Objective: Students will demonstrate an understanding of the process for multiplying fractional numbers.

Vocabulary:

Mixed Number- a <u>WHOLE NUMBER</u> and a <u>FRACTION</u> combined into one "mixed" number

Improper Fraction- a fraction whose <u>NUMERATOR</u> is larger than the

<u>DENOMINATOR</u> .

Steps: 1. Write all numbers in fraction form.
2. Cross-Simplify (Divide out common factors)
3. Multiply Numerators
4. Multiply Denominators
5. Make sure the answer is in simplest form.

Examples:

1.)	2.)
$\dfrac{8}{9} \times \dfrac{3}{4} = \dfrac{\cancel{8}^2}{\cancel{9}^3} \times \dfrac{\cancel{3}^1}{\cancel{4}^1} = \dfrac{2}{3}$	$3 \times \dfrac{4}{15} = \dfrac{\cancel{3}^1}{1} \times \dfrac{4}{\cancel{15}^5} = \dfrac{4}{5}$
3.)	4.)
$\dfrac{1}{2} \times 2\dfrac{3}{4} = \dfrac{1}{2} \times \dfrac{11}{4} = \dfrac{11}{8} = 1\dfrac{3}{8}$	$5\dfrac{5}{7} \times 2\dfrac{1}{10} = \dfrac{\cancel{40}^4}{\cancel{7}^1} \times \dfrac{\cancel{21}^3}{\cancel{10}^1} = \dfrac{12}{1} = 12$

5.) You have ²⁄₃ of a bag of flour. You use ¾ of the flour to make bread dough. How much of the entire bag do you use to make the dough?

$$\frac{2}{3} \times \frac{3}{4} = \frac{6}{12} = \frac{1}{2} \ of \ the \ bag$$

2.2 Dividing Fractions Teacher Notes

Objective: Students will apply the concept of reciprocals when dividing with fractional numbers.

Vocabulary:

- The __inverse__ of an operation in math is its __OPPOSITE__. It un-does the problem.

    o The inverse of division is __MULTIPLICATION__.

- The __reciprocal__ of a fraction is like an inverse. It's the fraction turned upside down or "__FLIPPED__".

    o When we multiply a fraction by its reciprocal, the product is __ONE__.

    o $\frac{4}{7} \times \frac{7}{4} = \frac{28}{28}$ which is __1__ when simplified.

Dividing Proper Fractions

1.) $\frac{3}{5} \div \frac{1}{2} =$

$\frac{3}{5} \times \frac{1}{2}$ ⟵ 1.) Exchange the division sign for its **inverse**-MULTIPLICATION

$\frac{3}{5} \times \frac{2}{1} = \frac{6}{5}$ ⟵ 2.) Replace the SECOND fraction with its **reciprocal**.

$= 1\frac{1}{5}$ ⟵ 3.) MULTIPLY and re-write as a mixed number.

> When we have *two opposites,* or __2__ __INVERSES__ in the same problem, they cancel each other out. This is why multiplying by the reciprocal works for dividing fractions!

2.) $\frac{7}{8} \div \frac{3}{4} =$ _____

$\frac{7}{8} \times \frac{4}{3} = \frac{7}{\cancel{8}^2} \times \frac{\cancel{4}^1}{3} = \frac{7}{6} = 1\frac{1}{6}$

> Once you have re-written the math problem with multiplying by the reciprocal, we can __CROSS-SIMPLIFY__ the numbers just like how we do when we multiply fractions.

3.) $9 \div \frac{2}{6} =$ _____

$\frac{9}{1} \times \frac{6}{2} = \frac{54}{2} = 27$

2.3 Dividing Mixed Numbers Teacher Notes

Objective: Students will apply a correct algorithm to divide mixed numbers.

Steps:
1.) Write all numbers in fraction form.
2.) Rewrite the problem-multiply by the reciprocal.
   ("Keep, Change, Flip")
3.) Cross-simplify if you can
4.) Multiply numerators.
5.) Multiply denominators.
6.) Simplify answer, if needed.

Be sure to always convert any mixed numbers into IMPROPER fractions to complete the problem!

1.) $5\frac{1}{3} \div \frac{2}{5} =$ _____

$$\frac{\cancel{16}^{8}}{3} \times \frac{5}{\cancel{2}^{1}} = \frac{40}{3} = 13\frac{1}{3}$$

2.) $6\frac{2}{3} \div 2\frac{2}{5} =$ _____

$$\frac{\cancel{20}^{5}}{3} \times \frac{5}{\cancel{12}^{3}} = \frac{25}{9} = 2\frac{7}{9}$$

3.) Mr. Diveley purchased a piece of wood at Home Depot that is $12\frac{3}{4}$ feet long. If he is building a table that needs segments of wood that are $\frac{3}{4}$ feet long, how many segments will he be able to cut from his original piece of lumber?

$$12\frac{3}{4} \div \frac{3}{4} = \frac{\cancel{51}^{17}}{\cancel{4}^{1}} \times \frac{\cancel{4}^{1}}{\cancel{3}^{1}} = \frac{17}{1} = 17 \; segments$$

2.4 Multiplying and Dividing Fractions Word Problems STUDENT NOTES

Essential Questions: How can you identify the math operation needed for working with fractions in a word problem? How can you make sense of the math problem?

Lesson Objective: Students will work together to determine key math operations in fraction word problems and use rules for multiplying and dividing fractions to solve these problems.

Steps:
1. _Read_ the problem and <u>underline</u> words that can be math operations.

2. Draw a _picture_ if that is a useful strategy.

3. Decide if you are breaking apart or putting together for the final product or quotient. This helps determine if you are _dividing_ or multiplying.
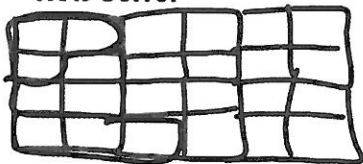
Examples:
1. How many $\frac{3}{4}$ pound packages can you make with 6 pounds of sunflower seeds?

Circle one: MULTIPLY   or (DIVIDE)   6 pounds into packages

Now Solve:

$$6 \div \frac{3}{4} = \frac{6}{1} \div \frac{3}{4} = \frac{6}{1} \times \frac{4}{3} = 8$$

I can make 8 packages

2. Maddie makes $3\frac{1}{2}$ cups of homemade applesauce. If she splits the homemade applesauce into $\frac{1}{8}$ cups per serving, how many servings can she get from the applesauce?

Circle one: MULTIPLY   or (DIVIDE)   the applesauce

Now Solve:

$$3\frac{1}{2} \div \frac{1}{8}$$

$$\frac{7}{2} \div \frac{1}{8}$$