Lesson 7: Common Factors and Multiples

A **multiple** of a whole number is found by multiplying that number by any other whole number.

Example

What are the first ten multiples of 4?

$4 \times 1 = \mathbf{4}$ $\quad$ $4 \times 6 = \mathbf{24}$

$4 \times 2 = \mathbf{8}$ $\quad$ $4 \times 7 = \mathbf{28}$

$4 \times 3 = \mathbf{12}$ $\quad$ $4 \times 8 = \mathbf{32}$

$4 \times 4 = \mathbf{16}$ $\quad$ $4 \times 9 = \mathbf{36}$

$4 \times 5 = \mathbf{20}$ $\quad$ $4 \times 10 = \mathbf{40}$

The first ten multiples of 4 are 4, 8, 12, 16, 20, 24, 28, 32, 36, and 40.

A number that is a multiple of two or more numbers is a **common multiple** of those numbers. Zero is not considered a common multiple. The smallest number that is a common multiple of a set of numbers is called the **least common multiple (LCM)** of that set of numbers.

Example

What is the LCM of 4 and 6?

The first ten multiples of 4 are listed in the previous example. The first ten multiples of 6 are as follows:

$6 \times 1 = \mathbf{6}$ $\quad$ $6 \times 6 = \mathbf{36}$

$6 \times 2 = \mathbf{12}$ $\quad$ $6 \times 7 = \mathbf{42}$

$6 \times 3 = \mathbf{18}$ $\quad$ $6 \times 8 = \mathbf{48}$

$6 \times 4 = \mathbf{24}$ $\quad$ $6 \times 9 = \mathbf{54}$

$6 \times 5 = \mathbf{30}$ $\quad$ $6 \times 10 = \mathbf{60}$

The first ten multiples of 6 are 6, 12, 18, 24, 30, 36, 42, 48, 54, and 60.

Common multiples of 4 and 6 include 12, 24, 36, and 48.

The LCM of 4 and 6 is 12.

TIP: There are an infinite number of multiples for any number or common multiples for any two numbers. However, there will only be one *least* common multiple.

CCSS: 6.NS.4

A **factor** of a whole number is any whole number that divides the first number evenly (with no remainder). A number is **divisible** by its factors because they divide evenly into the number. The factors of a number are less than or equal to the number.

Example

What are the factors of 15?

15 ÷ **1** = 15	15 ÷ 6 = 2 R3	15 ÷ 11 = 1 R4
15 ÷ 2 = 7 R1	15 ÷ 7 = 2 R1	15 ÷ 12 = 1 R3
15 ÷ **3** = 5	15 ÷ 8 = 1 R7	15 ÷ 13 = 1 R2
15 ÷ 4 = 3 R3	15 ÷ 9 = 1 R6	15 ÷ 14 = 1 R1
15 ÷ **5** = 3	15 ÷ 10 = 1 R5	15 ÷ **15** = 1

The factors of 15 are 1, 3, 5, and 15.

A number that is a factor of two or more numbers is a **common factor** of those numbers. The greatest number that is a common factor is called the **greatest common factor (GCF)**.

Example

What is the GCF of 15 and 9?

The factors of 15 are listed in the previous example. The factors of 9 are as follows:

9 ÷ **1** = 9	9 ÷ 4 = 2 R1	9 ÷ 7 = 1 R2
9 ÷ 2 = 4 R1	9 ÷ 5 = 1 R4	9 ÷ 8 = 1 R1
9 ÷ **3** = 3	9 ÷ 6 = 1 R3	9 ÷ **9** = 1

The factors of 9 are 1, 3, and 9.

The common factors of 15 and 9 are 1 and 3.

The GCF of 15 and 9 is 3.