Name: _____   Date: _____

Student Exploration: Fractions Greater than One

Vocabulary: equivalent, fraction, improper fraction, least common denominator, mixed number

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

Jack is baking cookies. Each batch of cookies requires $\frac{1}{2}$ cup of sugar.

1. Jack wants to make 3 batches of cookies. How much sugar will he need? _____

2. Jack has 2 cups of sugar. Is this enough? _____

Gizmo Warm-up

In the *Fractions Greater than One* Gizmo, the "Fractionator" makes fraction tiles. Drag tiles to the number lines to build sums of fractions.

Use the arrows (▲ and ▼) to adjust the numerator and denominator of the fraction.

1. Click **Clear**. Set the Fractionator to $\frac{1}{2}$. Click **Make tile**. Drag the tile to the top number line.

   A. How many twelfths ($\frac{1}{12}$ tiles) do you think it will take to equal $\frac{1}{2}$? _____

   B. Use the Fractionator to make that many $\frac{1}{12}$ tiles. Place them on the bottom number

      line. Was your answer to part A (above) correct? _____

   C. Based on this, what single tile would be **equivalent** (equal) to $\frac{1}{2}$? _____

2. List some fractions equivalent to the fractions below. Check your answers in the Gizmo.

   Equivalent to $\frac{1}{2}$: _____   Equivalent to $\frac{1}{3}$: _____

3. In general, how do you find equivalent fractions? _____

   _____

Activity A: **Adding fractions (like denominators)**	Get the Gizmo ready: • Click **Clear**. • Turn on **Word labels**.	5-ninths

1. Make a 5-ninths ($\frac{5}{9}$) and an 8-ninths ($\frac{8}{9}$) tile. Put them on the top number line in the Gizmo.

    A. How many ninths does this sum (5-ninths plus 8-ninths) equal? _____

    B. How do you write this sum as a fraction? _____ Select **Show sums** to check.

    This is an **improper fraction** because the numerator is greater than the denominator. (Fractions in which the numerator is equal to the denominator are also improper.)

2. Place a 1-whole ($\frac{1}{1}$) tile on the bottom number line.

    A. What would you need to add to the whole to equal the sum ($\frac{5}{9} + \frac{8}{9}$) on top? _____

    B. Add that tile to the bottom number line. Are the bottom and top equal? _____

    C. How does the Gizmo write the bottom sum? _____

    This is a **mixed number** because it consists of a whole number plus a fraction.

3. To fill in the left table, model the improper fraction on the top number line of the Gizmo. Then model the mixed number on the bottom number line, using at least one "1-whole" tile.

    On the right table, do the opposite: Model the mixed number on the bottom number line first, and then model the improper fraction on top. Turn on **Show sums** to check your answers.

Improper fraction	Mixed number
$\frac{8}{5}$	
$\frac{5}{2}$	
$\frac{19}{8}$	

$1\frac{1}{5}$	
$1\frac{6}{7}$	
$2\frac{2}{3}$	

Mixed number	Improper fraction

4. What improper fraction is equivalent to $5\frac{1}{2}$? _____ Explain how you figured this out.

_____

_____

Activity B: **Adding fractions (unlike denominators)**	Get the Gizmo ready: • Click **Clear**. • Turn off **Show sums** and **Word labels**.	$\dfrac{1}{2}$

Joe rides his bike $\dfrac{1}{2}$ mile to Jane's house. Then they bike together $\dfrac{2}{3}$ of a mile to get to school.

1. How far does Joe ride? To find out, model $\dfrac{1}{2}$ + $\dfrac{2}{3}$ on the top number line. Sketch your

   fraction tiles here:

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2. To add fractions with different denominators, find the **least common denominator** (LCD). The LCD is the smallest number that is a multiple of the two denominators.

   A. What is the smallest number that is a multiple of 2 and 3? _____ This is the LCD.

   B. Find fractions equivalent to both $\dfrac{1}{2}$ and $\dfrac{2}{3}$. Use the LCD as the denominator of both.

   $$\frac{1}{2} = \frac{}{} \qquad\qquad \frac{2}{3} = \frac{}{}$$

   C. Find the sum to see how far Joe biked. Write the answer as an improper fraction and as a mixed number. Turn on **Show sums** to check your answer.

   $$\frac{}{} + \frac{}{} = \frac{}{}$$

   Improper: _____ miles   Mixed: _____ miles

3. Find the sums below by hand. (Hint: In some cases, you may have to rewrite *both* fractions to get a common denominator.) Check your answers to A-C by modeling them in the Gizmo.

   A. $\dfrac{3}{5}$ + $\dfrac{4}{5}$ + $\dfrac{9}{10}$ Improper: _____   Mixed: _____

   B. $\dfrac{4}{5}$ + $\dfrac{1}{2}$ Improper: _____   Mixed: _____

   C. $\dfrac{5}{6}$ + $\dfrac{3}{4}$ + $\dfrac{2}{3}$ Improper: _____   Mixed: _____

   D. $\dfrac{4}{6}$ + $\dfrac{3}{8}$ Improper: _____   Mixed: _____