# Equivalent Fraction Lesson Plan (1)
# Folding Fraction Strips (4th)

**L1-2a**

**4.NF.1** Explain why a fraction a/b is equivalent to a fraction (a x n)/(b x n) by using visual models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

**NOTE**: ***Strips of paper 8 ½ by 2 inches needs to be cut out for this lesson. The paper CAN be different colors, but plain white will work, too.***

**Materials**: Strips of paper 8 ½ by 2 inches (**at least** 9 pieces per student)
***Note: Have more paper on hand in case students make mistakes.***
Rulers – 1 per student
Colored pencils (optional, but can be used to color white paper)
***Note: Do not make coloring the focus of this lesson.***
Pencils
Large plastic baggies – 1 per student (will be used to store fraction pieces)

**Time**: 1– 2 class periods

**Management**: Students will work independently for this activity with guided instruction provided by the teacher.

In **third grade**, students develop an understanding of fractions beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models (fraction towers) to represent parts of a whole. They are limited to denominators of 2, 3, 4, 6, and 8. The students should be familiar with the term **unit fraction**. **A unit fraction is a fraction whose numerator is 1 and the denominator is a positive integer. ½, ¼, 1/6, 1/8, are all examples of unit fractions**. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.

**Lesson Plan**: Read Fraction Action to the students. It is in the LRC or it can be checked out from most libraries.

Review "fraction" vocabulary with the students.

fraction
numerator
denominator
unit fraction

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# Folding Fraction Strips (4th)

The teacher should guide the students through the steps provided below. It is important that the teacher circulates the room to be sure the students are keeping up with the activity and to make sure that the students are understanding what they are expected to do during this activity. **If you are using a different color paper to "show" the different fraction pieces, be sure that each student uses the same color to represent each fraction. This will prevent confusion with the students.** Questions to ask students while they are working have been provided. The teacher can add his/her own similar types of questions during the activity.

1. **Label** one strip 1 whole. No folding needs to be done.
2. Fold a second strip of paper to show "halves". Give students time and have the students write ½ on each piece.
   **How did you decide where to fold the paper to show ½?**
   **How could you use a ruler to help you determine ½?**
3. Fold another strip of paper to show "fourths". Write ¼ on each section.
   **How did you make the "fourths"? Explain.**
4. Fold another strip of paper to show "eighths". Write 1/8 on each section.
   **How many "eighths" make 1 whole? How do you know?**
5. Fold a different strip of paper to show "thirds". Write 1/3 on each section.
   **How many "thirds" make 1 whole? Compare the "thirds" to the "eighths".**
   **Which pieces are *bigger*? Why?**
6. Fold another strip of paper to show "sixths". Write 1/6 on each section.
   **Compare the "sixths" to the "halves". Which pieces are *smaller*? Explain.**
7. Fold a different strip of paper to show ""twelfths". Write 1/12 on each section.
   **Is 1/12 big or small? Explain.**
   **How many "twelfths" make 1 whole?**
8. Fold another strip of paper to show "fifths". *Students might have difficulty with this task.* Write 1/5 on each section
   **How many "fifths" make up 1 whole?**
   **How did you make your "fifths"? Explain.**
9. Fold another strip of paper to show "tenths". Write 1/10 on each section.
   **How many "tenths" make a "fifth"? How do you know?**

<u>*Additional Questions*</u>

**Explain how you would show "ninths" using a strip of paper. DO NOT have the students make "ninths".**
**Is 1/6 greater than or less than ¼? How do you know?**
**How do the "fourths" compare to the "eighths"? Explain.**
**How many "tenths" make 1 whole? Explain.**

# Equivalent Fraction Lesson Plan (1)
# Folding Fraction Strips (4th)

**What might a "hundredth" look like?** The students should be able to explain that a "hundredth" would be a **very small size piece** and that it would take 1 hundred of them to make 1 whole. If students cannot answer this question, they will need more questioning using the pieces that they have created/folded.

**How difficult would it be to fold the paper into "hundredths"? Why?**

**Have the students compare other different unit fractions, by asking them similar types of questions.**

When the students have completed making/folding their fraction strips, these fraction representations can be put in their plastic bags and kept in a convenient place. Be sure that the students have their names on their fraction strips or bags.

# Equivalent Fraction Lesson Plan (2)
# One-Color Cover/Can You Sketch It? (4th)

**L1-2b**

**4.NF.1** Explain why a fraction a/b is equivalent to a fraction (a x n)/(b x n) by using visual models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

**Materials**: Rulers (1 per student, to draw straight lines)
One-Color Cover/Can You Sketch It worksheets, 4 sheets (1 set per student)
Transparency of the One-Color Cover/Can You Sketch It worksheet
Fraction strips (1 set per student) – not needed until Activity 2, see lesson plan
Teacher set of fraction strips – not needed until Activity 2, see lesson plan
Fraction magnets – not needed until Activity 2, see lesson plan
Equivalent Fractions worksheet (1 per student) – Activity 3
Transparency of the Equivalent Fractions worksheet (optional)

**Time**: 1 – 2 class periods

**Objective**: Students should **begin** examining the idea that equivalent fractions can be created by multiplying BOTH the numerator and denominator by the same number (2/2, 3/3, 4/4…. 1 whole). It is important students continue using visual models (fraction strips) as they work.

**Lesson Plan**: There is a progression to this lesson plan. Students begin by reviewing the concept of "1 whole" and eventually move into modeling equivalent fractions. Follow the lesson plan carefully. Be sure that all of the activities are completed with understanding.

**Warm-up (One-Color Cover) – 5 to 10 minutes**

Distribute the One-Color Cover Up worksheet to each student. Have the students use their fraction strips to determine the number of same-color pieces cover the 1 whole fraction strip. Students should record the numerators on the worksheet. See answer key. It is important that the teacher go over the questions about the patterns and that students can explain what is happening to the "piece" sizes as the denominators become larger. **This activity is a warm-up only. It should go very quickly**.

**Activity 1 (Can You Sketch It?)**

In the Folding Fractions lesson (Lesson 1), students folded the fraction pieces and filled in the name of the pieces as they worked. After the students have completed the One-Color Cover worksheet for this lesson, have them use a ruler to complete the Can You Sketch It worksheet. Students can generate their own ways for dividing the "1 whole" into the various fraction pieces. The teacher should be circulating to be sure that the students are doing the activity correctly.

**Note: Fraction strips needed beginning with Activity 2**

# Equivalent Fraction Lesson Plan (2)
# One-Color Cover/Can You Sketch It? (4th)

**Activity 2 (Cover Up)**

Students should use their fraction strips to complete the Cover Up worksheet. This worksheet should be done with the teacher providing guided instruction, so students begin to see the patterns and relationships between equivalent fractions.

Guide the students through the 1/2 example on the Cover Up worksheet. It has been started for the students. Students are to use their fraction strips to see which pieces will cover the 1/2 fraction **exactly**. The 1/2 piece will fit exactly, so it is circled. One-1/3 piece will be too small to fit onto the 1/2 piece, and two-1/3 pieces will be too big to fit onto the 1/2 piece exactly, so it is crossed out on the worksheet. Two-1/4 pieces will fit onto the 1/2 piece exactly, so a "2" is placed in the numerator because 2/4s equals 1/2. One and two-1/5s pieces are too small to fit onto the 1/2 piece exactly and three-1/5s pieces are too big to fit onto the ½ piece exactly, so the "fifths" should be crossed out on the worksheet. **STUDENTS MUST MODEL EACH FRACTION PIECE AND SEE HOW THE PIECES "FIT" OR "DOES NOT FIT"**. If students begin to see the connections, tell them to continue working to "prove" how many fraction pieces it takes to fit onto the "1 whole" or "prove" why the fraction should be crossed out. See the answer key for the answers and how students should be showing their work. When the students have completed the 1/2 "problem", have them write the circled fractions next to each other. This can be done on the worksheet OR on a separate sheet of paper.

Questions to ask the students:

**Do you see any patterns?** 1/2, 2/4, 3/6, 4/8, 5/10, 6/12

Have students tell you what they are seeing. **Do not** take away their thinking by leading them to the algorithm. They will develop this concept on their own.

**Compare 1/2 to 5/10, 2/4 to 6/12, and so on.**

What can you tell me about these fractions and the size of their pieces?

Have the students complete the 1/4 and 1/3 "problems" on their own. They should be using the fraction strips to model each one. Students should continue crossing out the fractions, writing the numerator in the pieces that "fit", listing the fractions, and comparing the equivalent fractions to each other. See the answer key.

Question to ask the students:

**What does it mean when fractions are equivalent?**

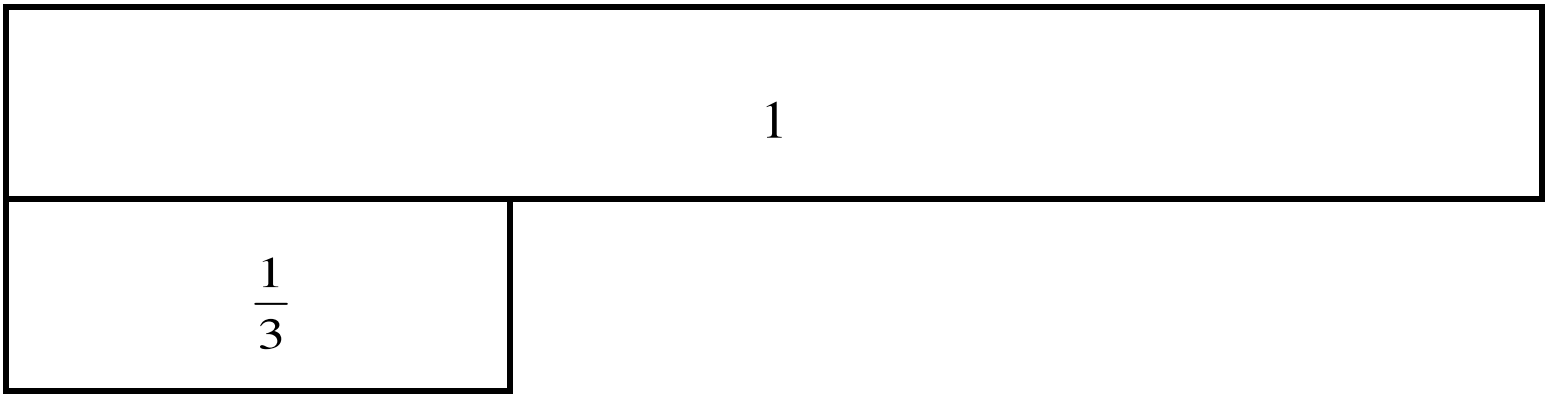
Equivalent Fraction Lesson Plan (2)
One-Color Cover/Can You Sketch It? (4th)

**Activity 3 (Equivalent Fractions)**

Students must use their fraction strips for this part of the lesson. It is important that they see the relationship between "1 whole" and the fractional parts of "1 whole." See example. Go through problem #1 with the students using the example shown below. **EVERY PROBLEM** must be modeled using the fraction strips, so the students develop the conceptual understanding of equivalent fractions.

For **each** problem, have students set up the "1 whole" piece, aligned with the given fraction.

**Problem #1**




Place 1/6s under the 1/3.
How many make 1/3?

(Answer – students should place two-1/6 pieces underneath the 1/3 piece.)

Underneath 1/3, students should fit their 1/6 pieces to see how many will make 1/3. Everything should be lined up perfectly, so that the students can "see" conceptually that two-1/6 pieces will equal the 1/3 piece **exactly**. Students should fill in the numerator on the worksheet with the number 2. It is important to constantly refer back to the term **unit fraction**, so the students understand that the unit fraction is "one" of the piece that is being referred to (e.g. 1/3 means one-1/3 piece and that 2/3's means two-1/3 pieces). 1/3 is the **unit fraction**, 2/3's is two of the 1/3 piece.

This concept will continue to be used as students develop understanding of equivalent fractions.

Name _____

**L1-2c**

## One-Color Cover

Use your fraction strips to find how many same-color pieces cover the whole fraction strip (1 whole). The first one ($\frac{2}{2}$) has been done for you.

| 1 |
|---|

$\frac{2}{2}$ $\frac{\quad}{3}$ $\frac{\quad}{4}$ $\frac{\quad}{5}$ $\frac{\quad}{6}$ $\frac{\quad}{8}$ $\frac{\quad}{10}$ $\frac{\quad}{12}$

Did you notice a pattern above? Use the information you gathered to fill in the numerators.

$1 = \frac{\quad}{9} = \frac{\quad}{20} = \frac{\quad}{25} = \frac{\quad}{47} = \frac{\quad}{50} = \frac{\quad}{100}$

What can you say about the numerator and denominator of a fraction that is equivalent to 1 whole? Explain why your answer makes sense.

Name _____

## Can You Sketch It?

Divide each "whole" fraction strip into the specified pieces.

$\frac{1}{2}$'s (2 equal size pieces)

$\frac{1}{4}$'s (4 equal size pieces)

$\frac{1}{8}$'s (8 equal size pieces)

How did you use the fourths pieces to help you make the eighths pieces? Explain.

Name _____

$\frac{1}{3}$'s

$\frac{1}{6}$'s

$\frac{1}{12}$'s

How did you use the thirds pieces to help you make the sixths pieces? Explain.

Name _____

$\frac{1}{5}$'s

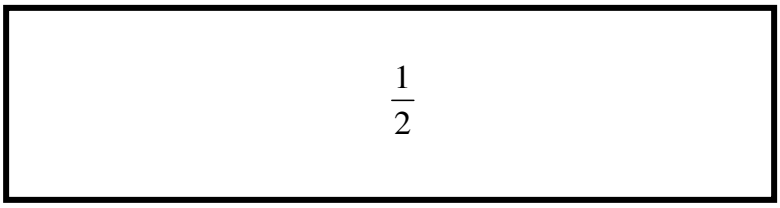
$\frac{1}{10}$'s

What strategy did you use to sketch the fifths pieces? How did you use the fifths pieces to sketch the tenths pieces? Explain your reasoning.

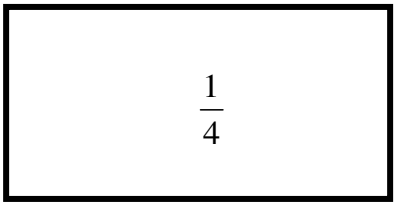
Name _____

# Cover Up

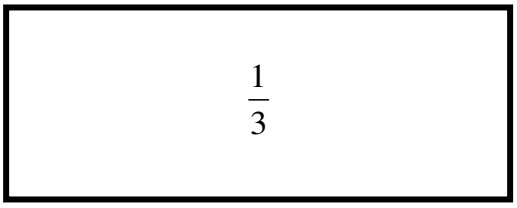
Find same-color fraction strips that will cover each figure below ***exactly***. Fill in the fraction numerators that show which pieces cover the figure exactly. Cross out the fractions that are not equivalent to the figures shown below. Circle the **equivalent fractions**. The first one has been started for you.




$\frac{1}{2}$ $\frac{\_}{3}$ $\frac{2}{4}$ $\frac{\_}{5}$ $\frac{\_}{6}$ $\frac{\_}{8}$ $\frac{\_}{10}$ $\frac{\_}{12}$




$\frac{\_}{2}$ $\frac{\_}{3}$ $\frac{\_}{4}$ $\frac{\_}{5}$ $\frac{\_}{6}$ $\frac{\_}{8}$ $\frac{\_}{10}$ $\frac{\_}{12}$




$\frac{\_}{2}$ $\frac{\_}{3}$ $\frac{\_}{4}$ $\frac{\_}{5}$ $\frac{\_}{6}$ $\frac{\_}{8}$ $\frac{\_}{10}$ $\frac{\_}{12}$

Name _____

## Equivalent Fractions

Use your fraction strips to model equivalent fractions. Fill in the missing numerator OR denominator.

1) $\frac{1}{3} = \frac{\square}{6}$

2) $\frac{1}{4} = \frac{\square}{12}$

3) $\frac{2}{5} = \frac{\square}{10}$

4) $\frac{8}{12} = \frac{\square}{3}$

5) $\frac{5}{10} = \frac{\square}{2}$

6) $\frac{3}{4} = \frac{\square}{12}$

7) $\frac{2}{6} = \frac{4}{\square}$

8) $\frac{2}{3} = \frac{\square}{12}$

9) $\frac{1}{\square} = \frac{2}{10}$

10) $\frac{6}{12} = \frac{4}{\square}$

11) $\frac{5}{6} = \frac{10}{\square}$

12) $\frac{2}{8} = \frac{\square}{12}$

Name _____

13) $\frac{2}{\square} = \frac{6}{6}$

14) $\frac{2}{4} = \frac{\square}{6}$

15) $\frac{\square}{3} = \frac{8}{8}$

16) $\frac{4}{8} = \frac{6}{\square}$

17) $\frac{6}{10} = \frac{3}{\square}$

18) $\frac{1}{2} = \frac{4}{\square}$

**Use fraction strips to model, solve, and explain your answer to problem #19.**

19) Pamela says that she ate $\frac{2}{3}$ of the pizza, and Teresa says that Pamela ate $\frac{5}{6}$ of the pizza. Could they both be right? Explain your answer.