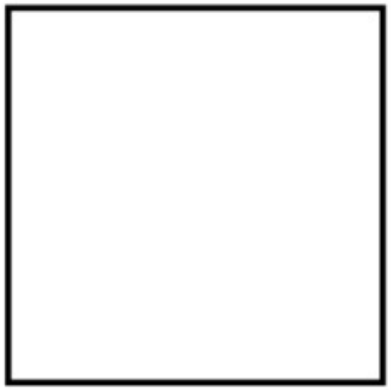
$$\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$$

Use what is known in the equation above to help you draw a horizontal lines and partition the area model into smaller units.



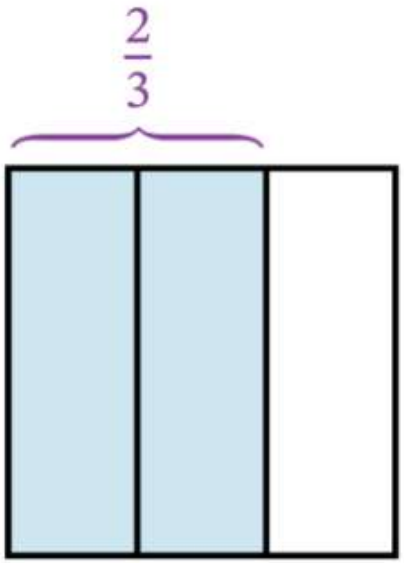
FLUENCY (10-min) **Whiteboard Exchange: Equivalent Fractions**

LEARN Book Page 59.



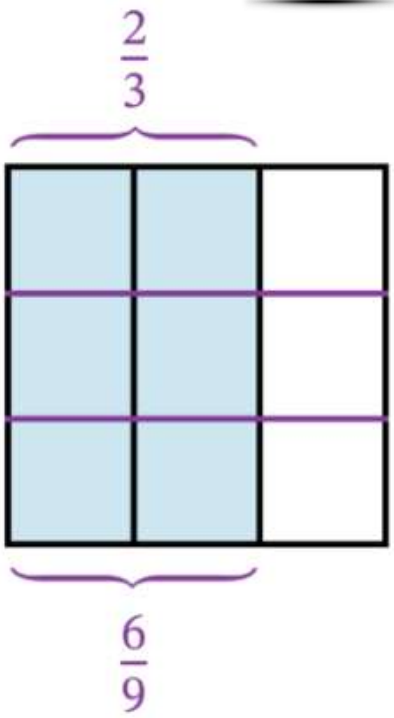
The area of this square represents 1 whole.

Use a vertical lines to partition the whole into thirds, and then shade and label 2/3.



$$\frac{2}{3} = \frac{2 \times 3}{3 \times 3} = \frac{6}{9}$$

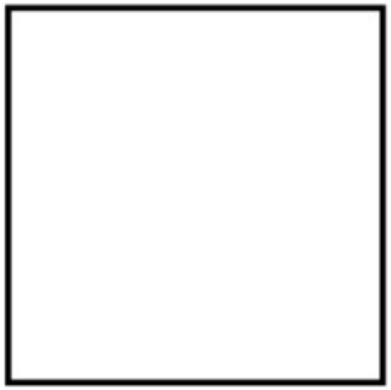
Use what is known in the equation above to help you draw a horizontal lines and partition the area model into smaller units.



FLUENCY (10-min)

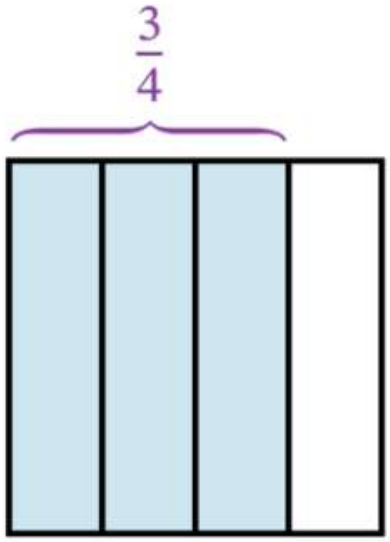
Whiteboard Exchange: Equivalent Fractions

LEARN Book Page 59.



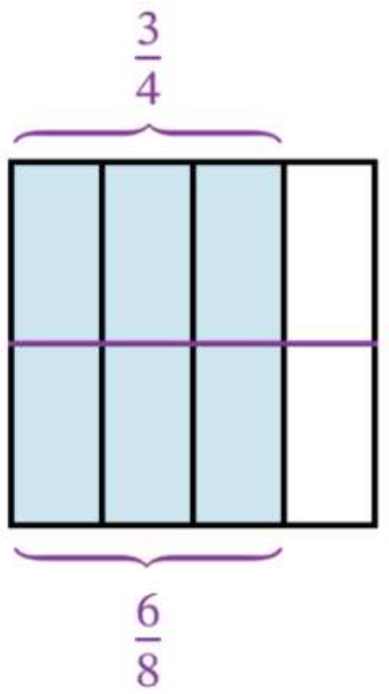
The area of this square represents 1 whole.

Use a vertical lines to partition the whole into fourths, and then shade and label 3/4.



$$\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}$$

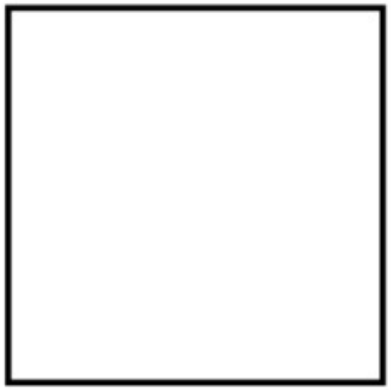
Use what is known in the equation above to help you draw a horizontal lines and partition the area model into smaller units.



FLUENCY (10-min)

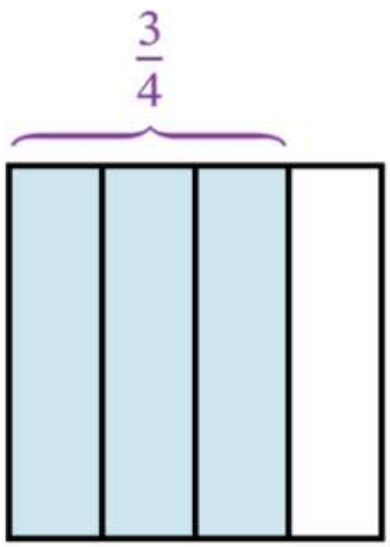
Whiteboard Exchange: Equivalent Fractions

LEARN Book Page 59.



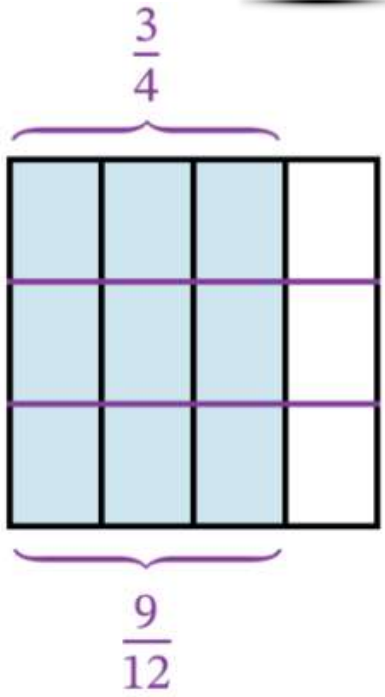
The area of this square represents 1 whole.

Use a vertical lines to partition the whole into fourths, and then shade and label 3/4.



$$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$$

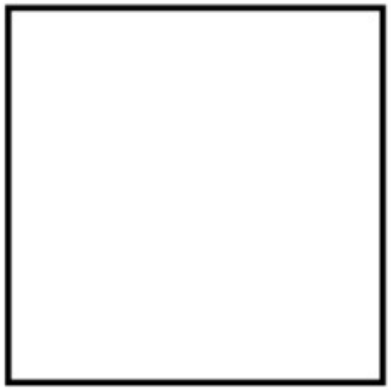
Use what is known in the equation above to help you draw a horizontal lines and partition the area model into smaller units.



FLUENCY (10-min)

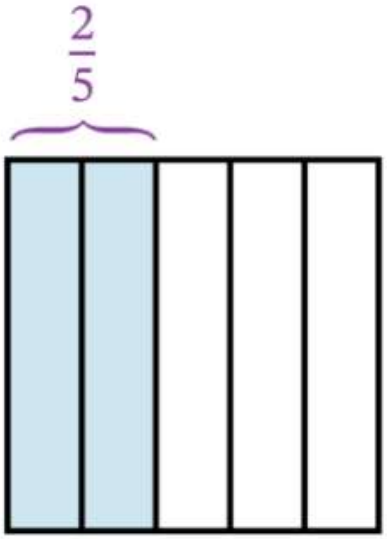
Whiteboard Exchange: Equivalent Fractions

LEARN Book Page 59.



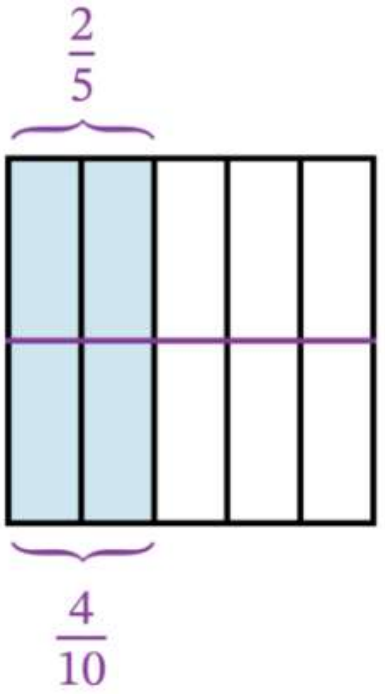
The area of this square represents 1 whole.

Use a vertical lines to partition the whole into fifths, and then shade and label 2/5.



$$\frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10}$$

Use what is known in the equation above to help you draw a horizontal lines and partition the area model into smaller units.



LAUNCH (5xx-min) **Find the sum of related units that are inefficient to draw in an area model.**

Try to find the sum of the following fractions.
You may use any strategy that works for you (number lines, tape diagrams, area model)

$$\frac{27}{51} = \frac{27 \div 3}{51 \div 3} = \frac{9}{17}$$

$$\frac{15}{17} + \frac{27}{51}$$

Are the units related?

Yes! The units are related because 17 is a factor of 5 and 51 is a multiple of 17.

17 x 3 = 51
51 ÷ 3 = 17

What did you experience when you tried to find the sum?

- *Difficult to draw.*
- *Hard to partition an area model into 51 parts!*
- *Hard to partition a tape diagram into 51 parts!*

When we realize that units are RELATED, we can use what we know about how they are related to RENAME fractions. Then we can use that relationship to show our thinking numerically – with only numbers and not with models!

LEARN (35-min) **Make Like Units by Using Multiplication**

In Module 1 we used estimation before we divided to make sure our answer was *reasonable*.
When adding or subtracting fractions like the ones below, estimate first whether the sum is less than 1, between 1 and 2, or greater than 2.

$$\frac{5}{6} + \frac{8}{12}$$

5/6 is about 1
8/ 12 is about ½
So, the sum of 5/6 + 8/12 is between 1 and 2

Are we ready to add these fractions as they are written? Why? Or Why not?

No! The whole units are not the same.

What do we need to do before we can add?

We need to rename one of the fractions, so we have LIKE units.

Are the units related? How do you know?

Yes. The units are related. We only need to rename one of the fractions because 6 is a factor of 12 and 12 is a multipe of 6.

Which fraction should we rename?

Let's rename 5/6 into twelfths.

LEARN (35-min) **Make Like Units by Using Multiplication**

$$\frac{5}{6} + \frac{8}{12}$$

$$\frac{5 \times 2}{6 \times 2} = \frac{10}{12} \qquad \frac{10}{12} + \frac{8}{12} = \frac{18}{12}$$

Is 18/12 reasonable based on our estimate of being between 1 and 2? Why?

$$\frac{18}{12} = 1\frac{6}{12}$$

LEARN (35-min)

Make Like Units by Using Multiplication

Let's do this problem again, this time RENAMING 8/12 as sixths.

$$\frac{5}{6} + \frac{8}{12}$$

$$\frac{5}{6} + \frac{4}{6} = \frac{9}{6}$$

$$\frac{8 \div 2}{12 \div 2} = \frac{4}{6}$$

Is 9/6 reasonable based on our estimate of being between 1 and 2? Why?

$$\frac{9}{6} = 1\frac{3}{6}$$

LEARN (35-min) **Make Like Units by Using Multiplication**

LEARN Book Page 61. Pick any 2 to complete. You can RENAME by multiplying or dividing.

1. $\frac{15}{8} - \frac{9}{24}$

$$\frac{15}{8} - \frac{9}{24} = \frac{15\times3}{8\times3} - \frac{9}{24}$$
$$= \frac{45}{24} - \frac{9}{24}$$
$$= \frac{36}{24}$$

2. $\frac{21}{15} + \frac{6}{5}$

$$\frac{21}{15} + 5 = \frac{21}{15} + \frac{6\times3}{5\times3}$$
$$= \frac{21}{15} + \frac{18}{15}$$
$$= \frac{39}{15}$$

3. $\frac{15}{8} - \frac{9}{24}$

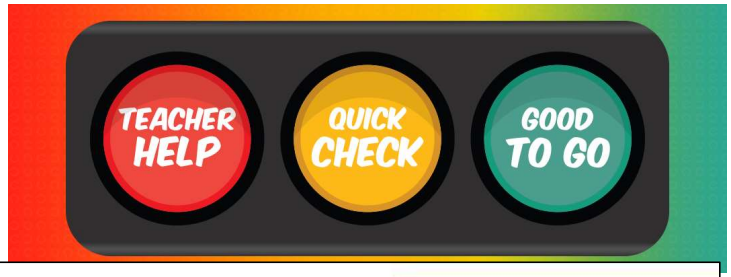
$$\frac{15}{8} - \frac{9}{24} = \frac{15}{8} - \frac{9\div3}{24\div3}$$
$$= \frac{15}{8} - \frac{3}{8}$$
$$= \frac{12}{8}$$

4. $\frac{21}{15} + \frac{6}{5}$

$$\frac{21}{15} + \frac{6}{5} = \frac{21\div3}{15\div3} + \frac{6}{5}$$
$$= \frac{7}{5} + \frac{6}{5}$$
$$= \frac{13}{5}$$

LAND (10-min)

Exit Ticket



Name _____ Date _____

7

1. Add.

$\frac{2}{3}+\frac{5}{6}=$ _____

2. Subtract.

$\frac{11}{8}-\frac{1}{2}=$ _____

Exit Ticket – PAGE 67

Small Group Time:
Problem Set Page 63

Homework:
Page 47 APPLY BOOK