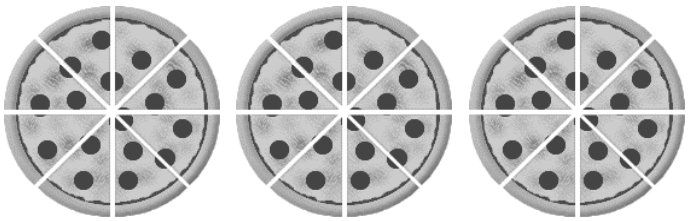
Name: _____ Multiplying any fraction by a whole number

Let's eat some more pizza.

Suppose your mother makes 3 pizzas—all the same size—and she cuts each of them into 8 equal pieces.



You eat 3 pieces from each pizza.

How much pizza have you eaten?

You've eaten 3+3+3 = **9 pieces**.

Or, 3/8 + 3/8 + 3/8 = **9/8 pizzas**.

Notice that we're adding eighths, so we end up with eighths. *Whenever* we add '*like*' fractions, we simply add the numerators and keep the same denominator.

Now, let's look at the problem another way and multiply instead of adding.

You've eaten 3 pieces from each of 3 pizzas. That's 3x3 = 9 pieces. And each piece is 1/8 of a pizza. So we get (3x3) x 1/8 = 9 x 1/8 = **9/8 pizzas**.

Or, we could say that you've eaten 3/8 of each of 3 pizzas. That's 3 x (3/8) pizzas.

But what is 3 x (3/8)? It must be 9/8 because that's how much pizza you've eaten. Let's see why?

(3/8) = (3 x 1/8) Why? Because 3/8 means 3 one-eighths. And 3 one-eighths is 3 x 1/8. (Just like 3 fours is 3 x 4.)

So, 3 x (3/8) = 3 x (3 x 1/8) = (3 x 3) x 1/8 = 9 x 1/8 = 9/8

No matter how you look at it, you've eaten **9/8 pizzas**.

9/8 is an improper fraction. It's numerator is larger than its denominiator. So it is greater than 1 whole.

We can change **9/8** to the mixed number $\mathbf{1\frac{1}{8}}$. *You have eaten the equivalent of* $\boldsymbol{1\frac{1}{8}}$ ***pizzas****.*

How much does that leave for the rest of the family?

There were 3 whole pizzas to begin with. That's 24/8 pizzas. Why?

You ate 9/8. So that leaves 24/8 – 9/8 = 15/8 pizzas.

What is that as a mixed number?

15/8 is equivalent to the mixed number _____.

Name: _____ Multiplying any fraction by a whole number

Let's multiply some more fractions by whole numbers like we did in the pizza problem. How about 4 x 2/9.

4 x 2/9 = 4 x (2 x 1/9) Why?

= (4 x 2) x 1/9 Why?

= 8 x 1/9 = 8 one-ninths = **8/9**

Let's try 3 x 4/6.

3 x 4/6 = 3 x (4 x 1/6) = (3 x 4) x 1/6 = 12 x 1/6 = **12/6** = **2**

Your Turn:

4 x 2/11 =

3 x 3/13 =

Did you notice what we're doing? We're just multiplying the numerator by the whole number and keeping the denominator. Do you see why?

To multiply *any fraction* by a *whole number*, multiply the numerator by the whole number and keep the same denominator.

This only works for multiplying fractions by WHOLE numbers.

Multiply:

8 x 2/3 =

3 x 3/9 =

7 x 1/16 =

11 x 3/33 =

2 x 6/18 =

9 x 2/21 =

2 x 4/8 =

3 x 2/3 =