ESTAR INTERVENTION

Tier 2 Mathematics Intervention

Module: *Building, Comparing, & Ordering Fractions (BCOF)*

Teacher Lesson Booklet

The Meadows Center for Preventing Educational Risk—Mathematics Institute
The University of Texas at Austin

The Meadows Center
FOR PREVENTING EDUCATIONAL RISK
THE UNIVERSITY OF TEXAS AT AUSTIN
COLLEGE OF EDUCATION

Mathematics Institute for Learning Disabilities and Difficulties

www.meadowscenter.org

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 1

Using Equal Shares to Develop Unit Fractions

<table>
<tr><td>Lesson Objectives</td><td colspan="2">• The student will partition objects into fractional equal shares that result in unit fractions.
• The student will apply the term “equal share” to the partitioning of quantities into equal parts.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">equal share: the share found by breaking quantities apart so that everyone gets the same amount
unit fraction: describes 1 piece of an amount partitioned equally, where the denominator represents the number of equal parts</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">one-fourth, one-eighth, one-half, one-sixth, one-third</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 1-12)
• Whiteboard with marker
• 4 plates
• 12 counters
• Fraction bars: whole and $\frac{1}{4}$</td><td>• Student Booklet (pp. 1-6)
• Fraction bars: whole, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, and $\frac{1}{8}$ (1 set per student)
• 4 Talk and Share-Unit Fractions Cards (1 set per student pair)</td></tr>
</table>

Preview

Say: **Today we will use what we know about equal sharing to share different amounts. We will also name the *equal shares* we create.**

Engage Prior/Informal Knowledge Time: 3 min

Review equal shares. Have students distribute 12 counters to equally share between 2 people. Draw squares on a whiteboard to place the counters in for each person.

Say: **Tristen and Trina have 12 counters. They want to equally share the counters between the 2 of them. An *equal share* means that each person will get the same, or equal, amount of counters.**

If we put 1 counter in Tristen's box, how many counters do we put in Trina's box? *(1)*

How will we know when we are finished equal sharing? *(when everyone has the same amount and there are no more left to share)*

Have student volunteers help finish the 1-for-1 sharing. Have students count the number of counters for each person.

Say: **How many counters are in each *equal share*?** *(6 counters)*

When we break apart a quantity so that each person gets the same amount, it is called an *equal share*. Here each person has 6 equal counters.

Modeled Practice Time: 8 min

1. Model the concept of equal shares in a situation requiring fractional shares of 1 object shared among 4 people.

   Distribute Student Booklets and have students turn to ***Modeled Practice Sheet #1***. Place 1 whole fraction bar and 4 plates on the table. Distribute 1 whole fraction bar to each student. The teacher and students will complete the steps together as the lesson progresses.

Say: **Let's read the problem together. Ready, read: "4 people want to share 1 cake so that each gets the same amount. How much of a cake does each person get?"**

Each person gets the same amount, so that means we are going to create *equal shares*. What does it mean to share equally? *(to break apart some quantity so that everyone gets the same amount)*

We will use this bar and these plates to model the problem.

How many cakes do we have? *(1)*

How many people are sharing the cake? *(4)*

Is there enough cakes for each person to get 1 whole cake? *(no)*

We will share the cake so that everyone gets an *equal share*. What should we do with the cake? *(cut it into 4 pieces)*

Cut it into 4 pieces. For each piece to be an *equal share*, each piece has to be the exact same size. Why is that? *(so each person gets the same amount)*

To model the division of 1 cake into 4 pieces, I am going to trade the whole bar for a bar that has 4 equal parts. Do the same with your fraction bar.

Trade the whole fraction bar for the bar with 4 pieces. Have students do the same.

Say: **We divided the cake. How many equal parts did we divide the cake into?** *(4)*

Pass out 1 equal part of the cake to each plate.

How many equal parts does each person get? *(1)* **When we divide an object into 4 equal parts, we have broken it into fourths. What is the name of the fraction for 1 equal part of 1 cake divided between 4 equal parts?** *(one-fourth)*

One-fourth is the share received when 4 people share some amount equally. One-fourth is a *unit fraction* because it describes 1 equal part of an amount divided equally.

What is a *unit fraction*? *(a fraction that is 1 equal part of an amount divided equally)* **What is another example of a *unit fraction*?** *(answers vary: 1/3, 1/5, 1/8)*

Teacher Note
When naming the equal share, ensure the student uses the correct "unit" (e.g., one-fourth of the cake). This is particularly important with fractional quantities.

Say: **What portion of the whole cake does each person get?** *(one-fourth of the cake)*

Write "one-fourth of the cake" on the "Equal Share" line.

Teacher Note
If students have trouble distinguishing what is being shared between the sharers, use different colors to represent the rectangles and circles in your model. Encourage students to do the same in their practice activities.

2. Model the concept of fractional equal shares through drawings.

   Have students turn to ***Modeled Practice Sheet #2***. Gather the fractional bar pieces from the students. The teacher and students will complete the steps together as the lesson progresses.

Say: **Let's read the next problem together. Ready, read: "8 friends want to share 1 candy bar equally. How much of the candy bar does each friend receive?"**

How many candy bars do we have to share? *(1)*

How many friends are sharing? *(8)*

We need to equally share 1 candy bar among 8 friends. What does that mean? *(you have to give out the same amount of candy bar to each friend until there is no more of the candy bar left to share)*

We will draw the fraction parts using the fraction bar on our sheet.

How can we show the equal sharing? *(divide the bar into equal parts for each friend)*

How should we divide this candy bar so that each friend gets an *equal share*? *(divide it into 8 equal parts, then give each friend 1 part)*

Partition, or divide, the rectangle on ***Modeled Practice Sheet #2*** into 8 equal parts. Model for the students how to divide the rectangle equally.

Teacher Note
A simple way to divide a rectangle into eighths is to first divide it in half, then divide each half in half again. That will make fourths. Last divide each fourth in half again to make eighths.

Say: **Think about when we shared the cake between 4 people. We broke apart the cake, and the *equal share* received by each friend was one-fourth. Can you predict what we might call each *equal share* when 1 candy bar is shared among 8 friends?** *(eighths)*

When we share something equally between 8 people, what is each share, or equal part, called? *(one-eighth)*

One-eighth is the portion received when 8 people share some amount equally. Write $\frac{1}{8}$ on each of the equal parts in the rectangle.

Is one-eighth a *unit fraction*? *(yes)* **Why?** *(because it is 1 piece of an amount divided equally into eighths)*

Now we can see how much each friend receives. How much is the *equal share*? *(one-eighth of a candy bar)*

Write "one-eighth or $\frac{1}{8}$ of the candy bar" on the "Equal Share" line.

One-eighth of a candy bar is the *equal share*. It is the equal amount that each friend receives.

Practice — Time: 8 min

Activity 1: Students will complete the activity on the *Practice Sheets* on pages 3 and 4 with a math partner. Have students use the fraction bars to solve each problem.

Say: **With your math partner complete the problems on the pages. Use your fraction bars to help you solve.**

Ask questions such as:

- How many items are being shared? *(1)* How many people are sharing? *(3, 4)*
- Tell me how you used your drawing to represent the items and the sharers to find the equal share. *(answers will vary; students*

should explain how they set up their drawing and how they shared the items)

- How much is the equal share? *(one-third of a brownie; one-fourth of a sandwich)*

- How did you know when you had an equal share? *(when each person had the same amount of items and there were no more items left to share)*

Activity 2: Students will play *Talk and Share* in pairs. Distribute 4 ***Talk and Share-Unit Fractions Cards*** to each pair of students. Each student draws a game card that shows a sharing scenario. Students use the fraction bars to solve each sharing scenario. Students should verbalize their reasoning as they model the problem solutions.

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as much as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 2

Non-Unit Fractions

Lesson Objectives	• The student will model non-unit fractions with equal shares and bar models. • The student will apply the term "equal share" to the partitioning of quantities into equal parts. • The student will create and use representations to organize, record, and communicate mathematical ideas to peers and teachers.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	equal share	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 13-20) • Whiteboard with marker • Fraction circles: 1 whole, 1 set of $\frac{1}{6}$ • 5 plates • Fraction bars: 1 whole, 3 sets of $\frac{1}{4}$ • 2 different colored markers or pencils	• Student Booklet (pp. 7-10) • Fraction bars: 2 wholes, 2 sets of $\frac{1}{3}$ (per student) • Fraction bars: 5 wholes, 5 sets of $\frac{1}{8}$, 2 sets of $\frac{1}{7}$ (per pair of students) • Colored markers/pencils: 2 different colors (per student) • *Talk and Share* Cards (4 per student pair)

Preview

Say: **Today we will equally share more than 1 object with several people. In the previous lesson, we shared 1 object equally with several people.**

Engage Prior/Informal Knowledge **Time: 3 min**

Review equal shares that result in unit fractions. Have students use Fraction circles to model 1 whole equally shared between 6 people. Using a whiteboard on the table, draw 6 stick figures to represent the 6 people.

Say: **We want to share this circle between 6 people. We want to find out what portion of the circle each person gets. These stick figures will represent the 6 people.**

What is it called when we break apart a quantity so that everyone gets the same amount? *(equal share)*

We want each person to get an equal share. What should we do with the circle so each person gets an equal share? *(divide it equally into 6 pieces)*

What is each equal part called? *(one-sixth)* **What type of fraction is one-sixth?** *(a unit fraction)* **Why?** *(because it is 1 piece of an amount divided equally)*

Have students trade the whole fraction circle for 1 with 6 pieces.

Say: **What do you do with the pieces?** *(give out them so each person has the same amount)*

Have a student distribute the 6 pieces, putting 1 under each stick figure.

Say: **What portion of the circle is each equal share?** *(one-sixth of the circle)*

Modeled Practice **Time: 8 min**

1. Model the concept of equal shares in a situation requiring fractional shares. Connect the action of shading each person's share to the sharing of concrete fraction bars.

   Have students turn to the *Modeled Practice Sheet* in their Student Booklet. Have 3 whole bars and 4 plates out on the table. Have different colored pencils or crayons available.

Say: **3 sandwiches are being shared by 4 people. Can everyone get a whole sandwich?** *(no)* **Why not?** *(there are only 3 sandwiches and 4 people)*

If each person gets an equal share, how much of a sandwich does each person get?

For this example, the 3 fraction bars on the table and the 3 rectangles on your paper represent the sandwiches. The rectangle underneath each person represents the amount each person will receive, which will go on his or her plate.

Quickly shade each rectangle representing a sandwich at the top of the page a different color.

We need to equally share each sandwich among the people. How might we share these sandwiches so that each person gets an equal share? *(answers will vary; example answer: you could divide each sandwich into 4 parts)*

Have a student volunteer trade in the 3 whole bars for wholes made up of fourths.

Say: **We have traded in the whole sandwiches for sandwiches divided into fourths. We will show this on our paper by dividing the 3 rectangles into fourths as well.**

Divide the rectangles into 4 equal parts each. Begin to pass out the sandwiches. What portion of each sandwich will each person get at first? *(one-fourth)*

Divide the rectangles representing each person's share into fourths as well, so we can record the share from each sandwich as we put it on the plate.

We can now share one-fourth of each sandwich with each person.

Have a student share the pieces of 1 sandwich between the 4 plates.

Say: **Using the color of the first sandwich, shade the amount each person receives from that sandwich.**

Shade each rectangle with one-fourth from each sandwich using the color that coordinates with the sandwich from which it comes. Confirm that students have done the same.

Have 2 other students distribute the pieces from the remaining sandwiches. Shade in each share with the same color.

Say: **Now we can see how much each person receives. Each person received one-fourth of each of the 3 sandwiches. How much is the equal share all together? Let's count the shares for 1 of the plates. Ready, count: one-fourth, two-fourths, three-fourths.** *(three-fourths of a sandwich)*

Let's count the share shown by 1 of the rectangles to make sure it's the same amount. Ready, count: one-fourth, two-fourths, three-fourths. Did we get the same amount? *(yes)*

We can find the equal share using our fraction bars or by drawing a picture. Both methods tell us that the equal share is three-fourths of a sandwich.

Write "three-fourths or $\frac{3}{4}$ of a sandwich" on the "Equal Share" line.

How many sandwiches are being shared? *(3 sandwiches)*

How many people are sharing? *(4 people)*

How much is the equal share? *($\frac{3}{4}$ of a sandwich)*

Are we sure that it is an equal share? *(yes, each person has the same amount)*

Teacher Note
If time permits, ask the students to restate the problem and answer in their own words. Prompt for something that sounds like, "if 3 sandwiches are equally shared among 4 people, each person gets $\frac{3}{4}$ of a sandwich."

Practice **Time: 8 min**

Activity 1: Students will complete the activity on the ***Practice Sheet*** on page 8 with a math partner.

Say: **With your math partner complete the problems on your sheet. Use your fraction bars or draw a picture to help solve.**

Ask questions and give instructions such as:

- How many items are being shared? *(2, 3)* How many people are sharing? *(8, 5)*
- Tell me how you used your drawing to represent the items and the sharers. How did you use your drawing to find the equal share? *(answers will vary; ensure that students are voicing how they set up their drawing and how they shared the items)*
- How much is the equal share? *(two-eighths of a banana; three-fifths of a sandwich)*
- How did you know when you had an equal share? *(when each person had the same amount of items and there were no more items left to share)*

Activity 2: Students will play *Talk and Share* in pairs. Distribute 4 ***Talk and Share Cards*** to each pair of students. Each student draws a game card that shows a sharing scenario. Students use the fraction bars to solve each sharing scenario. Students should verbalize their reasoning as they model the problem solutions.

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as much as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

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25

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Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 3

Modeling Fractions Equal to 1

<table>
<tr><td rowspan="1">Lesson Objectives</td><td colspan="2">• The student will model fractions equal to 1 with equal shares, fraction bars, and computation.
• The student will apply the term “equal share” to the partitioning of quantities into equal parts.
• The student will create and use representations to organize, record, and communicate mathematical ideas to peers and teachers.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">No new words are introduced.</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">equal share, fraction bars</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 21-30)
• 5 different colored markers or pencils</td><td>• Student Booklet (pp. 11-15)
• Different colored markers or pencils (8 per student)
• Talk and Share-1 Whole Cards (2 per student pair)</td></tr>
</table>

Preview

Say: **Today we will model fractions equal to 1.**

Engage Prior/Informal Knowledge — Time: 3 min

Review equal sharing that results in a non-unit fractional share less than 1. Have students complete the *Engaged Practice*.

Say: **Let's read the problem together. Ready, read: "Kathy has 5 mini-pies and 7 friends to share with. If Kathy gives an equal share to herself and her friends, what portion of a whole pie will each person receive?"**

We want to share these 5 mini-pies between 8 people. What are we looking for? *(how much of a whole pie each person will get)*

Will anyone receive a whole pie? *(no)* **Why not?** *(there are not enough pies, that would not be an equal share)*

Let's color each pie a different color so we can see where each piece goes as we pass it out.

What should we do next? *(divide the circles/pies into 8 equal parts)*

Divide the circles or pies into 8 equal parts because we are sharing the circles between 8 people.

Teacher Note

Instruct the students with a simple way to divide a circle into eighths: draw an addition sign in the circle and then a multiplication sign in the circle. That will make 8 equal parts.

Say: **What is the name of each equal part?** *(one-eighth)*

The circle or pie at the bottom represents 1 friend's portion of the pies. Go ahead and divide that circle into eighths so we can record his or her portion of the 5 pies.

In the circle representing the friend's equal share, shade in one-eighth for each circle being shared. Use the same colors of the circles you already shaded.

How much will each person get from the first whole circle? *(one-eighth)*

How much from the second whole circle? *(one-eighth)*

Continue to shade one-eighth from each of the circles left.

How much of a circle is in each equal share? Let's count the equal parts together: one-eighth, two-eighths, three-eighths, four-eighths, five-eighths.

How much is 1 friend's equal share? *(five-eighths of a circle)*

Each friend will get five-eighths of a circle.

Write "$\frac{5}{8}$ of a pie" at the bottom of the page on the "Friend's Equal Share" line.

Modeled Practice — Time: 8 min

1. Model the concept of equal shares in a situation requiring fractional shares that equal 1.

   Have students turn to the *Modeled Practice Sheet* in their Student Booklet. The teacher and student will complete the steps together as the lesson progresses.

Say: **Let's read together. Ready, read: "4 students want to share 4 candy bars so that each person gets the same amount. How much does each student get?"**

We have been using equal shares to solve problems like this in previous lessons, but can you figure out the answer in your head? *(each student gets 1 chocolate bar)*

Each student would get 1 whole chocolate bar.

Teacher Note
If students do not provide this answer on their own, model the situation using equal sharing with concrete materials.

Say: **Now there are 4 different flavors of chocolate bars: milk chocolate, white chocolate, dark chocolate, and chocolate with nuts. Each chocolate bar is the same size. The 4 students want to equally share the different flavors of chocolate bars.**

If each student wants an equal part of each chocolate bar, how can we divide, or equally share, the 4 different chocolate bars? *(divide each bar into fourths or 4 pieces or parts)*

We divide each bar into 4 equal parts, or fourths.

If each student gets one-fourth of each chocolate bar, how much will each student get altogether?

Let's draw a picture and count the equal parts to find out how much each student will get altogether. Draw 4 rectangles to represent 4 chocolate bars.

Divide each rectangle into 4 equal parts.

Watch For 	**Students may have difficulty drawing pieces that are the same size. Remind students that their drawing is a model, which means it *represents* 4 equal parts, even if it does not have equal divisions.**

Say: **Draw another rectangle below the 4 chocolate bars. This rectangle will be 1 student's share. Label this rectangle with your name and pretend that you are one of the students and it is your share. Divide the rectangle into fourths because you will receive fourth-sized pieces.**

This rectangle will represent the share that you will get. Each student gets a $\frac{1}{4}$ piece from each of the chocolate bars.

How much will each person get from the milk chocolate bar? *($\frac{1}{4}$ of a chocolate bar)*

Shade the first piece of the rectangle with a colored pencil.

How much from the white chocolate bar? *($\frac{1}{4}$ of a chocolate bar)*

Shade the second piece of the rectangle in a different color.

How much from the dark chocolate bar? How much from the chocolate bar with nuts? *($\frac{1}{4}$ of a chocolate bar each)*

Shade the remaining 2 pieces of the rectangle using a different color to represent each chocolate bar.

Now let's count to see how much each student gets. Count with me: one-fourth, two-fourths, three-fourths, four-fourths. How much is the equal share? *(four-fourths of a chocolate bar)*

Look at the equal share of chocolate bars. Four-fourths is the same as 1 whole chocolate bar.

How much is the equal share? *(four-fourths, or 1 whole chocolate bar)*

Write "four-fourths or $\frac{4}{4}$ or 1 whole chocolate bar" on the "Equal Share" line.

2. Model the concept of fractional equal shares.

Say: **If 3 children want to share 3 grilled cheese sandwiches equally, how much sandwich does each child get?** *(1 grilled cheese sandwich each)*

What if we have 3 different flavors sandwiches but all the same size: 1 turkey, 1 ham, and 1 roast beef? If each child wants a part of each sandwich, how can we divide the 3 sandwiches?

Refer students to the *Practice Sheet*.

Practice — Time: 8 min

Activity 1: Students will continue to work on the sandwich problem on the *Practice Sheet*.

Teacher Note
If students are having difficulty drawing equal shares, have them work with fraction bars to gain a better understanding of the sharing process.

Say: **How much of the turkey sandwich will each child get?** *(one-third of a turkey sandwich)*

How much of the ham sandwich will each child get? *(one-third of a ham sandwich)*

How much sandwich will each child get? [have students count: one-third, two-thirds, three-thirds] *(three-thirds)*

Does each child get the same amount to eat as if they each got 1 whole sandwich? *(yes)*

How do you know? *(1 sandwich and three-thirds of a sandwich are the same amount)*

Tell me how you used your drawing to represent the items and the children. *(answers will vary; ensure that students are voicing how they set up their drawing and how they shared the items)*

Have students work on the second problem independently. Then allow students to discuss their answer and compare pictures with a partner.

Say: **Why might someone think, when looking at this problem, that Ann Marie has more cake?** *(she has 3 pieces instead of just 1 piece)*

Activity 2: Students will play *Talk and Share* with a math partner using the ***Talk and Share-1 Whole Cards***. Each student draws a game card that shows a sharing scenario. Students draw a picture to solve each sharing scenario. Students verbalize their reasoning as they model the problem solutions.

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as much as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 4

Modeling Fractions Greater than 1

Lesson Objectives	• The student will model fractions greater than 1 with equal shares and fraction bars. • The student will apply the term "equal share" to the partitioning of quantities into equal parts. • The student will listen to peers and teachers to solve problems using steps and strategies and discuss how they solved.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	equal share, fraction bars, unit fraction	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 31-46) • Whiteboard with marker • Circle models: 5 wholes, 1 set of $\frac{1}{4}$, 5 sets of $\frac{1}{6}$ • Fraction bars: 4 wholes, 4 sets of $\frac{1}{3}$ • 6 different colored markers or pencils	• Student Booklet (pp. 16-23) • Fraction bars: 3 wholes, 3 sets of $\frac{1}{2}$ per pair • *Talk and Share*-More than 1 Cards (3 per student pair) • Different colored markers or pencils (6 per student)

Preview

Say: **Today we will model equal sharing of fractional amounts greater than 1 using fraction bars.**

Engage Prior/Informal Knowledge — Time: 3 min

Review equal share scenarios resulting in different types of fractional shares. Have students turn to the ***Engaged Practice Sheet*** in their Student Booklets. Discuss each scenario and answer as a group.

Ask questions such as:

- How many people are sharing? How many objects are being shared? *(answers will vary)*
- Into how many pieces is each object divided? *(answers will vary)*
- How would we draw the equal share? *(answers will vary)*

Modeled Practice — Time: 8 min

1. Model the concept of equal shares in a situation requiring fractional shares that are greater than 1.

Have students turn to ***Modeled Practice Sheet #1*** in their Student Booklet. Put 4 whole fractions bars on the table. Have 1 thirds fraction bar ready to use. On a whiteboard on the table draw 3 stick figures to represent the students. The teacher and students will complete the steps together as the lesson progresses.

Say: **Let's read the problem together. Ready, read: "4 bars of clay are shared equally between 3 students. How much clay did each student receive?"**

What is the question asking you to find? *(how much of the 4 bars of clay each student gets)*

Look at the 4 rectangles on your page. Each rectangle represents a bar of clay. Is there enough clay for each student

to receive 1 full bar? *(yes)* **How do you know?** *(there are 4 bars and only 3 students)*

Have a student volunteer distribute 3 fraction bars to the 3 stick figures on the whiteboard.

Will each student receive more than 1 whole bar of clay? *(yes)* **How do you know?** *(after passing out 3 bars of clay, 1 for each student, there is 1 more bar of clay left over)*

What should we do with that bar of clay? *(divide it between the 3 students)*

Draw 1 student share on your paper under the 4 rectangles of clay. Draw 1 rectangle to represent the 1 bar of clay each student will receive, then shade it in. Draw a second rectangle to represent the portion of a second bar of clay each student will receive.

Will each student receive 2 whole bars of clay? *(no)*

How many equal parts should we divide the last bar of clay into? *(3)* **Why?** *(there are 3 students)*

Have students help trade in the last fraction bar for 1 with 3 pieces.

Say: **Divide the last rectangle. How can you show the portion of the equal share for the student?** *(divide the second rectangle for the student's share into thirds and shade one-third)*

Next have a student distribute the pieces from the last fraction bar to each student (stick figure) one at a time.

Say: **What is the equal share for each student?** *(1 $\frac{1}{3}$ bars of clay)*

Teacher Note
Make sure students name the unit each time they give the amount of an equal share or piece of a whole.

Say: **Write the equal share on the line.**

2. Model the same situation with the result in an improper fraction. Compare it to the mixed fraction.

Have students turn to ***Modeled Practice Sheet #2.*** Collect the 4 whole fractions bars. Have 4 thirds fraction bars ready to use and the colored pencils. Keep the whiteboard on the table with the 3 stick figures on it to represent the students.

Say: **Let's read the next problem together. Ready, read: "4 different colored bars of clay are shared equally among 3 students so that each gets the same amount of each color. What portion of the 4 clay bars does each student get?"**

What is different about this problem? *(each bar of clay needs to be shared equally)*

If there are 3 people sharing, how can we divide each bar of clay so it can be shared equally? *(divide each into 3 pieces)* **Divide each bar into thirds.**

Have students help trade in each bar for 1 with 3 pieces.

Say: **If each student gets one-third of each bar of clay, how much clay will each student get altogether? Let's distribute the equal parts.**

Have a student distribute the pieces from each bar to each student (stick figure) one at a time.

Say: **Now we can count to see how much each student receives. Count with me: one-third, two-thirds, three-thirds, four-thirds. How much is the equal share?** *(four-thirds)* **What is the unit?** *(bars of clay)*

How many thirds make 1 whole bar? *(3)* **Does each student get more or less than 1 whole bar?** *(more)*

Draw the fraction bar. This rectangle will represent the equal share that each student gets. Each student gets a one-third equal part from each of the bars of clay.

Divide the rectangle into 3 pieces. Why? *(we are sharing with 3 students)*

Shade each one-third piece of the rectangle using a different color to represent each bar of clay. Repeat for the first 3 bars.

The first bar is full, but we haven't shared the fourth bar of clay. What do you think this means? *(answers vary; example answer: each student gets more than 1 whole bar of clay)*

Each student gets more than three-thirds, or 1 whole bar of clay, since we still have 1 more bar to share. Draw a second bar of clay for the student. How will you divide this bar? *(into thirds)*

How much of this bar will you shade? *(1 of the 3 equal parts)* **Why?** *(because each student will receive one-third of the last bar of clay)*

Now we can count to see how much each person receives. Count with me: one-third, two-thirds, three-thirds, four-thirds. How much is the equal share? *(four-thirds bars of clay)*

Write "four-thirds, $\frac{4}{3}$ bars of clay" on the "Equal Share" line.

Do the students receive the same amount of clay as they did the first time we shared it equally? *(yes)*

Is $1\frac{1}{3}$ the same as $\frac{4}{3}$? *(yes)*

3. Model the concept of fractional equal shares.

Have students turn to ***Modeled Practice Sheet #3***. The teacher and students will complete the steps together as the lesson progresses.

Say: **Let's read the problem together. Ready, read: "6 sticks of taffy are shared equally with 4 children. How much will each child receive?"**

The 6 sticks of taffy are each a different flavor. If each child wants a piece of each flavor, how can we divide the taffy equally? *(divide each stick into 4 pieces, give each child one-fourth of each stick)*

These rectangles represents the sticks of taffy. Divide the rectangles into equal parts. How many equal parts? *(4)*

Draw another rectangle below to represent the equal share each child will receive of taffy. Into how many equal parts will you divide the child's share? *(4 equal parts)*

Shade the child's share to represent the share of the first taffy stick. How much will you shade? *(one-fourth of a stick)*

Shade the part for the second stick with a different color. How much? *(one-fourth of a stick)*

Shade the part for the third stick. How much? *(one-fourth of a stick)*

Shade the part for the fourth stick. How much? *(one-fourth of a stick)*

We have shaded in 1 full rectangle. Is there more to share? *(yes)* **What can we do?** *(draw a second rectangle)* **Draw a second rectangle and divide it into fourths so you can continue to show how many fourths each child will receive.**

Keep shading portions, each with a different color, until each part of each taffy has been shared.

How much is that all together? Let's count: one-fourth, two-fourths, three-fourths, four-fourths, five-fourths, six-fourths. How much? *(six-fourths of a stick of taffy)*

Each child receives six-fourths of a stick of taffy, one-fourth from each of the 6 sticks.

Write "six-fourths or $\frac{6}{4}$ sticks of taffy" on the "Equal Share" line.

Did each child receive more than 1 whole stick? *(yes)* **How much more?** *(two-fourths more)*

Is there another way to write or think of six-fourths? *(yes, 1 and two-fourths or 1 and one-half)*

Practice Time: 8 min

Activity 1: Students will complete the activity on the ***Practice Sheet*** on page 20 with a math partner.

Say: **Work with your math partner to complete the problem on your sheet.**

Ask questions and give instructions such as:

- How many items are being shared? *(3, 5)* How many people are sharing? *(2, 3)*
- Tell me how you used your drawing to represent the items and the people. How can you use your drawing to also find the equal share? *(answers will vary; ensure that students are voicing how they set up their drawing and how they shared the items)*
- How much is the equal share? *(three-halves sandwiches; six-fifths hotdogs)*

Activity 2: Students will play *Talk and Share* with a math partner using the ***Talk and Share-More than 1 Cards***. 1 student in the pair draws a card with a fractional scenario on it. That student will direct the other student on how to physically model the solution to the scenario without showing or reading the card. Students switch roles after each card.

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets.*** Tell students to complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as much as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Ordering, & Comparing Fractions
Lesson 5

Modeling Fractions Greater than 1 With Computation

Lesson Objectives	• The student will model fractions greater than 1 with drawings and computation. • The student will create and use representations to organize, record, and communicate mathematical ideas with peers and teachers.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	equal share, unit fraction	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 47-60) • 3 different colored markers or pencils	• Student Booklet (pp. 24-31) • Different colored markers or pencils (3 per student) • *Talk and Share* - Mixed Cards (4 per student pair)

Preview

Say: **Today we will describe equal sharing scenarios with fraction bar models using computation equations.**

Engage Prior/Informal Knowledge — Time: 3 min

Review equal share scenarios which may result in fractional shares that are greater than 1. Have the students turn to the *Engaged Practice Sheet*.

Say: **Look at the pictures, A, B, C and D, the shaded part represent one equal share. These pictures match the equal share scenarios. Match the scenario with the equal share picture.**

Ask questions such as:

- How many objects are shared in the story? How many people are sharing? *(answers will vary)*
- How much is an equal share? (have students count: one-third, two-thirds…) *(answers will vary)*
- What is the unit? *(answers will vary)*

Modeled Practice — Time: 8 min

1. Model the concept of equal shares in a scenario requiring fractional shares that are greater than 1.

   Have students turn to ***Modeled Practice Sheet #1*** in their Student Booklet. The teacher and students will complete the steps as the lesson progresses.

Say: **Let's read together. Ready, read: "4 sandwiches are shared equally among 3 students, so each student gets the same amount. How many sandwiches does each student get?"**

How many students are sharing? *(3)* **How can we divide each sandwich so it can be shared equally among the 3 students?** *(divide each into 3 pieces)*

These 4 rectangles on the page represent the 4 sandwiches. Divide the rectangles into thirds. Color each sandwich a different color so we can record the sandwiches being shared.

Draw a rectangle to represent an equal share 1 student will receive. How much of the first sandwich will each student receive? *(one-third)*

How can you show one-third in your drawing? *(divide the rectangle into thirds and shade 1 of the equal parts)*

We will shade the equal parts from each sandwich with a different color.

How much from the first sandwich? *(one-third)* **How much from the second sandwich?** *(one-third)* **How much from the third sandwich?** *(one-third)*

How much from the fourth sandwich? *(one-third)* **Can you shade another third of the rectangle?** *(no)* **Why not?** *(the whole rectangle is already shaded)* **What does this mean for the amount of sandwich each student receives?** *(each student will receive more than 1 whole sandwich)*

To represent the equal share of more than 1 whole we need to draw another rectangle. How many equal parts will this rectangle have? *(3)* **Why?** *(it has to represent thirds)*

Draw and shade in the last equal part.

Let's count to see what portion of the sandwiches each student receives. Count with me: one-third, two-thirds, three-thirds, four-thirds. How much is each equal share? *(four-thirds sandwiches)*

Write "four-thirds or $\frac{4}{3}$" on the "Equal Share" line.

There is another way to write and read this fraction. How many whole sandwiches does each student receive? *(1)* **What fraction of a second sandwich does each student receive?** *($\frac{1}{3}$)*

So we can also say each student received 1 and $\frac{1}{3}$ sandwiches. Write "one and one-third or 1 $\frac{1}{3}$" on the "Equal Share" line.

We could also write an addition sentence to describe the equal share. How much of a sandwich is represented by the first shaded piece? *(one-third)* **By the second shaded piece?** *(one-third)*

Write "$\frac{1}{3}$" below the first shaded piece in the corresponding color. Continue with each of the four shaded pieces.

What symbol do we use to show addition? *(addition sign)* **Let's use an addition sign to show we add each equal part to find the total amount.**

Write an addition symbol between each fraction, followed by an equals sign.

Read the addition equation: one-third plus one-third plus one-third plus one-third equals…

What is the total amount of the equal share? *(four-thirds)*

Write "$\frac{4}{3}$" following the equals sign.

What is the unit? *(sandwiches)* **Write "sandwiches" on the "Equal Share" line.**

The equal share is four-thirds sandwiches. We found this first by counting the pieces that made up the equal share. Then we wrote an addition equation to show the equal share.

2. Model the concept of fractional equal shares. Draw pictures of the fraction bars.

   Have students turn to ***Modeled Practice Sheet #2***. The teacher and student will complete each step together as the lesson progresses.

Say: **Let's read together. Ready, read: "7 brownies are shared with 2 friends and each friend wants the same amount. How many brownies does each friend get?"**

Are there enough brownies for each friend to get 1 whole brownie? *(yes)* **Are there enough for each friend to get 2 whole brownies?** *(yes)* **3 whole brownies?** *(yes)* **4 whole brownies?** *(no)* **Why?** *(because there is only 1 brownie left and 2 friends to share it)*

So far each friend will be able to get 3 whole brownies. How should we divide the remaining brownie? *(in half)* **Why?** *(because there are 2 friends)*

How many brownies will each friend get altogether? Draw a picture to represent the equal share.

We will draw 1 friend's equal share. How many whole brownies will you draw? *(3)* **Draw 3 whole brownies.**

What portion of the last brownie will each friend get? *(half)* **How can you represent one-half?** *(draw a rectangle, divide it in half and shade 1 part)*

These rectangles will represent the share that each friend gets.

Write the equal share each student gets. *(three and one-half or $3\frac{1}{2}$ brownies)*

Each friend gets 3 whole and one-half pieces of brownie.

Practice **Time: 8 min**

Activity 1: Have student write an equation for the problem from ***Modeled Practice Sheet #2***. Provide prompts as needed.

Say: **Now let's count the brownies halves each friend receives. How many halves in 1 brownie?** *(2)* **Ready, count: one-half, two-halves, three-halves, four-halves, five-halves, six-halves, seven-halves."**

How many halves is the equal share? *(seven-halves brownies)*

What is another way to write or think of seven-halves? *(3 and one-half)*

Write an addition equation for the number of halves. *($\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}=\frac{7}{2}$)*

Does this equation represent what we counted? *(yes)*

Have students complete a problem on the ***Practice Sheet*** on page 28.

Ask questions and give instructions such as:

- How many items are being shared? *(5)* How many people are sharing? *(4)*
- Tell me how you used your drawing to represent the items and the people sharing. How did you use your drawing to show the equal share? *(answers will vary; ensure that students are voicing how they set up their drawing and how they shared the items)*
- How much is the equal share? *(five-fourths or one and one-fourth chocolate bars)*
- How does the addition equation represent the model? *(each fraction in the equation represents 1 of the shaded pieces in the picture)*

Activity 2: Students will play *Talk and Share* with a math partner using ***Talk and Share – Mixed Cards***. Students take turns drawing cards in an attempt to match a sharing scenario with the model or addition sentence that represents the scenario. Students verbalize how they know a pair is or is not a match.

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Ordering, & Comparing Fractions
Lesson 6

Multiple Representations of a Whole

Lesson Objectives	• The student will generate various representations of a fraction using fraction bars. • The student will write addition equation that represent concrete models. • The student will communicate mathematical thinking using precise vocabulary coherently and clearly with peers and teachers.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	equal share	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 61-70) • Whole Fraction Mat • Fraction bars: 1 set each of 1 whole, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$	• Student Booklet (pp. 32-36) • Fraction bars: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$ (1 set per student) • Whole Fraction Mat • Fractional Share Cards (4 per student pair)

Preview

Say: **Today we will use fraction bars to represent fractions that are equal to 1 whole.**

Engage Prior/Informal Knowledge — Time: 3 min

Have students model an equal share equivalent to more than 1 whole using fraction bars. Distribute a whiteboard and marker along with fraction bars to each student.

Say: **With your fraction bars show 1 whole made out of sixths.**

If 6 friends shared 8 cookies equally, how much is each equal share? Use your fraction bars to show the equal share.

Ask questions such as:

- Would everyone get 1 whole cookie? *(yes)*
- Would each equal share be more than 1 whole? *(yes)* How much more? *($\frac{2}{6}$)*
- Write the addition equation for the equal parts of 1 equal share? ($\frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{8}{6}$)
- How much is each equal share? ($\frac{8}{6}$) What is another way to write this fraction? *($1\frac{2}{6}$)*

Modeled Practice **Time: 8 min**

1. Model various ways to represent the same fractional amount, showing how many ways to share 1 whole sandwich.

Distribute the ***Whole Fraction Mat*** to each student. The teacher and student will complete the steps together as the lesson progresses. Point to the rectangle on the fraction mat. Have fraction bar pieces ready for use.

Say: **This model represents 1 whole sandwich. We want to find different ways to divide the sandwich.**

Sandy, Lizbeth, and Joseph are going to share a sandwich. How can they share it equally? *(divide the sandwich into 3 parts or thirds)*

How many third-sized parts are equal to a whole sandwich? *(3 parts)*

Use your fraction bars to represent 3 thirds.

Let's count the parts together: one-third, two-thirds, three-thirds. How could we describe the parts using an addition equation? *(one-third plus one-third plus one-third equals three-thirds)*

Write the addition equation on your whiteboard. ($\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{3}{3}$)

Another friend, Aiden, arrived and would like some sandwich. How can they equally share the sandwich between 4 people now? How many fourth-sized parts are equal to a whole sandwich? *(4 parts)*

Model this scenario with your fraction bars. Write the addition equation after building the whole. ($\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{4}{4}$)

We have found 2 different ways to divide 1 whole sandwich. The size of the thirds and the size of the fourths are different but they still cover the same rectangle or 1 whole sandwich.

Write "$\frac{3}{3} = \frac{4}{4} = 1$ whole" on your whiteboard.

Watch For	**Students may have difficulty understanding how 2 fractions such as 3/3 and 4/4 can represent the same amount. Use one-fourth parts and one-third parts to cover the whole. Discuss how 4 one-fourth parts, or four-fourths, is the same amount as 3 one-third parts, or three-thirds.**

2. Model various ways to represent the same fractional amount, showing how many ways to share 1 sandwich.

   Have students turn to the ***Modeled Practice Sheet*** in the Student Booklet. The teacher and student will complete the steps together as the lesson progresses.

Say: **Let's read the problem together. Ready, read: "Marcia ordered a sandwich, but only ate half. The next day she decided to share the remaining half of her sandwich with 2 friends. She cut the half of the sandwich into thirds to share with her friends and herself. What portion of the whole sandwich did Marcia's friends receive?"**

We will use our fraction bars to find the size of the portion her friends got. First we will start with 1 whole. Place 1 whole fraction bar in front of you.

How much of her sandwich did Marcia eat the first day? *(one-half)* **Cover half of the whole fraction bar with a half fraction bar.**

On the next day we cut the half into 3 equal parts. Does this mean the whole sandwich was cut into thirds? Place the third pieces on the half bar that is not covered. Do they fit? *(no)*

Experiment with your fraction bars until you find 3 equal pieces that will fit onto the half.

Which size pieces did you find? *(one-sixth)*

How many $\frac{1}{6}$ parts fit on $\frac{1}{2}$ of the sandwich? Let's count together: one-sixth, two-sixths, three-sixths. How many sixths cover $\frac{1}{2}$? *(three-sixths)*

$\frac{3}{6}$ covers $\frac{1}{2}$ of the sandwich, which means $\frac{1}{2}$ and $\frac{3}{6}$ represent the same amount. Let's write an addition equation to represent all the parts that equal the whole sandwich.

How much did Marcia eat the first day? *($\frac{1}{2}$)* **Then what fraction represents the remaining half of the sandwich after Marcia divided it for her friends?** *($\frac{3}{6}$)* **Write "$\frac{1}{2} + \frac{3}{6}$ = 1 whole sandwich" on the line below.**

These parts of the sandwich all add up to 1 whole sandwich.

Practice Time: 8 min

Activity 1: Have students work in pairs to share $\frac{1}{2}$ of the sandwich using one-eighth parts, then write the addition equation represented by their model. Then on the *Practice Sheet* on page 33 have students work independently to divide a whole sandwich into sixths, then half of a sandwich into fourths.

Say: **There are many different ways we can share a whole sandwich. With your math partner use your fraction bars to find a way to share $\frac{1}{2}$ of the sandwich using one-eighth parts. Then write the addition equation.**

Ask questions such as:

- How do you know when you have used the right number of parts to divide the sandwich? *(the entire area of the whole is covered)*
- How do you know each group of parts represents the same amount? *(each group of parts covers the same rectangle, which represents 1 whole sandwich)*

Activity 2: In pairs, have students determine whether the fractional parts described by the addition expressions would equal 1 whole sandwich. Students will take turns using the fractional parts described to cover the whole on their ***Whole Fraction Mat.***

Write the following addition expressions on the whiteboard:

- $\frac{1}{2}+\frac{1}{3}+\frac{1}{3}+\frac{1}{3}$
- $\frac{1}{2}+\frac{1}{4}+\frac{1}{4}$
- $\frac{1}{2}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}$
- $\frac{1}{3}+\frac{1}{3}+\frac{1}{3}$
- $\frac{1}{2}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}$

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

ESTAR INTERVENTION

25

Total Time: 25 minutes
Instructional Time: 19minutes
Independent Practice: 6 minutes

Module: Building, Ordering, & Comparing Fractions
Lesson 7

Placing Fractional Shares on the Number Line

Lesson Objectives	• The student will locate and place points on the number line. • The student will translate an equal share represented by a bar model into a location on the number line. • The student will select, apply, and translate among mathematical representations to solve problems.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	equal share, fraction bars, number line	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 71-84) • 5 different colored markers or pencils	• Student Booklet (pp. 37-43) • Different colored markers or pencils (5 per student) • *Talk and Share* Cards (2 per student pair) • Whiteboard with marker (1 per student)

Preview

Say: **Today we will show each equal share using a number line.**

Engage Prior/Informal Knowledge — Time: 3 min

Have students divide the number line into halves, fourths, and eighths. Have students turn to the *Engaged Practice Sheet*.

Say: **The number line on your sheet is from 0 to 2. Today we will be finding numbers that are between whole numbers.**

Put your finger on 0 and another finger on 1. With your eyes find the halfway point between your 2 fingers.

Draw a hash mark, a short line, where you think halfway between 0 and 1 would be on the line. What fraction should we use to label this hash mark? *($\frac{1}{2}$)* **Label it.**

Put your fingers on 1 and 2. With your eyes find the halfway point. Draw a hash mark halfway between 1 and 2.

Let's count the halves: 0 to $\frac{1}{2}$ is one-half, $\frac{1}{2}$ to 1 is two-halves, 1 to the next hash mark is three-halves. Label this hash mark $\frac{3}{2}$. Can we also label with the whole number and fraction? *(yes, $1\frac{1}{2}$)*

Continue to count the halves. How many halves in all? *(four-halves)*

As time allows, walk students through dividing each half in half again to find fourths. Then have the students label the fourths. 1 option is to stop at four-fourths if time runs out.

Modeled Practice **Time: 8 min**

1. Model the placement of a fractional share on the number line using fraction bar drawings.

   Have students turn to ***Modeled Practice Sheet #1*** in their Student Booklet. The teacher and students should complete the steps together as the lesson progresses.

Say: **Read the problem together. Ready, read: "3 sandwiches are shared equally among 8 students. What portion of a sandwich does each student get?"**

The rectangle below represents 1 whole sandwich. How many students are sharing sandwiches? *(8)* **How many equal parts will we divide the sandwich into?** *(8)* **Divide the rectangle.**

Teacher Note
A simple way to divide the rectangle or number line into eighths is to divide it in half, then divide each half in half, then each of those halves into half. The students should divide the rectangle into 8 vertical pieces so that the pieces transfer directly to the pieces on the number line.

Say: **Below the rectangle is a number line. We will use this number line to show the length of an equal share of the sandwiches. On 1 end is 0, and at the other end is 1. The length from 0 to 1 represents the length of 1 whole sandwich.**

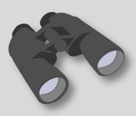
Divide the number line in the same places you divided the rectangle representing the sandwich above it. How many equal parts did you divide the number line into? *(8)*

What portion of a sandwich would each of the 8 students receive from the first sandwich? *(one-eighth)*

Each of the 8 students receives one-eighth of the first sandwich we divided.

Shade $\frac{1}{8}$ of the rectangle, and shade from 0 to $\frac{1}{8}$ above the number line using the same color.

How much of the length between 0 and 1 have we shaded on the number line? *(one-eighth)* **Write "$\frac{1}{8}$" below the hash mark to which you have shaded.**

Watch For 	**Students may struggle to associate the fraction name at the hash mark with the shaded distance along the number line from zero. Stress that $\frac{1}{8}$ is the distance from 0 to the hash mark, not the position of the hash mark.**

Say: **How much of a sandwich would each of the 8 students receive from the second sandwich?** *(one-eighth)*

Each of the 8 students receives one-eighth of the second sandwich.

Shade another $\frac{1}{8}$ of the rectangle with a different color, and trace $\frac{1}{8}$ on the number line using that same color.

How much of the length between 0 and 1 have we shaded on the number line in all? Let's count: one-eighth, two-eighths of the sandwich. How much? *(two-eighths)* **Write "$\frac{2}{8}$" below the hash mark to which you have shaded.**

How much of a sandwich would each of the 8 students receive from the third sandwich? *(one-eighth)* **Shade one-eighth of the rectangle, and trace one-eighth on the number line using the same color.**

How much of the length between 0 and 1 have we shaded on the number line total? Let's count: one-eighth, two-eighths,

three-eighths of the sandwich. How much? *(three-eighths)* **Write "$\frac{3}{8}$" below the hash mark to which you have shaded.**

How much is an equal share of the sandwiches? *(three-eighths of a sandwich)*

Write "$\frac{3}{8}$ of a sandwich" on the "Equal Share" line.

We have represented the equal share of the sandwiches in 2 different ways with a picture of a fraction bar and on the number line. Both represent an equal share of the sandwiches.

2. Model fractional shares on a number line.

   Have students turn to ***Modeled Practice Sheet #2***. The teacher and students should complete the steps together as the lesson progresses.

Say: **Let's read the problem together. Ready, read: "5 feet of rope needs to be cut into 3 equal pieces. What is the length of each equal part?"**

Look at the number line. What length does the number line represent? *(0 to 2)*

How many equal parts will the rope be cut into? *(3 equal parts)*

This number line will represent the length of 1 of the equal parts. How should we divide each foot of the number line? *(divide each foot represented by the number line into 3 equal parts)*

Each foot of the 5-foot rope will be divided into thirds.

Use hash marks to divide the number line into 3 pieces from 0 to 1, then another 3 pieces from 1 to 2.

How much would 1 share be from the first foot of the rope? *(one-third)*

The first piece of the number line represents one third. Shade along the first piece, and label the hash mark "$\frac{1}{3}$."

The second piece of the number line represents a piece from the second foot of the rope. Shade and label the hash mark "$\frac{2}{3}$."

The third piece of the number line represents a piece from the third foot of the rope. Shade and label the hash mark "$\frac{3}{3}$."

There are 2 more feet of rope cut into thirds. Shade and label the number line to represent a piece from each of those feet.

How many thirds have we shaded and labeled on the number line? *($\frac{5}{3}$)*

Are the equal parts of the 5-foot rope more than 1-foot? *(yes)* **How do you know?** *(we shaded more than 1 on the number line)*

How many more thirds than 1 is the equal part? *(2 more thirds)*

The equal part of the 5 foot rope cut into 3 equal parts in $\frac{5}{3}$ or $1\frac{2}{3}$.

Write "$\frac{5}{3}$ or $1\frac{2}{3}$ feet of rope" on the "Equal Share" line.

Practice Time: 8 min

Activity 1: Students will complete the *Practice Sheet* on page 40 with a partner. Have students discuss whether the number line shown is correct, and then draw a number line that shows the equal share.

Say: **With your math partner complete the problems on the sheet. Discuss with your partner if the number line is correct. If it is not correct, draw the correct number line to represent the equal share.**

Helpful hints:

- Think of the 3 miles as 3 objects (like 3 candy bars). Think of the 4 water stops as the 4 people sharing.

- Rachel and Sydney are how many people? *(2)* How many sandwiches are they sharing? *(3)* Will each person get at least 1 whole sandwich? *(yes)* Why? *(because there are more sandwiches then people)*

Activity 2: Students will play *Talk and Share* in pairs. Each student draws a ***Talk and Share Card*** that shows a sharing scenario. Students will draw a picture to solve each sharing scenario on whiteboards or paper. Students verbalize their reasoning as they model the problem solutions.

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Ordering, & Comparing Fractions
Lesson 8

Placing Fractions on the Number Line

<table>
<tr><td rowspan="1">Lesson Objectives</td><td colspan="2">• The student will name lengths on a number line using fractions between 0 and 2.
• The student will use mathematically precise language to reason about the location of fractions in relation to benchmarks.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">numerator: the number on the top of a fraction that represents the number of fractional parts
denominator: the number on the bottom of a fraction that represents the number of equal parts into which the whole is divided</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">equal share, number line</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 85-98)
• 2 colored markers or pencils</td><td>• Student Booklet (pp. 44-50)
• Different colored markers or pencils (2 per student)
• Laminated number line (1 per student pair)
• Fraction bars (1 whole set per student pair)</td></tr>
</table>

Preview

Say: **Today we will place fractions on the number line by analyzing the *numerator* and *denominator*.**

Engage Prior/Informal Knowledge **Time: 3 min**

Have students label hash marks for different number lines on the *Engaged Practice Sheet*.

Say: **On your sheet, the first number line has been divided into equal parts. Start at 0 and move your finger along the line to count the number of parts the line is divided into.**

Ready, count: 1, 2, 3. How many equal parts? *(3)* **What fractional part of the number line is each part?** *(one-third)*

Let's label each of the equal parts. If the first hash mark is at 0, what fractional part of the line does 0 represent? *(zero-thirds)* **Write "$\frac{0}{3}$" under the 0 hash mark.**

The next hash mark represents what portion of the number line? *(one-third)* **Write "$\frac{1}{3}$" under the hash mark.**

What would we label the next hash mark? *($\frac{2}{3}$)* **Label it. And the last hash mark, 1 whole?** *($\frac{3}{3}$)* **Label it.**

Use the same mathematical language to label the next 2 number lines on the sheet. Make sure students count the distance from 1 hash mark to the next and not just the hash marks. Also make sure students label the 0 hash mark and the 1 whole hash mark.

Modeled Practice **Time: 8 min**

1. Model a strategy for placing a fraction on the number line – $\frac{7}{8}$ of a mile.

   Have students turn to ***Modeled Practice Sheet #1*** in their Student Booklet. Prompt students to read along.

Say: **Jason ran $\frac{7}{8}$ of a mile. Where is this length located on the number line?**

Look at the number line. What does the length from 0 to 1 represent? *(1 mile)*

The distance from 0 to 1 represents 1 mile. The distance from 1 to 2 also represents 1 mile. What distance does the number line represent from 0 to 2? *(2 miles)*

The length from 0 to 2 represents 2 miles.

In order to place $\frac{7}{8}$ of a mile on the number line, we must first determine how to divide the number line. Is $\frac{7}{8}$ greater or less than 1? *(less than 1)*

We know that $\frac{8}{8}$ is the same as 1 whole so $\frac{7}{8}$ is less than 1. Do we need to divide the number line from 0 to 2 or 0 to 1? *(divide the number line between 0 and 1)* **Why?** *($\frac{7}{8}$ is less than 1)*

The number on the bottom of the fraction, or the *denominator*, represents the number of equal pieces the whole is divided into. When we divide an amount into equal shares, the *denominator* represents the number of sharers because each sharer gets 1 piece of the whole.

What is the *denominator* of the fraction $\frac{7}{8}$? *(8)*

The *denominator* tells us how the whole amount is being shared. How will we divide the whole amount? *(into 8 equal parts)*

Watch For	Students may divide the whole using 8 hash marks instead of creating 8 equal parts, which only requires 7 hash marks. Make sure students count the parts in the whole to confirm they have the right number.

Say: **Divide the number line into 8 equal parts using hash marks.**

Teacher Note
Some students may have trouble dividing the whole into 8 equal pieces. Help them use halving to divide the whole into approximately equal sections: divide the whole in half, then each half in half, and finally, each quarter in half.

Say: **How much is 1 piece of a whole that has been divided into 8 equal pieces?** *(one-eighth)*

Write "$\frac{1}{8}$" below the first hash mark.

As we move to the right we add another eighth each time, so we can count up by eighths. Count with me: one-eighth, two-eighths, three-eighths, four-eighths, five-eighths, six-eighths, seven-eighths.

Write each fraction under the hash mark.

Watch For	Students may incorrectly write the numerator and the denominator when writing fraction names. For example, students may write "$\frac{8}{7}$" instead of "$\frac{7}{8}$." Show students the representations of both fractions to demonstrate the difference.

Say: **Look at the fractions beneath the number line. What do you notice about the top number, or *numerator*, of each fraction?** *(answers may vary; example: it goes up, or increases, by 1)*

The *numerator* of the fractions we have labeled increases by 1 each time. This is because the *numerator* tells us how many one-eighth sized pieces there are: at the line marked $\frac{2}{8}$ there are 2 pieces that are each one-eighth of the whole.

Teacher Note
To reinforce the idea that the fractional hash mark represents the amount from zero to the mark, use the bar models above the number line to show each $\frac{1}{8}$ segment.

Say: **The fraction we want to locate on the number line is $\frac{7}{8}$. Label the $\frac{7}{8}$ hash mark "J" to state for Jason's run. Then shade the area from 0 to $\frac{7}{8}$. The shaded length represents $\frac{7}{8}$ of a mile, because the whole is 1 mile.**

What is one more eighth after seven-eighths? *(eight-eighths)*
What is another name for eight-eighths? *(1 whole)*

Write "$\frac{8}{8}$" under the 1 on the number line.

Look at $\frac{7}{8}$ on the number line. What can you say about $\frac{7}{8}$ as it compares to the 1 whole? *(answers may vary; accept reasonable answers such as: seven-eighths is close to 1)*

What can you say about $\frac{7}{8}$ compared to 0? *(seven-eighths is far from 0)*

What about $\frac{1}{2}$, how does $\frac{7}{8}$ compare to $\frac{1}{2}$? Where is $\frac{1}{2}$ on the number line? *(seven-eighths is more than one-half)* **How do you know? If the line is divided into 8 equal parts, how many equal**

parts is half of the line? *(4)* **Is 4 equal parts more or less than 7 equal parts?** *(less than)*

Practice — Time: 8 min

Activity 1: Students will complete the activity on the ***Practice Sheets*** on pages 46 and 47 with a partner for the first 2 problems, and then work independently for the rest of the page.

Say: **Work with your math partner for the first 2 problems. Then try the rest on your own.**

Ask the questions such as:

- Is the distance you are trying to locate greater or less than 1? *(answers will vary by problem)*
- Is the fraction closer to 0 or closer to 1? How do you know?
- What part of the fraction tells you how many pieces are in the whole? *(the denominator)* How do you show these pieces on the number line? *(by dividing the number line from 0 to 1 into that many pieces)*
- What part of the fraction tells you how many pieces are shaded? *(the numerator)*

Activity 2: Using fraction bars, have 1 student in each pair build a fraction. The other student identifies the fraction built, and then shades the fractional amount on the laminated ***number line***.

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 9

Modeling Equivalent Fractions Using Fraction Bars

Lesson Objectives	• The student will model equivalent fractions using fraction bar models. • The student will communicate mathematical thinking using precise vocabulary related to fractions. • The student will use various mathematical representations to solve problems.	
Vocabulary	**equivalent fractions:** 2 or more fractions that represent the same amount or value	
Reviewed Vocabulary	denominator, equivalent, numerator	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 99-112) • Fraction bars: 1 whole, 1 set of $\frac{1}{2}$, 1 set of $\frac{1}{4}$ • 2 different colored markers or pencils • Flip book	• Student Booklet (pp. 51-57) • Fraction bars: 1 whole, 1 set of $\frac{1}{2}$, 1 set of $\frac{1}{4}$ (per student) • Different colored markers or pencils (2 per student) • Flip book (1 per student) • Scissors

Preview

Say: **Today we will model *equivalent fractions* using fraction bars.**

Engage Prior/Informal Knowledge — Time: 3 min

Have students complete the *Engaged Practice Sheet* to match fractions and models. Discuss the meaning of the numerator and the denominator for each fraction.

Ask questions such as:

- How many parts are in the whole? Which part of the fraction tells us? *(answer varies; the denominator)*
- How many parts are shaded? Which part of the fraction tells us? *(answer varies; the numerator)*
- How can you tell which model goes with the word or number form? *(it has the same number of parts in the whole and the same number of parts shaded)*

Modeled Practice — Time: 8 min

1. Model equivalent fractions with denominators of 2 and 4 using fraction bars. Display 1 whole fraction bar and two $\frac{1}{2}$ fraction bars on the table. Have the $\frac{1}{4}$ fraction bars set nearby.

Say: **Using fraction bars, we will determine if 2 fractions are equivalent. *Equivalent fractions* are fractions that represent the same amount. For example, in previous lessons we learned that three-thirds is *equivalent* to four-fourths. Both fractions are the same amount as 1 whole.**

Compared to the whole, we can see that each of these bars represents $\frac{1}{2}$.

Have students match up both $\frac{1}{2}$ parts to a whole to confirm that each piece is half of the whole.

Say: **Pick up the fourth parts. Match them to the 1 whole to see that 4 parts are the same amount, or equivalent to 1 whole.**

How many parts do we have? *(4)*

What is the name of each part? *($\frac{1}{4}$)*

Does the numerator or denominator of the fraction represent the number of parts in the whole? *(the denominator)*

Four is the denominator, which represents the fourths or four parts in the whole.

Compare the $\frac{1}{2}$ and $\frac{1}{4}$ parts. How many $\frac{1}{4}$ parts do we need to cover a $\frac{1}{2}$ part? *(2 parts)*

Two $\frac{1}{4}$ parts are the same amount as a $\frac{1}{2}$ part.

If each part is fourths, what portion of the whole do the 2 parts cover? *($\frac{2}{4}$)*

Two-fourths of the whole are covered.

Look at the parts below the whole. What is the relationship between $\frac{2}{4}$ and $\frac{1}{2}$? *(they are the same size because the same area is covered)*

The fractions are *equivalent*, or represent the same amount. Even though the number of parts is different, the total amount is the same.

$\frac{1}{2}$ and $\frac{2}{4}$ are *equivalent* because they represent the same amount, or value.

2. Model equivalent fractions using a pictorial model.

Watch For	Students may need to continue with the use of fraction bars. For example if students do not quickly see that four-fourths equals 1 whole or that two-fourths equals one-half, continue to have students use the fraction bars.

Have students turn to the *Modeled Practice Sheet*. The teacher and student will complete the steps together as the lesson progresses.

Say: **Javier's older brother offers him either $\frac{2}{3}$ of a brownie or $\frac{4}{6}$ of a brownie.**

Divide and shade the first rectangle so that it represents $\frac{2}{3}$.

Which part of the fraction represents the number of parts in the whole? How many are there? *(the denominator, 3)*

Which part of the fraction represents the number of parts shaded? How many are there? *(the numerator, 2)*

Label the first rectangle. Label each part "$\frac{1}{3}$."

Divide and shade the second rectangle to also show $\frac{2}{3}$. We will use this rectangle to compare $\frac{2}{3}$ to $\frac{4}{6}$.

We want to divide this second rectangle into sixths. How can we do this? *(by dividing each part in half)*

Divide the rectangle. How many equal parts is the rectangle now divided into? *(sixths)* **Label each part as $\frac{1}{6}$.**

How many sixths are shaded? Let's count: one-sixth, two-sixths, three-sixths, four-sixths. What is the total amount? *(four-sixths)*

Are the numbers of shaded parts the same? *(no)*

But is the size of the shaded portions the same? *(yes)*

If the shaded areas of the whole are the same, what can we say about $\frac{2}{3}$ and $\frac{4}{6}$? *(they are equivalent)*

How do we know 2 fractions are *equivalent*? *(equivalent fractions represent the same amount, or value)*

Write "$\frac{2}{3} = \frac{4}{6}$" beneath the models.

Practice

Time: 8 min

Activity 1: Have students cut the divisions for each fractional part of the flipbook. Use the flipbook to solve the problem on the ***Practice Sheet*** on page 53, and then have students complete the fraction bars to show the equivalence.

Say: **How can you divide the second model to show sixths?**

How do you know the second amount is *equivalent* to the first? *(the same portion of the whole is shaded)*

Activity 2: Discuss the following problem together as a group. Have students turn to the ***Practice Sheet*** on page 54. Allow students to work in pairs to determine different ways to model $\frac{1}{2}$.

Say: **Amanda and Jonathan are working on a fraction assignment. Amanda thinks that there are many fractions equivalent to one-half. John disagrees. Is Amanda or John correct? Defend your answer using drawings or the flipbook.**

Ask questions such as:

- How can you show $\frac{1}{2}$ with the flipbook?
- How did you model $\frac{1}{2}$ in the first problem using the flipbook?
- How else could you model $\frac{1}{2}$?

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible. Students may use the flipbook if needed to complete the problems.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

ESTAR INTERVENTION

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 10

Modeling Equivalent Fractions on the Number Line

<table>
<tr><td rowspan="1">Lesson Objectives</td><td colspan="2">• The student will model equivalent fractions on the number line using partitioning.
• The student will use various mathematical representations to solve problems.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">No new words are introduced.</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">equivalent, numerator, denominator</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 113-126)
• 4 different colored markers or pencils</td><td>• Student Booklet (pp. 58-64)
• Flip book (1 per student)
• Different colored markers or pencils (4 per student)
• Match Cards (1 set of 6 cards per student pair)</td></tr>
</table>

Preview

Say: **Today we will use the number line to show that 2 fractions are equivalent.**

Engage Prior/Informal Knowledge — Time: 3 min

Have students use their flipbooks to determine what fraction is equivalent to $\frac{1}{4}$ on the ***Engaged Practice Sheet*** .

Ask questions such as:

- Where is $\frac{1}{4}$ on your flipbook?
- How do you divide the parts of the second model to show eighths? *(divide each part in half)*
- How many eighths are equivalent to $\frac{1}{4}$? *(2)*
- How do you know the fractions are equivalent? *(the same amount is shaded for each fraction)*

Modeled Practice — Time: 8 min

1. Show fractions are equivalent using the number line and fraction bars.

   Have students turn to ***Modeled Practice Sheet #1*** in their Student Booklets. The teacher and students will complete the steps together as the lesson progresses.

Say: **Let's read the problem together. Ready, read: "Tony has $\frac{3}{4}$ of a candy bar. Jessica has $\frac{6}{8}$ of a candy bar. Who has the greatest portion of a candy bar?"**

We will use the rectangles as our fraction bar models. Let's shade $\frac{3}{4}$ of a candy bar and $\frac{6}{8}$ of a candy bar.

Compare the portions of each whole rectangle. Are the same amounts shaded? *(yes)*

Tony and Jessica have the same amount of a candy bar. Now let's use the number line to show that Tony's and Jessica's candy bar amounts are the same, or equivalent.

Let's start with $\frac{3}{4}$ on the number line. How do we know how many parts to divide the whole into? *(the number in the denominator)*

There are 4 parts in the whole, so we divide the number line into 4 parts between 0 and 1, just like the fraction bar model.

Divide the number line, labeling each hash mark as you count.

How do we know how many parts to shade? *(from the numerator)*

We shade 3 parts of the number line, just as we shaded the bar model. Let's count: one-fourth, two-fourths, three-fourths.

Now shade the number line to represent $\frac{6}{8}$. How can we divide the number line so we can show $\frac{6}{8}$? *(divide each part in half so there are 8 parts between 0 and 1)*

Divide the number line, labeling each hash mark.

Looking at the number line, there are several equivalent fractions labeled.

Which fraction matches up with $\frac{1}{4}$? *($\frac{2}{8}$)*

Two-eighths is equivalent to one-fourth.

How do you determine whether the fractions are the same, or equivalent, to another? *(the shaded amount on the number line or fraction bar model is the same)*

Shade below the number line until you get to the fraction that matches up with $\frac{3}{4}$. What fraction is equivalent to $\frac{3}{4}$? *($\frac{6}{8}$)*

The fractions $\frac{3}{4}$ and $\frac{6}{8}$ are equivalent because the amounts shaded are the same. What does it mean for 2 fractions to be equivalent? *(they represent the same value, or amount)*

We can use a fraction bar model or a number line to determine if fractions are equivalent. You can see that $\frac{3}{4}$ and $\frac{6}{8}$ on the number line represent the same shaded amount as in the fraction bar model. This means Tony and Jessica have the same amount of a candy bar.

Write "$\frac{3}{4} = \frac{6}{8}$" below the models.

2. Show fractions are equivalent using the number line.

   Have students turn to ***Modeled Practice Sheet #2*** in their Student Booklet. The teacher and students will complete the steps together as the lesson progresses.

Say: **Are $\frac{2}{4}$ of a banana and $\frac{4}{8}$ of a banana equivalent, or the same amount? Let's use the number line to determine if these 2 fractions are equivalent.**

How can we find $\frac{2}{4}$ on the number line? *(divide the length between 0 and 1 into 4 equal parts, then shade 2 parts)*

Look at the parts on the top of the number line. How many parts? *(4)* **What does the length from 0 to the first hash mark represent?** *(one-fourth)*

What does the length from 0 to the second hash mark represent? *(two-fourths)*

Label the hash marks on the top of the number line. Shade the length that represents two-fourths above the number line.

How can we find $\frac{4}{8}$ on the number line? *(divide the length between 0 and 1 into 8 equal parts, then move over 4 parts)*

Why? *(the denominator says there are 8 equal parts in the whole)*

Look at the parts on the bottom of the number line. How many parts? *(8)* **What does the length from 0 to the first hash mark represent?** *(one-eighth)*

What does the length from 0 to the second hash mark represent? *(two-eighths)*

To the third hash mark? *(three-eighths)*

Label the hash marks below the number line. Shade the length that represents four-eighths below the number line.

What can you say about the shaded lengths above and below the number line? *(they are the same length)*

What do we call 2 fractions that represent the same amount? *(equivalent)*

What does the top shaded length represent? *($\frac{2}{4}$)*

What does the bottom shaded length represent? *($\frac{4}{8}$)*

The lengths have different names but they are the same size. This means 2 parts that are each one-fourth of a whole are the same size as 4 parts that are each one-eighth of a whole.

What 2 fractions are equivalent? *(two-halves and four-eighths)*

Write "$\frac{2}{4} = \frac{4}{8}$" beneath the models.

Practice Time: 8 min

Activity 1: Students will complete the activity on the ***Practice Sheet*** on page 61 with a math partner. Select several students to verbalize their reasoning.

Say: **Work with your math partner to complete the problems on your sheet. Use the number line and the fraction bar models to find the equivalent fractions.**

Ask questions such as:

- What does the fraction bar model look like for each fraction?
- How do you divide the number line for each fraction? Which part of the fraction tells you how many parts? *(the denominator)*
- How do you know whether the fractions are equivalent using the number line? *(the shaded lengths are the same)*

Activity 2: Students will play *Flapjack Find Memory Game* in pairs. Students take turns flipping over 2 ***Match Cards*** to see if they have found a pair of equivalent fractions. Students should use the flipbook as a resource to help determine the fractions are equivalent. Students flip their cards back over if a match is not found.

Independent Practice Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 11

Equivalent Fractions Using Models and Multiplication

<table>
<tr><td>Lesson Objectives</td><td colspan="2">• The student will model equivalent fractions using fraction bar models and number lines.
• The student will generate multiplication equations based on the partitioning of fraction bars and number lines to create equivalent fractions.
• The student will use mathematical knowledge and vocabulary in problem-solving situations.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">No new words are introduced.</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">equivalent fractions, numerator, denominator</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 127-138)
• Fraction bars: $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{6}$</td><td>• Student Booklet (pp. 65-70)
• Fraction bars: $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{6}$ (1 set per student)
• Matching Cards (8 per student pair)
• Whiteboard with marker (1 per student)</td></tr>
</table>

Preview

Say: **Today we will describe the relationship between equivalent fractions using multiplication.**

Engage Prior/Informal Knowledge — Time: 3 min

Have students draw models on the ***Engaged Practice Sheet*** to show that $\frac{1}{3}$ is equivalent to $\frac{2}{6}$. Have half the class draw a fraction bar model, while the other half draws a number line.

Ask questions such as:

- How do you divide the fraction bar model/number line to show sixths? *(divide the parts already divided into thirds in half)*
- How do you know the 2 fractions are equivalent? *(they represent the same value, or amount)*

Modeled Practice — Time: 8 min

1. Model the process for creating equivalent fractions using multiplication.

   Have students turn to the ***Modeled Practice Sheet*** in their Student Booklets. The teacher and students will complete the steps together as the lesson progresses. Have fraction bars ready for student use.

Say: **Michael has a whole peanut butter and jelly sandwich. He cuts his sandwich into 2 parts. Divide the sandwich in half.**

How many halves does he have? *(2 halves)*

Michael has two-halves: one-half, two-halves. What does two-halves equal? *(1 whole)*

Shade one-half of Michael's sandwich. Write "$\frac{1}{2}$" below the shaded part. Michael wants to share this half with 2 of his friends.

How would he divide it so he can share a half between 2 friends? *(cut the half sandwich in half again)*

Michael will need to divide the half sandwich into 2 equal parts. Divide the half. How many parts are there? *(2 parts)*

Are these 2 parts equal parts? *(yes)* **Are these 2 parts equal parts with the other half of the sandwich?** *(no)*

We need to make all the parts equal. Let's divide the unshaded half into 2 parts to make equal parts for the whole sandwich.

How many parts are in the whole sandwich now that we have made 2 more cuts? *(4)*

What is the name of each part? *(one-fourth)*

Lay $\frac{1}{4}$ parts of the fraction bars on the rectangle to see each part is $\frac{1}{4}$ of the whole.

Each part is a fourth: one-fourth, two-fourths, three-fourths, four-fourths. We have four-fourths, which is equivalent to 1 whole sandwich.

Look at the shaded half sandwich. How many fourths equal a half? *(two-fourths)*

Write "$\frac{2}{4}$" below "$\frac{1}{2}$" under the shaded region.

Two-fourths is equivalent to one-half. Two-fourths of a sandwich is the same as half a sandwich.

Do the fractions represent the same shaded amount? *(yes)*

Write "$\frac{1}{2} = \frac{2}{4}$."

The peanut butter and jelly sandwich was first divided into 2 equal parts or halves. Next we cut each half again. How many parts did we have? *(4)*

Now there were 4 equal parts, how many more parts do we have now than what we started with? *(twice as many)*

The denominator, which represents the number of parts the whole is divided into, was multiplied by 2.

Write "×2" beside the denominator of the first fraction.

2 times 2 is 4. There are four parts in the whole of the second rectangle, so the denominator is 4.

What does the numerator, or top number, of the fraction represent? *(the total number of parts shaded)*

The numerator for the first fraction is 1 because 1 part is shaded. How many parts are shaded in the second rectangle? *(2)* **There are 2, or twice as many parts shaded in the second rectangle, so we will multiply the numerator by 2 to get 2.**

Write "×2" beside the numerator of the first fraction.

There are twice as many parts in the whole, and twice as many parts shaded in the second rectangle. Looking at the picture, how do we know these fractions are equivalent? *(the parts shaded are the same amount)*

Looking at the fraction $\frac{2}{2}$, what does $\frac{2}{2}$ equal? *(1 whole)* **When we multiply by 1 do we change the value of the number?** *(no)* **When we multiply a fraction by a fraction equivalent to 1 we do not change the value of the fraction, so $\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$.**

Practice — Time: 8 min

Activity 1: Using the *Practice Sheet* on page 67, have students work with a math partner to model the 2 equivalent fractions using concrete fraction bars.

Say: **With your math partner, use $\frac{1}{6}$ fraction parts to find how to divide the sandwich to share with 3 people.**

Ask questions such as:

- How many $\frac{1}{6}$ parts fit in the $\frac{1}{2}$ section of the sandwich? *(3)*
- What fraction is that? *($\frac{3}{6}$)*
- How many more parts is the sandwich divided into? *(3 times as many)*
- What fraction equivalent to 1 whole do you multiply $\frac{1}{2}$ by to get $\frac{3}{6}$? *($\frac{3}{3}$)*

Have students find the equivalent fraction at the end of item 1 on the ***Practice Sheet***.

Activity 2: Using ***Match Cards***, students will match fraction bar models to the multiplicative factor (2, 3, 4, etc.) needed to create the equivalent fractions shown. Once they have matched the cards, have students write the multiplication equation shown by 2 of the pairs of cards on their whiteboard.

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

ESTAR INTERVENTION

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 12

Equivalent Fractions Using Number Lines and Multiplication

<table>
<tr><td>Lesson Objectives</td><td colspan="2">• The student will model equivalent fractions using number lines.
• The student will generate multiplication equations based on the partitioning of number lines to create equivalent fractions.
• The student will use mathematical knowledge and vocabulary in problem-solving situations.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">No new words are introduced.</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">equivalent fractions, numerator, denominator</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 139-150)
• 4 different colored markers or pencils</td><td>• Student Booklet (pp. 71-76)
• Different colored markers or pencils (4 per student)
• Matching Cards (8 per pair)</td></tr>
</table>

Preview

Say: **Today we will find equivalent fractions with number lines and we will describe the relationship between them using multiplication.**

Engage Prior/Informal Knowledge **Time: 3 min**

Have student complete the ***Engaged Practice Sheet*** to model 2 equivalent fractions.

Ask questions such as:

- How do we divide the whole to show $\frac{1}{2}$? *(divide it into 2 equal parts)*
- How do we divide the whole to show $\frac{4}{8}$? *(divide it into 4 equal parts)*
- How many more parts are in the whole for $\frac{4}{8}$ compared to $\frac{1}{2}$? *(2 times, or twice as many)*
- How many more parts are shaded for $\frac{4}{8}$ compared to $\frac{1}{2}$? *(2 times, or twice as many)*
- What fraction equivalent to 1 whole did we multiply $\frac{1}{2}$ by to find the equivalent fraction of $\frac{4}{8}$? *(multiply by 1 whole as $\frac{2}{2}$)*
- How do you know they are equivalent by looking at the fraction bar models? *(the same amounts are shaded)*
- What does it mean for 2 fractions to be equivalent? *(the fractions represent the same value, or amount)*

Modeled Practice **Time: 8 min**

1. Model the process for creating fractions equivalent to $\frac{2}{3}$ using multiplication.

Have students turn to the ***Modeled Practice Sheet*** in their Student Booklets. The teacher and students will complete the steps together as the lesson progresses.

Say: **We want to find a fraction that is equivalent to $\frac{2}{3}$. We will use the number line.**

In the fraction two-thirds, what is the numerator? *(2)*

2 is the numerator.

What is the denominator? *(3)*

3 is the denominator. If we used the fraction bar model, how many equal parts would the bar be divided into? *(3)*

Using a number line, how many equal parts will be between 0 and 1? *(3)*

The least and greatest numbers of the number line is 0 to 1. In between the 0 and 1, we have 3 equal parts or thirds. Each hash mark represents a length of one-third.

Label the hash marks starting at 0. How many thirds is 0? *(zero-thirds)* **Label 0 as "$\frac{0}{3}$."**

What fractions are the next 2 hash marks? *($\frac{1}{3}$ and $\frac{2}{3}$)* **Label them.**

What fraction would be best for labeling 1? *($\frac{3}{3}$)* **Why?** *(because the line is divided into 3 equal parts and 1 whole is the same as three-thirds)*

Let's count the parts on the number line: one-third, two-thirds, three-thirds, or 1 whole.

Show me where $\frac{2}{3}$ is on the number line. Shade the number line up to $\frac{2}{3}$.

If we shade the same amount under the number line and divide it into more parts, would the distance change? *(no)* **Let's try it and find out.**

How do we know if 2 fractions are equivalent? *(they will be the same amount in a fraction bar model or the same length on the number line)*

We are going to see how many twelfths are equivalent to $\frac{2}{3}$. How do we divide the whole to show twelfths? *(divide it into 12 equal parts)*

Divide the number line into 12 parts using hash marks. To do this we can divide each third into 4 equal parts.

We will label the twelfths the same way we labeled the thirds. How many twelfths is 0? *($\frac{0}{12}$)* **Start at 0 and label the twelfths all the way to 1.**

How many twelfths are equivalent to $\frac{2}{3}$? Let's count: one-twelfth, two-twelfths, … eight-twelfths. Eight-twelfths is equivalent to two-thirds.

How do we know they are equivalent? *(because they represent the same shaded area)*

How many parts did we divide the number line into to find thirds? *(3)*

How many parts did we divide the number line into to find twelfths? *(12)*

How many more equal parts did we divide the thirds into to get twelfths? 3 time what number equals 12? *(4 times)*

In a fraction, the denominator, or the number below the numerator, represents the number of parts the whole is divided into.

Because eight-twelfths has 4 times as many parts in the whole, what fraction equivalent to 1 whole should we multiply $\frac{2}{3}$ by to get $\frac{8}{12}$? *($\frac{4}{4}$)* **Why?** *(because twelfths is 4 times more than thirds)*

Let's fill in the boxes for the equivalent fractions. What fraction did we begin with? *($\frac{2}{3}$)* **Fill that in.**

What fraction equivalent to 1 did we multiply by? *($\frac{4}{4}$)* **Why?** *(because 3 times 4 is 12)* **Fill that in.**

What equivalent fraction did we find? *($\frac{8}{12}$)* **Fill that in.**

What does the numerator, or the number above the denominator, of a fraction represent? *(the total number of parts shaded or shared)*

How many parts are shaded in $\frac{2}{3}$? *(2)* **How many parts are shaded in $\frac{8}{12}$?** *(8)* **The number of parts shaded changed but did the amount that is shaded change?** *(no)* **Why not?** *(because now the equal parts are divided into more equal parts or smaller equal parts)*

There are 4 times as many parts in the whole, and 4 times as many parts shaded to show $\frac{8}{12}$.

Look at the number line. How do we know these fractions are equivalent? *(the length shaded is the same amount)*

Practice **Time: 8 min**

Activity 1: Work together as a group to solve the problems on the ***Practice Sheet*** on page 73.

Say: **Let's read the problem together. Ready, read: "Linda measures her pencil to be $\frac{1}{3}$ of a foot long. Matt says his pencil is twice as long because his pencil is $\frac{2}{6}$ of a foot long. Is Matt correct? Why or why not?"**

Use mathematical language from the lesson to walk through the solution with the students.

Ask questions such as:

- How would you label the number line to show thirds? *($\frac{0}{3}, \frac{1}{3}, \frac{2}{3}, \frac{3}{3}$)*
- What portion of the number line would you shade for $\frac{1}{3}$? *(just the first equal part, from the 0 to the first hash mark)*
- How do you divide the number line to show sixths? *(divide each third in half)*
- How would you label the number line to show sixths? *($\frac{0}{6}, \frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}, \frac{6}{6}$)*
- What portion of the number line would you shade for $\frac{2}{6}$? *(the first 2 equal parts, from the 0 to the second hash mark)*
- Is Matt correct? Why or why not? *(he is not correct; his pencil is the same length because the two fractions are equivalent)*
- Why does he think his pencil is twice as long? *(probably because you multiply $\frac{1}{3}$ by $\frac{2}{2}$ to get $\frac{2}{6}$)*

Activity 2: Using the ***Match Cards***, students match number lines to the multiplicative factor (2, 3, 4, etc.) needed to create the equivalent fractions shown. Once they have matched the cards, have students write the multiplication equations shown by 2 of the pairs of cards on the ***Practice Sheet*** on page 73.

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 13

Equivalent Fractions Using Fraction Bar Models and Division

Lesson Objectives	• The student will model equivalent fractions using fraction bar models. • The student will generate equivalent fractions using division. • The student will create and use representations to organize, record, and communicate mathematical ideas to peers and teachers.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	equivalent fractions	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 151-164) • 2 different colored markers or pencils	• Student Booklet (pp. 77-83) • Fraction bars: $\frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ (1 set per student) • Different colored markers or pencils (2 per student)

Preview

Say: **We have been using multiplication to find equivalent fractions. Today we will find equivalent fractions using fraction bar models and division.**

Engage Prior/Informal Knowledge **Time: 3 min**

Have students complete the *Engaged Practice Sheet* to find equivalent fractions using fraction bar models and the number line. Show the multiplication used to find the equivalent fraction.

Ask questions such as:

- How many more parts are in the whole for the equivalent fraction? *(answers vary – [2, 3, 4] times as many)*
- How many more parts are shaded? *(answers vary – [2, 3, 4] times as many – same as the answer above)*
- What fraction equivalent to 1 whole did you multiply by to find the equivalent fraction? *(answers vary – 2, 3, 4 – same as above)*
- How do you know the fractions are equivalent? *(the fractions represent the same value, or amount)*

Modeled Practice **Time: 8 min**

1. Find equivalent fractions using a fraction bar model.

   Have students turn to the ***Modeled Practice Sheet*** in their Student Booklets. Use the fraction bars. The teacher and students will complete the steps together as the lesson progresses.

Say: **4 sandwiches are equally shared between 10 friends. Let's represent this equal share with a fraction.**

How many sandwiches did they share? *(4)* **What do we call the amount shared or the number above the denominator?** *(the numerator)* **What is the denominator, the amount of equal parts?** *(10)*

What fraction does the shaded amount of the top model represent? *($\frac{4}{10}$)* **The top model shows $\frac{4}{10}$ or 1 equal share of the sandwiches.**

Write "$\frac{4}{10}$" to the right of the model.

The model shows four-tenths. Do you think we could make the same portion but with less divisions or cuts?

We have 10 equal parts in the whole and 4 parts shaded in. Can we group the parts so there are fewer divisions? Let's use our fraction bars to find a different way to divide the sandwiches.

With your math partner use the thirds, fourths, and fifths to find the parts that exactly cover the shaded part of the model.

Teacher Note
Guide the students toward fifths if they are struggling to find the correct fraction bar.

Say: **Which fraction parts exactly cover the shaded portion $\frac{4}{10}$?** *(the fifths)*

How many fifths fit over the shaded area? *(2)* **How many shaded tenths are under each fifth?** *(2)*

For every fifth, there are 2 tenths underneath. Draw a bold line around each section covered by a fifth, including the parts that are not shaded.

Use a fifth bar to trace around if you are unsure where to draw the bold line.

Now that we have grouped the parts by 2s, how many parts are shaded now? *(2)*

Is it the same amount as the 4 parts we shaded to start with? *(yes)*

How many parts are in the whole? *(5)* **Divide the bottom fraction bar model into fifths.**

How many equal parts are shaded? *(2)* **Shade 2 parts.**

Shade the first 2 parts of 5 in the bottom model. Write "$\frac{2}{5}$" to the right of the model.

2. Compare the equivalent fraction. Use division to find the equivalent fraction.

Have students continue to use the ***Modeled Practice Sheet***.

Say: **Now let's compare the 2 fractions.**

There are how many parts are in the whole for $\frac{4}{10}$? *(10)* **Write "10" for the denominator of the first fraction below the models.**

How many parts are in the whole for $\frac{2}{5}$? *(5)* **Write "5" for the denominator of the second fraction below the models.**

We will use division to show that $\frac{4}{10}$ is equivalent to $\frac{2}{5}$.

10 divided by what number equals 5? *(2)* **Or thinking about it as multiplication, 5 times what number equals 10?** *(2)*

How many shaded parts for $\frac{4}{10}$? *(4)* **Write "4" for the numerator of the first fraction below the models.**

How many shaded parts for $\frac{2}{5}$? *(2)* **Write "2" for the numerator of the second fraction below the models.**

There are half as many parts in the whole for $\frac{2}{5}$. There are half as many shaded parts for $\frac{2}{5}$.

When we divided by 1, just like when we multiply by 1, the value does not change.

What fraction equivalent to 1 did we divide by? *($\frac{2}{2}$)*

Write "÷ 2" in the boxes for the fraction that is equivalent to 1.

$\frac{4}{10}$ **is equivalent to** $\frac{2}{5}$**. How can we tell they are equivalent?** *(they represent the same value, or amount)*

Both fractions represent the same shaded portion. This means they are equivalent.

If friends were sharing sandwiches, each friend would get 2 parts that are one-fifth size, instead of 4 smaller parts that are only one-tenth in size. Each person gets half as many parts, but each equal part is twice as big.

Teacher Note
Students might have a difficulty understanding the concept of having half as many parts that are twice the size. Use the fraction bars from the example to emphasize that 2 fraction bars parts that are $\frac{1}{10}$ of the whole are the same size of 1 fraction bar part that is $\frac{1}{5}$ of the whole.

Practice Time: 8 min

Activity 1: Have students work in pairs to solve the problem on the *Practice Sheet* on page 79. Allow student to use fraction bars to cover the shaded area.

Say: **We will read the problem together. Then work with your math partner to find the equivalent fraction. Use the fraction bars to help you solve.**

Ready? Read: "Allie, Robert, and 4 of their friends are sharing 2 sandwiches equally. They know they can cut each sandwich

into 6 parts and share 1 with each person, but there will be many small parts to share. Is there a way Allie and Robert can share the parts so each person gets only 1 larger part?"

Ask questions such as:

- What size part exactly covers the $\frac{2}{6}$ area that is shaded? *($\frac{1}{3}$)*
- How do you know the 2 amounts are equivalent? *(they cover the same portion)*
- How many fewer parts are in the whole? *(there are half as many parts)* How many fewer parts are in the shaded area? *(there are half as many)*
- What fraction equivalent to 1 whole can you divide the fraction by? *($\frac{2}{2}$)*
- What 2 fractions are equivalent? *($\frac{2}{6}$ and $\frac{1}{3}$)*

Activity 2: Have students complete the ***Practice Sheet*** on page 80 independently. Work with students then gradually fade teacher assistance. Provide immediate corrective feedback when necessary.

Say: **For the next practice page work the problems independently. Use the fraction bars to help you solve. Fill in the blank boxes to the side of the model.**

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 14

Equivalent Fractions Using Number Lines and Division

Lesson Objectives	• The student will model equivalent fractions using number lines. • The student will generate equivalent fractions using division. • The student will create and use representations to organize, record, and communicate mathematical ideas to peers and teachers.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	equivalent fractions	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 165-178) • Fraction bars: $\frac{1}{3}, \frac{1}{4}$	• Student Booklet (pp. 84-90) • Fraction Bars: $\frac{1}{6}, \frac{1}{3}, \frac{1}{4}, \frac{1}{2}$ (1 set per student)

Preview

Say: **We have been using fraction bar models to find equivalent fractions using division. Today we will find equivalent fractions using the number line.**

Engage Prior/Informal Knowledge Time: 3 min

Have students complete the *Engaged Practice Sheet* to find equivalent fractions using fraction bar models. Show the division and multiplication used to find the equivalent fraction.

Ask questions such as:

- How many fewer/more parts are in the whole for the equivalent fraction? *(answers vary)*
- How many fewer/more parts are shaded? *(answers vary)*
- What fraction equivalent to 1 whole did you divide/multiply the fraction by? *(answers vary: $\frac{2}{2}$, $\frac{3}{3}$, $\frac{4}{4}$)*
- How do you know the fractions are equivalent? *(the fractions represent the same value, or amount)*

Modeled Practice Time: 8 min

1. Find equivalent fractions using a number line and division.

   Have students turn to the ***Modeled Practice Sheet*** in their Student Booklets. The teacher and students will complete the steps together as the lesson progresses.

Say: **8 sandwiches are shared equally among 12 friends. Let's represent this equal share with a fraction.**

What is the denominator, or the amount of people sharing? *(12)* **How many sandwiches did they share?** *(8)* **What do we call the amount shared or the number above the denominator?** *(the numerator)*

The number line is already divided for us. How many equal parts is the number line divided into? *(12)*

Label each hash mark of the number line. Start at 0 and go all the way to 1. How many twelfths is 0? *($\frac{0}{12}$)* **Label it and the rest of the hash marks on the line.**

We want to show $\frac{8}{12}$ on the number line. How far will we shade the line to show $\frac{8}{12}$? *(up to the eighth hash mark)* **Shade the line.**

What fraction does the shaded amount of the number line represent? *($\frac{8}{12}$)* **The number line shows 1 equal share of the sandwiches.**

It would take a lot of cutting to divide each of the 8 sandwiches into 12 parts. Do you think we could make the same portion but with less divisions or cuts? *(yes)*

Can we group the parts so there are fewer divisions? Let's use our fraction bars to find a different way to divide the sandwiches.

In pairs, have students use the tenths-, eighths-, and sixths-sized fraction bars to find the parts that exactly cover the shaded part of the number line.

Say: **Which fraction part covers the eighth-twelfths without going over or leaving some out?** *(the sixths)*

How many sixths fit over the shaded area? *(4)* **How many shaded twelfths are under each sixth?** *(2)*

For every sixth, there are 2 twelfths underneath. Let's draw an arch under each section covered by a sixth, including the parts that are not shaded.

Now that we have grouped the parts by 2s, how many parts are shaded? *(4)* **How many parts in the whole are shown by the jumps?** *(6)*

What fraction is equivalent to $\frac{8}{12}$? *($\frac{4}{6}$)*

How many parts are in the whole for $\frac{8}{12}$? *(12)* **Write "12" for the denominator of the first fraction next to the number line.**

How many parts are in the whole for $\frac{4}{6}$? *(6)* **Write "6" for the denominator of the second fraction next to the number line.**

We will use division to show that $\frac{8}{12}$ is equivalent to $\frac{4}{6}$.

12 divided by what number equals 6? *(2)* **Or thinking about it as multiplication, 6 times what number equals 12?** *(2)*

How many shaded parts for $\frac{8}{12}$? *(8)* **Write "8" for the numerator of the first fraction next to the number line.**

How many shaded parts for $\frac{4}{6}$? *(4)* **Write "4" for the numerator of the second fraction next to the number line.**

There are half as many parts in the whole for $\frac{4}{6}$.

When we divided by 1 just like when we multiplied by 1, the value does not change.

What fraction equivalent to 1 did we divide by? *($\frac{2}{2}$)*

Write "÷ 2" in the boxes for the fraction that is equivalent to 1.

$\frac{8}{12}$ is equivalent to $\frac{4}{6}$. How can we tell they are equivalent? *(they represent the same value, or amount)*

Both fractions represent the same shaded portion. This means they are equivalent.

The friends would get 4 sandwich parts that are $\frac{1}{6}$ of a sandwich in size, instead of 8 parts that are $\frac{1}{12}$ of a sandwich in size. That

is only half as many pieces! But, the pieces are twice as big, so each friend still gets the same amount.

What if the friends wanted even fewer pieces? Can you find a way to share the sandwiches equally that results in even fewer pieces? *(answers vary; discuss during Practice)*

Practice — Time: 8 min

Activity 1: Have students work with a math partner to determine another way to divide the equal share using either thirds or fourths on the second number line.

Say: **Work with your math partner to find another way to cut the 8 sandwiches for 12 friends to share equally. Use the fraction bars for fourths, thirds, and halves. Then fill in the boxes for the division problem used to find the equivalent fraction.**

After student pairs solve the final problem on the ***Modeled Practice Sheet***, discuss the solution as a class.

Ask questions such as:

- What other size part exactly covers the $\frac{8}{12}$ shaded portion? *($\frac{1}{3}$)* How many thirds are needed to cover the same portion? *(2)*
- How do you know the 2 amounts are equivalent? *(they cover the same portion)*
- How many fewer parts are in the whole? *(there are a fourth as many parts)* How many fewer parts are in the shaded area? *(there are a fourth as many)*
- What fraction equivalent to 1 whole do you divide by? *($\frac{4}{4}$)*
- What 2 fractions are equivalent? *($\frac{8}{12}$ and $\frac{2}{3}$)*
- Is $\frac{4}{6}$ equivalent to $\frac{2}{3}$? *(yes)* How? *(both fractions are equivalent to $\frac{8}{12}$, so they must be equivalent to each other, or dividing $\frac{4}{6}$ by $\frac{2}{2}$ will get $\frac{2}{3}$)*

Activity 2: Have students complete the ***Practice Sheet*** on page 86 independently. Work with students, then gradually fade teacher assistance. Provide immediate corrective feedback when necessary.

Say: **For the next practice page work the problems independently. Use the fraction bars to help you solve. Fill in the blank boxes to the side of the model.**

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

ESTAR INTERVENTION

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 15

Equivalent Fractions Using Multiplication and Division

<table>
<tr><td rowspan="1">Lesson Objectives</td><td colspan="2">• The student will model equivalent fractions using fraction bar models.
• The student will generate equivalent fractions using multiplication and division.
• The student will use correct mathematical language to describe equivalent fractions and in counting fractions.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">No new words are introduced.</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">equivalent fractions, numerator, denominator</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 179-192)
• 4 different colored markers or pencils</td><td>• Student Booklet (pp. 91-97)
• Different colored markers or pencils (4 per student)</td></tr>
</table>

Preview

Say: **Today we will find equivalent fractions using either multiplication or division.**

Engage Prior/Informal Knowledge — Time: 3 min

Have students complete the ***Engaged Practice Sheets*** determining whether the equivalent fraction is correct or not. Provide teacher assistance in finding the correct equation for the equivalent fraction.

Say: **Determine whether the equations match the models that are shown. If the equation does *not* match the model, then write the correct equation for the equivalent fraction.**

Ask questions such as:

- How did the number of equal parts in the whole of the equivalent fraction change? *(answers may include it is twice as many parts or there are half as many parts as before)*
- How many parts are in the whole? How many are shaded? *(answers vary)*
- Do you multiply or divide to find the equivalent fraction shown by the model? *(depends on the problem)*
- What are the equivalent fractions? *(answers vary depending on the problem)*
- How do you know when 2 fractions are equivalent? *(the fractions represent the same value, or amount)*

Modeled Practice — Time: 8 min

1. Review finding a fraction equivalent using fraction bar models and multiplication.

   Have students turn to ***Modeled Practice Sheet #1*** in their Student Booklets. The teacher and students will complete the steps together as the lesson progresses.

Say: **Let's read the problem together. Ready, read: "Juan's mom baked a cake for Juan's birthday. After eating 2 pieces of cake Juan had $\frac{3}{5}$ of the cake left to share with his friends that stopped by to wish him a happy birthday. How can Juan cut the remaining cake equally to make enough pieces for his friends?"**

What is the question asking you to find? *(how to share $\frac{3}{5}$ of cake with friends)*

What is the important information? *($\frac{3}{5}$ of cake)*

What fraction of the cake did Juan start with? *($\frac{3}{5}$)*

Look at the first bar model. What does it represent? *($\frac{3}{5}$)* **How do you know?** *(broken into 5 parts and 3 are shaded)* **What is the denominator?** *(5)* **What is the numerator?** *(3)*

Juan has some friends come to visit. How can he cut the cake pieces to make more equal shares? *(accept reasonable answers that include, cut each piece in half, cut each piece into 3 pieces)*

If we cut each piece of cake into 3 pieces, each cake piece would be very small. So let's just cut each piece in half and hope that is enough pieces for all his friends.

Use the second fraction bar model to represent the cake after it is cut into more pieces. It is already divided into 5 parts, so what should we do? *(divide each part in half)* **Divide each part in half.**

How many equal parts do we have in the whole? *(10)* **What does it mean to have a denominator of 10?** *(the whole is divided into 10 equal parts)*

From 5 equal parts to 10 equal parts, 5 times what number equals 10? *(2)*

There are 2 times, or twice, as many equal parts.

How do we know if 2 fractions are equivalent? *(they represent the same value, or amount)*

Let's shade the number of parts that will be an equal amount to $\frac{3}{5}$. First, shade $\frac{3}{10}$. Compare the 2 models. Is $\frac{3}{10}$ equivalent to $\frac{3}{5}$? *(no)* **Why not, if it has the same number of equal parts shaded?** *(the size of the parts are different, fifths are not the same size as tenths)*

Correct, remember we multiply by 1 whole when we find equivalent fractions. What fraction equivalent to 1 whole do we multiply $\frac{3}{5}$ by to get tenths? *($\frac{2}{2}$)*

So how many tenths will be shaded to equal $\frac{3}{5}$? *(6)* **Shade the bottom fraction bar model to be equivalent to $\frac{3}{5}$.**

What fraction is equivalent to $\frac{3}{5}$? *($\frac{6}{10}$)* **How do we know?** *(they represent the same value, or amount)* **Fill in the boxes.**

Juan had 5 friends come by to visit. Did he have enough pieces of cake for everyone to get a piece? *(yes)*

2. Review finding fraction equivalent using fraction bar model and division.

   Have students turn to ***Modeled Practice Sheet #2***. The teacher and students will complete the steps together as the lesson progresses.

Say: **Let's read the next problem. Ready, read: "Juan did so well finding the first equivalent fraction for his cake that his mom asked him to help her with a cookie basket. This time Juan's**

mom starts with $\frac{4}{12}$ of a cookie basket and wants to know what third of the basket is left. How can Juan find an equivalent fraction that has a denominator of 3?"

What fraction are we starting with? *($\frac{4}{12}$)* **What does the denominator have to be for the equivalent fraction?** *(3)* **What does it mean to have a denominator of 3?** *(the whole is divided into 3 equal parts)*

How do we know if 2 fractions are equivalent? *(they represent the same value, or amount)*

Look at the fraction bar model. What fraction does it represent? *($\frac{4}{12}$)* **How do you know?** *(it is broken into 12 parts and 4 are shaded)*

We want to draw another fraction bar model that represents the equivalent fraction. What should we do first? *(divide the whole into 3 equal parts)*

It is already divided into 12 parts, so what should we do? *(make 3 equal groups)*

We need to make 3 equal groups. How many will be in each equal group? We have 12 total parts. 3 times what number equals 12? *(4)* **There will be 4 parts in each group.**

Use dark lines to group each of the 4 parts.

We began with 12 total parts and now have 3, so how did the denominator change? *(it decreased)* **Do we multiply or divide to find the equivalent fraction when the denominator changes from 12 to 3?** *(divide)*

How many parts are in the whole for the first fraction? *(12)* **How many for the second?** *(3)* **There are one-fourth as many parts for the second fraction, so what fraction equivalent to 1 whole will we divide by?** *($\frac{4}{4}$)* **Fill in the boxes for the equivalent fraction to 1 whole.**

Shade the number of parts that will be an equal amount to $\frac{4}{12}$. How many did you shade? *(1)* **Fill in the box for the equivalent fraction.**

What fraction is equivalent to $\frac{4}{12}$? *($\frac{1}{3}$)* **How do we know?** *(they represent the same value, or amount)*

Practice **Time: 8 min**

Activity 1: Have students complete the problems on ***Practice Sheet*** on page 94 with a partner.

Say: **With your math partner, complete the problems on the practice sheet.**

Ask questions such as:

- How did the denominator change from the first fraction to the second fraction? *(#1: increased, #2: decreased)*
- To find the equivalent fraction, do you multiply or divide by a fraction equivalent to 1 whole? *(#1: multiply, #2: divide)*
- How do you know the fractions are equivalent? *(they represent the same value, or amount)*

Activity 2: Have students complete the ***Practice Sheet*** on page 95 in pairs. They will draw a line to match the equivalent fractions, and then identify which operation they would use and what number they would multiply or divide by to find the equivalent fraction.

Say: **For the next practice sheet, you and your math partner will match the equivalent fractions. Use the fraction bar models as your guide. After you draw a line to match, circle if it was multiplication or division to find the equivalent fraction. Then in the blank, write what fraction equivalent to 1 you multiplied or divided by.**

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

ESTAR INTERVENTION

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 16

Fraction Equivalency

<table>
<tr><td rowspan="1">Lesson Objectives</td><td colspan="2">• The student will determine if 2 given fractions are equivalent using models.
• The student will determine if 2 given fractions are equivalent using computation.
• The student will use language and models to determine equivalent fractions.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">No new words are introduced.</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">denominator, equivalent fractions, numerator</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 193-206)
• 4 different colored markers or pencils
• Whiteboard with marker</td><td>• Student Booklet (pp. 98-104)
• Different colored markers or pencils (4 per student)
• Whiteboard with marker (1 per student)</td></tr>
</table>

Preview

Say: **Today we will evaluate pairs of fractions to determine whether they are equivalent.**

Engage Prior/Informal Knowledge — Time: 3 min

Review fractions using a whiteboard and marker to show fraction parts.

Say: **Draw a rectangle. A fraction represents part of a whole. What number shows how to break apart the whole?** *(denominator)*

Write the fraction $\frac{3}{4}$ on your whiteboard. How do we break apart the whole to represent $\frac{3}{4}$? *(into fourths)*

Break the rectangle into 4 equal pieces. How many pieces should we shade for $\frac{3}{4}$? *(3)*

Continue having students draw fractions ($\frac{2}{3}$, $\frac{3}{6}$, $\frac{7}{8}$).

Say: **What is the denominator?** *(3, 6, 8)*

What is the numerator? *(2, 3, 7)*

How do we separate the whole? *(into thirds, sixths, eighths)*

How many parts do we shade? *(2, 3, 7)*

Modeled Practice — Time: 8 min

1. Model the evaluation of fractions for equivalence.

   Have students turn to *Modeled Practice Sheet #1* to determine if the fractions are equivalent. The teacher and student will complete the steps together as the lesson progresses.

Say: **We will read the problem together. Ready, read: "Two friends walk to school each morning. Natalie walks $\frac{3}{4}$ of a mile. Jason says he walks further since he walks $\frac{6}{8}$ of a mile. Is he correct?"**

What is the question asking you to find? *(if Jason walks further than Natalie)*

We need to find out if Jason's distance to school is further than Natalie's distance.

Let's compare the 2 distances using the number line. What fractional parts is the number line already divided into? *(fourths)* **How do you know?** *(the line is divided into 4 equal parts)*

Label the hash marks on the number line starting at 0. Write each fractional part above the hash marks.

Shade the number lines to represent the distance Natalie walks to school. How many fourths will you shade? *(3)*

Now let's use the same number line to represent the distance Jason walks to school. He says he walks $\frac{6}{8}$ of a mile. How many equal parts will the number line need to have to show $\frac{6}{8}$? *(eight equal parts)*

The number line already has 4 equal parts. How would we divide the four equal parts into eighths? *(divide each part in half)* **Divide the equal parts to make eighths.**

How many more parts does the number line have now? *(twice as many, 2 times as many)*

Label the eighth hash marks starting at 0. Write the fractional part below the hash marks.

Shade the line to represent $\frac{6}{8}$. How far do you shade? *(to the sixth hash mark)*

Compare the 2 fractions on the number line. What do you notice? *(the fractions are equivalent, the fractions are the same distance on the number line)*

Does Jason walk further than Natalie? *(no)*

We can use multiplication to show the fractions are equivalent.

Why would you use multiplication to find the equivalence? *(because the denominator went from 4 to 8, because we cut the line into more pieces)*

There are 2 times as many pieces in the whole and 2 times as many shaded pieces to represent the same amount. What fraction equivalent to 1 would you use to go from $\frac{3}{4}$ to $\frac{6}{8}$? *($\frac{2}{2}$)* **Fill in $\frac{2}{2}$ for the fraction equivalent to 1.**

We have shown that $\frac{3}{4}$ is equivalent to, or represents the same amount, as $\frac{6}{8}$.

Was Jason correct? Does he walk further? *(no)* **Why not?** *(they walk the same distance)*

2. Model the evaluation of fractions for equivalence.

   Have students turn to ***Modeled Practice Sheet #2*** using the fraction bar model to show equivalent fractions.

Say: **Read the problem together. Ready, read: "Michael has $\frac{2}{5}$ of a sandwich. Robert has $\frac{5}{10}$ of a sandwich. Robert thinks their sandwiches are the same size. Is he correct?"**

What is the question asking you to find? *(if $\frac{2}{5}$ is equivalent to $\frac{5}{10}$)*

We want to find if Michael and Robert have the same portion of a sandwich. If they do, then $\frac{2}{5}$ and $\frac{5}{10}$ would be equivalent. What does it mean for 2 fractions to be equivalent? *(they represent the same value, or amount)*

We will use fraction bar models to compare. Shade the fraction bar models to represent the size of each friend's sandwich.

The shaded parts of the fraction bar models look close to being the same length. We will use computation to determine whether they actually are equivalent.

Can we use 1 of the denominators to compare pieces of the same size? *(yes, we could compare tenths)*

Write "10" for the denominator.

We can use multiplication to find how many tenths are equal to $\frac{2}{5}$. 5 times what number equals 10? *(2)*

There are 2 times as many pieces in the whole, so there would be 2 times as many shaded pieces to represent the same amount. What fraction equivalent to 1 whole should we use to find the equivalent fraction? *($\frac{2}{2}$)* **Why?** *(because 10 is 2 times 5)*

How many shaded tenths would be equivalent to two-fifths? *(4)* **Why?** *(because 2 × 2 = 4)* **Write "4" for the numerator.**

We have shown that $\frac{2}{5}$ is equivalent to $\frac{4}{10}$.

Was Robert correct, are the sandwich portions the same? *(no)*

Practice — Time: 8 min

Activity 1: Have students complete *Practice Sheet* on page 100.

Say: **With your math partner determine whether the fractions are equivalent. Make prediction with your math partner, then use the number line or fraction bar model to see if your predictions are correct. Discuss with your math partner your prediction and your findings.**

Ask questions such as:

- How did you show each fraction using the number line/fraction bar model? *(divided the line/bar into equal parts from the denominator, then shaded the number parts from the numerator)*
- What fraction equivalent to 1 whole can you use to multiply or divide the fraction by to make an equivalent fraction? *($\frac{2}{2}, \frac{3}{3}, \frac{4}{4}$)*

- How do you know when the fractions are equivalent? *(they represent the same value, or amount)*

Activity 2: Have students complete the problems on the *Practice Sheet* on page 101 in pairs. Compare answers as a group.

Say: **With your math partner, complete the next few problems finding the equivalent fraction using the number line.**

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the *Independent Practice Sheets* and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 17

Comparing Fractions with Same Numerators or Denominators

<table>
<tr><td rowspan="1">Lesson Objectives</td><td colspan="2">• The student will compare fractions with like numerators through sharing scenarios and fraction bar models.
• The student will compare fractions with like denominators through sharing scenarios and number lines.
• The student will create and use representations to organize, record, and communicate mathematical ideas to peers and teachers.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">No new words are introduced.</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">compare, denominator, greater than, less than, numerator</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 207-220)
• 3 different colored markers or pencils</td><td>• Student Booklet (pp. 105-111)
• Different colored markers or pencils (3 per student)
• Fraction Cards (12 per pair)</td></tr>
</table>

Preview

Say: **Today we are going to compare different fractions using equal sharing scenarios and fraction bar models.**

Engage Prior/Informal Knowledge — Time: 3 min

Review the use of the "greater than," "less than," and "equal to" symbols to compare numbers. Have students turn to the *Engaged Practice Sheet*. Have students read each inequality after they fill in the symbol.

Say: **Let's review the greater than, less than, and equal to symbols used to compare numbers.**

Point to the greater than symbol at the top of the page.

Say: **What symbol is this?** *(greater than)* **Write "greater than" on the line below the symbol.**

What does the greater than symbol mean? *(the number to the left of the symbol is greater than the number to the right of the symbol)*

Point to the less than symbol at the top of the page.

Say: **What symbol is this?** *(less than)* **Write "less than" on the line below.**

What does the less than symbol mean? *(the number to the left of the symbol is less than the number to the right of the symbol)*

Point to the equal sign at the top of the page.

Say: **What is this symbol?** *(equal sign)* **Write "equal" on the line.**

What does the equal symbol mean? *(the same as or the same amount)*

Compare the numbers below using the greater than, less than, or equal to symbols.

When we have all finished comparing we will read the inequality statements together.

Modeled Practice Time: 8 min

1. Compare fractions with common denominators.

   Have students turn to ***Modeled Practice Sheet #1*** to compare fractions. The teacher and students will complete the steps together as the lesson progresses.

Say: **If you were sharing 3 sandwiches or 5 sandwiches, when would you have a greater amount of sandwiches?** *(5 sandwiches)*

What if you were sharing those same sandwiches with 8 people? Would you want to be sharing 3 sandwiches or 5 sandwiches? *(5 sandwiches)* **Why?** *(answers vary – because there is more to start with so each share would be bigger)*

Let's compare the size of an equal share if 10 people are sharing 3 and 5 sandwiches. Starting with 5 sandwiches, how would you divide each sandwich so each person gets an equal share? *(divide them into 10 equal pieces)*

How many pieces are shaded if there are 3 sandwiches to share? *(3)* **How much is the equal share?** *($\frac{3}{10}$ of a sandwich)*

Shade 3 pieces and write the fraction to the right.

How do we draw a model to represent 10 people equally sharing 5 sandwiches? *(divide the rectangle into 10 equal pieces, shade 5)* **How much is an equal share?** *($\frac{5}{10}$ of a sandwich)*

Shade the second rectangle with a different color. Write the fraction to the right.

Looking at the fraction bar models, which fraction is greater? *($\frac{5}{10}$)* $\boldsymbol{\frac{5}{10}}$ **is greater. This matches our earlier prediction that sharing 5 sandwiches would result in more sandwiches per person.**

What if we add another fraction? Is $\frac{7}{10}$ greater or less than $\frac{3}{10}$ and $\frac{5}{10}$? *(greater)* **How do you know?** *(because it will have more of the same size pieces)*

Let's check by drawing a fraction bar model. How many pieces are in the whole? *(10)* **How many are shaded?** *(7)*

Shade the third rectangle. Write the fraction to the right.

What observations can you make about these 3 fractions? *(answers vary – the denominator is the same, the amount shaded gets larger as the numerator gets larger)*

Notice that the denominator is the same. The number of pieces in the whole does not change, they are the same size.

What can we say about the size of the fraction when the denominator does not change? *(answers vary – the larger the numerator, the larger the fraction)*

Since the numerator represents the number of pieces shaded, the greater the numerator, the greater the amount shaded.

2. Compare fractions with the same numerator.

   Have students turn to *Modeled Practice Sheet #2*. The teacher and students will complete the sheet as the lesson progresses through each section.

Say: **Imagine you have 2 licorice ropes to share. Would you rather share them with 3 other people or 7 other people?** *(3 other people)* **Why?** *(because each share would be larger)*

When the denominator of a fraction is larger and the numerator is the same, it means there are more people sharing the same number of pieces. Each person still has an equal share, but the piece is smaller in size.

Draw a model showing the length of a share of licorice when 4 people are sharing 2 ropes. How do we divide the whole? *(into 4* *equal parts)* **How many equal parts are shaded?** *(2)* **What is the length?** *($\frac{2}{4}$ of a rope)*

Label the hash marks for the number line starting at 0.

Shade the number line to show $\frac{2}{4}$.

Now label the next 2 number lines. How many equal parts is the second number line divided into? *(8)* **What about the third number line?** *(12)*

Shade $\frac{2}{8}$ and $\frac{2}{12}$ on the number lines.

Compare the 3 fractions. What do you notice about them? *(answers vary – the numerators are the same, as the denominator gets larger, the amount gets smaller)*

How many sections are shaded for each fraction? *(2)* **Why is the amount shaded smaller?** *(because the parts get smaller in size)*

As the denominator gets larger, the amount or length shaded gets smaller because the whole is divided into more pieces. This makes each equal part of the line smaller.

How do you think the fraction $\frac{2}{16}$ would compare to the other fractions? How about $\frac{2}{3}$? *($\frac{2}{16}$ would be less than the other fractions, $\frac{2}{3}$ would be greater than the other fractions)*

The more people you share the same amount with, the smaller each piece becomes.

Practice **Time: 8 min**

Activity 1: Have students work in pairs to solve the first problem on the ***Practice Sheet*** on page 108. Students will solve the second problem independently. Discuss answers as a group.

Say: **Work with your math partner to compare the first fractions using the fraction bar model. Then try the second problem on your own, comparing 2 fractions using the number line.**

Ask questions such as:

- How many parts are in the whole? *(answers vary)*
- How many parts are shaded? *(answers vary)*
- How do you know if a fraction is greater than or less than another fraction?
- Which fraction has the most shaded parts/most parts in the whole? *(answers vary)*

Activity 2: Using the ***Fraction Cards*** in pairs, student place their cards face down on the table between them. Students take turns flipping a card. As each card is flipped, the student claims the fraction closest to him or her. The student with the larger fraction gets the cards.

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 18

Compare Fractions Using Benchmarks

Lesson Objectives	• The student will compare numbers by estimating their placement on the number line using benchmarks. • The student will organize and verbalize steps to compare fractions through communication with peers and teacher.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	equivalent fractions	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 221-232) • 6 different colored markers or pencils	• Student Booklet (pp. 112-117) • Different colored markers or pencils (6 per student)

Preview

Say: **Today we will compare fractions with unlike numerators and denominators using benchmarks.**

Engage Prior/Informal Knowledge Time: 3 min

Have students work together to complete the ***Engaged Practice Sheet.*** Determine if fractions are closer to 0, $\frac{1}{2}$, or 1 using the number line.

Say: **We will complete the sheet together.**

Ask a volunteer to read the questions to the group. Discuss the questions and provide immediate corrective feedback when necessary.

Ask additional questions such as:

- How do you know $\frac{1}{8}$ is closer to 0 than $\frac{1}{2}$? *(accept reasonable answers such as: an eighth is a smaller part than a half, one-eighth is only 1 of a smaller part)*
- Why is $\frac{3}{4}$ closer to 1 rather than 0? *(accept reasonable answers such as: there are 4 parts in three-fourths and 3 of them are shaded, that is almost 4, or 4 is the whole thing and 3 is very close to 4)*

Modeled Practice Time: 8 min

1. Compare fractions using 0 and 1 as benchmarks.

   Have students turn to the ***Modeled Practice Sheet***. The teacher and students will complete the steps together as the lesson progresses.

Say: **To compare numbers with unlike numerators and denominators, we are going to use benchmark numbers 0 and 1. We will estimate if the fraction is closer to 0 or closer to 1, then compare.**

Let's start with $\frac{1}{4}$. Would $\frac{1}{4}$ be closer to 0 or 1? *(closer to 0)* **Why?** *(only 1 part out of 4 equal parts)* **Where does $\frac{1}{4}$ go on the number line? Divide the number line and label $\frac{1}{4}$.**

$\frac{1}{4}$ is closer to 0. We divided the whole into 4 equal parts, and then labeled $\frac{1}{4}$.

Look at the second fraction, $\frac{5}{6}$. How many sixths are in 1 whole? *(six-sixths)* **Is $\frac{5}{6}$ closer to 0 or to 1?** *(1)* **How do you know?** *(5 is close to 6, six-sixths equals 1 whole)*

Divide the second number line into sixths. Label the hash mark for $\frac{5}{6}$ on the number line.

Looking at both number lines, is $\frac{1}{4}$ greater than or less than $\frac{5}{6}$? *($\frac{1}{4}$ is less than $\frac{5}{6}$)* **Write the less than symbol in the circle between the 2 fractions.**

2. Compare 2 fractions using the benchmarks $\frac{1}{2}$ and 1.

   Continue using the ***Modeled Practice Sheet.*** The teacher and students will continue to complete the steps together.

Say: **What 2 fractions are we comparing?** *($\frac{9}{10}$ and $\frac{3}{8}$)* **Thinking about $\frac{9}{10}$, is it closer to 0 or 1 on the number line?** *(closer to 1 because it is only one-tenth away from 1, or $\frac{10}{10}$)*

Write a hash mark and write $\frac{9}{10}$ on you number line. Shade the number line up to $\frac{9}{10}$.

$\frac{9}{10}$ is close to 1. It is only $\frac{1}{10}$ from 1, which is 1 part of 10.

Look at the second fraction, $\frac{3}{8}$. Let's first compare $\frac{3}{8}$ to $\frac{1}{2}$. If we have 8 equal parts how many eighths would be equivalent to $\frac{1}{2}$? *(4)*

How close is $\frac{3}{8}$ to $\frac{4}{8}$ or $\frac{1}{2}$? *(very close, only 1 more eighth away from $\frac{1}{2}$)*

Mark $\frac{1}{2}$ on the second number line. Would $\frac{3}{8}$ be greater than or less than $\frac{1}{2}$? *(less than)* **Why?** *(because 3 is less than 4)*

Place a hash mark on the number line where $\frac{3}{8}$ would be and label the fraction. Shade $\frac{3}{8}$ length on the number line.

Explain why you chose the placement of $\frac{3}{8}$ on the number line. *(answers vary – close to $\frac{1}{2}$, because it is only $\frac{1}{8}$ away from $\frac{1}{2}$)*

Is $\frac{9}{10}$ closer or further away from 1 than $\frac{3}{8}$? *($\frac{9}{10}$ is closer to 1)* **Why is $\frac{9}{10}$ closer to 1 than $\frac{3}{8}$?** *(because $\frac{9}{10}$ is almost a whole and $\frac{3}{8}$ is closer to a $\frac{1}{2}$)*

Looking at the number line, is $\frac{9}{10}$ greater than or less than $\frac{3}{8}$? *($\frac{9}{10}$ is greater than $\frac{3}{8}$)*

Write the correct symbol in the circle between the 2 fractions.

Practice Time: 8 min

Activity 1: Have students compare pairs of fractions on the *Practice Sheet* on page 114 by reasoning about their place on the number line in relation to benchmarks and each other.

Say: **With your math partner use the number line and the benchmarks 0, $\frac{1}{2}$, and 1 to compare the fractions. Then write > or < in the circle between the 2 fractions.**

Ask questions such as:

- Is the fraction closer to 0 or closer to 1? *(answers vary)*
- Is the fraction greater than or less than $\frac{1}{2}$? *(answers vary)*
- How far away is the fraction from 1 or 0? *(answers vary)*
- Which fraction is closest to 1? *(answers vary)*

Have students divide the whole and shade the parts if they are having difficulty with estimation.

Activity 2: Have students work in pairs to complete the *Practice Sheet* on page 115. The students first write 3 fractions greater than $\frac{1}{2}$ and then 3 fractions less than $\frac{2}{3}$, labeling them all on a number line.

Watch For

Students may struggle with thinking of a fraction on their own. If this is the case, offer fraction bars for students to use in order to come up with fractions greater than and less than $\frac{1}{2}$ or $\frac{2}{3}$. Students should start with the given fraction in fraction bar pieces then build a second fraction using different sized pieces until they find a fraction that is greater than or less than.

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 19

Compare Fractions Using Common Denominators

<table>
<tr><td>Lesson Objectives</td><td colspan="2">• The student will compare fractions by finding common denominators using multiplication.
• The student will use prior knowledge, answer mathematical questions accurately, and formulate single or multiple sentences using mathematical vocabulary to compare fractions.</td></tr>
<tr><td>Vocabulary</td><td colspan="2">common denominator: the denominators of 2 or more fractions that are the same</td></tr>
<tr><td>Reviewed Vocabulary</td><td colspan="2">denominator, equivalent fractions, numerator</td></tr>
<tr><td rowspan="2">Instructional Materials</td><td>Teacher</td><td>Student</td></tr>
<tr><td>• Teacher Masters (pp. 233-248)
• 4 different colored markers or pencils (optional)
• Number line (optional)</td><td>• Student Booklet (pp. 118-125)
• Different colored markers or pencils (optional, 4 per student)
• Multiplication Table (optional, 1 per student)</td></tr>
</table>

Preview

Say: **Today we are going to compare fractions using *common denominators*.**

Engage Prior/Informal Knowledge — Time: 3 min

Have students find the equivalent fraction using multiplication in each equation. Use the *Engaged Practice Sheet*.

Say: **To compare fractions using *common denominators,* we must make an equivalent fraction. We will practice making equivalent fractions using multiplication.**

Remember to make an equivalent fraction, we must multiply by a fraction equivalent to 1 whole.

Ask questions such as:

- What does equivalent fraction mean? *(they are the same amount, the same portion is shaded)*
- Looking at the denominators, how many times more parts are in the whole of the second fraction compared to the first? *(4 times, 5 times, 2 times, 2 times)*
- What fraction equivalent to 1 whole will you multiply by to find the missing numerator? *($\frac{4}{4}$, $\frac{5}{5}$, $\frac{2}{2}$, $\frac{2}{2}$)*
- How did you use the model to help you find the missing numerator? *(divide the equal parts into smaller parts)*

Modeled Practice **Time: 8 min**

1. Compare 2 fractions by first finding common denominators.

   Have students turn to ***Modeled Practice Sheet #1***. The teacher and students will complete the steps together as the lesson progresses.

Say: **What fractions are we comparing?** *($\frac{1}{3}$ and $\frac{3}{12}$)* **What can you say about the denominators?** *(they are not the same, the whole is divided into thirds and the other is divided into twelfths)*

Can we use benchmarks to compare the fractions? *(no)* **Why not?** *(because both fractions are somewhere between 0 and $\frac{1}{2}$)*

Use fraction bar models to compare the fractions. Shade and label the models.

Look at the shaded portion of the models. What do you notice? *(they are close in size)* **The parts of the fraction bar models are not the same size, but the portion shaded in both models is very close in comparison.**

All we know is that both fractions are somewhere between 0 and $\frac{1}{2}$.

When 2 fractions are close together, we can compare them by using *common denominators*. When 2 fractions have the same denominator, they have a *common denominator*.

To compare the fractions with a *common denominator*, we have to find an equivalent fraction with a denominator that is the same as the other fraction we are comparing.

Why can we use an equivalent fraction to compare? *(the equivalent fraction represents the same amount as the original fraction)*

The equivalent fraction represents the same amount because we multiplied it by a fraction equivalent to 1 whole.

How do we compare fractions with the same denominator? *(look at the numerator to see which fraction has more shaded parts because the size of the equal parts is the same for both fractions)*

To find a common denominator we ask ourselves, 3 times what number equals 12? *(4)*

Teacher Note
For students who need help with multiplication allow them to use the multiplication table.

Say: **3 times 4 equals 12, so we can find the equivalent fraction to $\frac{1}{3}$ that has a denominator of 12 to compare the fractions.**

Because there are 4 times as many parts in the whole, what fraction equivalent to 1 whole will we multiply by? *($\frac{4}{4}$)* **Fill in the 1 whole fraction boxes.**

What is the equivalent fraction to $\frac{1}{3}$? *($\frac{4}{12}$)* **What does it mean for 2 fractions to be equivalent?** *(they represent the same value, or amount)*

Can we use $\frac{4}{12}$ to compare to $\frac{3}{12}$? *(yes)* **Write the fractions in the boxes under the models.**

Compare $\frac{4}{12}$ and $\frac{3}{12}$. Is $\frac{4}{12}$ greater than or less than $\frac{3}{12}$? *(greater than)* **Why?** *(both wholes are divided into twelfths and 4 is greater than 3)* **Write the greater than symbol in the circle between the fractions.**

Now compare the original fractions, $\frac{1}{3}$ and $\frac{3}{12}$. Write these 2 fractions beneath the first set of fractions.

Is $\frac{1}{3}$ greater than or less than $\frac{3}{12}$? *(greater than)* **Write the greater than symbol in the circle between the fractions.**

$\frac{1}{3}$ is greater than $\frac{3}{12}$ because $\frac{4}{12}$ is greater than $\frac{3}{12}$, and $\frac{1}{3}$ and $\frac{4}{12}$ are equivalent fractions.

Watch For 	**Students may have difficulty comparing fractions using the relationship between equivalent fractions. Use colored markers or pencils corresponding with the fraction bar model throughout the demonstration to show that $\frac{4}{12}$ is equivalent to $\frac{1}{3}$ during the comparison.**

2. Compare 2 fractions by first finding common denominators.

Have students turn to *Modeled Practice Sheet #2*. The teacher and students will continue to complete the sheet as the lesson progresses.

Say: **Now, let's compare $\frac{3}{5}$ and $\frac{7}{10}$ by finding a *common denominator*.**

Which denominator will we use for the *common denominator*? *(10)*

5 times what number equals 10? *(2)*

We want to find a fraction that is equivalent to $\frac{3}{5}$ with a denominator of 10. What fraction would that be?

Give students a chance to find the equivalent fraction on their own.

Say: **What fraction is equivalent to $\frac{3}{5}$ and has 10 in the denominator?** *($\frac{6}{10}$)*

$\frac{6}{10}$ is equivalent to $\frac{3}{5}$ and has the same denominator as $\frac{7}{10}$, so we can now compare these 2 fractions.

Is $\frac{6}{10}$ greater than or less than $\frac{7}{10}$? *(less than)* **Write "<" in the circle between the 2 fractions. How do you know?** *(because 6 is less than 7)*

Now let's compare $\frac{3}{5}$ and $\frac{7}{10}$. Is $\frac{3}{5}$ greater than or less than $\frac{7}{10}$? *(less than)* **How do you know?** *(because $\frac{3}{5}$ is equivalent to $\frac{6}{10}$ and $\frac{6}{10}$ is less than $\frac{7}{10}$)*

Let's use the number line to check our answer. How many equal parts is the number line divided into? *(10)* **Each hash mark is a tenth. Label the tenths below the number line.**

Look closely at the number line, every other hash mark is taller than the 1 next to it. What fractional part of the line do these hash marks represent? *(fifths)* **Label the fifths above the number line.**

Shade $\frac{3}{5}$ in 1 color. Shade $\frac{7}{10}$ in another color. Is our comparison correct; is $\frac{3}{5}$ less than $\frac{7}{10}$? *(yes)*

These fractions are very close, and the best way to compare fractions that are close is to find a *common denominator* and then compare.

Practice — Time: 8 min

Activity 1: Have students complete the *Practice Sheet* on page 121. Students may work with a math partner or independently. Read the first problem together.

Say: **Let's read the problem together. Ready, ready: "Sam ran $\frac{1}{4}$ of a mile. Raquel ran $\frac{3}{8}$ of a mile. Who ran farther?"**

What will be the *common denominator* for the 2 fractions? *(8)*

Work with a partner to find the equivalent fraction for $\frac{1}{4}$ then compare the 2 fractions.

Ask questions such as:

- What fraction equivalent to 1 whole did you multiply by? *($\frac{2}{2}$, $\frac{4}{4}$, $\frac{2}{2}$)*

- Is the first fraction greater than or less than the second fraction?
  (less than, greater than, less than)

Activity 2: Have students work in pairs to complete the ***Practice Sheet*** on page 122. Students will determine which runner ran the furthest by comparing the fractional distances. If necessary, have students look at a multiplication table to find that the common denominator is 12.

Teacher Note
For students who need a model to help find equivalent fractions and compare, have students use a number line for twelfths. Use mathematical language from the lesson to help students place each fraction on the number line.

Independent Practice **Time: 6 min**

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.

ESTAR INTERVENTION

25

Total Time: 25 minutes
Instructional Time: 19 minutes
Independent Practice: 6 minutes

Module: Building, Comparing, & Ordering Fractions
Lesson 20

Comparing Fractions Using Multiple Strategies

Lesson Objectives	• The student will compare fractions using strategies learned in previous lessons. • The student will determine which strategy is most appropriate by examining the characteristics of the fractions being compared. • The student will organize and verbalize strategies in solving to explain mathematical thinking through communication to peers and teacher.	
Vocabulary	**No new words are introduced.**	
Reviewed Vocabulary	common denominator, denominator, equivalent fractions, numerator	
Instructional Materials	**Teacher**	**Student**
	• Teacher Masters (pp. 249-260) • Multiplication Table (optional)	• Student Booklet (pp. 126-131) • Whiteboards with marker (1 per student)

Preview

Say: **We have learned several different strategies to compare fractions. Today we will practice identifying which strategy works best for a pair of fractions.**

Engage Prior/Informal Knowledge Time: 3 min

Have students practice comparing fractions with like denominators on the *Engaged Practice Sheet.*

Say: **On your sheet, the fractions in each problem have something in common. What does the first pair of fractions have in common?** *(same denominator)*

What does the second pair of fractions have in common? *(same denominator)*

When comparing fractions with like denominators what are you comparing? *(the number of parts shaded, the numerators)*

Look at #1: $\frac{3}{12}$ compared to $\frac{9}{12}$. We are comparing twelfths with twelfths. Which fraction has more twelfths? *($\frac{9}{12}$)* **So is $\frac{3}{12}$ less than or greater than $\frac{9}{12}$?** *(less than)*

Complete the rest on your own.

Modeled Practice Time: 8 min

1. Compare fractions with like numerators.

   Have students turn to the ***Modeled Practice Sheet***. The teacher and students will complete the steps together as the lesson progresses.

Say: **Look at the first pair of fractions. What strategy would you use to compare them?** *(like numerator)* **Why?** *(because they have the same numerator)*

Write "like numerator" on the first line.

Teacher Note
Students may have difficulty writing out the words that describe the comparison strategies. Allow students to abbreviate as needed.

Say: **Is $\frac{4}{8}$ greater than or less than $\frac{4}{5}$?** *(less than)*

Give students time to discuss the answer with a partner.

Say: **$\frac{4}{8}$ is less than $\frac{4}{5}$. How do you know?** *(because there are the same number of parts, but eighths are smaller than fifths because the whole is divided into more parts)*

Write "<" in the circle. Read the inequality: "Four-eighths is less than four-fifths."

If the fractions you are comparing have like numerators or denominators, the quickest way to compare is to think about the size of the parts of each fraction. How many equal parts in the whole for $\frac{4}{8}$? *(8)* **How many equal parts in the whole for $\frac{4}{5}$?** *(5)*

When 1 whole is divided into more pieces what happens to each piece? *(the piece is smaller in size)* **Which is a smaller piece, an eighth or a fifth?** *(an eighth)* **Why?** *(because the whole was cut into more pieces)*

Remember, the more people you share with the smaller the parts become.

2. Compare fractions using benchmarks 0 and 1.

Direct the students' attention to the second example on the ***Modeled Practice Sheet***.

Say: **Look at the fractions. Do they have like numerators or denominators?** *(no)*

They do not have like numerators or denominators, so we need to use another strategy to help us compare.

How many equal parts are in the whole for $\frac{2}{6}$? *(6)* **How many parts are shaded?** *(2)*

2 parts out of 6 are shaded. Is $\frac{2}{6}$ closer to 0 or 1 whole? *(0)* **Why?** *(because 2 is not very much of 6)*

Mark where you think $\frac{2}{6}$ is on the number line. If you need to divide the number line into sixths, you may.

How many parts are in the whole for $\frac{4}{5}$? *(5)* **How many parts are shaded?** *(4)*

4 out of 5 parts are shaded. Is $\frac{4}{5}$ closer to 0 or 1 on the number line? *(1)* **Why?** *(because 4 is close to 5, $\frac{5}{5}$ is 1 whole)*

Mark where you think $\frac{4}{5}$ is on the number line. If you need to divide the number line into fifths, you may.

Is $\frac{2}{6}$ less than or greater than $\frac{4}{5}$? *(less than)* **Why?** *(because $\frac{2}{6}$ is closer to 0 and $\frac{4}{5}$ is closer to 1 whole)*

Write "<" in the circle. Read the inequality: "$\frac{2}{6}$ is less than $\frac{4}{5}$."

3. Compare fractions by finding a common denominator.

   Direct the students' attention to the third example on the ***Modeled Practice Sheet***.

Say: **Do these 2 fractions have like numerators or denominators?** *(no)*

Can we use benchmarks of 0, $\frac{1}{2}$, or 1? *(maybe)* **Is $\frac{5}{8}$ closer to 0, $\frac{1}{2}$, or 1 whole?** *(accept $\frac{1}{2}$ or 1 whole as long as students can explain their answer)*

Is $\frac{3}{4}$ closer to 0, $\frac{1}{2}$, or 1 whole? *(accept $\frac{1}{2}$ or 1 whole as long as students can explain their answer)*

So both fractions could be close to $\frac{1}{2}$ and could be close to 1 whole. It is too close to determine, so we will need to use another strategy that is more precise.

We can find a common denominator. We have 8 and 4 as the denominators. Can we multiply 1 of the denominators by a number to get the other denominator? *(yes, 4 times 2 equals 8)*

Teacher Note
If students have difficulty finding common denominators, allow them to compare rows of multiples on a multiplication table.

Say: **Since 4 times 2 equals 8, we want to find a fraction that is equivalent to $\frac{3}{4}$ that has a denominator of 8. What fraction equivalent to 1 whole will we multiply by?** *($\frac{2}{2}$)*

What is the equivalent fraction to $\frac{3}{4}$? *($\frac{6}{8}$)*

The equivalent fraction is $\frac{6}{8}$. Write it.

Is $\frac{5}{8}$ greater than or less than $\frac{6}{8}$? *(less than)* **$\frac{5}{8}$ is less than $\frac{6}{8}$. Write it.**

Which of these fractions is equivalent to $\frac{3}{4}$? *($\frac{6}{8}$)* **$\frac{6}{8}$ is equivalent to $\frac{3}{4}$.**

Since $\frac{5}{8}$ is less than $\frac{6}{8}$, it is also less than $\frac{3}{4}$. Write "<" in the circle.

4. Review steps to determine the appropriate strategy.

Say: **Before we use the strategy of finding a common denominator, think about the first 2 strategies we reviewed. First check to see if there are like numerators or denominators.**

What can you do first? *(check to see if there are like numerators or denominators)* **This is the quickest way to compare because you don't have to do any calculations.**

If the fractions do not have any like numbers, see if it is possible to compare the fractions to benchmarks like 0, $\frac{1}{2}$, or 1 whole.

If the fractions are too close to one another to use the benchmark strategy, then find a common denominator. Why is this saved for last? *(because it has the most steps, it involves calculations)*

Using the appropriate strategy to compare fractions will help you solve the problem.

Practice — Time: 8 min

Activity 1: Have students complete the *Practice Sheets* on pages 128 and 129. Have them complete the first 3 problems with a partner and work the second 3 problems independently.

Say: **Work with a math partner to complete the first page. Then try to second page on your own.**

Ask questions such as:

- What strategy are you using to compare the fractions? *(answers will vary by problem)*
- How did you choose your strategy? *(answers will vary by problem)*
- Could you have used a different strategy? Why or why not? *(answers will vary by problem)*

Activity 2: For additional practice, present fraction pairs to students. In pairs, students will take turns teaching the other how to compare them. Have students use whiteboards to write the problems and show their work.

Some possible fractions pairs are:

- $\frac{8}{12}$ and $\frac{8}{10}$
- $\frac{2}{3}$ and $\frac{7}{12}$
- $\frac{3}{4}$ and $\frac{2}{8}$

Independent Practice — Time: 6 min

1. For 5 minutes: Have students turn to the ***Independent Practice Sheets*** and complete as many items as possible.

Say: **You will work independently for 5 minutes. Complete as many as you can. At the end of 5 minutes we will discuss our answers as a group.**

2. For the remaining time: Have students share their answers with the group. Provide corrective feedback using mathematical language from the lesson. Have students mark the total number correct at the top of the page.