

Mathematics Lessons for Grades 6-8

“Factors & Multiples”

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Discipline: Math (Numbers, operations, and quantitative reasoning [factors and multiples])

Grade: 6 to 8

Standard

Grades 6-8 Expectations: Use factors, multiples, prime factorization, and relatively prime numbers to solve problems

Purpose/Goal

The students should have a clear understanding of the differences between factors and multiples of a number and be able to distinguish one type from the other.

Context

Sixth-grade level students confuse factors with multiples and vice versa when first introduced to these concepts. The point of this lesson is to lead the students into discovering that factors are small, numerical components that form a larger number when multiplied together, and that multiples of that number lead to even larger numerical values. Factors and multiples should have already been introduced to the class before working this lesson.

Preparation

Materials:

- Computer and Smartboard/projector to run and display slideshow
- MS PowerPoint (2003 or more recent version)
- Styrofoam beads covered in paint or glitter*
- $\frac{1}{3}$ to $\frac{1}{2}$ inch in diameter, four different colors
- Toothpicks
- Two types: plain wood and colored
- Ziploc bags to hold materials

Website

None

Motivation

The slideshow included (fnms.ppt) should be used to guide the students through the lesson. A self-discovery approach is followed in the design of the slides that will encourage the students to draw their own conclusions as they work each step of the activity. For example, a question mark in the first slide is meant to imply that there is not a specific title for the activity. The students will come up with one that is appropriate for the activity based on what they have learned at the end of it.

Description

Working in teams, the students will use Styrofoam beads of different colors and two different types of toothpicks to build two-dimensional (2-D) and three-dimensional (3-D) geometric shapes. They will start by assigning specific numerical values to each bead color and they will then interconnect a number of beads using toothpicks that imply “multiplication” to create a 2D shape. A set of questions in the slideshow will lead the students to recognize the beads used as them being the factors of the number formed. Following that, the students will build additional copies of the exact same 2D structure already made and stack them all together using toothpicks that imply “addition,” forming a 3D shape. Another round of questions in the slideshow will lead the students to realize that each additional copy of the original 2D shape is a multiple. At the end, the students benefit from this hands-on activity by physically seeing the difference between factors and multiples from a spatial perspective (little vs. large), all while having fun building colorful structures.

Assessment

The level of participation from the students as well as the answers to the questions in the slideshow given by the teams should be good indicators of the level of success of the lesson. An answer sheet could be required from every team to evaluate their performance.

Follow-Up Activities

Depending on time limitations, the teams could be given the opportunity to come up with a question relevant to the activity and allowed to repeat the activity on their own to try to answer it themselves.