Teaching Computations with Fractions So Students Can Explain WHY

NCTM 2014

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Foamy Fractions!

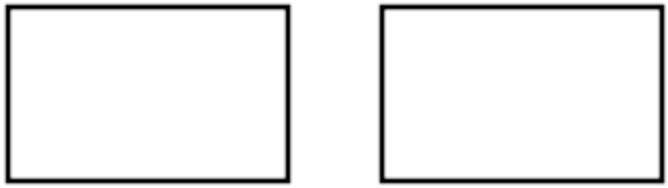
Check to make sure you have: A pair of scissors. A piece of yellow, red, orange, blue and green foam. A plastic bag, pencil or pen, and a yellow, red, orange, blue and green crayon or colored pencil.

1.) Pick up the yellow piece and look at it. Describe this piece. Draw a picture of the yellow piece below.

_____

_____

2.) Pick up the red piece of foam. Is the red piece the same size as the yellow piece? _____ Follow your teacher's directions. Once finished, draw a picture of the red pieces compared to the yellow piece below.



Yellow Red

3.) Each red piece is _____ out of _____ equal pieces needed to make the whole. So each red piece is called _____. Two of the red pieces would be called _____, which is the same as _____. The fractional unit of the red piece is called _____.

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4.) True or False?

a. ½ is smaller than 1 whole. _____

By how much? _____

b. ½ and ½ is the same as one whole. _____

Write an equation_____

c. It takes two ½ pieces to make one whole. _____

Write an equation_____

5.) Pick up the orange piece of foam. Is the orange piece the same size as the yellow piece and the red piece before you cut it? _____ Follow your teacher's directions, then draw a picture of the orange pieces compared to the yellow and red pieces below.

Yellow Red Orange

6.) Each orange piece is _____ out of _____ equal pieces needed to make the whole.

So each orange piece is called _____. Two of the orange pieces would be called

_____, which is equal to _____. Three of the orange pieces would be called

_____. Four of the orange pieces would be called _____, which is equal to

_____ and _____. The fractional unit of the orange pieces is called

_____.

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7.) Write a true statement comparing the orange pieces to the yellow piece or the red pieces. These statements should be like those in number 4, using the fractional unit names for the pieces. (The red is called $\frac{1}{2}$, two orange pieces are called $\frac{2}{4}$, so I could write $\frac{1}{2} = \frac{2}{4}$.) Draw a picture to model the statement you write.

_____

_____

8.) In a fraction, the bottom number is called the _____.

The bottom number, or the _____ tells us

_____.

9.) A unit fraction is a fractions with a _____ equal to

_____.

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10.) Pick up the blue piece of foam. Is the blue piece the same size as the original yellow, red and orange pieces? _____ Follow your teacher's directions, then draw a picture of the blue pieces compared to the yellow, red, and orange pieces below.

Yellow

Red

Orange

Blue

11.) Each blue piece is _____ out of _____ equal pieces needed to make the whole. So each blue piece is called _____. Two of the blue pieces would be called _____. Three of the blue pieces would be called _____, which is equal to _____ , _____ , and _____ . The fractional unit of each blue piece is called _____.

12.) Write a true statement comparing the blue pieces to the yellow piece, red pieces or the orange pieces. Draw a picture to model your statement.

_____

_____

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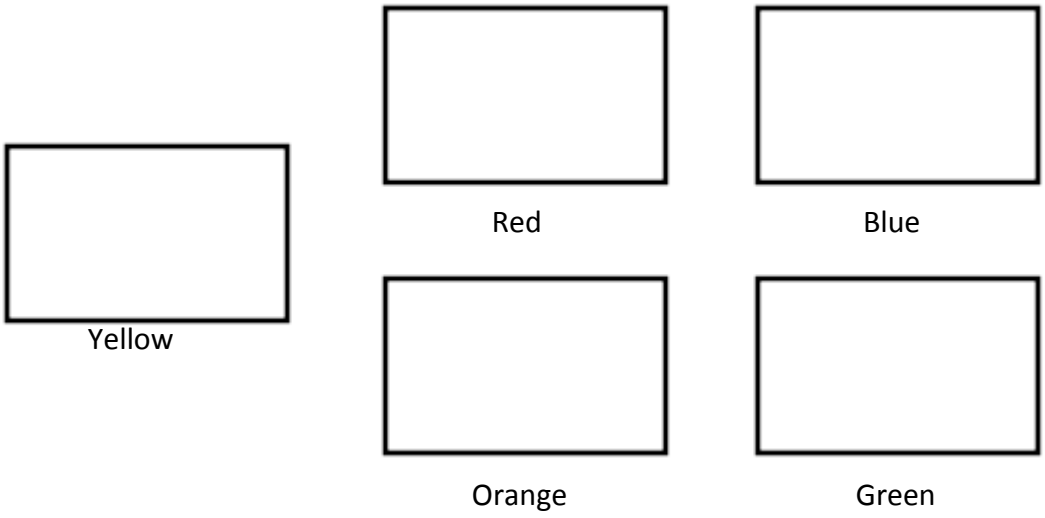
13.) Pick up the green piece of foam. Is the green piece the same size as the original yellow, red, orange, and blue pieces? _____ Follow your teacher's directions, then draw a picture of the green pieces compared to the yellow, red, orange, and blue pieces below.



14.) Each green piece is _____ out of _____ equal pieces needed to make the whole. So each green piece is called _____. Two of the green pieces would be called _____, which is equal to _____. Three of the green pieces would be called _____, which is equal to _____. Four of the green pieces would be called _____, which is equal to _____. Five of the green pieces would be called _____. Six of the green pieces would be called _____, which is equal to _____, _____ , _____ , and _____ . The fractional unit of each green piece is called _____.

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15.) Write a true statements comparing the green pieces to the yellow piece or the red pieces or the orange pieces or the blue pieces. Draw a picture to model your statement.

_____

_____

16.) In a fraction, the top number is called the _____. The top number, or the _____ tells us

_____.

17.) In the fraction $\frac{1}{2}$ the numerator is _____. It tells me _____

_____.

The denominator is _____. It can tell me _____

_____.

So $\frac{1}{2}$ means I have _____ piece and the fractional unit is called

_____.

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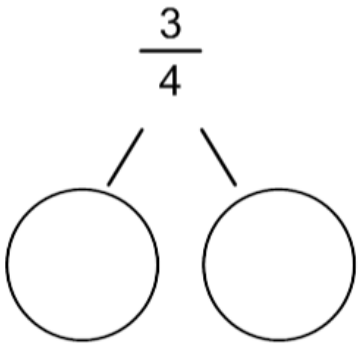
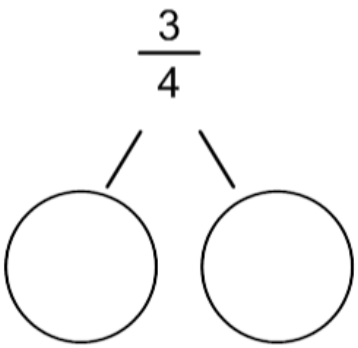
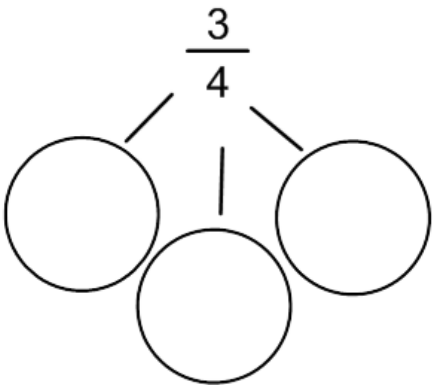
Composing and Decomposing $\frac{3}{4}$

1.) Using only your fourth pieces, make the fraction ¾. Draw a picture below. Label each unit fraction.	2.) Using only your fourth pieces, make the fraction ¾. Draw a picture below. Label each unit fraction.
3.) Write as the sum of two addends. 	4.) Write as the sum of two addends. 
5.) Write as the sum of unit fractions 	6.) $\frac{3}{4} = \frac{\quad}{\quad} \times \frac{1}{4}$

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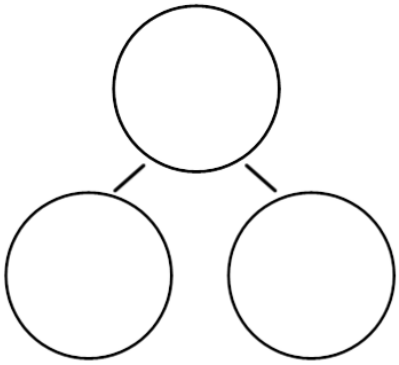
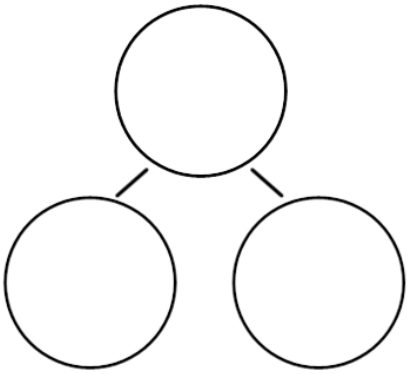
Composing and Decomposing $\frac{5}{6}$

1.) Using only your sixth pieces, make the fraction $\frac{5}{6}$. Draw a picture below. Label each unit fraction.	2.) Using only your third and sixth pieces, make the fraction $\frac{5}{6}$. Draw a picture below. Label each unit fraction.
3.) Write as the sum of two addends. 	4.) Write as the sum of two addends. 
5.) Write as the sum of unit fractions	6.) Write an equation to show the product of a whole number and a unit fraction.

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Adding and Subtracting

$3\frac{3}{8}+1\frac{1}{8}=$

Whole	Fractional unit

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

Whole	Fractional unit

$3\frac{3}{4}-1\frac{2}{4}=$

Whole	Fractional unit

$4\frac{3}{8}-1\frac{5}{8}=$

Whole	Fractional unit

$3\frac{3}{4}+1\frac{5}{8}=$

Whole	Fractional unit

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

Whole	Fractional unit

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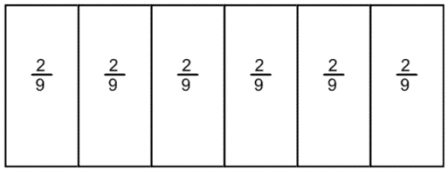
Multiplication

Write two equations (one addition and one multiplication)
to describe this tape diagram.



_____

_____

Model the following using the tape diagrams provided. Keep in mind that * can be read as "OF".

$8 * \frac{3}{4} =$

$\frac{3}{4} * 8 =$

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

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

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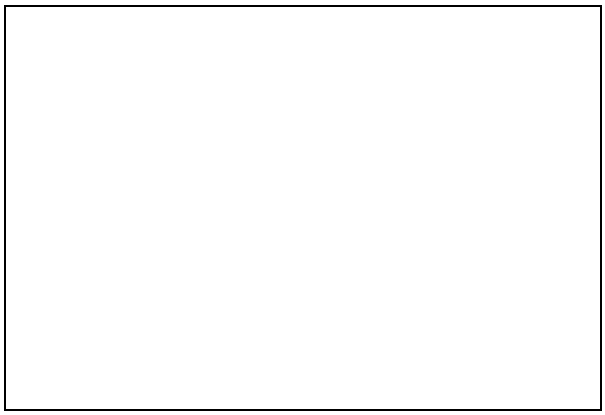
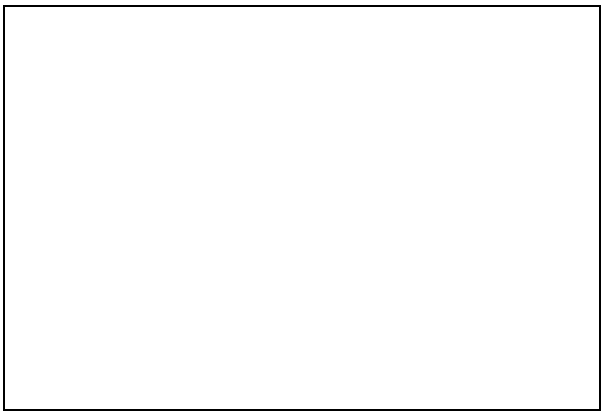
Use your fraction pieces to solve the following. Remember, * can be read as "OF".

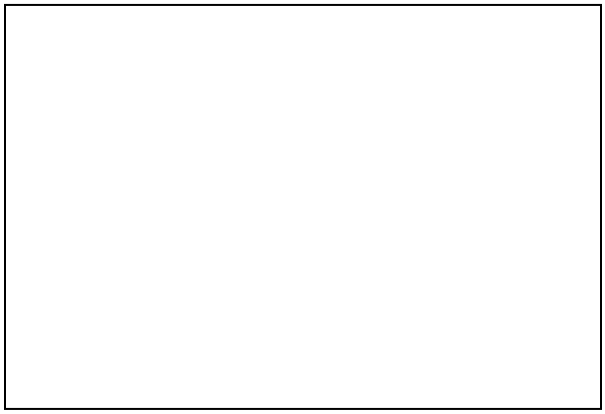
$\frac{1}{3} * \frac{3}{8} =$



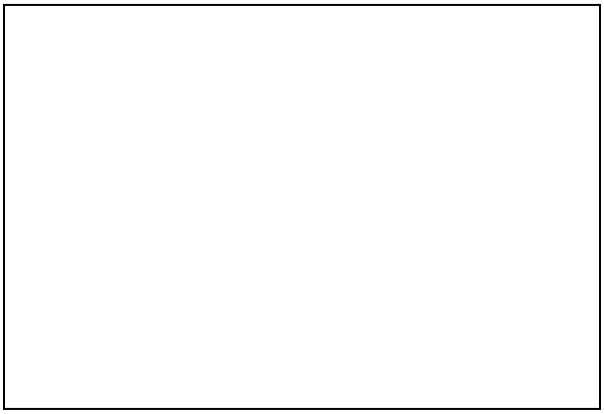
$\frac{3}{4} * \frac{4}{6} =$



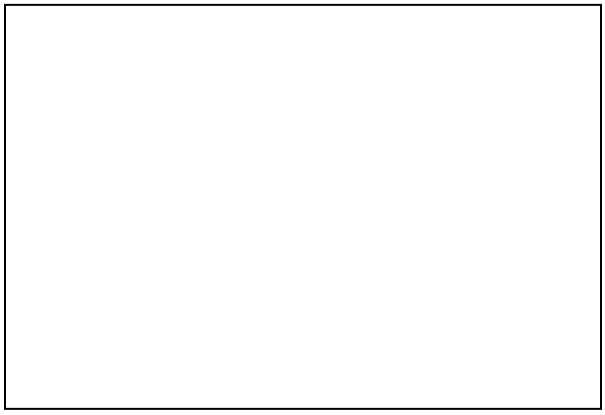
$\frac{2}{5} * \frac{5}{6} =$



$\frac{5}{6} * \frac{3}{8} =$



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



$\frac{3}{10} * \frac{5}{6} =$

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DIVISION

$\frac{3}{4} \div \frac{1}{4} =$

$\frac{6}{8} \div \frac{2}{8} =$

$\frac{8}{3} \div \frac{2}{3} =$

$\frac{11}{6} \div \frac{5}{6} =$

$\frac{7}{4} \div \frac{3}{4} =$

$\frac{7}{4} \div \frac{3}{8} =$

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DIVISION

$\frac{1}{4} \div \frac{3}{4} =$

$\frac{2}{8} \div \frac{6}{8} =$

$\frac{2}{3} \div \frac{8}{3} =$

$\frac{5}{6} \div \frac{11}{6} =$

$\frac{3}{4} \div \frac{7}{4} =$

$\frac{3}{8} \div \frac{7}{8} =$

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