Dividing Fractions I

Part 1: Opening Question

How many 4's are there in 12? When we are dividing, we are finding the number of
_____ groups that there are in a number. Circle groups of 4 stars below.

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*There are _____ **equal** groups of 4 in 12.

How many times can 4 be subtracted from 12? Show how many times you can subtract
4 from 12, below.

Four (4) can be subtracted from twelve (12) _____ times.

Part 2: Dividing a Whole Number by a Fraction

1) Marissa bakes one tray of brownies. She divides the tray of brownies in half. How
    many one half pieces does Marissa have?

a) Write the problem in words: *How many _____ are there in _____?*

b) Using a rectangle, show: $1 \div \frac{1}{2}$:

c) There are _____ halves in 1.
    Show using repeated subtraction.

d) Symbols: $1 \div \frac{1}{2}$ = _____

(one whole)

2) $4 \div \dfrac{1}{2}$:

a) Write the problem in words: *How many _____ are there in _____?*

b) Using rectangle(s), show: $4 \div \dfrac{1}{2}$:

c) There are _____ halves in 4.

d) Symbols: $4 \div \dfrac{1}{2}$ = _____

3) $8 \div \dfrac{1}{4}$:

a) Write the problem in words: *How many _____ are there in _____?*

b) Using rectangle(s), show: $8 \div \dfrac{1}{4}$:

c) There are _____ fourths in 8.

d) Symbols: $8 \div \dfrac{1}{4}$ = _____

4) $6 \div \dfrac{1}{3}$:

a) Write the problem in words: *How many _____ are there in _____?*

b) Using rectangle(s), show: $6 \div \dfrac{1}{3}$:

c) There are _____ thirds in 1.

d) Symbols: $6 \div \dfrac{1}{3}$ = _____

Practice:
Use a picture to solve questions 5-10.

5) $5 \div \dfrac{1}{3}$

6) $9 \div \dfrac{1}{3}$

7) $5 \div \dfrac{1}{4}$

8) $9 \div \dfrac{1}{4}$

9) How many thirds of a cup are in two cups?

10) Mrs. Sanchez promised each of her 35 fifth grade students one fourth of a pie for Pi Day (March 14th). There are 6 pies left at Costco. Does she have enough for her 35 students? Explain how you know. If she doesn't have enough, how many more pies does she need?

Teacher Directions: Dividing Fractions I

Materials:
- Play-Doh (1 small tub per student)
- Plastic Knives (1 per student)
- Paper Plates (1 per student)
- Optional: Colored Pencils

Objective:
Students will use quotative division to rewrite division of fraction problems as "How many ____ are in ___", and use this definition with an area model to divide a whole number by a fraction. Students will first understand this by seeing how many of a smaller pattern block fit into a larger one and then relating the context to the math behind it.

Directions:
Pass out the activity sheet and have students read the opening question. Have 12 students come up to the front of the class and stand in one long line. Use think-pair-share to have students decide how many 4's there are in 12. Have a student show how to measure out "three" fours in the 12 by having a group of four students sit down, then another group of four sit down, then the last group of four sit down. Relate this to repeated subtraction by writing a subtracting equation(s) as students sit down (12-4-4-4=0 or 12-4=8, 8-4=4, 4-4=0). Explain that you will be using this measurement definition of division to divide whole numbers by fractions today.
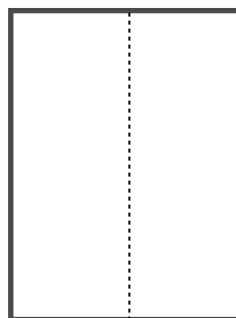
Pass out the Play-Doh and have students build a rectangle to represent one whole tray of brownies in #1. Ask students to cut the tray of brownies in half and think about how many halves there are in 1.

a) Write the problem in words: *How many $\frac{1}{2}$s are there in _1_?*

b) Using a rectangle, show: $1 \div \frac{1}{2}$:

c) There are _2_ halves in 1.
    Show using repeated subtraction.

d) Symbols: $1 \div \frac{1}{2} = \underline{2}$

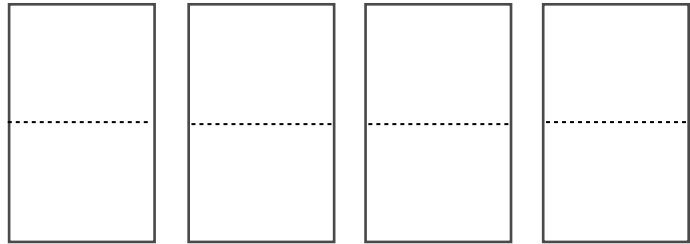*The cut could be horizontal instead of vertical.*

(one whole)

BIG IDEA:
For problems 2-4, many students will not count all the pieces or even draw all of them. That is great! Make sure to ask students what they did to count the total, anticipating that many will discuss multiplication (or repeated addition). Point out that even though we are dividing, we seem to be multiplying.

Allow students to continue using their Play-Doh and working independently on problems 2-10 for about 15 minutes. Then let them discuss with a partner before leading a class discussion. Encourage students with different approaches to share. Problems 2 and 5 are worked out here as an example.

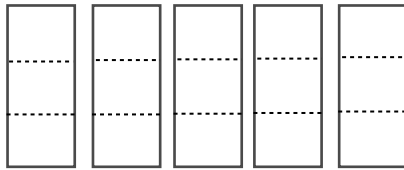2a) Write the problem in words: *How many* $\frac{1}{2}$ *s are there in 4?*

b) Using rectangle(s), show: $4 \div \frac{1}{2}$:

c) There are <u>8</u> halves in 4.

d) Symbols: $8 \div \frac{1}{2} = \underline{4}$

5) $5 \div \frac{1}{3} = 15$

For #10, this is a great opportunity for students to share their method which may be different than others in the class. One option is to use an inside-outside line. Number students off by 1's and 2's. All the ones stand in a long line side by side; all the 2's line up in a line across from the 1's so each person has a partner. Students bring their paper to the inside-outside line and explain how they solved, then listen to how their partner solved. Then the person at the end of the #1 line goes to the other end of the line and everyone in the 1's line shifts over one and has a new partner. Rotate 2-3 times, giving everyone a chance to explain how they solved and listen to others explain how they solved. There are many methods, but an equation that could model the problem is:

10) $6 \div \frac{1}{4} = 24$ *or*   "There are 24 one-fourth pieces in 6 pies, but I need 35 pieces, so I need 11 more pieces. There are 4 one-fourth pieces in one pie, so I would need 3 more pies to get 11 pieces, with one piece left over."

ANSWER KEY:

Part 1:

> When we are dividing, we are finding the number of <u>equal</u> groups there
> > are in a number.
> * There are <u>3</u> equal groups of 4 in 12.
> 12 - 4 - 4 - 4 = 0 *or* 12 - 4 = 8; 8 - 4 = 4; 4 - 4 = 0
> Four (4) can be subtracted from twelve (12) <u>3</u> times.

Part 2:

Problem:	1)	2)	3)	4)
a)	$^1/_2$; 1	$^1/_2$; 4	$^1/_4$; 8	$^1/_3$; 6
c)	2 ; 1 - $^1/_2$ - $^1/_2$	8	32	18
d)	2	8	32	18

Practice:

5) 15

6) 27

7) 20

8) 36

9) 6

10) $6 \div \dfrac{1}{4} = 24$ *or*   "There are 24 one-fourth pieces in 6 pies, but I need 35 pieces, so I need 11 more pieces. There are 4 one-fourth pieces in one pie, so I would need 3 more pies to get 11 pieces, with one piece left over."