
1. Lesson Plan Title: Adding and Subtracting Fractions with Unlike Denominators

2. Subjects: Mathematics

3. Grade: Rising 7th

4. CSS: Concept: Number Sense
Standard Set: 2.0
Sub-Strand 2.4 Determine the least common multiple and the greatest common divisor of whole numbers; use them to solve problems with fractions (e.g., to find a denominator to add two fractions or to find the reduced form of a fraction).
6NS2.4

5. Keywords: Fractions, Unlike Denominators, Adding, Subtracting

6. Required Materials: Students:
 Rulers
 Markers/colored pencils/crayons
 Paper

7. Lesson Goal: The student will add and subtract fractions with unlike denominators.

8. Time: 45 minutes

9. Vocabulary: **Fraction:** A number that can represent part of a whole expressed in the form a/b .
Denominator: the part of a fraction that is below the line and that functions as the divisor of the numerator
Unlike Denominator: fractions whose denominators are not the same.
Least Common Denominator: Also known as the lowest common denominator. It is the smallest number that is a common denominator of a given set of fractions.

10. ELL See the teacher guidebook for guidelines on ELL

Differentiation: Differentiation.

11. Lesson Background for Teacher: Formulas: $a/b + c/d = (ad + bc) / bd$
 $a/b - c/d = (ad - bc) / bd$

Relevancy: This sub-strand is part of the CSS, 2.4.

Previous Learning: In the last lesson, students added and subtracted fractions with like denominators.

12. Math Review for Teacher: Find $1/3 + 1/2$.

1. Find the least common denominator. The least common denominator of $1/3$ and $1/2$ is 6.
2. Find the equivalent fraction using the common denominator. $1/3 = 2/6$ and $1/2 = 3/6$
3. Add or subtract the numerators. $2 + 3 = 5$
4. The denominator stays the same. 6
5. Write the numerator over the denominator. $5/6$
6. Simplify the fraction. The fraction is in the simplest form.

$$2/7 + 3/14 = 7/14 \text{ or } 1/2$$

$$6/10 - 2/5 = 2/10 \text{ or } 1/5$$

Misconception: Students may think that since you add and subtract the numerators, you can also add and subtract the denominators. If this happens, have students use non-numerical objects to reinforce the concept that a denominator represents a unit.

TASK ANALYSIS

Steps for adding or subtracting fractions with unlike denominators:

1. Find the least common denominator.
2. Find the equivalent fraction using the common denominator.
3. Add or subtract the numerators.
4. The denominator stays the same.
5. Write the numerator over the denominator.
6. Simplify the fraction

13. Linked w/ Lesson Plan: N/A

14. Classroom Organization: See the teacher guidebook for guidelines on Classroom Organization.

15. Anticipatory Set: A model of what the Anticipatory Set: *Can you add apples and oranges? What would you call that an “apporange” or an “orangapple”? Now, that is just silly. We need to find a common unit to add.*

Teacher may say!

Previous Learning: *In the last lesson, you added and subtracted fractions with like denominators.*

Lesson Goal: *The goal for this lesson is for students to add and subtract fractions with unlike denominators.*

16. Math Notebook Setup:

See the teacher guidebook for guidelines on Math Notebook Setup.

17. Script for Teacher: A model of what the Teacher may say!

We are going to start the lesson with a partner activity. In this activity, you are going to add and subtract fractions with unlike denominators using paper squares.

Add $1/2 + 1/4$.

Step 1: Using your paper squares, create a model for each fraction.



Step 2: Find the common denominator. A common denominator of $1/2$ and $1/4$ is 8. Divide each square into eighths.



Step #3

Combine fractional parts onto one paper square. Shade 4 of the eight squares to represent $4/8$ or $1/2$. Next, shade 2 of the eight squares to represent $2/8$ or $1/4$.

Give students time to struggle when deciding how and why they need to fold the paper squares a certain way. You want them to discover that you need to find a common denominator before they can subtract fractions. It is helpful is they fold the square for one denominator horizontally and the other denominator vertically.



The combined shaded area is $\frac{6}{8}$ of the paper square.
 $\frac{1}{2} + \frac{1}{4} = \frac{6}{8}$ or $\frac{3}{4}$.

How is this similar or different to adding fractions with like numerators?

Students should recognize that the difference is that the parts of the square need to be equal before they can add them together. This is called finding the common denominator.

Step #4 Using your paper squares, add or subtract the following:

$$\frac{1}{4} + \frac{2}{3}$$

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

$$\frac{4}{5} - \frac{1}{4}$$

$$\frac{6}{8} - \frac{2}{4}$$

Remind students to simplify.

Why do you need a common denominator to add or subtract fractions with unlike denominators?

What is the relationship between common multiples and adding and subtracting fractions with unlike denominators?

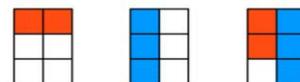
Let's try another partner activity. Let's say we want to add apples and oranges. Are those like items? What could we call them to make them like items?

Apples and oranges are not the same unit. Students should respond that apples and oranges are both fruits.

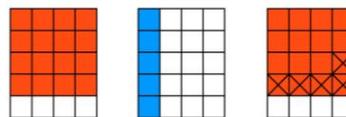
It is similar because students are adding together the numerators. It is different because they need to find the common denominator first (equal number of parts).



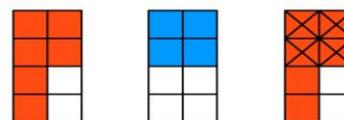
$$\frac{1}{4} + \frac{2}{3} = \frac{5}{6}$$



$$\frac{2}{6} + \frac{1}{2} = \frac{5}{6}$$



$$\frac{4}{5} - \frac{1}{4} = \frac{12}{20}$$



$$\frac{6}{8} - \frac{2}{4} = \frac{2}{8}$$

We can combine fruits.

Therefore if you name a group of different objects, you have to find a common name for them.

How would you describe adding 2 apples and 5 oranges using a common term?

7 pieces of fruit.

What is a common term to add together shirts, socks, and shorts?

Articles of clothing.

When you are working with fractions with unlike denominators, it is the same as adding or subtracting items that don't share a common term. When you find a common term, you are finding a common denominator. Then you can find the sum or the difference. Finally, you need to simplify.

Record the following steps in your math notebook.

Steps for adding or subtracting fractions with unlike denominators:

1. *Find the least common denominator.*
2. *Find the equivalent fraction using the common denominator.*
3. *Add or subtract the numerators.*
4. *The denominator stays the same.*
5. *Write the numerator over the denominator.*
6. *Simplify the fraction.*

With your partner, take turns solving the problems and explaining your steps.

Add the following fractions. Simplify.

$$\frac{3}{5} + \frac{1}{4}$$

17/20

$$\frac{2}{12} + \frac{3}{4}$$

11/12

$$4/11 + 2/66$$

$$26/66 \text{ or } 13/33$$

Subtract the following fractions. Simplify.

$$6/8 - 4/24$$

$$14/24 = 7/12$$

$$4/5 - 2/15$$

$$10/15 = 2/3$$

Use fractions to solve the following problem using a table.

Electronic Device	Mp3 player	Cell phone	Computer	None
Fraction	4/20	8/25	6/20	5/50

Use the table to find the fraction of students that own either a cell phone or a computer.

$$8/25 + 6/20 = 62/100 \text{ or } 31/50$$

Evaluate $a + b$ if $a = 2/3$ and $b = 1/6$

$$2/3 + 1/6 = 5/6$$

Evaluate $c - d$ if $c = 10/12$ and $d = 4/6$

$$10/12 - 4/6 = 1/6$$

18. Learning Reflection for Student:

How is adding and subtracting fractions with unlike denominators different than adding and subtracting fractions with like denominators?

19. Plan for at home Ind. Practice:

N/A

20. Assessment Based on Goal:

Add or subtract. Write in the simplest form.

Assessment Key

$$1/9 + 2/6$$

$$4/9$$

$$2/8 + 1/5$$

$$18/40 = 9/20$$

$$2/3 - 1/5$$

$$7/15$$

$$3/4 - 1/3$$

$$5/12$$

Explain how to add the following fractions $\frac{1}{3}$ and $\frac{1}{6}$.

1. Find the least common denominator. The least common denominator of $\frac{1}{3}$ and $\frac{1}{2}$ is 6.
 2. Find the equivalent fraction using the common denominator. $\frac{1}{3} = \frac{2}{6}$ and $\frac{1}{2} = \frac{3}{6}$
 3. Add or subtract the numerators. $2 + 3 = 5$
 4. The denominator stays the same. 6
 5. Write the numerator over the denominator. $\frac{5}{6}$
- Simplify the fraction. The fraction is in the simplest form

Evaluate $c - d$ if $c = \frac{10}{12}$ and $d = \frac{4}{6}$

$$\frac{10}{12} - \frac{4}{6} = \frac{2}{12} \text{ or } \frac{1}{6}$$

21. Additional Notes:

22. Quiz Items (up to 5) Use fractions to solve the following problem using a table.

Types of Cookie	Chocolate Chip	Oatmeal	Sugar	Peanut Butter
Fraction	$\frac{4}{20}$	$\frac{8}{25}$	$\frac{6}{20}$	$\frac{5}{50}$

13/25

Use the table to find the fraction of students who prefer oatmeal or chocolate chip cookies.

Add or subtract. Write in the simplest form.

$$2/6 + 5/12$$

$$9/12$$

$$6/8 - 2/4$$

$$2/8 \text{ or } 1/4$$

Evaluate $c - d$ if $c = 10/12$ and $d = 4/6$

$$10/12 - 4/6 = 2/12 \text{ or } 1/6$$