Fraction Division--6.NS.1 **Saturday, October 18, 2014**

Name: _____ Class: _____

Lesson 1: Dividing Fractions

OBJECTIVES: SWBA to

Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. 6. NS.1

INTRODUCTION

Division of Fractions is one of, if not the most, commonly used mathematical concept is our daily life. We use fraction division without even knowing that we are using it. We just do the division in our head or use objects unaware of the fact that we are dividing things. For instance, we fraction division during the calculation of percentages, dividing objects, especially money, among people; when we figure out to figure out how many days a certain shampoo or other bathroom substance may last. We use division of fractions when we cook (for instance, two and third cups of flour, one-half bar of butter, etc.), shop, etc. Believe it or not! We use fractions division when deciding how much we need to eat, especially if we are in a diet!

It is important to notice that when we do fraction division, the first thing that pops into our head is a picture, never an algorithm. We are always drawing imaginary pictures in our head and use these images to determine quotients of two fractions. We are going to use our innate ability to solve fraction division problems, and later we will apply the famous fraction algorithm –change and flip!

MINI-LESSON (I DO):

Let's consider the situation below.

Mrs. Drake is grilling the hamburgers. Some people like big patties, some medium patties, and some small patties.

1. How many $\frac{1}{8}$-pound patties can she make from $\frac{7}{8}$ of a pound of hamburger?
2. How many $\frac{2}{8}$-pound patties can she make from $\frac{7}{8}$ of a pound of hamburger?
3. A teacher brings $2\frac{3}{4}$ pounds of hamburger to make $\frac{1}{4}$-pound patties. How many patties can he make?

I am going to model how to solve each problem using a picture. Later, I am to use an algorithm to solve the same problems.

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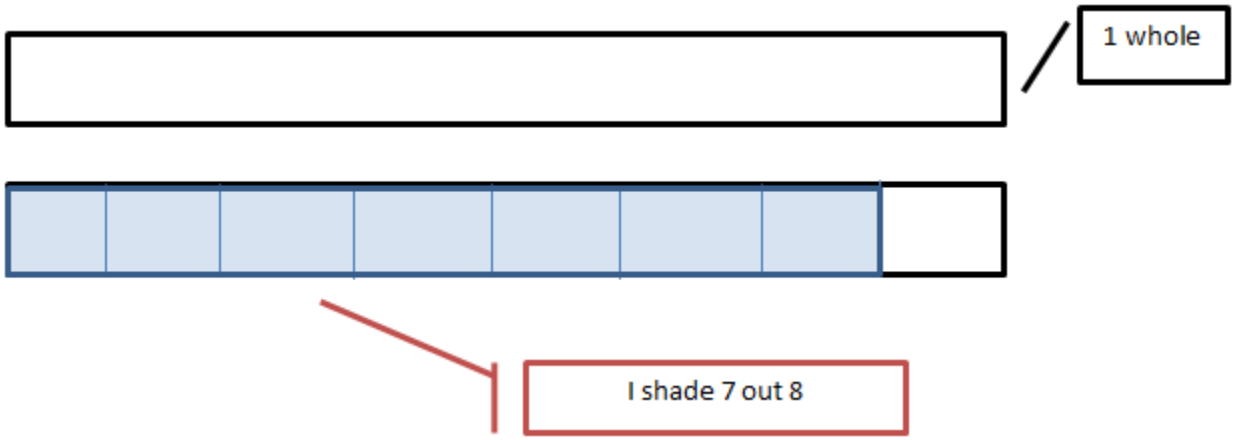
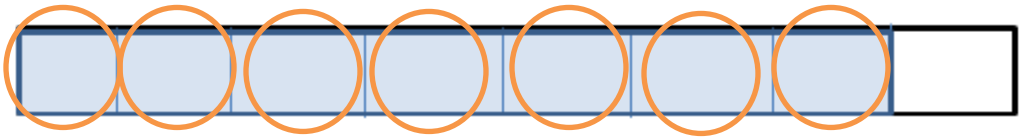
Modeling #1

1. How many $\frac{1}{8}$-pound patties can she make from $\frac{7}{8}$ of a pound of hamburger?

Step 1: I draw a picture of 1 whole and cut it into 8 equal pieces, and shade 7 out of the 8 pieces.



Step 2: I ask myself the following question, how many 1/8 can I fit into 7/8 depicted in the picture above?



Solution: 7 patties.

Ms. Drake can grill 7patties with 7/8 pound of hamburger.

Now let's try using the algorithm: **"Keep the first fraction, Replace ÷ with × and write the Reciprocal or multiplicative inverse of the second fraction."**

$\frac{7}{8} \div \frac{1}{8} = \frac{7}{8} \times \frac{8}{1} = \frac{7 \times 8}{8 \times 1} = 7$ patties!

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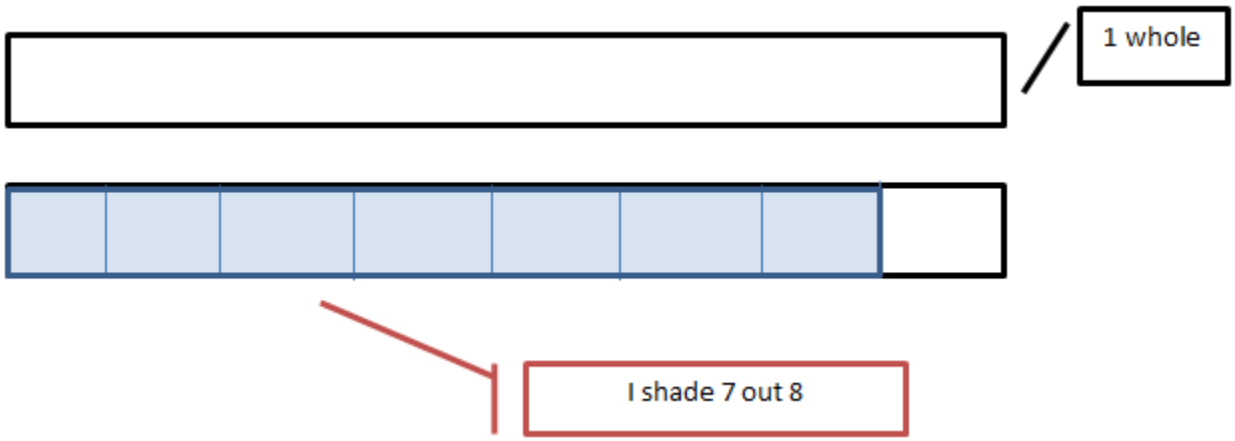
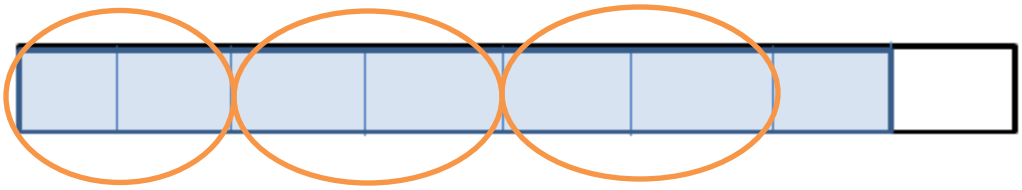
Modeling #2:

2. How many $\frac{2}{8}$-pound patties can she make from $\frac{7}{8}$ of a pound of hamburger?

Step 1: I draw a picture of 1 whole and cut it into 8 equal pieces, and shade 7 out of the 8 pieces.



Step 2: I ask myself the following question, how many 2/8 can I fit into 7/8 depicted in the picture above?



Solution: $3\frac{1}{2}$ patties.

Ms. Drake can grill $3\frac{1}{2}$ patties with 7/8 pound of hamburger.

Now let's try using the algorithm: **"Keep the first fraction, Replace ÷ with × and write the Reciprocal or multiplicative inverse of the second fraction."**

$\frac{7}{8} \div \frac{2}{8} = \frac{7}{8} \times \frac{8}{2} = \frac{7 \times 8}{8 \times 2} = \frac{7}{2} = 3\frac{1}{2}$ Two-eighth patties!

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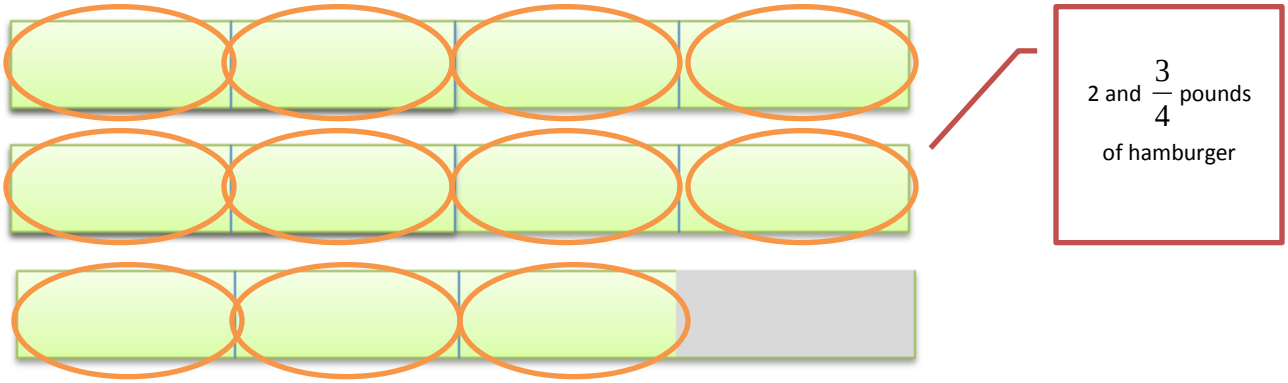
Guided Practice:

3. A teacher brings $2\frac{3}{4}$ pounds of hamburger to make $\frac{1}{4}$-pound patties. How many patties can he make?

Step 1: First, we notice that $2\frac{3}{4} = 2 + \frac{3}{3}$. Therefore, we draw a picture of 3 whole-bars, and I shade 2 whole bars and shade $\frac{3}{4}$ of a third, same-size bar.



Step 2: We ask ourselves the following question, how many $\frac{1}{4}$ pound can we fit into $2\frac{3}{4}$ pounds depicted in the picture above? Or how many $\frac{1}{4}$ pounds do we see in the whole picture above?

Answer: 11 one-quarter pound patties.

Now let's try using the algorithm: **"Keep the first fraction, Replace ÷ with × and write the Reciprocal or multiplicative inverse of the second fraction."**

Step 1: Change the mixed number to an improper fraction

$$2\frac{3}{4} \div \frac{1}{4} = \frac{2\times 4+3}{4} \div \frac{1}{4} = \frac{8}{4} \div \frac{1}{4}$$

Step 2: apply **"Keep the first fraction, Replace ÷ with × and write the Reciprocal or multiplicative inverse of the second fraction."**

$$2\frac{3}{4} \div \frac{1}{4} = \frac{2\times 4+3}{4} \div \frac{1}{4} = \frac{11}{4} \div \frac{1}{4} = \frac{11}{4} \times \frac{4}{1} = 11$$ One-quarter patties

Summarize what you have taught them—Assess for understanding by show of thumbs up/down.

Designed by Alejandro Rivera, MS319 Mathematics Coach

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Independent Practice (You Do):

Problem 1:

$$\frac{8}{9} \div \frac{2}{9}$$

Draw a model to show the division problem.

Problem 2:

$$\frac{9}{12} \div \frac{3}{12}$$

Be sure to draw a model to support your answer.

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Use an algorithm to find the quotient in of the following division.

Problem 3:

$$\frac{4}{5} \div \frac{2}{5}$$

Problem 4:

$$\frac{9}{4} \div \frac{3}{4}$$

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Problem 5:

Molly purchased $\frac{11}{8}$ cups of strawberries. She eats $\frac{2}{8}$ in a serving. How many servings did Molly purchase?

Use a model to prove your answer.

Problem 6:

Now imagine that Molly's friend Xavier purchased $\frac{11}{8}$ cups of strawberries and that he eats $\frac{3}{4}$ cup servings. How many servings has he purchased?

Use a model to prove your answer.

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Problem 7:

The distance between Rosa's house and her school is $\frac{3}{4}$ mile. She ran $\frac{1}{4}$ mile. What fraction of the way to school did she run?

Use a model or a computational approach to solve this problem. Show your work.

Problem 8:

A baker used 12 cups of batter to make muffins. It took 2/3 cup of batter to make 1 muffin. How many muffins did the baker make?

A. 6 muffins

B. 8 muffins

C. 18 muffins

D. 36 muffins

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Problem 9:

The area and one dimension of a piece of land are given. Find the second dimension of each piece of land described. Show your work.

Part A:

The area of a rectangular piece of land is 6/10 square mile. One dimension of this piece of land is 3/4 mile.

Part B:

The area of a piece of land that is in the shape of a triangle is 1/6 square mile. One dimension of this piece of land is 2/3 mile.

Part C:

The area of a rectangular piece of land is 4/25 square mile. One dimension of this piece of land is 2/5 mile.

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Final Summary

In a U-Shape:

1. Re-state the objective to assess if students learn it
2. Elicit from students what they have learned and what they want to learn more about.
3. Tie what they learn to the lesson, and upcoming lessons (Next Saturday, they will learn about proportion, a comparison of two ratios!)