# MATH NEWS

Grade 4, Module 3, Topic F — December 2013

## 4th Grade Math

*Module 3: Multi-Digit Multiplication and Division*

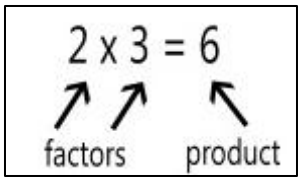
**Math Parent Letter**

This document is created to give parents and students a better understanding of the math concepts found in Eureka Math (© 2013 Common Core, Inc.) that is also posted as the Engage New York material which is taught in the classroom. Module 3 of Eureka Math (Engage New York) covers Multi-Digit Multiplication and Division. This newsletter will discuss Module 3, Topic F.

Topic F. Reasoning with Divisibility

***Words to know***

- Factor
- Products
- Multiple
- Composite Number
- Prime Number
- Associative Property




***Things to remember!!!***

The Commutative Property says you can swap numbers (or change order) and still get the same answer.

1 x 6 = 6 and 6 x 1 = 6

## Objective of Topic F

1. Find factor pairs for numbers to 100 and use understanding of factors to define prime and composite.
2. Use division and the associative property to test for factors and observe patterns.
3. Determine whether a whole number is a multiple of another number.
4. Explore properties of prime and composite numbers to 100 using multiples.

## Focus Area– Topic F

*Reasoning with Divisibility*

***Identify Factors and Product***

What are the two multiplication sentences that represent the arrays above?

1 x 6 = 6 and 2 x 3 = 6

The same product is represented in both sentences.

What are the **factors** of 6? 1, 2, 3, 6

Look at the list of factors, draw an arrow to connect the factor pairs.


Notice that 2 and 3 are the middle factor pair. We have checked all numbers up to 2. There are no numbers between 2 and 3, so we have found all factors of 6.

***1 x 5 = 5***

Find another factor pair for 5. ***5 x 1 = 5***

2, 3, and 4 are not factors of 5, so 5 has only one set of factors. Numbers that have exactly two factors, 1 and itself are called **prime numbers.** Numbers that have at least one other factor beside 1 and itself are called **composite numbers.**

Factors can also be written in a table.

| ***27*** | |
|---|---|
| **1** | ***27*** |
| | |

| **35** | |
|---|---|
| **1** | **35** |
| **5** | ***7*** |

*Use division to find factors of larger numbers.*

How can one find out if 3 is a factor of 48? Divide 48 by 3.

What if there is a remainder?
If there is a remainder then 3 is not a factor of 48.

3 is a factor of 48 because there are no remainders when divided.

```
  16
3)48
 -3
  18
 -18
   0
```

*Use the associative property to find additional factors*

Find the factors of 48.

Is 5 a factor of 48?
No, any number multiplied by 5 ends with a 0 or a 5.

Is 2 a factor of 48?
Yes, 2 is a factor of all even numbers.

Is 1 a factor of 48?
Yes, 1 is a factor of all numbers.

Is 3 a factor of 48?
Yes, we divided 48 by 3 and had no remainders.

Is 6 a factor of 48?
Yes, 6 x 8 = 48

**Is this number sentence true?**

**48 = 6 x 8 = (2 x 3) x 8**

```
48 = 6 x 8          48 = 6 x 8
   = (2 x 3) x 8       = (3 x 2) x 8
   = 2 x (3 x 8)       = 3 x (2 x 8)
   = 2 x 24            = 3 x 16
   = 48                = 48
```

Use the associative property to see that 2 and 3 are both factors of 48. The **associative property** means that it does not matter how you group numbers when you multiply.

2 x 3 = 6 Move the parentheses so that 3 is *associated* with the 8 instead of the 2. 3 x 8 = 24 and 24 x 2 = 48

3 x 2 = 6 Move the parentheses so that 2 is *associated* with the 8 instead of the 3. 2 x 8 = 16 and 16 x 3 = 48

*What is a multiple?*

Count by 3's to 30.
0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

What pattern is being used when counting?
Add 3 to the number said

When we skip count by a whole-number, the numbers said are called **multiples**.

How are multiples different from factors.
When listing factors, we listed them and were done, multiples can go on forever.

Is 84 a multiple of 12?
Yes, 12 x 7 = 84 or count 12, 24, 36, 48, 60, 72, 84

Using the associative property, since 3 x 4 = 12 we also know that 84 is also a multiple of 3 and 4.

We also know that 3, 4, 8, and 12 are also factors of 84.

```
84 = 12 x 7
   = (3 x 4) x 7
   = 3 x (4 x 7)
   = 3 x 28
   = 84
```

***4 x 6 = 4 x (2 x 3)***
*is the original problem*

```
Associative Property (change group)
4 x 6 = 4 x (2 x 3)
      = (4 x 2) x 3
      = (8) x 3
      = 24
```

The **associative property** says that when we are multiplying all numbers together we can multiply the numbers in any order and still get the same answer.

In the problem above, we can move our parentheses and multiply 4 x 2 first then multiply the answer by 3.

4 x 2 = 8 and 8 x 3 = 24.

```
4 x 6 = 4 x (2 x 3)
      = 4 x (3 x 2)   Commutative Property (change order)
      = (4 x 3) x 2   Associative Property (change group)
      = (12) x 2
      = 24
```

The **commutative property** states that you can swap numbers over or change the order of the numbers and the answer will remain the same, so 2 x 3 = 6 and 3 x 2 = 6.

We know that we can use the associative property next to solve the problem.