LESSON 18: Subtract Fractions - Unlike Denominators

[Objective]

The student will subtract fractions with unlike denominators.

[Prerequisite Skills]

equivalent fractions, subtracting fractions with like denominators

[Materials]

Student pages **S170 – S179**
Transparencies **T516, T518, T520, T522, T524, T526, and T528**
Fraction Kits 1–3
Overhead fraction strips
Colored pencils
Foldable from Lesson 16

[Essential Questions]

1. How does it help our understanding of subtracting fractions to build with concrete materials?
2. How does it help our understanding of subtracting fractions to build with pictorial models?
3. How can we subtract fractions with unlike denominators?

[Words For Word Wall]

subtrahend, minuend, difference, denominator, numerator, equivalent, simplify, simplest form, legal trade

[Grouping]

Cooperative Pairs (CP), Whole Group (WG), Individual (I)
*For Cooperative Pairs (CP) activities, assign the roles of Partner A and Partner B to students. This allows each student to be responsible for designated tasks within the lesson.

[Levels of Teacher Support]

Modeling (M), Guided Practice (GP), Independent Practice (IP)

[Multiple Representations]

SOLVE, Graphic Organizer, Verbal Description, Pictorial Representation, Concrete Representation

[Warm-Up] (5 minutes – IP, I, WG) S170 (Answers on T515.)

- Have students turn to S170 in their books to begin the Warm-Up. Students will practice subtracting fractions with like denominators. Monitor students to see if any of them need help during the Warm-Up. Give students 3 minutes to complete the problems and then spend 2 minutes reviewing the answers as a class. **{Verbal Description}**

[Homework] (5 minutes)

Take time to go over the homework from the previous night.

[Lesson] (60 minutes – M, GP, IP, I, WG, CP)

SOLVE Problem (3 minutes – GP, WG) T516, S171 (Answers on T517.)

Have students turn to S171 in their books, and place T516 on the overhead. The first problem is a SOLVE problem. You are only going to complete the S step with students at this point. Tell students that during the lesson they will learn how to subtract fractions with unlike denominators. They will use this knowledge to complete this SOLVE problem at the end of the lesson. **{SOLVE, Graphic Organizer}**

Subtract Fractions – Concrete – Unlike Denominators (9 minutes – M, IP, GP, WG, CP) T516, T518, S171, S172 (Answers on T517, T519.)

5 minutes – M, GP, CP, WG: Have students turn to S171 in their books, and place T516 on the overhead. Use the overhead fraction strips and the following modeling activity to help students investigate subtracting fractions with unlike denominators using their fraction kits. Assign the roles of Partner A and Partner B. **{Verbal Description, Concrete Representation, Graphic Organizer}**

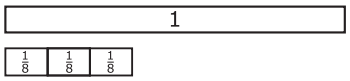
MODELING

Subtract Fractions – Concrete – Unlike Denominators

Step 1: Direct students' attention to Problem 1. Explain to students that they will use their fraction kits to model $\frac{3}{8} - \frac{1}{4}$.

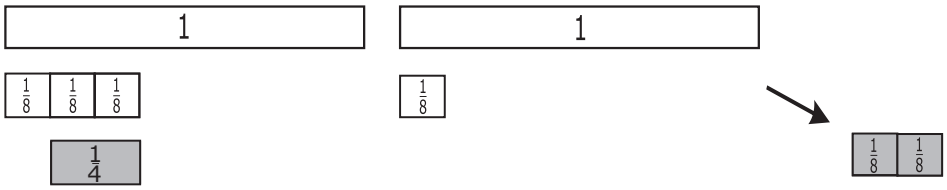
Explain to students that when modeling subtraction, we show the first fraction.

Step 2: Have students place the fraction $\frac{3}{8}$ underneath the whole unit as shown below.



- Partner A, determine the color of the **minuend**. (red) Record.
- Partner B, determine if the denominators in the subtraction problem are the same. (No.) Record. Remind students that before the fractions can be subtracted they must have a common denominator.

Explain to students that they will have to make a legal trade so that it is possible to subtract the $\frac{1}{4}$. Model for students how to trade $\frac{1}{4}$ for $\frac{2}{8}$ and then take away the $\frac{2}{8}$ from the $\frac{3}{8}$ to find the **difference** of $\frac{1}{8}$ as shown below.

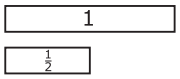


Step 3:
- Partner A, explain what happened to the **denominators** when the fractions were subtracted. (The denominators were not alike, so one had to be changed to make a fraction that was equivalent with a common denominator.)
- Partner B, explain what happened to the **numerators** when the fractions were subtracted. (The numerator of one fraction changed when the denominator was changed. Once the two fractions had a common denominator, the numerators were subtracted to find the difference.)

Step 4:
- Partner B, determine if you can **legally trade** the difference of $\frac{1}{8}$ for fewer fraction strips in another color. (No.) Tell students that this indicates that the difference is in **simplest form**.

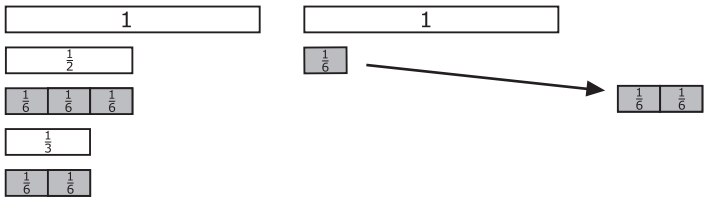
Step 5: Direct students' attention to Problem 2. Explain to students that they will use their fraction kits to find $\frac{1}{2} - \frac{1}{3}$.

Step 6: Have students place the fraction $\frac{1}{2}$ underneath the whole unit as shown below.



- Partner A, identify the color of the minuend. (brown)
- Partner B, determine if the denominators in the subtraction problem are the same. (No.) Record. Explain to students that they will have to make a legal trade so that it is possible to subtract the $\frac{1}{3}$.

Model for students how to trade $\frac{1}{2}$ for $\frac{3}{6}$ and $\frac{1}{3}$ for $\frac{2}{6}$. Then model how to take away $\frac{2}{6}$ from $\frac{3}{6}$ to find the difference of $\frac{1}{6}$ as shown below.



Step 7:
- Partner A, explain what happened to the denominators when the fractions were subtracted. (The denominators were not alike, and they both had to be changed to make fractions that have common denominators.)
- Partner B, explain what happened to the numerators when the fractions were subtracted. (The numerators both changed when the denominators were changed. Once the two fractions have common denominators, the numerators were subtracted to find the difference.)

Step 8:
- Partner A, determine if you can legally trade the difference of $\frac{1}{6}$ for fewer fraction strips in another color. (No.) Tell students that this indicates that the difference is in simplest form.

3 minutes – IP, CP: Have students work in partners to complete Problems 3 and 4 on S172. Tell students to make sure they use their fraction strips to legally trade the differences for strips of one color and to put the solutions in simplest form. **{Verbal Description, Concrete Representation, Graphic Organizer}**

1 minute – WG: Have students come back together as a class and share their results. They should be able to justify the differences using their fraction strips. **{Verbal Description, Concrete Representation, Pictorial Representation, Graphic Organizer}**

Subtract Unlike Fractions – Move to Pictorial – Rename One Number

(12 minutes – M, GP, CP, IP, WG) T520, S173 (Answers on T521.)

7 minutes – M, GP, CP, WG: Have students turn to S173 in their books, and place T520 on the overhead. Use the overhead fraction strips and the following modeling activity to help students investigate subtracting fractions with unlike denominators (renaming either the minuend or the subtrahend) at the pictorial level. Assign the roles of Partner A and Partner B. **{Verbal Description, Concrete Representation, Graphic Organizer}**

MODELING

Subtract Unlike Fractions – Move to Pictorial – Rename One Number

Step 1: Have students take out their fraction kits and build $\frac{6}{9}$ using purple fraction strips. Ask students to subtract $\frac{1}{3}$ from $\frac{6}{9}$ using their fraction strips and determine the difference. $\left(\frac{3}{9}\right)$ Have students legally trade $\frac{3}{9}$ for $\frac{1}{3}$ to put the difference in simplest form.

Step 2: Tell students that they will be moving to the pictorial representation of the fraction strips. Direct students' attention to Problem 1 and explain that students will model subtracting $\frac{1}{3}$ from $\frac{6}{9}$ pictorially.

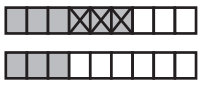
Step 3: Point out the three strips in the second column next to Problem 1. Tell students that the first strip represents the first number in the problem (minuend), and the second strip represents the difference. Explain that the third strip represents the difference in simplest form, if possible.

- Partner A, determine how many sections the first strip is divided into. (9) Tell students to shade $\frac{6}{9}$ on the first strip purple to represent the minuend as shown below.

Step 4: Tell students that they need to subtract $\frac{1}{3}$ from $\frac{6}{9}$ and that they need to legally trade one of the fractions for another to get a common denominator.

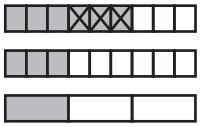
- Partner B, determine if we can legally trade a third for ninths. How many? (Yes, 3.)
- Partner A, identify the **equivalent** fraction for $\frac{1}{3}$ in ninths. $\left(\frac{3}{9}\right)$ Have students record this in the third column.

Step 5: Have students cross out $\frac{3}{9}$ on the first strip and shade in the difference of $\frac{3}{9}$ on the second strip as shown below.



Ask students if $\frac{3}{9}$ can be legally traded for fewer strips of another color. (Yes, $\frac{3}{9}$ can be legally traded for $\frac{1}{3}$.) Have students divide the third strip in Problem 1 into thirds and shade 1 of the 3 sections to show the difference $\left(\frac{1}{3}\right)$ in simplest form. The completed shading is shown below. Have students look again at the equivalent fraction for $\frac{1}{3}$, which was $\frac{3}{9}$. Explain that, mathematically, the 3 was multiplied by 3 to get 9.

Ask, "What happened to the numerator?" (It was also multiplied by 3.)



Have students rewrite the number sentence as $\frac{6}{9} - \frac{1}{3} = \frac{6}{9} - \frac{3}{9} = \frac{3}{9}$ and then write the difference in simplest form in Column 4. $\left(\frac{3}{9} = \frac{1}{3}\right)$

3 minutes – IP, CP: Have students work in partners to complete Problems 2–4 on S173. Tell students to use their fraction strips to check if they can legally trade the solutions for fewer strips in another color. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

2 minutes – WG: Have students come back together as a class and share their results. They should be able to justify the differences using the pictorial models. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

Subtract Unlike Fractions – Move to Pictorial – Rename Minuend and Subtrahend (8 minutes – M, GP, IP, WG, CP) T522, S174 (Answers on T523.)

4 minutes – M, GP, CP, WG: Have students turn to S174 in their books, and place T522 on the overhead. Pass out colored pencils to each student. Use the overhead fraction strips and the following modeling activity to help students investigate subtracting fractions with like and unlike denominators (renaming both the minuend and subtrahend) at the pictorial level. Assign the roles of Partner A and Partner B. **{Verbal Description, Concrete Representation, Pictorial Representation, Graphic Organizer}**

MODELING

Subtract Unlike Fractions – Move to Pictorial – Rename Minuend and Subtrahend

Step 1: Have students take out their fraction kits and build $\frac{1}{2}$ using a brown fraction strip. Ask students to subtract $\frac{1}{5}$ from $\frac{1}{2}$ using their fraction strips and determine the difference. $\left(\frac{3}{10}\right)$

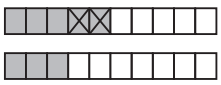
Step 2: Tell students that they will be moving to the pictorial representation of the fraction strips. Direct students' attention to Problem 1 and explain that now students will model subtracting $\frac{1}{5}$ from $\frac{1}{2}$ pictorially.

Step 3: Point out that there are three strips in Problem 1. Tell students that the first strip represents the first number in the problem (minuend), and the second strip represents the difference. Explain that the third strip represents the difference in simplest form, if possible. Ask students how many sections the first strip is divided into. (2) Tell students to shade $\frac{1}{2}$ on the first strip brown to represent the minuend as shown below.

Step 4:

- Partner A, identify which fractions need to be traded for a common denominator. (both) Model for students how to list the multiples of the denominators 2 and 5. Have students circle the common multiples and ask students to determine the least common multiple. (10)
- Partner B, identify the new denominator.
- Partner A, identify the two fractions when represented with a common denominator. $\left(\frac{5}{10}\right.$ and $\left.\frac{2}{10}\right)$ Look at the equivalent fractions again. $\frac{1}{2}$ changed to $\frac{5}{10}$. The denominator of 2 was multiplied by 5 to equal the 10. What happened to the numerator? (It was also multiplied by 5.) $\frac{1}{5}$ changed to $\frac{2}{10}$. The denominator of 5 was multiplied by 2 to equal the 10. What happened to the numerator? (It was also multiplied by 2).

Step 5: Have students rewrite the problem as $\frac{5}{10} - \frac{2}{10}$. Model how to divide the halves strip into tenths by drawing lines. Shade in five of the tenths. Then, cross out two of the tenths from the first strip. Ask, "How many tenths are left?" (3) Have students divide the second strip into tenths and shade the difference $\left(\frac{3}{10}\right)$ on the second strip. Ask students if they can legally trade the difference of $\frac{3}{10}$ for fewer fraction strips in another color. (No, the fraction is in simplest form.) The completed shading is shown below.



3 minutes – IP, CP: Have students work in partners to complete S174. Tell students that they may use their fraction strips to check if their solutions are in simplest form. **{Verbal Description, Graphic Organizer, Pictorial Representation}**

1 minute – WG: Have students come back together as a class and share their results. They should be able to justify differences using the pictorial models. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

Subtract Fractions – Move from Pictorial to Abstract

(8 minutes – M, WG, CP, GP, IP) T524, S175 (Answers on T525.)

3 minutes – WG, M, GP, CP: Have students turn to S175 in their books, and place T524 on the overhead. Use the following modeling activity to help students investigate subtracting fractions at the abstract level. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

MODELING

Subtract Fractions – Move from Pictorial to Abstract

Step 1: Direct students' attention to Problem 1. Have students draw a pictorial model of $\frac{1}{2}$. Shade $\frac{1}{2}$ in brown.

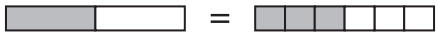
Step 2:

- Model for students how to find a common denominator by finding the least common multiple of 2 and 6:

  2: 2, 4, (6)

  6: (6), 12

- Partner A, identify the common denominator. (6)
- Partner B, identify the fraction that needs to have the denominator changed. $\left(\frac{1}{2}\right)$ Have students draw a picture in the second column to show the legal trade as you model.



Explain that $\frac{1}{2}$ is equivalent to $\frac{3}{6}$ and that the 2 was multiplied by 3 to get the denominator of 6.

- Partner A, explain what happened to the numerator. (It was also multiplied by 3.)

Step 3: Partner B, identify the **subtrahend**. ($\frac{2}{6}$) Partner B, cross out the subtrahend and identify what is left. ($\frac{1}{6}$)

Step 4: Ask students if they can legally trade to get fewer strips in another color. (No.) Tell students that the fraction is in simplest form. Have students write the problem and solution numerically in the third column.

Step 5: Model Problem 2, following the same process in Steps 1–4. Explain to students that in Problem 2 the denominator in both numbers will need to be changed to a common denominator.

4 minutes – IP, CP: Have students work in partners to complete Problems 3–4 on S175. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

1 minute – WG: Have students come back together as a class and share their results. They should be able to justify the differences using the pictorial models. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

Subtract Fractions Without Models (8 minutes – M, GP, IP, WG, CP) T526, S176 (Answers on T527.)

4 minutes – M, CP, GP, WG: Have students turn to S176 in their books, and place T526 on the overhead. Use the following activity to help students subtract unlike fractions without models. Assign the roles of Partner A and Partner B. (Some students may need to draw pictures.) **{Verbal Description, Graphic Organizer}**

MODELING

Subtract Fractions Without Models

Step 1: Have students look at Problem 1.

- Partner A, explain what the problem asks us. (What is $\frac{4}{6} - \frac{1}{2}$?)
- Partner B, do the fractions have a common denominator? (No.) Record.

Find a common denominator by finding the least common multiple of both denominators. Record. (Model how to list the multiples and find the least common multiple. Multiples of 2: 2, 4, 6, 8, 10; Multiples of 6: 6, 12, 18)

- Partner A, identify the least common multiple of 2 and 6. (6)
- Partner B, explain how to change $\frac{1}{2}$ to a fraction with a denominator of 6. This will be a fraction that is equivalent to $\frac{1}{2}$. What would you multiply 2 by to get a product of 6 (3) Multiply the numerator by the same factor. What is the equivalent fraction? $\left(\frac{3}{6}\right)$
- Partner A, identify the number sentence. $\left(\frac{4}{6} - \frac{3}{6}\right)$ Record.
- Subtract the numerators, and the denominator will remain the same. What is the difference? $\left(\frac{1}{6}\right)$ Record.
- Partner B, detemine if the fraction can be **simplified**. (No.)

Step 2: Have students look at Problem 2.

- Partner A, explain what the problem asks us. (What is $\frac{3}{5} - \frac{1}{2}$?)
- Partner B, do the fractions have a common denominator? (No.)
- Find a common denominator by finding the least common multiple of both denominators. Record. (Model how to list the multiples and find the least common multiple. Multiples of 5: 5, 10, 15, 20; Multiples of 2: 2, 4, 6, 8, 10, 12)
- Partner A, identify the least common multiple of 5 and 2. (10)
- Partner B, explain how to change both fractions to equivalent fractions with a denominator of 10. Think about what you would multiply the denominator of each fraction by to get an equivalent fraction. What will happen to the numerators? (They will be multiplied by the same factor.)
- Partner A, explain the number sentence. $\left(\frac{6}{10} - \frac{5}{10}\right)$ Record.

- Subtract the numerators, and the denominator will remain the same.
- Partner B, identify the difference. $\left(\frac{1}{10}\right)$ Record.
- Ask students if the fraction can be simplified. (No.)

Step 3: Have students look at Problem 3.

- Partner A, explain what the problem asks us. $\left(\frac{2}{3} - \frac{3}{9}\right)$
- Partner B, do the fractions have a common denominator? (No.) Record.
- Find a common denominator by finding the least common multiple of both denominators. Record. (Model how to list the multiples and find the least common multiple. Multiples of 3: 3, 6, 9, 12; Multiples of 9: 9, 18, 27, 36)
- Partner A, identify the least common multiple of 3 and 9. (9)
- Change both fractions to equivalent fractions with a denominator of 9. Think about what you would multiply the denominator of each fraction by to get an equivalent fraction. What will happen to the numerators? (They will be multiplied by the same factor.)
- Partner B, describe the number sentence. $\left(\frac{6}{9} - \frac{3}{9}\right)$ Record.

Subtract the numerators, and the denominators will remain the same.

- Partner A, identify the difference. $\left(\frac{3}{9}\right)$ Record.
- Ask students if the fraction can be simplified. (Yes, $\frac{3}{9} = \frac{1}{3}$.) Record.

3 minutes – IP, CP: Have students work in partners to complete Problems 4–6 on S176. **{Verbal Description, Graphic Organizer}**

1 minute – WG: Have students come back together as a class and share their results. **{Verbal Description, Graphic Organizer}**

Fraction Foldable **(5 minutes – GP, WG)**

Have students take out the Fraction Foldable they created in Lesson 16. Use the following activity to help students continue to add to the fraction foldable. **{Verbal Description, Graphic Organizer}**

MODELING

Fraction Foldable

Step 1: Have students take out their Fraction Foldables.

Step 2: Create a transparency to model for students what should be written on each page.

Step 3: On page 3 of the Fractions Foldable, model for students how to label the section – Subtraction with Unlike Denominators. Discuss with students what they have to do to subtract fractions with unlike denominators, and then write on the appropriate section. Use your foldable to reference what you want written in the foldable.

SOLVE Problem **(5 minutes – GP, WG) T528, S177 (Answers on T529.)**

Remind students that the SOLVE problem is the same one from the beginning of the lesson. Complete the SOLVE problem with your students. Ask them for possible connections from the SOLVE problem to the lesson. (Students will work with subtraction of fractions with unlike.) **{SOLVE, Verbal Description, Graphic Organizer}**

If time permits... **(10 minutes – IP, I) S178 (Answers on T530.)**

Have students complete Problems 1–10 on S178.

[Closure] (2 minutes)

To wrap up the lesson, go back to the essential questions and discuss them with students.

- How does it help our understanding of subtracting fractions to build with concrete materials? *(Using concrete materials helps us see and touch the fractions we are subtracting.)*
- How does it help our understanding of subtracting fractions to build with pictorial models? *(Using pictorial models helps us see the relationship between the fractions we are subtracting.)*
- How can we subtract fractions with unlike denominators? *(Represent first fraction, legally trade for one color, take away the second* fraction, *then simplify.)*

[Homework] Assign S179 for homework. (Answers on T531.)

[Quiz Answers] T532–T533

1. **C** 2. **A** 3. **D** 4. **A** 5. **B** 6. **D** 7. **A** 8. **C** 9. **A** 10. **D**

The quiz can be used at any time as extra homework or to see how students progress on understanding subtracting fractions with unlike denominators.

Here is the key to **S170.**

Warm–Up

Directions: Find the difference in each of the following subtractions, problems. Simplify answers if needed.

1. $\frac{3}{4} - \frac{1}{4} = \mathbf{\frac{2}{4}} = \mathbf{\frac{1}{2}}$

2. $\frac{10}{12} - \frac{3}{12} = \mathbf{\frac{7}{12}}$

3. $\frac{7}{8} - \frac{2}{8} = \mathbf{\frac{5}{8}}$

4. $\frac{5}{6} - \frac{1}{6} = \mathbf{\frac{4}{6}} = \mathbf{\frac{2}{3}}$

TRANSPARENCY MASTER for S171

Directions: Complete the following SOLVE problem with your teacher. You will only complete the S step.

Mr. Martinez is building a short walkway to the playground area. There is a muddy area from the door to the gate of the playground. He needs to cut a length of wood that is $\frac{3}{4}$ of a meter, and the length of the wood he has is $\frac{7}{8}$ of a meter. How much wood will he need to cut from the longer piece of wood to have the length he needs?

S Underline the question.
This problem is asking me to find _____

_____.

Directions: Complete this page with your teacher and partner.

1.

Problem: $\frac{3}{8} - \frac{1}{4} =$

What color are the fraction strips?

Think about this:

Denominators? _____

Legally trade for fraction strips of all _____ _____. Then, _____ the numerators.

Legally trade for fewer fraction pieces, if possible.

2.

Problem: $\frac{1}{2} - \frac{1}{3} =$

What color are the fraction strips?

Think about this:

Denominators? _____

Legally trade for fraction strips of all _____ _____. Then, _____ the numerators.

Legally trade for fewer fraction pieces, if possible.

LESSON 18: Subtract Fractions - Unlike Denominators

Here is the key to **S171**.

Directions: Complete the following SOLVE problem with your teacher. You will only complete the S step.

Mr. Martinez is building a short walkway to the playground area. There is a muddy area from the door to the gate of the playground. He needs to cut a length of wood that is $\frac{3}{4}$ of a meter, and the length of the wood he has is $\frac{7}{8}$ of a meter. How much wood will he need to cut from the longer piece of wood to have the length he needs?

S Underline the question.
This problem is asking me to find **the amount of wood that needs to be cut from the longer piece of wood.**

Directions: Complete this page with your teacher and partner.

1.

Problem: $\frac{3}{8} - \frac{1}{4} = \mathbf{\frac{1}{8}}$

What color are the fraction strips?

red

Think about this:

Denominators? **not the same**

Legally trade for fraction strips of all **one color**. Then, **subtract** the numerators.

Legally trade for fewer fraction pieces, if possible.

2.

Problem: $\frac{1}{2} - \frac{1}{3} = \mathbf{\frac{1}{6}}$

What color are the fraction strips?

brown

Think about this:

Denominators? **not the same**

Legally trade for fraction strips of all **one color**. Then, **subtract** the numerators.

Legally trade for fewer fraction pieces, if possible.

TRANSPARENCY MASTER for S172

Directions: Complete this page with your parttner.

3.

Problem: $\frac{3}{4} - \frac{1}{2} =$

What color are the fraction strips?

Think about this:

Denominators? _____

Legally trade for fraction strips of all _____ _____. Then, _____ the numerators.

Legally trade for fewer fraction pieces, if possible.

4.

Problem: $\frac{2}{3} - \frac{1}{4} =$

What color are the fraction strips?

Think about this:

Denominators? _____

Legally trade for fraction strips of all _____ _____. Then, _____ the numerators.

Legally trade for fewer fraction pieces, if possible.

Here is the key to **S172.**

Directions: Complete this page with your parttner.

3.

Problem: $\frac{3}{4} - \frac{1}{2} = \mathbf{\frac{1}{4}}$

What color are the fraction strips?

yellow

Think about this:

Denominators? **not the same**

Legally trade for fraction strips of all **one color**. Then, **subtract** the numerators.

Legally trade for fewer fraction pieces, if possible.

4.

Problem: $\frac{2}{3} - \frac{1}{4} = \mathbf{\frac{5}{12}}$

What color are the fraction strips?

green

Think about this:

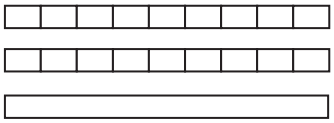
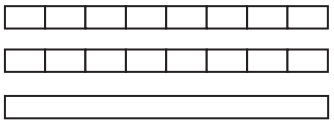
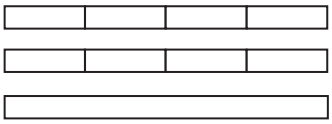
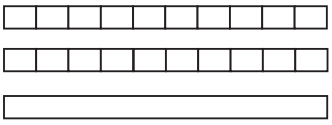
Denominators? **not the same**

Legally trade for fraction strips of all **one color**. Then, **subtract** the numerators.

Legally trade for fewer fraction pieces, if possible.

TRANSPARENCY MASTER for S173

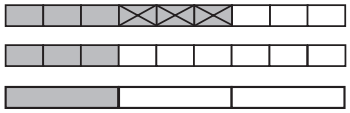
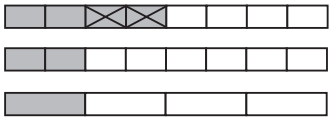
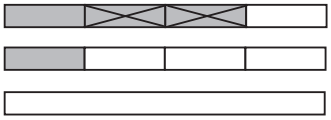
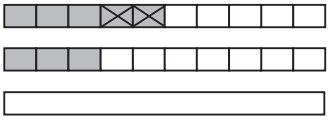
Direction: Complete this page with your teacher and partner.

Problem	Picture	Rewrite Fraction with Common Denominator	Subtract Fractions	Simplest Form
1. $\frac{6}{9} - \frac{1}{3}$			$\frac{6}{9} - \frac{1}{3} =$ ___ – ___ = ___	
2. $\frac{4}{8} - \frac{1}{4}$			$\frac{4}{8} - \frac{1}{4} =$ ___ – ___ = ___	
3. $\frac{3}{4} - \frac{1}{2}$			$\frac{3}{4} - \frac{1}{2} =$ ___ – ___ = ___	
4. $\frac{5}{10} - \frac{1}{5}$			$\frac{5}{10} - \frac{1}{5} =$ ___ – ___ = ___	

LESSON 18: Subtract Fractions - Unlike Denominators

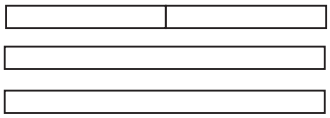
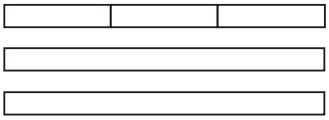
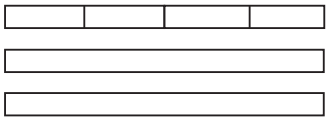
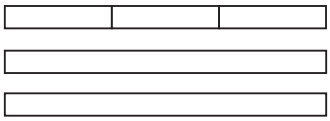
Here is the key to **S173**.

Directions: Complete this page with your teacher and partner.

Problem	Picture	Rewrite Fraction with Common Denominator	Subtract Fractions	Simplest Form
1. $\frac{6}{9} - \frac{1}{3}$		$\mathbf{\frac{1}{3} = \frac{3}{9}}$	$\frac{6}{9} - \frac{1}{3} =$ $\mathbf{\frac{6}{9} - \frac{3}{9} = \frac{3}{9}}$	$\mathbf{\frac{3}{9} = \frac{1}{3}}$
2. $\frac{4}{8} - \frac{1}{4}$		$\mathbf{\frac{1}{4} = \frac{2}{8}}$	$\frac{4}{8} - \frac{1}{4} =$ $\mathbf{\frac{4}{8} - \frac{2}{8} = \frac{2}{8}}$	$\mathbf{\frac{2}{8} = \frac{1}{4}}$
3. $\frac{3}{4} - \frac{1}{2}$		$\mathbf{\frac{1}{2} = \frac{2}{4}}$	$\frac{3}{4} - \frac{1}{2} =$ $\mathbf{\frac{3}{4} - \frac{2}{4} = \frac{1}{4}}$	$\mathbf{\frac{1}{4}}$
4. $\frac{5}{10} - \frac{1}{5}$		$\mathbf{\frac{1}{5} = \frac{2}{10}}$	$\frac{5}{10} - \frac{1}{5} =$ $\mathbf{\frac{5}{10} - \frac{2}{10} = \frac{3}{10}}$	$\mathbf{\frac{3}{10}}$

TRANSPARENCY MASTER for S174

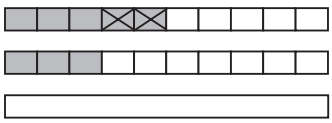
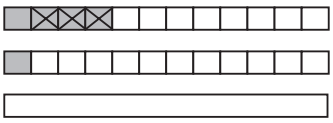
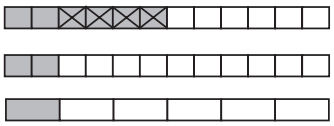
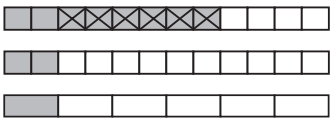
Directions: Complete this page with your teacher and partner.

Problem	Picture	Rewrite Fraction with Common Denominator	Subtract Fractions	Simplest Form
1. $\frac{1}{2} - \frac{1}{5}$		2: 5:	$\frac{1}{2} - \frac{1}{5} =$ ___ – ___ = ___	
2. $\frac{1}{3} - \frac{1}{4}$		3: 4:	$\frac{1}{3} - \frac{1}{4} =$ ___ – ___ = ___	
3. $\frac{2}{4} - \frac{2}{6}$		4: 6:	$\frac{2}{4} - \frac{2}{6} =$ ___ – ___ = ___	
4. $\frac{2}{3} - \frac{2}{4}$		3: 4:	$\frac{2}{3} - \frac{2}{4} =$ ___ – ___ = ___	

LESSON 18: Subtract Fractions - Unlike Denominators

Here is the key to **S174**.

Directions: Complete this page with your teacher and partner.

Problem	Picture	Rewrite Fraction with Common Denominator	Subtract Fractions	Simplest Form
1. $\frac{1}{2} - \frac{1}{5}$		2: **2, 4, 6, 8, (10)** 5: **5, (10), 15** $\mathbf{\frac{1}{2} = \frac{5}{10}}$ $\mathbf{\frac{1}{5} = \frac{2}{10}}$	$\frac{1}{2} - \frac{1}{5} =$ $\mathbf{\frac{5}{10} - \frac{2}{10} = \frac{3}{10}}$	$\mathbf{\frac{3}{10}}$
2. $\frac{1}{3} - \frac{1}{4}$		3: **3, 6, 9, (12), 15** 4: **4, 8, (12), 16** $\mathbf{\frac{1}{3} = \frac{4}{12}}$ $\mathbf{\frac{1}{4} = \frac{3}{12}}$	$\frac{1}{3} - \frac{1}{4} =$ $\mathbf{\frac{4}{12} - \frac{3}{12} = \frac{1}{12}}$	$\mathbf{\frac{1}{12}}$
3. $\frac{2}{4} - \frac{2}{6}$		4: **4, 8, (12)** 6: **6, (12)** $\mathbf{\frac{2}{4} = \frac{6}{12}}$ $\mathbf{\frac{2}{6} = \frac{4}{12}}$	$\frac{2}{4} - \frac{2}{6} =$ $\mathbf{\frac{6}{12} - \frac{4}{12} = \frac{2}{12}}$	$\mathbf{\frac{2}{12} = \frac{1}{6}}$
4. $\frac{2}{3} - \frac{2}{4}$		3: **3, 6, 9, (12)** 4: **4, 8, (12), 16** $\mathbf{\frac{2}{3} = \frac{8}{12}}$ $\mathbf{\frac{2}{4} = \frac{6}{12}}$	$\frac{2}{3} - \frac{1}{4} =$ $\mathbf{\frac{8}{12} - \frac{6}{12} = \frac{2}{12}}$	$\mathbf{\frac{2}{12} = \frac{1}{6}}$

TRANSPARENCY MASTER for S175

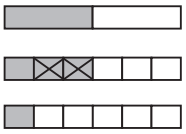
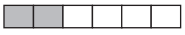
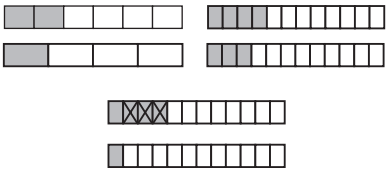
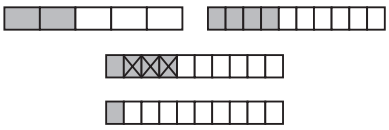
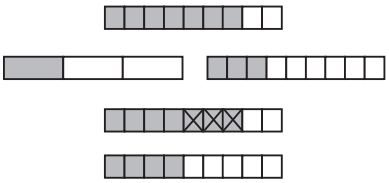
Directions: Complete this page with your teacher and partner.

Draw the first fraction. (minuend)	Legally trade, so they are all one color. Take away the second fraction (subtrahend) by crossing out.	Write numerically what you have in the previous column and then show in simplest form.
1. $\frac{1}{2} - \frac{2}{6}$		
2. $\frac{2}{6} - \frac{1}{4}$		
3. $\frac{2}{5} - \frac{3}{10}$		
4. $\frac{7}{9} - \frac{1}{3} =$		

LESSON 18: Subtract Fractions - Unlike Denominators

Here is the key to **S175**.

Directions: Complete this page with your teacher and partner.

Draw the first fraction. (minuend)	Legally trade, so they are all one color. Take away the second fraction (subtrahend) by crossing out.	Write numerically what you have in the previous column and then show in simplest form.
1. $\frac{1}{2} - \frac{2}{6}$		$\frac{1}{2} - \frac{2}{6}$ $\frac{3}{6} - \frac{2}{6} = \frac{1}{6}$
2. $\frac{2}{6} - \frac{1}{4}$ 		$\frac{2}{6} - \frac{1}{4}$ $\frac{4}{12} - \frac{3}{12} = \frac{1}{12}$
3. $\frac{2}{5} - \frac{3}{10}$		$\frac{2}{5} - \frac{3}{10}$ $\frac{4}{10} - \frac{3}{10} = \frac{1}{10}$
4. $\frac{7}{9} - \frac{1}{3} =$		$\frac{7}{9} - \frac{1}{3}$ $\frac{7}{9} - \frac{3}{9} = \frac{4}{9}$

TRANSPARENCY MASTER for S176

Directions: Complete this page with your teacher and partner.

1. $\frac{4}{6} - \frac{1}{2}$ Are denominators common? Least Common Multiple: Equivalent Fractions: Rewrite number sentence:	**4.** $\frac{3}{8} - \frac{1}{4}$ Are denominators common? Least Common Multiple: Equivalent Fractions: Rewrite number sentence:
2. $\frac{3}{5} - \frac{1}{2}$ Are denominators common? Least Common Multiple: Equivalent Fractions: Rewrite number sentence:	**5.** $\frac{3}{5} - \frac{1}{10}$ Are denominators common? Least Common Multiple: Equivalent Fractions: Rewrite number sentence:
3. $\frac{2}{3} - \frac{3}{9}$ Are denominators common? Least Common Multiple: Equivalent Fractions: Rewrite number sentence:	**6.** $\frac{6}{8} - \frac{1}{2}$ Are denominators common? Least Common Multiple: Equivalent Fractions: Rewrite number sentence:

LESSON 18: Subtract Fractions - Unlike Denominators

Here is the key to **S176**.

Directions: Complete this page with your teacher and partner.

1. $\frac{4}{6} - \frac{1}{2}$

Are denominators common? **No**.
Least Common Multiple: **6**

Equivalent Fractions: $\mathbf{\frac{1}{2} = \frac{3}{6}}$

Rewrite number sentence:
$\mathbf{\frac{4}{6} - \frac{3}{6} = \frac{1}{6}}$

2. $\frac{3}{5} - \frac{1}{2}$

Are denominators common? **No**.
Least Common Multiple: **10**

Equivalent Fractions: $\mathbf{\frac{3}{5} = \frac{6}{10}}$, $\mathbf{\frac{1}{2} = \frac{5}{10}}$

Rewrite number sentence:
$\mathbf{\frac{6}{10} - \frac{5}{10} = \frac{1}{10}}$

3. $\frac{2}{3} - \frac{3}{9}$

Are denominators common? **No**.
Least Common Multiple: **9**

Equivalent Fractions: $\mathbf{\frac{2}{3} = \frac{6}{9}}$

Rewrite number sentence:
$\mathbf{\frac{6}{9} - \frac{3}{9} = \frac{3}{9} = \frac{1}{3}}$

4. $\frac{3}{8} - \frac{1}{4}$

Are denominators common? **No**.
Least Common Multiple: **8**

Equivalent Fractions: $\mathbf{\frac{1}{4} = \frac{2}{8}}$

Rewrite number sentence:
$\mathbf{\frac{3}{8} - \frac{2}{8} = \frac{1}{8}}$

5. $\frac{3}{5} - \frac{1}{10}$

Are denominators common? **No**.
Least Common Multiple: **10**

Equivalent Fractions: $\mathbf{\frac{3}{5} = \frac{6}{10}}$

Rewrite number sentence:
$\mathbf{\frac{6}{10} - \frac{1}{10} = \frac{5}{10} = \frac{1}{2}}$

6. $\frac{6}{8} - \frac{1}{2}$

Are denominators common? **No**
Least Common Multiple: **8**

Equivalent Fractions: $\mathbf{\frac{1}{2} = \frac{4}{8}}$

Rewrite number sentence:
$\mathbf{\frac{6}{8} - \frac{4}{8} = \frac{2}{8} = \frac{1}{4}}$

TRANSPARENCY MASTER for S177

Directions: Complete the following SOLVE problem with your teacher.

Mr. Martinez is building a short walkway to the playground area. There is a muddy area from the door to the gate of the playground. He needs to cut a length of wood that is $\frac{3}{4}$ of a meter, and the length of the wood he has is $\frac{7}{8}$ of a meter. How much wood will he need to cut from the longer piece of wood to have the length he needs?

S Underline the question.
This problem is asking me to find_____

_____.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts.

L Choose an operation or operations.
Write in words what your plan of action will be.

V Estimate your answer.
Carry out your plan.

E Does your answer make sense? (Compare your answer to the question.)

Is your answer reasonable? (Compare your answer to the estimate.)

Is your answer accurate? (Check your work.)

Write your answer in a complete sentence.

LESSON 18: Subtract Fractions - Unlike Denominators

Here is the key to **S177**.

Directions: Complete the following SOLVE problem with your teacher.

~~Mr. Martinez is building a short walkway to the playground area.~~ | ~~There is a muddy area from the door to the gate of the playground.~~ | He needs to cut a length of wood that is $\frac{3}{4}$ meter, | and the length of the wood he has is $\frac{7}{8}$ of a meter. | How much wood will he need to cut from the longer piece of wood to have the length he needs?

S Underline the question.
This problem is asking me to find **the amount of wood that needs to be cut from the longer piece of wood.**

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. **Needs $\frac{3}{4}$ meter, has $\frac{7}{8}$ meter**

L Choose an operation or operations. **Subtraction**
Write in words what your plan of action will be. **Subtract the length of wood Mr. Martinez needs from the length of wood he already has. To subtract the fractions, find the common denominator by finding the least common multiple, create equivalent fractions, and then subtract.**

V Estimate your answer. **About $\frac{1}{8}$ meter**

Carry out your plan. $\frac{7}{8} - \frac{3}{4} =$ **Least Common Multiple: 8**

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

$\frac{7}{8} - \frac{6}{8} = \frac{1}{8}$ **meter**

E Does your answer make sense? (Compare your answer to the question.) **Yes, because we are looking for the length of wood Mr. Martinez needs to cut from the longer piece of wood.**

Is your answer reasonable? (Compare your answer to the estimate.) **Yes, because it matches our estimate of about $\frac{1}{8}$ meter.**

Is your answer accurate? (Check your work.) **Yes.**

Write your answer in a complete sentence. **The total length of wood Mr. Martinez needs to cut off the longer piece of wood is $\frac{1}{8}$ meter.**

LESSON 18: Subtract Fractions - Unlike Denominators

Here is the key to **S178**.

Directions: Complete the following problems with unlike denominators. Draw pictures if needed. All answers should be simplified.

1. $\frac{3}{5} - \frac{3}{10} = \mathbf{\frac{3}{10}}$

2. $\frac{4}{12} - \frac{1}{4} = \mathbf{\frac{1}{12}}$

3. $\frac{3}{6} - \frac{1}{3} = \mathbf{\frac{1}{6}}$

4. $\frac{5}{6} - \frac{1}{3} = \mathbf{\frac{3}{6} = \frac{1}{2}}$

5. $\frac{6}{10} - \frac{1}{2} = \mathbf{\frac{1}{10}}$

6. $\frac{4}{9} - \frac{1}{3} = \mathbf{\frac{1}{9}}$

7. $\frac{4}{5} - \frac{3}{10} = \mathbf{\frac{5}{10} = \frac{1}{2}}$

8. $\frac{1}{2} - \frac{1}{6} = \mathbf{\frac{2}{6} = \frac{1}{3}}$

9. $\frac{3}{4} - \frac{1}{8} = \mathbf{\frac{5}{8}}$

10. $\frac{5}{6} - \frac{1}{12} = \mathbf{\frac{9}{12} = \frac{3}{4}}$

Here is the key to **S179**.

Homework

Name _____ **Date** _____

Directions: Solve the following problems. Draw pictures if needed to solve. All differences should be in simplest form.

1. $\frac{2}{5} - \frac{2}{10} = \mathbf{\frac{2}{10} = \frac{1}{5}}$

2. $\frac{5}{9} - \frac{1}{3} = \mathbf{\frac{2}{9}}$

3. $\frac{4}{8} - \frac{2}{4} = \mathbf{0}$

4. $\frac{2}{4} - \frac{1}{3} = \mathbf{\frac{2}{12} = \frac{1}{6}}$

5. $\frac{1}{2} - \frac{3}{10} = \mathbf{\frac{2}{10} = \frac{1}{5}}$

6. $\frac{7}{8} - \frac{2}{4} = \mathbf{\frac{3}{8}}$

7. $\frac{3}{4} - \frac{2}{8} = \mathbf{\frac{4}{8} = \frac{1}{2}}$

8. $\frac{4}{12} - \frac{1}{4} = \mathbf{\frac{1}{12}}$

9. $\frac{9}{12} - \frac{1}{4} = \mathbf{\frac{6}{12} = \frac{1}{2}}$

10. $\frac{3}{5} - \frac{2}{10} = \mathbf{\frac{4}{10} = \frac{2}{5}}$

LESSON 18: Subtract Fractions - Unlike Denominators

Name _____ Date _____

Quiz

Directions: Subtract. All differences should be in simplest form.

1. $\frac{5}{8} - \frac{1}{4} =$

A. $\frac{1}{8}$

B. $\frac{1}{4}$

C. $\frac{3}{8}$

D. $\frac{3}{4}$

2. $\frac{2}{6} - \frac{1}{4} =$

A. $\frac{1}{12}$

B. $\frac{1}{6}$

C. $\frac{1}{4}$

D. $\frac{1}{2}$

3. $\frac{3}{5} - \frac{1}{10} =$

A. $\frac{1}{10}$

B. $\frac{1}{5}$

C. $\frac{3}{10}$

D. $\frac{1}{2}$

4. $\frac{2}{3} - \frac{6}{9} =$

A. 0

B. $\frac{3}{3}$

C. $1\frac{1}{3}$

D. $1\frac{1}{2}$

5. $\frac{1}{2} - \frac{4}{12} =$

A. 0

B. $\frac{1}{6}$

C. $\frac{1}{4}$

D. $\frac{1}{3}$

6. $\frac{9}{12} - \frac{2}{6} =$

A. 0

B. $\frac{1}{4}$

C. $\frac{1}{3}$

D. $\frac{5}{12}$

7. $\frac{2}{3} - \frac{3}{6} =$

A. $\frac{1}{6}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. 1

8. $\frac{1}{2} - \frac{1}{4} =$

A. 0

B. $\frac{1}{8}$

C. $\frac{1}{4}$

D. $\frac{1}{2}$

9. $\frac{9}{10} - \frac{4}{5} =$

A. $\frac{1}{10}$

B. $\frac{1}{5}$

C. $\frac{1}{2}$

D. 1

10. $\frac{2}{3} - \frac{2}{9} =$

A. 0

B. $\frac{1}{9}$

C. $\frac{2}{9}$

D. $\frac{4}{9}$