Mine Shaft Grade 6 Multiples Clarification

CCSSM: Grade 6

DOMAIN: Expressions and Equations

Cluster: Reason about and solve one-variable equations and inequalities.

Standard: 6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

CCSSM: Grade 5

DOMAIN: Operations and Algebraic Thinking

Cluster: Write and interpret numerical expressions.

Standard: 5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

CCSSM: Grade 4

DOMAIN: Operations and Algebraic Thinking

Cluster: Gain familiarity with factors and multiples.

Standard: 4.OA.4 Find all **factor pairs** for a whole number in the range 1-100. Recognize that a whole number is a **multiple** of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number.

Clarification of Math Discussion Terms

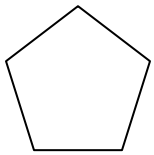
A **POLYGON** is a geometric figure with sides that are segments. Specific polygons are named according to the number of sides they have:

Number of Sides	Name of Polygon
3	**Triangle**
4	**Quadrilateral**
5	**Pentagon**
6	**Hexagon**
7	**Septagon**
8	**Octagon**

Classroom Example 1:
What is the name for a polygon with 6 sides?
A polygon with 6 sides is called a hexagon.

How many sides does an octagon have?
An octagon has 8 sides.

What is the name of the geometric figure shown at the right?
Since the figure is a polygon with five sides, it is a pentagon.



A **MULTIPLE** of a number is the product resulting from multiplying the number by any whole number. For example: The multiples of 6 are 0, 6, 12, 18, 24, …

Sometimes a **RULE** is written to generate a set of multiples. For example, the **RULE** for multiples of 6 would be 6*n* where *n* represents any whole number.

Classroom Example 2
What are the multiples of 7?
The multiples of 7 are 0, 7, 14, 21, 28, …

Is 42 a multiple of 7? Explain.
Yes, since 7 times 6 is 42.

Is 50 a multiple of 7? Explain.
No, because there is no whole number that when multiplied by 7 results in a product of 50.

The Math in the Puzzle

In the Mine Shaft puzzles, players must place the "bots" so that they will not land on any flowers as they hop from the beginning to the end of the row. The number of sides of the bot corresponds to the multiples on which the bots will land.

In the screen shot below, a player could place the triangle bot on the first or second rows, since none of the multiples of three have a flower. The triangle bot can not be placed on rows three, four, or five because flowers are resting on a multiple of three somewhere in the row. Initially it may be possible for a bot to be placed on more than one row; however rows will be eliminated because of the placement of other bots.

In higher levels of the puzzle, bots will move from one row to another by using tubes that match their colors or by using spring-loaded lifts. The lifts change the numbers in the sequence without changing the constant difference between the terms.