Directed Learning Activity – Equivalent Fractions

Description: *In this DLA, you will discover what an equivalent fraction is and how to create an equivalent fraction using multiplication and division.*

Prior Knowledge: *In order to complete this DLA, you will need to know your multiplication table or have one available to use.*

 Directions: *Please read the following examples and questions carefully and in order. Please do not skip ahead. If you have a question, please ask for help. After reading the examples in the gray boxes, spend some time thinking about what is being presented. Once you understand the examples, answer the practice questions. When you are finished, please sign up to have a tutor to review this activity with you. Don’t worry, you are not being graded. This is a learning activity, and you are not expected to know everything.*

**Step One: Discovering Equivalent Fractions**

**Example 1**

The fraction $\frac{1}{2}$ looks like this:

If we cut *each* $\frac{1}{2}$ into three equal parts, the whole gets cut into 6 equal parts. Each part is called $\frac{1}{6}$. We get this:

There are three $\frac{1}{6}$ in $\frac{1}{2}$, so we say there are $\frac{3}{6}$ in $\frac{1}{2}$. In other words, $\frac{1}{2} = \frac{3}{6}$.

Therefore, $\frac{1}{2}$ and $\frac{3}{6}$ are called *equivalent fractions*.

**Example 2**

The fraction $\frac{1}{3}$ looks like this:

If we cut *each* $\frac{1}{3}$ into four equal parts, the whole gets cut into 12 equal parts. Each part is called $\frac{1}{12}$. We get this:

There are four $\frac{1}{12}$ in $\frac{1}{3}$, so we say there are $\frac{4}{12}$ in $\frac{1}{3}$. In other words, $\frac{1}{3} = \frac{4}{12}$.

Therefore, $\frac{1}{3}$ and $\frac{4}{12}$ are called *equivalent fractions*.  **
Step Two: Putting It All Together

Example 3

The fractions halves, thirds, fourths, sixths, and twelfths are represented in the picture below.

If we look at the length of $\frac{1}{2}$ above and compare it with the lengths of the other fractions, we get:

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

If we look at the length of $\frac{1}{3}$ above and compare it with the lengths of the other fractions, we get:

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

Looking at the picture, can you find two more equivalent fractions for $\frac{2}{3}$?

$$\frac{2}{3} = \frac{\text{___}}{\text{___}} = \frac{\text{___}}{\text{___}}$$

Step Three: Using Multiplication to Create Equivalent Fractions

Example 4

Using the equivalent fractions we found earlier, let’s see if we can find a pattern.

$$\frac{1 \cdot 2}{2 \cdot 2} = \frac{2}{4} \quad \frac{1 \cdot 3}{2 \cdot 3} = \frac{3}{6} \quad \frac{3 \cdot 2}{6 \cdot 2} = \frac{6}{12}$$

$$\frac{1 \cdot 2}{3 \cdot 2} = \frac{2}{6} \quad \frac{2 \cdot 2}{6 \cdot 2} = \frac{4}{12} \quad \frac{1 \cdot 4}{3 \cdot 4} = \frac{4}{12}$$

Can you see the pattern? If you want to create a fraction that is equivalent to a given fraction, you multiply the numerator and denominator of the given fraction by the same number.

You can multiply by any number you choose, except zero. But remember:

*Multiply the top and bottom by the same number.*
Can you create three more equivalent fractions for \(\frac{5}{8}\) by multiplying? I will get you started.

\[
\begin{align*}
\frac{5 \cdot 7}{8 \cdot 7} &= \frac{35}{56} & \frac{5 \cdot 8}{8 \cdot 8} &= \frac{40}{64} & \frac{5 \cdot 10}{8 \cdot 10} &= \frac{50}{80}
\end{align*}
\]

**Step Four: Using Division to Create Equivalent Fractions**

Equivalent fractions can also be created by dividing the top and bottom by the same number.

\[
\begin{align*}
\frac{2 \div 2}{4 \div 2} &= \frac{1}{2} & \frac{9 \div 9}{27 \div 9} &= \frac{1}{3} & \frac{15 \div 5}{10 \div 5} &= \frac{3}{2} \\
\frac{72 \div 2}{24 \div 2} &= \frac{36}{12} & \frac{7 \div 7}{14 \div 7} &= \frac{1}{2} & \frac{18 \div 18}{36 \div 18} &= \frac{1}{2}
\end{align*}
\]

Can you create three more equivalent fractions for \(\frac{24}{36}\) by dividing? I will get you started.

\[
\begin{align*}
\frac{24 \div 2}{36 \div 2} &= \frac{12}{18} & \frac{24 \div 3}{36 \div 3} &= \frac{8}{12} & \frac{24 \div 6}{36 \div 6} &= \frac{4}{6}
\end{align*}
\]

**Step Five: Testing Your Knowledge**

1) Find the missing number in each pair of equivalent fractions.
   
   \[
   \begin{align*}
   a) \frac{2}{5} &= \frac{a}{10} & b) \frac{6}{7} &= \frac{36}{b} & c) \frac{10}{35} &= \frac{c}{7}
   \end{align*}
   \]

2) Find three equivalent fractions for \(\frac{3}{8}\) by multiplying top and bottom by the same number.

3) Find three equivalent fractions for \(\frac{24}{36}\) by dividing top and bottom by the same number.

4) Mary thinks that \(\frac{3}{4}\) and \(\frac{9}{10}\) are equivalent fractions. Is she right? Show how you got your answer.
5) Circle the fractions that are equivalent to \( \frac{2}{5} \).

\[
\begin{array}{ccc}
6 & 18 & 14 \\
12 & 40 & 35
\end{array}
\]

6) Costco slices each pizza into 6 equal slices.

   a) What fraction of the whole pizza does each slice represent? We can call this the fractional size of the slice.

   b) You purchase a whole pizza that is cut into 6 equal slices. Suppose that you decide that each slice is too large, and you take a knife and start dividing each slice into smaller slices of equal size. Name two more fractional sizes that you can create with your knife. Remember, you started with 6 slices.

7) An American ruler is divided into inch, 1/2 inch, 1/4 inch, 1/8 inch, and 1/16 inch increments.

   1/16 inch, the smallest line measures the length of 1/16 of an inch
   1/8 inch, the 2nd smallest line measures the length of 1/8 of an inch
   1/4 inch, the 3rd smallest line measures the length of 1/4 of an inch
   1/2 inch, the 4th smallest line measures the length of 1/2 of an inch

Identify on the ruler the mark that corresponds to 3/4 of an inch and write all the different ways to name this measurement on this ruler.

\[
\frac{3}{4} = \quad = \quad
\]

Step Six: Reflecting on What You Learned

a) Name one thing that you understand better about equivalent fractions as a result of completing this activity.

b) Name one thing that you still do not understand about equivalent fractions.

c) Can you think of a way to make this activity more useful to you and other students?

STOP. Please go over your work with a tutor at this time.
For Follow-Up:

- The student completed the entire activity.
- The student multiplied the numerator and denominator correctly to create equivalent fractions.
- The student used division to reduce a fraction correctly.
- The student demonstrated an understanding of why multiplying and dividing the numerator and denominator creates equivalent fractions during the discussion of his/her work.

Additional Comments:

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PRINT INSTRUCTOR/TUTOR NAME

DATE

INSTRUCTOR/TUTOR SIGNATURE

STUDENT – DO NOT FORGET TO TURN THIS SHEET IN AT THE FRONT DESK!

You may not get credit for completing this DLA if you fail to leave this sheet with the front desk receptionist.