

Fractions Learning Strategies

What should students be able to do within this interactive?

- Select a denominator and move the slider to the numerator for a chosen fraction.
- Recognize an improper fraction as a mixed fraction.

For addition or subtraction:

- See the chosen fraction(s) shaded on the fraction strip.
- Recognize the numbers in the list of multiples.
- Identify the number that represents the lowest common denominator from a list of multiples.
- Recognize the equivalent fractions that are formed when common denominators are required.
- See the sum or difference that results from the shading of a fraction strip.
- See the connection between the pictorial representation and the concrete representation of the operation.
- Understand the concrete solution to the operation.

For multiplication:

- Count the number of boxes that make up the 1 by 1 grid.
- See the chosen fraction(s) shaded on the fraction grid.
- See that the overlapped shading of two fractions represents the result of multiplication.
- Identify the number of boxes in the 1 by 1 square will be the denominator resulting from multiplication.
- See the connection between the pictorial representation and the concrete representation of the operation.
- Understand the concrete solution to the operation.

For division:

- Recognize division is the opposite of multiplication.
- Recognize division can be changed to multiplication by inverting the second fraction.
- Recognize when the product of two fractions is divided by one of the fractions, it will result in the other fraction.
- See the connection between the pictorial representation and the concrete representation of the operation.
- Understand the concrete solution to the operation.

Common mistakes made by students:

- Not seeing the connection between a selected fraction and its shaded region.
- Not understanding how a fraction can be changed to an equivalent form.
- Not understanding addition and subtraction of fractions requires a common denominator.
- Not understanding how a fraction can be reduced.
- Confusing the operation of multiplication with addition.
- Not identifying the result of multiplication from the shaded region of the grid.
- Not understanding division is the opposite of multiplication.
- Not following the mathematical steps that perform each of the operations.

Curriculum Connections:

- ❖ Please note all of the following correlations match outcomes in the new Mathematics Kindergarten to Grade 9 Program of Studies (2007).

Grade 5 Number SO7: Demonstrate an understanding of fractions by using concrete, pictorial and symbolic representations to:

- create sets of equivalent fractions
- compare fractions with like and unlike denominators.

Grade 6 Number SO4: Relate improper fractions to mixed numbers and mixed numbers to improper fractions.

Grade 7 Number SO5: Demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially and symbolically (limited to positive sums and differences).

Grade 7 Number SO7: Compare and order positive fractions, positive decimals (to thousandths) and whole numbers by using:

- benchmarks
- place value
- equivalent fractions and/or decimals.

Grade 8 Number SO6: Demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers, concretely, pictorially and symbolically.

Grade 9 Number SO3: Demonstrate an understanding of rational numbers by:

- comparing and ordering rational numbers
- solving problems that involve arithmetic operations on rational numbers.

Print Activity notes:

*Note: The Print Activity is not intended to be an assessment piece

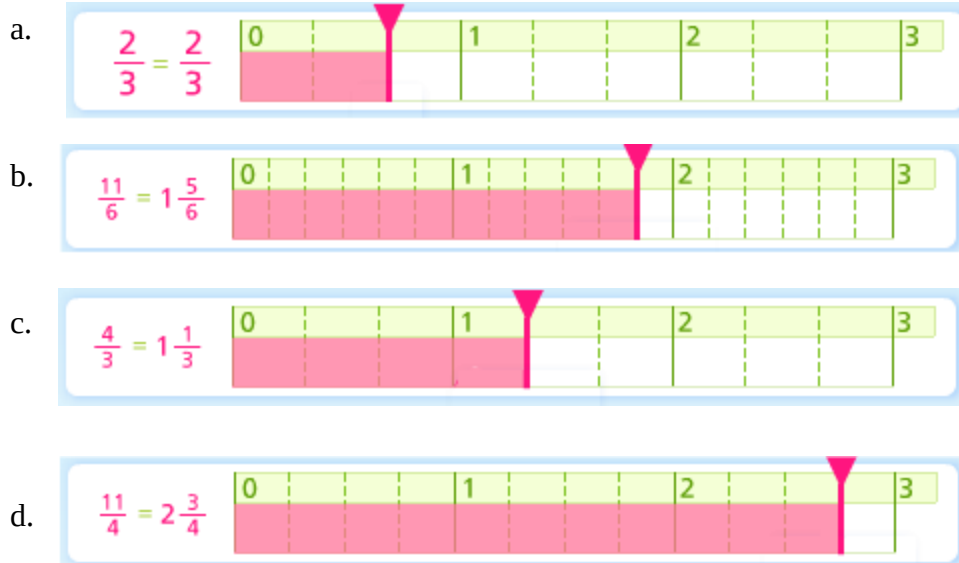
It is necessary for students to use the “**Explore It**” mode to work through the Print Activity. Students will be asked to select an operation on fractions: addition, subtraction, or multiplication and division. They will select a denominator and a numerator for two fractions. They will be expected to see the chosen fractions as they are shaded on either a fraction strip (for adding or subtracting) or on a fraction grid (for multiplying or dividing). The student will be expected to see how the operation is carried out by the shading on the strip or grid. They will be expected to see the connection to and understand the steps of the concrete solution.

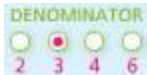
The Print Activity may be opened in Word Format instead of PDF so that changes to questions can be made.

Fractions Print Activity Key

Use the “**Explore It**” mode to answer the following questions:

1. Use the fraction strips below to shade in the following values:



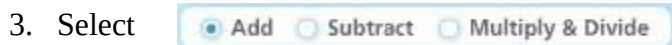
2. a. Select 

The **multiples** of 3 that are listed are 3, 6, 9, 12, 15, 18.



The **multiples** of 4 that are listed are 4, 8, 12, 16, 20, 24.

c. Using the **multiples** from above the **LCD** for 3 and 4 is 12.



a. **Pink fraction:** If you select a **denominator** of 2 and a **numerator** of 3, the resulting fraction will be:

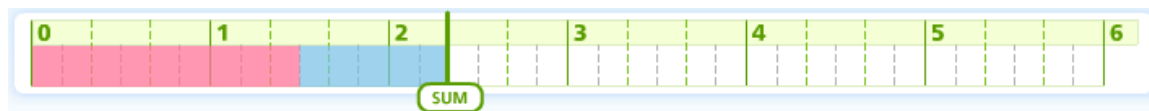
$$\frac{\boxed{3}}{\boxed{2}} = 1 \frac{\boxed{1}}{\boxed{2}}$$

b. **Blue fraction:** If you select a **denominator** of 6 and a **numerator** of 5, the resulting fraction is:

$$\frac{\boxed{5}}{\boxed{6}}$$

c. The **LCD** for the pink and blue fractions is 6.

d. Shade in the **sum** of the pink and blue fractions below:



e. Complete the following:

$$\frac{3}{2} + \frac{5}{6} = \frac{\boxed{9}}{\boxed{6}} + \frac{\boxed{5}}{\boxed{6}} = \frac{\boxed{14}}{\boxed{6}} = 2 \frac{\boxed{2}}{\boxed{6}} = 2 \frac{\boxed{1}}{\boxed{3}}$$



a. **Pink fraction:** If you select a **denominator** of 3 and a **numerator** of 1, the resulting fraction is:

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

- b. **Blue fraction:** If you select a **denominator** of 4 and a **numerator** of 3, the resulting fraction is:

$$\frac{3}{4} = \frac{9}{12}$$

- c. The **LCD** of the pink and blue fractions is 12.
- d. Shade in the **sum** of the pink and blue fractions below:



- e. Complete the following:

$$\frac{1}{3} + \frac{3}{4} = \frac{4}{12} + \frac{9}{12} = \frac{13}{12} = 1 \frac{1}{12}$$

5. Select ☐ Add ☒ Subtract ☐ Multiply & Divide

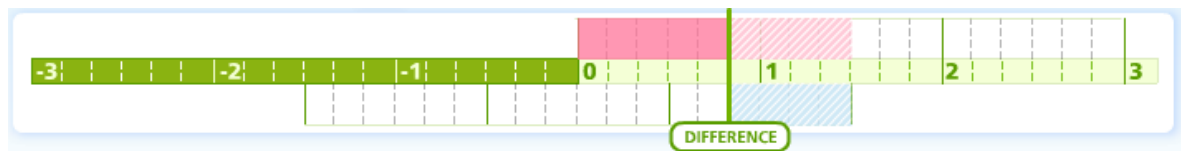
- a. **Pink fraction:** If you select a **denominator** of 2 and a **numerator** of 3, the resulting fraction is:

$$\frac{3}{2} = \frac{9}{6}$$

- b. **Blue fraction:** If you select a **denominator** of 3 and a **numerator** of 2, the resulting fraction is:

$$\frac{2}{3} = \frac{4}{6}$$

- c. The **LCD** of the pink and blue fractions is 6.
- d. Shade in the **difference** of the pink and blue fractions below:



- e. Complete the following:

$$\frac{3}{2} - \frac{2}{3} = \frac{9}{6} - \frac{4}{6} = \frac{5}{6}$$

6. Select

☐ Add ☒ Subtract ☐ Multiply & Divide

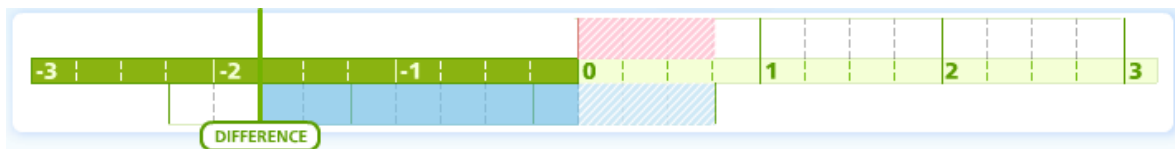
- a. **Pink fraction:** If you select a **denominator** of 4 and a **numerator** of 3, the resulting fraction is:

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

- b. **Blue fraction:** If you select a **denominator** of 2 and a **numerator** of 5, the resulting fraction is:

$$\frac{5}{2} = \frac{10}{4} = 2\frac{2}{4}$$

- c. The **LCD** of the pink and blue fractions is 4.
- d. Shade in the **difference** of the pink and blue fractions:



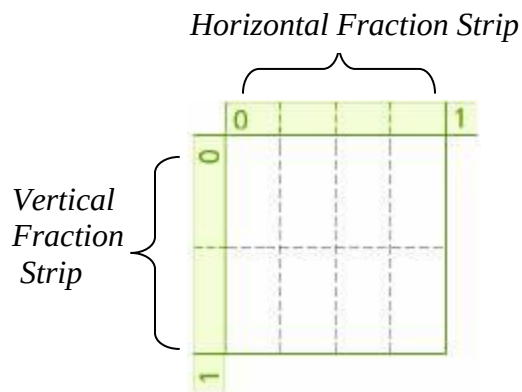
- e. Complete the following:

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

7. When adding or subtracting fractions you must have a common denominator.

(numerator/denominator)

8. Refer to the grid below to answer questions a, b and c:



- a. The *horizontal fraction strip* is divided into quarters.

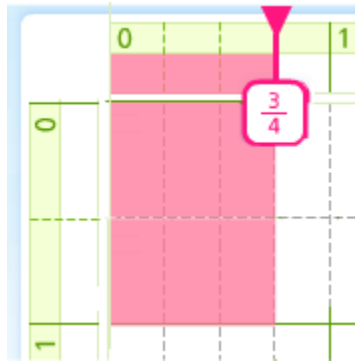
(halves/thirds/quarters)

- b. The *vertical fraction strip* is divided into halves.

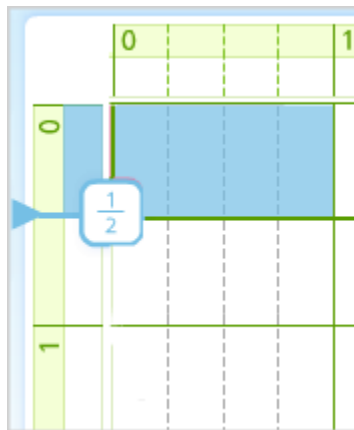
(halves/thirds/quarters)

- c. The total number of white boxes in the 1 by 1 square is 8.

- d. Using the *horizontal fraction strip* on the grid below, shade in the boxes that represent the fraction $\frac{3}{4}$:

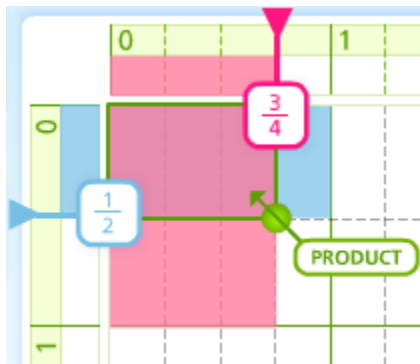


- How many boxes are shaded above? 6
 - What fraction of the total does this represent? $\frac{3}{4} = \frac{6}{8}$
- e. Using the *vertical fraction strip* on the grid below, shade in the boxes that represent the fraction $\frac{1}{2}$:



- How many boxes are shaded above? 4
- What fraction of the total does this represent? $\frac{1}{2} = \frac{4}{8}$

- f. Shade **both** the fractions $\frac{3}{4}$ and $\frac{1}{2}$ using the *horizontal and vertical strips* below:



- How many boxes were overlapped by the shading of both fractions? 3
- What fraction of the total area does this represent? $\frac{3}{8}$
- The **product** of $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$

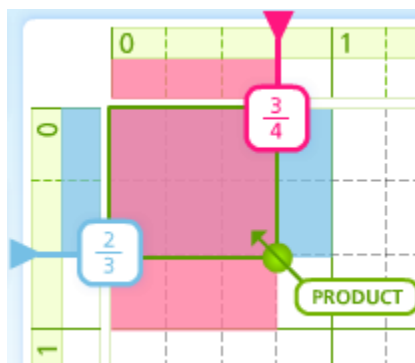
9. Select



Pink fraction: If you select a **denominator** of 4 and a **numerator** of 3.

Blue fraction: If you select a **denominator** of 3 and a **numerator** of 2.

- The selected fractions are $\frac{3}{4}$ and $\frac{2}{3}$.
- Use the grid below to find the **product** by answering and doing the following:
 - The total number of white boxes in the 1 by 1 square is 12.
 - SHADE: Use the *horizontal fraction strip* to shade in the boxes that represent the fraction $\frac{3}{4}$.
 - SHADE: Use the *vertical fraction strip* to shade in the boxes that represent the fraction $\frac{2}{3}$.



- The number of boxes that make up the overlapped shading is 6.

v. The **product** of $\frac{3}{4} \times \frac{2}{3} = \frac{6}{12} = \frac{1}{2}$

c. Complete the **short form** of the **quotient** statements below:

$$\frac{6}{12} \div \frac{\boxed{3}}{\boxed{4}} = \frac{2}{3}$$

$$\frac{6}{12} \div \frac{\boxed{2}}{\boxed{3}} = \frac{3}{4}$$

d. Use the **expanded form** to complete the statements below:

$$\frac{6}{12} \div \frac{3}{4} = \frac{6}{12} \times \frac{4}{\boxed{3}} = \frac{\boxed{24}}{36} = \frac{\boxed{2}}{\boxed{3}}$$

$$\frac{6}{12} \div \frac{2}{3} = \frac{6}{12} \times \frac{\boxed{3}}{\boxed{2}} = \frac{18}{\boxed{24}} = \frac{\boxed{3}}{\boxed{4}}$$

10. Select

☐ Add ☐ Subtract ☒ Multiply & Divide

Pink fraction: If you select a **denominator** of 2 and a **numerator** of 3.

Blue fraction: If you select a **denominator** of 4 and a **numerator** of 5.

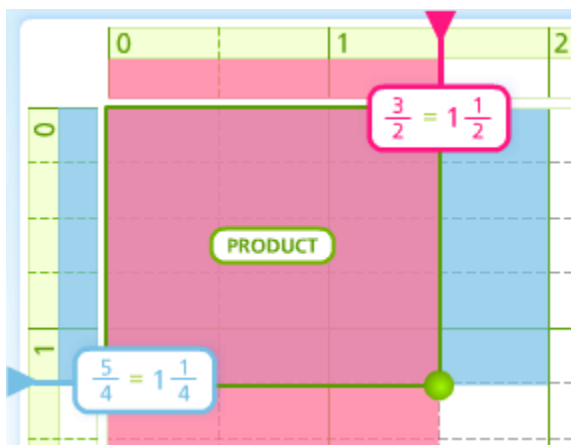
a. The selected fractions are $\frac{\boxed{3}}{\boxed{2}}$ and $\frac{\boxed{5}}{\boxed{4}}$

b. Use the grid below to find the **product** by answering and doing the following:

i. The total number of white boxes in the 1 by 1 square **only** is 8.

ii. SHADE: Use the *horizontal fraction strip* to shade in the boxes that represent the fraction $\frac{3}{2}$.

iii. SHADE: Use the *vertical fraction strip* to shade in the boxes that represent the fraction $\frac{5}{4}$.



iv. The number of boxes that make up the overlapped shading is 15.

v. The product of $\frac{3}{2} \times \frac{5}{4} = \frac{15}{8} = 1 \frac{7}{8}$

c. Complete the **short form** of the **quotient** statement below:

$$\frac{15}{8} \div \frac{3}{2} = \frac{5}{4} = 1 \frac{1}{4}$$

d. Use the **expanded form** to complete the following:

$$\frac{15}{8} \div \frac{5}{4} = \frac{15}{8} \times \frac{4}{5} = \frac{60}{40} = 1 \frac{20}{40} = 1 \frac{1}{2}$$

11. Answer True (T) or False (F):

F Multiplication of fractions requires a common denominator.

T Addition of fractions requires a common denominator.

F Division of fractions requires a common denominator.

T Subtraction of fractions requires a common denominator.

T Division is changed to multiplication by inverting the second fraction.