BRIDGES IN MATHEMATICS 5

GRADE 5 SUPPLEMENT

Set A6 Numbers & Operations: Fraction Concepts

Includes

Skills & Concepts

- ★ compare fractions
- ★ given two fractions with unlike denominators, rewrite the fractions with a common denominator
- ★ determine the greatest common factor and the least common multiple of two or more whole numbers
- ★ simplify fractions using common factors
- ★ fluently and accurately subtract fractions (find the difference)
- ★ estimate differences of fractions to predict solutions to problems or determine reasonableness of answers.
- ★ solve single- and multi-step word problems involving subtraction of fractions and verify their solutions

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Bridges in Mathematics Grade 5 Supplement
Set A6 Numbers & Operations: Fraction Concepts

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set A6 ★ Activity 1

ACTIVITY

Simplify & Compare

Overview

During this activity, students learn to simplify fractions by finding the greatest common factor of the numerator and the denominator. Then the teacher introduces a game to provide more practice with these new skills. Simplify & Compare can be used as a partner game once it has been introduced to the class, or played several times as a whole group.

Skills & Concepts

★ determine the greatest common factor of two whole numbers

★ simplify fractions using common factors

You'll need

★ Simplify & Compare Game Board (page A6.7, run one copy on a transparency)

★ Simplify & Compare Record Sheets (page A6.8, run a class set)

★ students' fraction kits (see Advance Preparation)

★ 1 $^1/_2$″ x 12″ construction paper strips, class set plus a few extra in each of the following colors: white, light brown, purple, green, orange, pink, blue, and yellow

★ class set of 6″ x 9″ manila or legal size envelopes

★ class set of scissors

★ class set of rulers

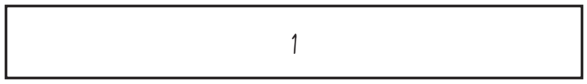
★ overhead double spinner

★ a more/less cube

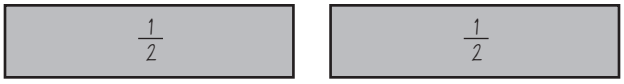
★ overhead pens

Advance Preparation: Making Construction Paper Fraction Kits

Give each student a set of 5 construction paper strips, one each in the following colors: white, light brown, purple, green, and orange. Reserve a set of strips for yourself as well. Holding up the white strip, label it with a 1 as students do the same on their white strips.



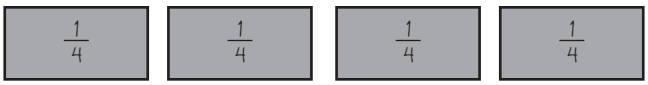
Ask students to fold their light brown strip in half and cut it along the fold line as you do the same with your light brown strip. Ask students to identify the value of these two pieces relative to the white strip. Then have them label each light brown piece ½.



Note If some of your students are already quite proficient with fractions, you might increase the challenge level of this activity by asking them to predict the length in inches of each fractional part as they cut and fold their strips.

Now ask students to fold the purple strip in half and then in half again. Before they unfold the strip, ask students to pair-share the number of segments they'll see and the value of each, relative to the white strip. Then ask them to unfold the strip, check their predictions, cut along the fold lines, and label each part, as you do the same with your purple strip.

Activity 1 Simplify & Compare (cont.)



Next, ask students to fold their green strip in half, in half again, and in half a third time. Before they unfold it, have them pair-share their ideas about how many segments they'll see and how the size of each will compare to the white strip. Some students might believe there will be 8 segments, while others are equally convinced that there will be 6. In either case, ask students to explain their thinking, although there's no need to reach consensus right now. When students unfold their green strips, they'll see 8 segments. If there's been debate beforehand, you might continue the discussion as students cut and label each of the green pieces.

> ***Teacher*** *So we got 8 parts instead of 6, even though we only folded the green strip 3 times. Why is that?*
>
> ***Students*** *Because you can see when you fold it that it's half the size of a purple piece.*
> *I think what's doubling is the number of pieces. Every time you fold the strip, you get double the number of pieces you got the last time, like 2 is double 1, 4 is double 2, and 8 is double 4.*
> *So it is a doubling pattern, just different from how some of us thought.*

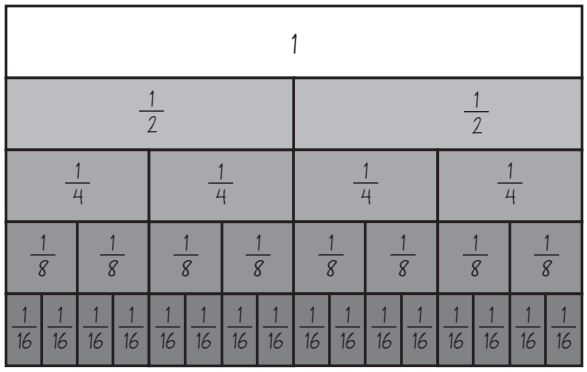
Once they have cut out and labeled the eighths, ask students to consider how the purple pieces (the fourths) compare to the whole and half strips. Students' responses may provide some sense of their current understandings (and misconceptions) about fractions.

> ***Students*** *The purple ones, the fourths, are half the size of the halves.*
> *Yeah, a fourth is like half of a half.*
> *Right! It's like a half folded in half again.*
> *If you put 2 of the fourths together, they're the same as a half.*
>
> ***Teacher*** *That's very interesting. So how could we complete this equation?* $1/4 + 1/4 =$
>
> ***Students*** *It's* $1/2$.
> *You can see the answer if you put 2 of the purples together.*
>
> ***Teacher*** *I've had students tell me the answer is* $2/8$. *What do you think of that?*
>
> ***Students*** *Maybe they didn't understand about fractions.*
> *Maybe they didn't have these strips to look at.*
> *I know what they did. They added the numbers on top and the numbers on the bottom.*
>
> ***Teacher*** *Why doesn't it work to do it that way?*
>
> ***Students*** *It's hard to explain. I think fractions don't work the same as regular numbers.*
> *I think it's because they're pieces, like parts of something else. I mean, if you added 2 of the white strips together, you'd get 2 because 1 + 1 is 2. But if you add 2 fourths together, it makes a larger piece—a half.*
> *And if you show two-eighths, two of the green pieces together, you can see it's not the same as one-fourth plus one-fourth.*

Now ask students to fold their orange strip in half 4 times. Again, ask them to make predictions about the number of segments they'll see when they unfold the strip and how big each segment will be relative to the others they've cut and labeled. After a bit of discussion, have them cut the orange strip along the folds and label each piece.

Activity 1 Simplify & Compare (cont.)

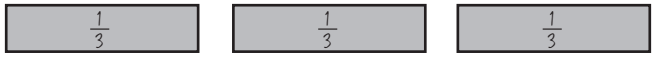
Finally, ask students to work in pairs to arrange *one* of their sets as shown on the next page. Give them a couple minutes to pair-share mathematical observations about the pieces, and then invite volunteers to share their thinking with the class.



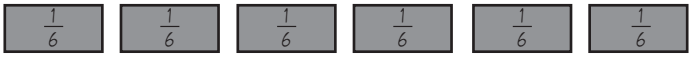
Students *The number of pieces in each row doubles. It goes 1, 2, 4, 8, then 16.*
Whatever the number is on the bottom, that's how many there are of that piece, like there are 4 fourths, 8 eighths, and 16 sixteenths.
And they all match up. You can see that 2 fourths make a half, 4 eighths make a half, and 8 sixteenths make a half.
Remember when you said that you had some kids who thought that if you added $\frac{1}{4} + \frac{1}{4}$ *you'd get* $\frac{2}{8}$*? But you can see that* $\frac{2}{8}$ *is the same as* $\frac{1}{4}$*.*
There's stuff that doesn't match up too, like there's no bigger piece that's exactly the same size as $\frac{3}{16}$ *or* $\frac{3}{8}$*.*

Making Thirds, Sixths, and Twelfths to Add to the Fraction Kits

Next, give each student a set of 3 new construction paper strips, one each in the following colors: pink, blue, and yellow. Ask students to use their rulers to find and mark thirds on the pink strip before they fold and cut. Then ave them label each piece with the fraction $\frac{1}{3}$.



Now ask students to fold the blue strip in thirds and then in half. Before they unfold the strip, ask them to pair-share the number of segments they will see and the value of each relative to the white strip. Then ask them to unfold the strip, check their predictions, cut it along the fold lines, and label each part.



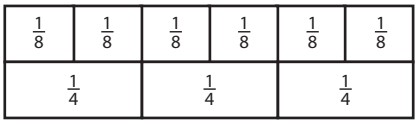
Finally, ask the students to describe and then try any methods they can devise to fold the yellow strip into twelfths. Let them experiment for a few minutes. Some students may reason that they will be able to make twelfths by folding the strip into thirds, then in half, and then in half again. Others may use their rulers, reasoning that if the length of the whole is 12 inches, each twelfth must be 1". Still others may work entirely by trial and error and will need an extra yellow strip or two. When they are finished, give students each an envelope to store all their fraction pieces. (It's fine to fold the white strip so it will fit.)

Activity 1 Simplify & Compare (cont.)

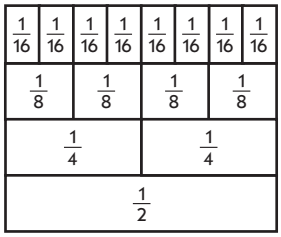
Instructions for Simplify & Compare

1. Explain that students are going to use their fraction kits to learn more about fractions and play a new game today. Have them take all the fraction strips out of their envelopes and stack them in neat piles by size on their desks.

2. Write the fraction $^6/_8$ at the overhead. Read it with the students and ask them to build the fraction with their pieces. Then challenge them to lay out an equivalent fraction with fewer pieces, all the same size as one another. Most children will set out three fourths in response. If some students set out one half and one fourth, remind them that all the pieces in the equivalent fraction have to be the same size.



3. Ask students to share any observations they can make about the two sets of pieces. Record the equation $^6/_8 = {}^3/_4$ on the overhead, and have students return the pieces they have just used to their stacks. Then write $^8/_{16}$, and have students show this fraction with their pieces. When most have finished, ask them to build all the equivalent fractions they can find, using only same-sized pieces for each one. Give them a minute to work and talk with one another, and then invite volunteers to share their results.



Students *I got $\frac{8}{16}$, $\frac{4}{8}$, $\frac{2}{4}$, and $\frac{1}{2}$.*
They're all the same as $\frac{1}{2}$.
When you use bigger pieces, you don't need as many.

4. Write a series of numbers and arrows on the board to represent the sequence. Ask students to pair-share any observations they can make about the sequence of fractions, and then have volunteers share their ideas with the class. Can they find and describe any patterns? How do the numbers relate to one another? Which requires the fewest pieces to build?

$$\frac{8}{16} \rightarrow \frac{4}{8} \rightarrow \frac{2}{4} \rightarrow \frac{1}{2}$$

Students *The numbers on the top, the numerators, go 8, 4, 2, and 1. It's like they keep getting cut in half.*
It's the same with the numbers on the bottom. 16 ÷ 2 is 8. 8 ÷ 2 is 4. 4 ÷ 2 is 2.
A half was the fastest way to build the fraction.
I knew $\frac{8}{16}$ was a half to begin with because 8 is half of 16.
Every number on the top is half of the number on the bottom.

5. Explain that $^1/_2$ is the simplest way to show $^8/_{16}$ because *the numerator (1) and denominator (2) have no common factors other than 1.*

6. Remind students that *a factor is a whole number that divides exactly into another number.* One way people find factors is to think of the pairs of numbers that can be multiplied to make a third number. Work with input from the students to list the factors of 8 and 16.

Factors of 8 are 1, 2, 4, and 8. You can divide 8 by each of these numbers.

1 x 8 = 8 2 x 4 = 8

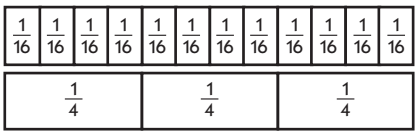
Factors of 16 are 1, 2, 4, 8, and 16. You can divide 16 by each of these numbers.

1 x 16 = 16 2 x 8 = 16 4 x 4 = 16

7. Work with input from the class to identify and circle the factors 8 and 16 have in common: 1, 2, 4, and 8. Then draw students' attention back to $^1/_2$. What are the factors of 1 and 2? What factors do the two numbers have in common? Only 1, so there's no way to simplify the fraction any further.

8. Explain that you can find the simplest form of a fraction by building it with the fewest number of pieces. But you can also simplify a fraction by identifying the *greatest common factor*, or the biggest number by which you can divide both the numerator and the denominator. Write $^{12}/_{16}$ on the board. Can this fraction be simplified? Ask students to pair-share ideas about the largest number by which both 12 and 16 can be divided. When they have identified 4 as the greatest common factor of 12 and 16, record the operation shown below at the overhead, and ask students to confirm it with their pieces. Is it true that $^{12}/_{16}$ cannot be built with any fewer pieces than 3 fourths?

$$\frac{12 \div 4}{16 \div 4} = \frac{3}{4} \qquad \frac{12}{16} = \frac{3}{4}$$



9. Repeat step 8 with $^{10}/_{12}$, $^3/_{16}$, and $^{12}/_8$. Students will note that $^3/_{16}$ cannot be simplified because 3 and 16 have no factors in common other than 1. They will also discover that $^{12}/_8$ simplifies to $^3/_2$ and then converts to a mixed number, $1^1/_2$.

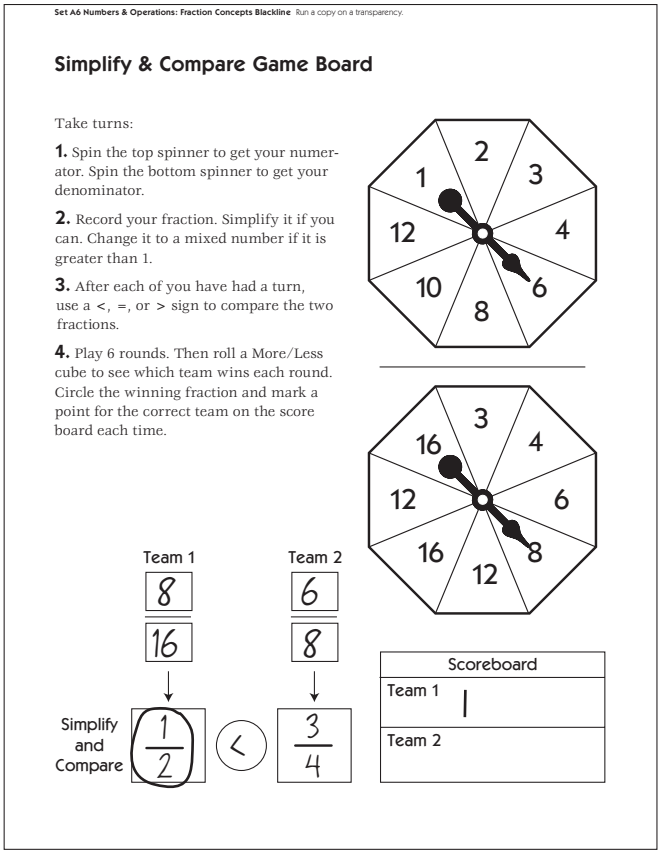
10. Now explain that you're going to play a new game with students that will give them more opportunities to simplify fractions by finding the greatest common factor. Ask them to carefully re-stack all their fraction strips by size while you place the Simplify & Compare game board on display at the overhead. Give students a few moments to examine it quietly, and then read the game rules with the class. Explain that they are going to play as Team 2, and you will play as Team 1. You will play a trial round so everyone can learn the rules, and then play the whole game with them.

11. Place the double spinner overlay on top of the spinners, spin both, and record the results under "Team 1". Work with students to simplify your fraction by finding the greatest common factor for the numerator and denominator. Invite them to check the results with their fraction pieces as well.

12. Invite a volunteer up to the overhead to spin for the class. Record the students' fraction under "Team 2" and work with their input to simplify it. Then ask students to compare their fraction with yours. If they are not sure which fraction is greater, have them build both with their fraction pieces. Use a <, >,

or = sign to show the results. Then have a second volunteer roll the more/less cube to determine the winner. Circle the winning fraction on the overhead.

> ***Teacher*** *I really lucked out on this first trial. I thought you were going to win because* $\frac{3}{4}$ *is greater than* $\frac{1}{2}$*, but Kendra rolled "less" instead of "more".*



13. Once the trial round is completed, erase the overhead. Give students each a copy of the Simplify & Compare record sheet and play 6 rounds with the class. You will need to erase the overhead between each round, but students will have a record of the complete game on their sheets. At the end of the game, have students take turns rolling the more/less cube for each pair of fractions. Have them circle the winning fraction for each round, fill in the scoreboard on their papers, and determine the winning team. If any of the pairs of fractions are equal, both teams score a point for the round.

Extensions

- Play Simplify & Compare several times with the class. The game provides an engaging context in which to practice simplifying and comparing fractions, and you don't have to play all 6 rounds at once.
- Run extra copies of the record sheet and game board, and have the students play the game in pairs. Encourage them to use their fraction kits to confirm their answers if necessary.

INDEPENDENT WORKSHEET

Use Set A6 Independent Worksheets 1 and 3 to provide students more practice simplifying fractions by finding the greatest common factor for the numerator and denominator.

Simplify & Compare Game Board

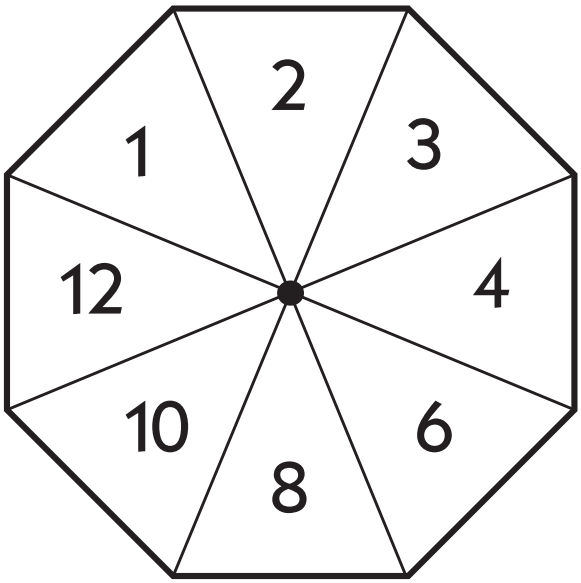
Take turns:

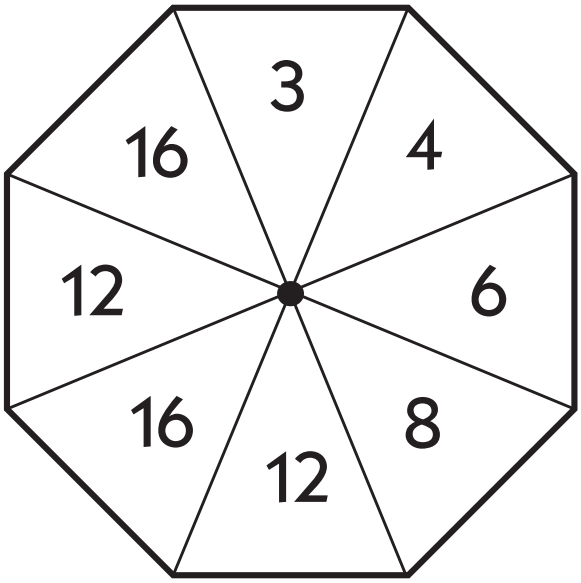
1 Spin the top spinner to get your numerator. Spin the bottom spinner to get your denominator.

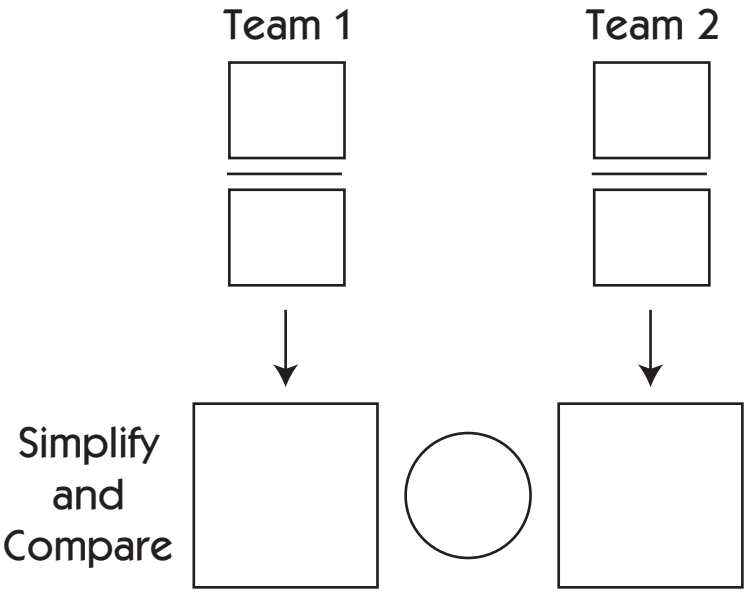
2 Record your fraction. Simplify it if you can. Change it to a mixed number if it is greater than 1.

3 After each of you have had a turn, use a <, =, or > sign to compare the two fractions.

4 Play 6 rounds. Then roll a More/Less cube to see which team wins each round. Circle the winning fraction and mark a point for the correct team on the score board each time.



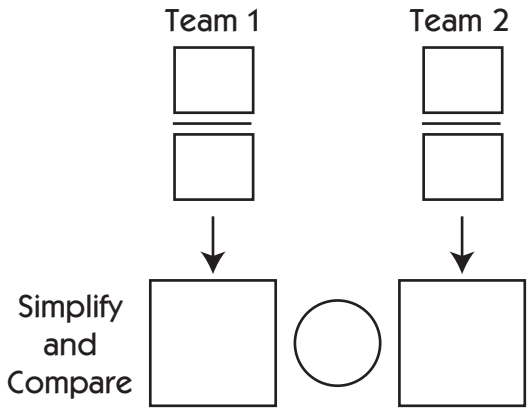
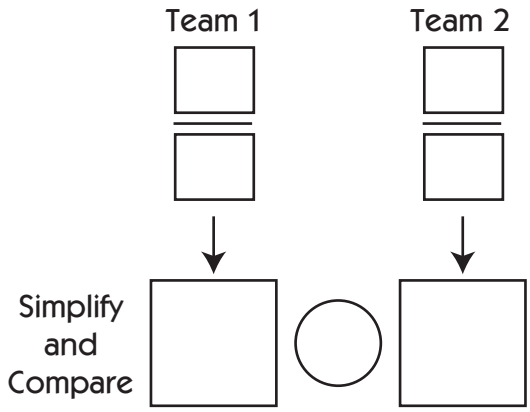
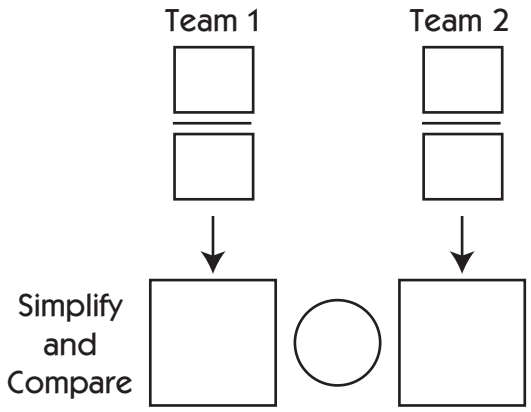
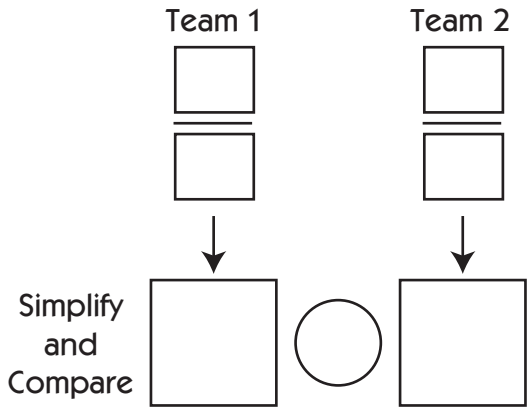
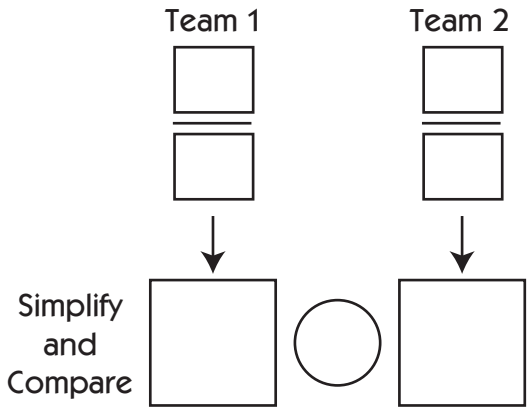
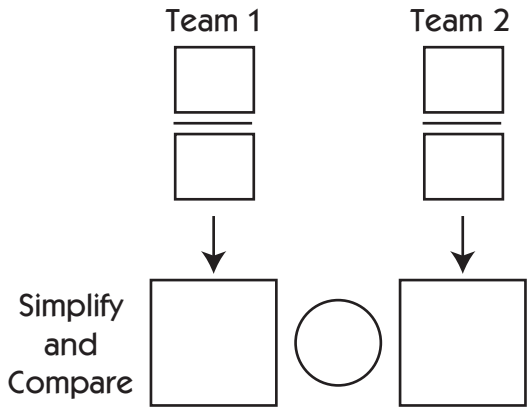




Scoreboard
Team 1
Team 2

NAME _____ **DATE** _____

Simplify & Compare Record Sheet

Round 1	Round 2
	
Round 3	**Round 4**
	
Round 5	**Round 6**
	
Scoreboard	
Team 1	**Team 2**

Set A6 ★ Activity 2

ACTIVITY

Same-Sized Pieces

Overview

Students use sketches to compare fractions with unlike denominators. The teacher then introduces the idea of finding the least common multiple to rewrite fractions so they have common denominators. Students practice and apply this skill as a whole group and then independently.

Skills & Concepts

★ find the difference between two fractions

★ find the least common multiple of two or more whole numbers

★ given two fractions with unlike denominators, rewrite the fractions with a common denominator

You'll need

★ Square Sandwiches & Bedroom Walls (page A6.14, run one copy on a transparency)

★ Same-Sized Pieces (page A6.15, run a class set)

★ Fraction Equivalents Worksheet (pages A6.16 and A6.17 run a class set)

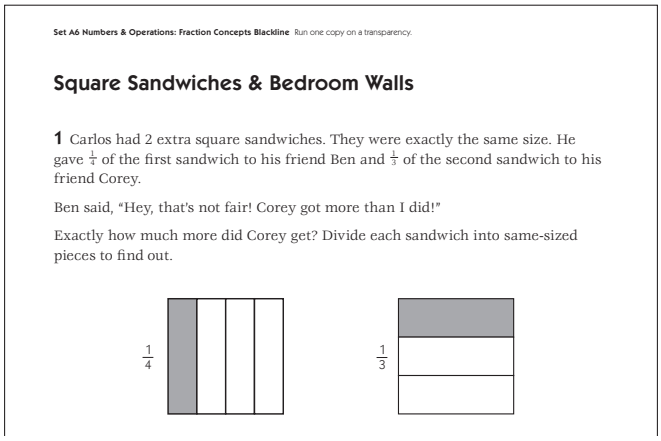
★ piece of paper to mask parts of the overhead

★ overhead pens

★ rulers

Instructions for Same-Sized Pieces

1. Let students know that during this activity the class is going to develop some strategies for comparing fractions. Then display the top portion of the Square Sandwiches overhead. Keep the bottom part of the overhead covered for now.



Set A6 Numbers & Operations: Fraction Concepts Blackline Run one copy on a transparency.

Square Sandwiches & Bedroom Walls

1 Carlos had 2 extra square sandwiches. They were exactly the same size. He gave $\frac{1}{4}$ of the first sandwich to his friend Ben and $\frac{1}{3}$ of the second sandwich to his friend Corey.

Ben said, "Hey, that's not fair! Corey got more than I did!"

Exactly how much more did Corey get? Divide each sandwich into same-sized pieces to find out.

$\frac{1}{4}$ $\frac{1}{3}$

2. Read the text to the class and ask students to pair-share ideas about the situation. Is it true that Corey got more than Ben? Exactly how much more did Corey get? How might dividing each of the sandwiches into same-sized pieces help students solve the problem?

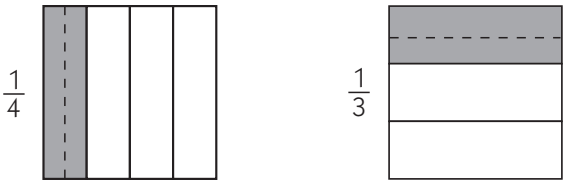
Activity 2 Same-Sized Pieces (cont.)

Students *A third is more than a fourth, but it's hard to tell how much more.*
If you could cut both of the sandwiches into smaller pieces, you could maybe count up the pieces to see how many more of them are in a third.
I don't get it!
I think we're supposed to figure out a way to cut the sandwiches so they both have the same number of pieces. Right now, the first sandwich is cut into 4 pieces. The second sandwich is cut into 3 pieces. How could we make more cuts so they both have the same number?

3. Give students each a copy of the Same-Sized Pieces blackline. Note with students that there are 2 copies of the sandwich squares so they can try at least two different ideas. Some children might want to cut out and fold the sandwich squares, while others may want to draw lines on the squares.

4. After they have had a few minutes to work ask students to share their thinking and compare their answers with neighbors. Then invite several volunteers to share their thinking at the overhead.

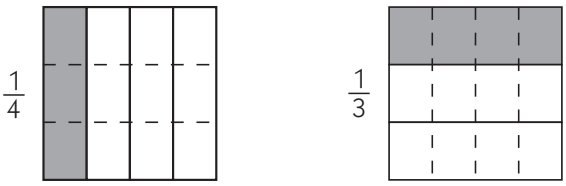
Nick *I saw that if you divide each section of the first sandwich up and down you would get 8 pieces so Ben got $^{2}/_{8}$ of a sandwich. I divided the other sandwich with a line across and saw that you would get 6 pieces and two of those would be the same as the third, so Corey got $^{2}/_{6}$ of a sandwich. Sixths are bigger than eighths, so $^{2}/_{6}$ is more than $^{2}/_{8}$.*



Jade *But that still doesn't tell us how much more Corey got than Ben. I thought we were supposed to make both sandwiches into the same sized pieces.*

Teacher *How did you solve the problem, Jade?*

Jade *Well, I kind of thought about how fourths and thirds go together, and I realized you could cut both of the sandwiches into 12 pieces, like this.*



Teacher *Let's look at the situation again. Should we end up with more pieces all the same size for each sandwich like Nick did or should we cut both sandwiches so they both have the same number of pieces, like Jade did? Talk to the person next to you about this.*

Steven *It's easier to compare if both sandwiches are cut the same. I did the same thing as Jade. You can see that Corey got $^{4}/_{12}$ of a sandwich, and Ben only got $^{3}/_{12}$. Corey got $^{1}/_{12}$ more than Ben did.*

Activity 2 Same-Sized Pieces (cont.)

5. Summarize the sandwich situation by writing the following equations on the board or overhead. How do fourths, thirds, and twelfths relate to one another? Ask students to pair-share ideas, and then call on volunteers to share with the class.

$$\frac{1}{4} = \frac{3}{12} \qquad \frac{1}{3} = \frac{4}{12} \qquad \frac{3}{12} < \frac{4}{12}$$

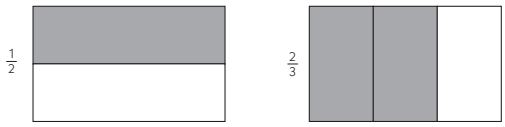
Students *If you can figure out how to make both things, like the sandwiches, into pieces that are the same, you can tell who has more.*
You can cut fourths and thirds into twelfths.
3 and 4 both go into 12. Also, you can get to 12 if you count by 3s and if you count by 4s.

Teacher *So, 3 and 4 are both factors of 12, and 12 is a multiple of 3 and a multiple of 4.*

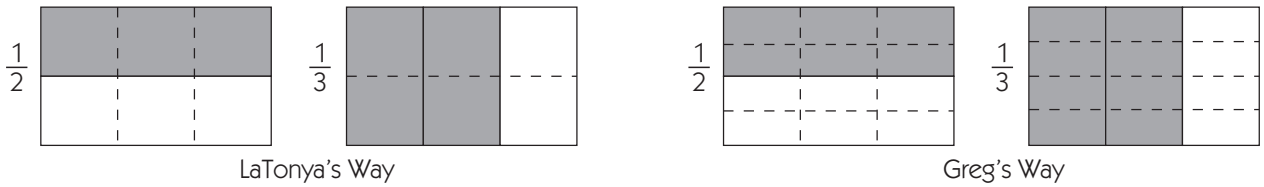
6. Show the next problem on the overhead. Read it with the class and clarify the situation as needed.

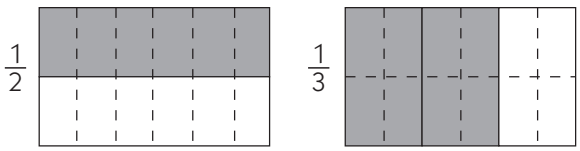
2 Jasmine and Raven were painting 2 walls in Jasmine's bedroom. The 2 walls were exactly the same size. Jasmine painted $\frac{1}{2}$ of the first wall. Raven painted $\frac{2}{3}$ of the other wall.

Exactly how much more did Raven paint than Jasmine? Divide each wall into same-sized pieces to find out. Is there more than one answer?



7. Give students a few minutes to solve the problem by experimenting with the rectangles at the bottom of their Same-Sized Pieces blackline. Encourage children who finish quickly to generate a second, and even third solution. Ask them to check their ideas and solutions with others nearby, and then invite several volunteers to the overhead to share their thinking with the class.





LaTonya *This is so cool! I just split the halves into thirds and the thirds into halves, and got sixths for both walls. Raven painted one more sixth of her wall.*

Activity 2 Same-Sized Pieces (cont.)

Greg *I did sixths at first, and then I split them up into twelfths. Jasmine painted $^{6}/_{12}$ of her wall, and Jasmine painted $^{8}/_{12}$ of her wall.*

Sam *I did the same thing as Sam, but I cut the pieces the other way.*

8. Chances are, your students will discover that the amount of wall space each girl painted can be compared by cutting the rectangles into sixths, twelfths, perhaps even eighteenths or twenty-fourths. Summarize their findings by writing equations similar to the ones below on the board or overhead. Ask students to share their ideas about how sixths and twelfths relate to halves and thirds.

$$\frac{1}{2} = \frac{3}{6} \qquad \frac{2}{3} = \frac{4}{6} \qquad \frac{3}{6} < \frac{4}{6}$$

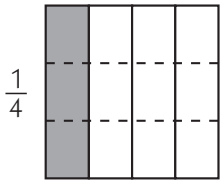
$$\frac{1}{2} = \frac{6}{12} \qquad \frac{2}{3} = \frac{8}{12} \qquad \frac{6}{12} < \frac{8}{12}$$

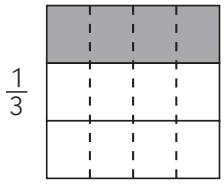
9. Explain that in order to compare, add, or subtract fractions that have different denominators, such as $^{1}/_{4}$ and $^{1}/_{3}$ or $^{1}/_{2}$ and $^{2}/_{3}$, people usually rewrite both fractions so they have the same denominator. Most students will readily agree that rewriting $^{1}/_{2}$ as $^{3}/_{6}$ and rewriting $^{2}/_{3}$ as $^{4}/_{6}$ makes it possible to compare the two with complete accuracy. Furthermore, people usually look for the lowest or least common denominator; in this case sixths rather than twelfths, eighteenths, or twenty-fourths.

While it is possible to find the least common denominator for two fractions by dividing them into smaller pieces as students have been doing today, one can also find the least dommon denominator by finding the least common multiple of the denominators. Write $^{1}/_{4}$ and $^{1}/_{3}$ on the board. Work with student input to identify the denominators and find the least common multiple of 4 and 3 by skip counting. Record the work as shown below.

$\frac{1}{(4)}$ $\frac{1}{(3)}$ 4, 8, (12) 3, 6, 9, (12) 12 is the least common multiple of 4 and 3.

10. Ask students to consider what the equivalent of $^{1}/_{4}$ and $^{1}/_{3}$ would be in twelfths. How many twelfths are there in each of these fractions? Have them re-examine the squares they divided at the beginning of the activity. Then show them how to get the same results by multiplying the numerator and denominator of $^{1}/_{4}$ and $^{1}/_{3}$ by 3 and 4 respectively.





$\frac{1 \times 3}{4 \times 3} = \frac{3}{12}$ $\frac{1 \times 4}{3 \times 4} = \frac{4}{12}$

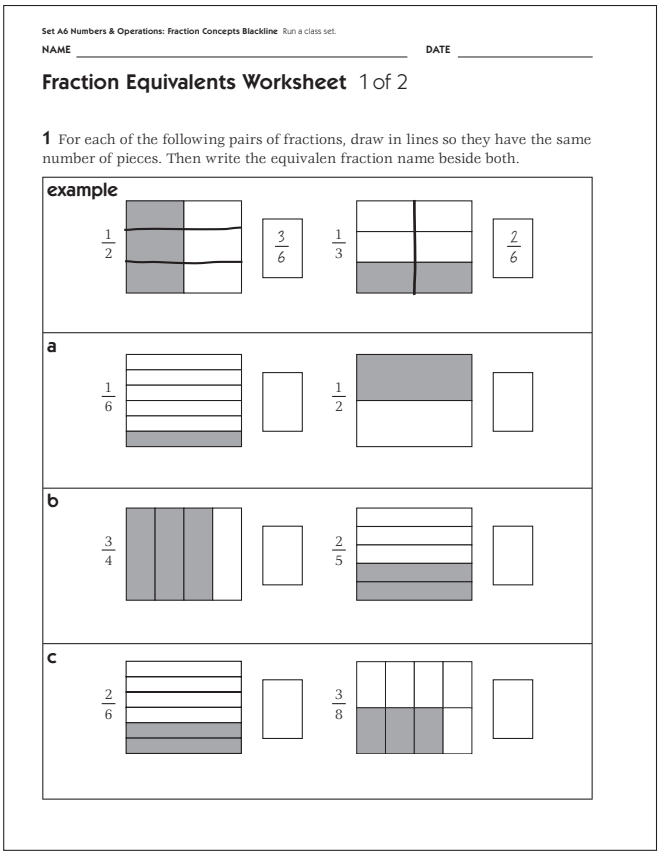
11. Now write $^{1}/_{2}$ and $^{2}/_{3}$ on the board. Work with student input to find the least common multiple of 2 and 3, and then multiply the numerator and denominator of $^{1}/_{2}$ by 3 and the numerator and denominator of $^{2}/_{3}$ by 2.

$$\frac{1 \times 3}{2 \times 3} = \frac{3}{6} \qquad \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$$

Activity 2 Same-Sized Pieces (cont.)

12. Write $^1/_4$ and $^2/_6$ on the board. Which of the two fractions is greater? Exactly how much greater? Ask students to work in pairs to find the least common multiple of 4 and 6, and use the information to rewrite $^1/_4$ and $^2/_6$ so they have a common denominator. After they have had a minute or two to work, ask volunteers to share their solutions and strategies with the class.

13. Repeat step 12 with two or three other pairs of fractions. Possibilities include $^2/_6$ and $^3/_8$, $^3/_4$ and $^7/_{12}$, and $^3/_5$ and $^4/_6$. Then give students each a copy of the Fraction Equivalents Worksheets. Review both sheets with the class and clarify as needed. When students understand what to do, have them go to work. Encourage them to help one another, and circulate to provide help as needed. You might also want to give students a choice of working on the sheet independently, or working with you in a more supported small group setting.



Set A6 Numbers & Operations: Fraction Concepts Blackline Run a class set.

NAME _____ DATE _____

Fraction Equivalents Worksheet 1 of 2

1 For each of the following pairs of fractions, draw in lines so they have the same number of pieces. Then write the equivalen fraction name beside both.

example

$\frac{1}{2}$ $\frac{3}{6}$ $\frac{1}{3}$ $\frac{2}{6}$

a

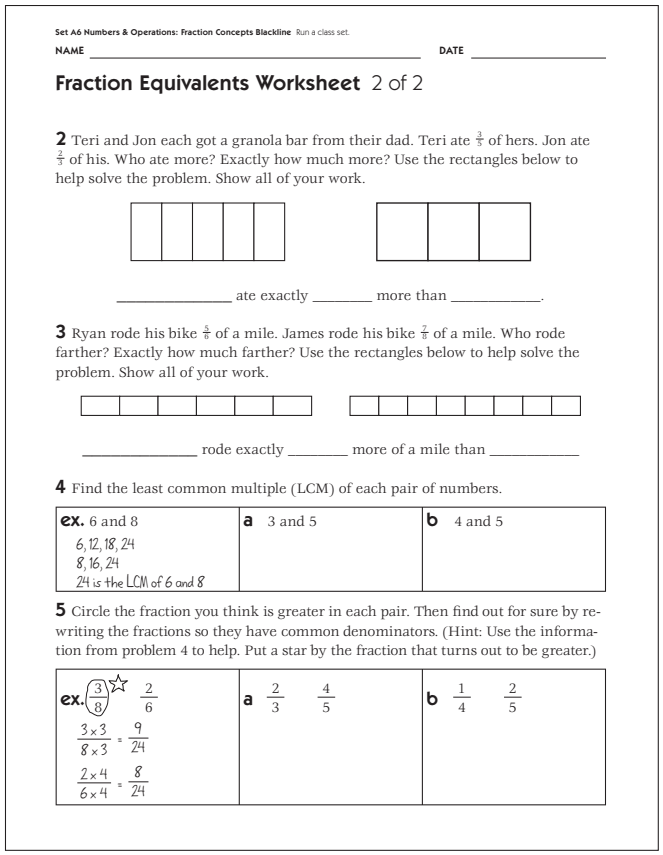
$\frac{1}{6}$ $\frac{1}{2}$

b

$\frac{3}{4}$ $\frac{2}{5}$

c

$\frac{2}{6}$ $\frac{3}{8}$



Set A6 Numbers & Operations: Fraction Concepts Blackline Run a class set.

NAME _____ DATE _____

Fraction Equivalents Worksheet 2 of 2

2 Teri and Jon each got a granola bar from their dad. Teri ate $\frac{3}{8}$ of hers. Jon ate $\frac{2}{3}$ of his. Who ate more? Exactly how much more? Use the rectangles below to help solve the problem. Show all of your work.

_____ ate exactly _____ more than _____.

3 Ryan rode his bike $\frac{5}{6}$ of a mile. James rode his bike $\frac{7}{8}$ of a mile. Who rode farther? Exactly how much farther? Use the rectangles below to help solve the problem. Show all of your work.

_____ rode exactly _____ more of a mile than _____

4 Find the least common multiple (LCM) of each pair of numbers.

ex. 6 and 8	**a** 3 and 5	**b** 4 and 5
6, 12, 18, 24 8, 16, 24 24 is the LCM of 6 and 8		

5 Circle the fraction you think is greater in each pair. Then find out for sure by rewriting the fractions so they have common denominators. (Hint: Use the information from problem 4 to help. Put a star by the fraction that turns out to be greater.)

ex. (3/8)☆ 2/6	**a** 2/3 4/5	**b** 1/4 2/5
$\frac{3\times3}{8\times3} = \frac{9}{24}$ $\frac{2\times4}{6\times4} = \frac{8}{24}$		

INDEPENDENT WORKSHEET

Use Set A6 Independent Worksheets 2 and 3 to provide students more practice finding the difference between two fractions by rewriting them so they have common denominators.

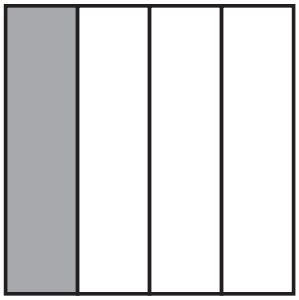
Square Sandwiches & Bedroom Walls

1 Carlos had 2 extra square sandwiches. They were exactly the same size. He gave $\frac{1}{4}$ of the first sandwich to his friend Ben and $\frac{1}{3}$ of the second sandwich to his friend Corey.

Ben said, "Hey, that's not fair! Corey got more than I did!"

Exactly how much more did Corey get? Divide each sandwich into same-sized pieces to find out.

$\frac{1}{4}$

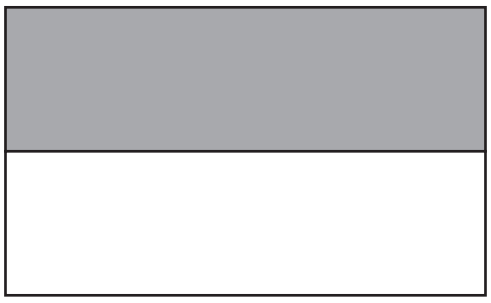


$\frac{1}{3}$

2 Jasmine and Raven were painting 2 walls in Jasmine's bedroom. The 2 walls were exactly the same size. Jasmine painted $\frac{1}{2}$ of the first wall. Raven painted $\frac{2}{3}$ of the other wall.

Exactly how much more did Raven paint than Jasmine? Divide each wall into same-sized pieces to find out. Is there more than one answer?

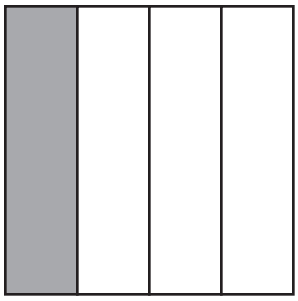
$\frac{1}{2}$

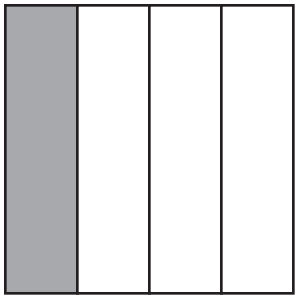


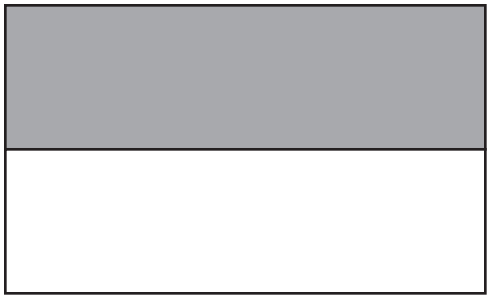
$\frac{2}{3}$

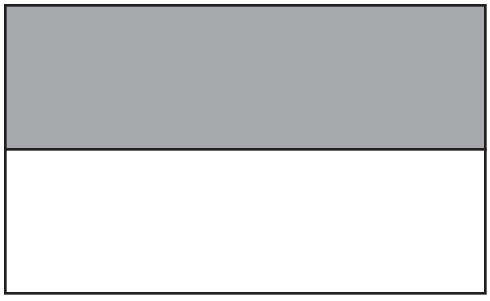
NAME _____ **DATE** _____

Same-Sized Pieces







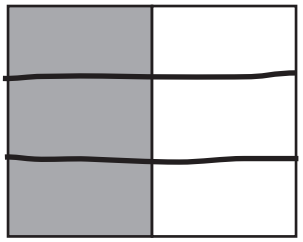


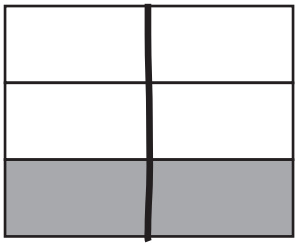
NAME _____ **DATE** _____

Fraction Equivalents Worksheet page 1 of 2

1 For each of the following pairs of fractions, draw in lines so they have the same number of pieces. Then write the equivalen fraction name beside both.

example

$\frac{1}{2}$  $\frac{3}{6}$

$\frac{1}{3}$  $\frac{2}{6}$

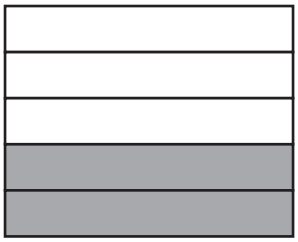
a

$\frac{1}{6}$  _____

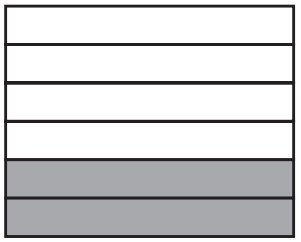
$\frac{1}{2}$  _____

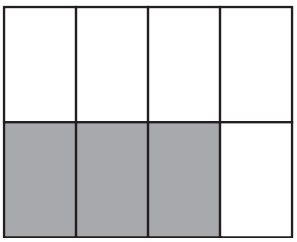
b

$\frac{3}{4}$  _____

$\frac{2}{5}$  _____

c

$\frac{2}{6}$  _____

$\frac{3}{8}$  _____

NAME _____ **DATE** _____

Fraction Equivalents Worksheet page 2 of 2

2 Teri and Jon each got a granola bar from their dad. Teri ate $\frac{3}{5}$ of hers. Jon ate $\frac{2}{3}$ of his. Who ate more? Exactly how much more? Use the rectangles below to help solve the problem. Show all of your work.

_____ ate exactly _____ more than _____.

3 Ryan rode his bike $\frac{5}{6}$ of a mile. James rode his bike $\frac{7}{8}$ of a mile. Who rode farther? Exactly how much farther? Use the rectangles below to help solve the problem. Show all of your work.

_____ rode exactly _____ more of a mile than _____

4 Find the least common multiple (LCM) of each pair of numbers.

ex. 6 and 8 6, 12, 18, 24 8, 16, 24 24 is the LCM of 6 and 8	**a** 3 and 5	**b** 4 and 5

5 Circle the fraction you think is greater in each pair. Then find out for sure by re-writing the fractions so they have common denominators. (Hint: Use the information from problem 4 to help. Put a star by the fraction that turns out to be greater.)

ex. $\frac{3}{8}$ ☆ $\frac{2}{6}$ $\frac{3 \times 3}{8 \times 3} = \frac{9}{24}$ $\frac{2 \times 4}{6 \times 4} = \frac{8}{24}$	**a** $\frac{2}{3}$ $\frac{4}{5}$	**b** $\frac{1}{4}$ $\frac{2}{5}$

NAME _____ **DATE** _____

Set A6 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

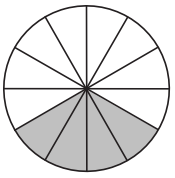
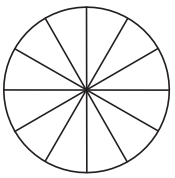
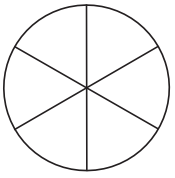
Using the Greatest Common Factor to Simplify Fractions

1 Write all the factors of each number below. Try to think of the factors in pairs.

ex. 2 1, 2 **a** 4 _____ **b** 8 _____

c 3 _____ **d** 6 _____ **e** 12 _____

2 You can simplify a fraction by dividing the numerator and the denominator by the same number. If you divide the numerator and denominator by the largest factor they have in common (the greatest common factor), you can show the fraction in its simplest form. Look carefully at the example below. Then fill in the rest of the table.

Fraction	Factors of the Numerator (Top Number)	Factors of the Denominator (Bottom Number)	Greatest Common Factor	Divide to Get the Simplest Form	Picture and Equation
ex. $\frac{4}{12}$	1, 2, (4)	1, 2, 3, (4), 6, 12	4	$\frac{4 \div 4}{12 \div 4} = \frac{1}{3}$	 $\frac{4}{12} = \frac{1}{3}$
a $\frac{8}{12}$				$\frac{8 \div}{12 \div} = \_\_$	 $\frac{8}{12} = \_\_$
b $\frac{4}{6}$				$\frac{4 \div}{6 \div} = \_\_$	 $\frac{4}{6} = \_\_$

(Continued on back.)

Independent Worksheet 1 Using the Greatest Common Factor to Simplify Fractions (cont.)

3 Find the greatest common factor of each pair of numbers below.

example 6 and 16 Factors of 6 1, (2) 3, 6 Factors of 16 1, (2) 4, 8, 16 Greatest Common Factor of 6 and 16 2	**a** 6 and 21 Factors of 6 _____ Factors of 21 _____ Greatest Common Factor of 6 and 21 _____
b 8 and 24 Factors of 8 _____ Factors of 24 _____ Greatest Common Factor of 8 and 24 _____	**c** 18 and 24 Factors of 18 _____ Factors of 24 _____ Greatest Common Factor of 18 and 24 _____

4 Use your answers from problem 3 to simplify these fractions.

example $\frac{6 \div 2}{16 \div 2} = \frac{3}{8}$ $\frac{6}{16} = \frac{3}{8}$	**a** $\frac{6}{21}$
b $\frac{8}{24}$	**c** $\frac{18}{24}$

5 A fraction is in its simplest form when its numerator and denominator have no common factor other than 1. Look at the fractions below.

- Circle the fractions that can be simplified.
- Put a line under the fractions that are already in simplest form.

$\frac{3}{6}$ $\frac{5}{8}$ $\frac{4}{10}$ $\frac{12}{15}$ $\frac{2}{7}$ $\frac{8}{14}$ $\frac{3}{13}$

6 Choose three of the fractions in problem 5 that can be simplified. Simplify them below. Show your work.

NAME _____ **DATE** _____

Set A6 ★ Independent Worksheet 2

INDEPENDENT WORKSHEET

Finding the Least Common Denominator

Which is greater, $\frac{2}{3}$ or $\frac{4}{5}$? Exactly how much difference is there between these two fractions? If you want to compare, add, or subtract two fractions, it is easier if you rewrite them so they both have the same denominator.

To do this:

- Find the least common multiple of the denominators of the fractions.

  multiples of 3 3, 6, 9, 12, 15
  multiples of 5 5, 10, 15
  The least common multiple of 3 and 5 is 15.

- Multiply the numerator and denominator of each fraction by the same number so the denominators are equal.

$\frac{2 \times 5}{3 \times 5} = \frac{10}{15}$ $\frac{4 \times 3}{5 \times 3} = \frac{12}{15}$ $\frac{4}{5}$ is greater than $\frac{2}{3}$ by exactly $\frac{2}{15}$

1 Find the least common multiple (LCM) of each pair of numbers.

ex. 4 and 10	**a** 5 and 6	**b** 2 and 7
4, 8, 12, 16, 20 10, 20 20 is the LCM of 4 and 10		

2 Circle the fraction you think is greater in each pair. Then find out for sure by rewriting the fractions so they have common denominators. Hint: Use the information from problem 1 to help. Put a star by the fraction that turns out to be greater.

ex. $\frac{3}{4}$ ☆ $\frac{7}{10}$ $\frac{3 \times 5}{4 \times 5} = \frac{15}{20}$ $\frac{7 \times 2}{10 \times 2} = \frac{14}{20}$	**a** $\frac{4}{5}$ $\frac{5}{6}$	**b** $\frac{1}{2}$ $\frac{4}{7}$

(Continued on back.)

Independent Worksheet 2 Finding the Least Common Denominator (cont.)

3 Find the least common multiple (LCM) of each pair of numbers.

a 5 and 10	**b** 6 and 9	**c** 5 and 7

4 Circle the fraction you think is greater in each pair. Then find out for sure by rewriting the fractions so they have common denominators. Hint: Use the information from problem 3 to help. Put a star by the fraction that turns out to be greater.

a $\frac{2}{5}$ $\frac{3}{10}$	**b** $\frac{4}{6}$ $\frac{7}{9}$	**c** $\frac{4}{5}$ $\frac{5}{7}$

5 Erica swam $\frac{6}{8}$ of a mile on Monday. She swam $\frac{10}{12}$ of a mile on Tuesday. Did she swim farther on Monday or Tuesday. Exactly how much farther? Use numbers, words, and/or labeled sketches to solve this problem. Show all your work.

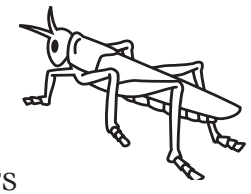
Erica swam exactly _____ of a mile farther on _____.

Set A6 ★ Independent Worksheet 3

INDEPENDENT WORKSHEET

LCM & GCF

1 Two grasshoppers are hopping up the stairs. Gary starts at the bottom and hops up 3 stairs at a time. First he lands on step 3, then step 6, and so on. Grace starts at the bottom and hops up 4 stairs at a time. First she lands on step 4, then step 8, and so on.



a The staircase has 24 steps. On which steps will both grasshoppers land? Use labeled sketches, numbers, and/or words to solve the problem. Show your work.

Both grasshoppers will land on steps _____.

b What is the first step on which both grasshoppers will land? _____
This is the least common multiple of 3 and 4.

2 Find the least common multiple (LCM) of each pair of numbers.

ex. 6 and 8	**a** 4 and 9	**b** 5 and 8	**c** 6 and 14
6, 12, 18, 24 8, 16, 24 24 is the LCM of 6 and 8			

3 Circle the fraction you think is greater in each pair. Then find out for sure by rewriting the fractions so they have common denominators. Hint: Use the information from problem 2 to help. Put a star by the fraction that turns out to be greater.

ex. (5/6) ☆ 6/8	**a** 3/4 7/9	**b** 2/5 3/8	**c** 4/6 9/14
$\frac{5\times4}{6\times4} = \frac{20}{24}$ $\frac{6\times3}{8\times3} = \frac{18}{24}$			

(Continued on back.)

Independent Worksheet 3 LCM & GCF (cont.)

4 You can use the greatest common factor (GCF) to help simplify fractions.

Find the greatest common factor of each pair of numbers.

ex. 12 and 24 Factors of 12 are 1, 2, 3, 4, 6, (12) Factors of 24 are 1, 2, 3, 4, 6, 8, (12), 24 12 is the GCF of 12 and 24	**a** 8 and 20
b 12 and 18	**c** 10 and 15

5 Use your answers from problem 4 to simplify these fractions.

ex. $\frac{12 \div 12}{24 \div 12} = \frac{1}{2}$ $\quad \frac{12}{24} = \frac{1}{2}$	**a** $\frac{8}{20}$
b $\frac{12}{18}$	**c** $\frac{10}{15}$

6 Ebony got $\frac{3}{4}$ of a yard of red ribbon and $\frac{10}{12}$ of a yard of purple ribbon. Which piece of ribbon was longer? Exactly what fraction of a yard longer was it? Use numbers, words, and/or labeled sketches to solve this problem. Make sure your answer is in simplest form.

The _____ piece of ribbon was exactly _____ of a yard longer than the _____ piece of ribbon.