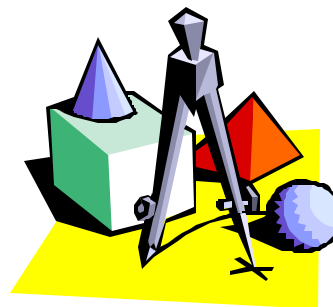


# Algebra/Geometry Institute Summer 2003

## Lesson Plan 2

**Faculty Name:** Patansy Miller  
**School:** Solomon Middle School  
**City:** Greenville, MS  
**Grade Level:** 7th



### 1 Teaching objective(s)

Objective: The student will model the order of operations to simplify and/or evaluate numerical and algebraic expressions.

### 2. Instructional Activities

1. The teacher will have the students to pair up. Given the following situation, Jon and Karen suggested that their allowance be changed. They wanted 2 cents the first week with their allowance to be doubled each week. Their parents investigated the suggestion using this information:

Week	Cents	=
One	2	=
Two	$2 \times 2$	=
Three	$2 \times 2 \times 2$	=
Four	$2 \times 2 \times 2 \times 2$	=

2. The students will complete the table to find how many cents Jon and Karen would be paid each of the first four weeks.
3. The students will tell how much would be paid the seventh week, the tenth week. The students will explain whether or not the parents will agree with the suggestion.
4. The teacher will introduce vocabulary words exponent (the number which indicates the number of times to multiply the base) and base (the number which is being multiplied).
5. The teacher will give students examples of numbers written in exponential form and identify the base and the exponent, such as  $10^2$ ,  $3^3$ ,  $12^3$ .

6. The teacher will warn the students of possible errors, such as multiplying the base by the exponent. The teacher will suggest the students draw the number of empty boxes as the power given in the problem and put a multiplication sign between each box. Then fill in each box with the base.
7. Given the real-world problem, such as Gibraltar has an area of  $(1.5)^2$  mi<sup>2</sup>, the student will evaluate with a calculator. The partners will exchange papers and check each other's papers.
8. The teacher will introduce the order of operations rule:
  - a. Do all operations within grouping symbols first.
  - b. Evaluate any term with exponents.
  - c. Multiply and divide in order from left to right.
  - d. Add and subtract in order from left to right.
9. The student will use the rule for order of operation to simplify the following examples:
  - a.  $4^3 + (3 + 15)$
  - b.  $5^2 - 3 + 6 \times 3$
  - c.  $13^3 \div 13^2$
  - d.  $8^2 \times (15 - 11)$
10. The student will create an expression that involves order of operations with exponents. The example must have parentheses and at least two operations. The student will evaluate the expression and keep the answer. Partners exchange problems and simplify. The teacher will allow the partners to check each other's work for correct answers. The teacher will ask for volunteers to share their expressions with the class.
11. The teacher will give examples with algebraic expressions. The teacher will assign value to the variables. The student will evaluate the expressions, such as  $m + n^2$ ,  $(m + n) \times n^2$ ,  $m^2 - n \div n + m$ , and  $n^3 - m \times n \div m + (n^3 - m)$  with  $m = 2$  and  $n = 3$ .
12. The student will create an expression that involves order of operations with variables. The teacher will ask the partners to exchange problems and simplify. The teacher will allow the partners to check each other's work. The teacher will ask for volunteers to share their expressions with the class.

### 3 Materials and Resources

Calculators

Pencil

Notebook

Textbook-*Mathematics and Connections, Course (Glencoe, 1995)*

4 **Assessment**

Teacher evaluation/observation

Peer evaluating

Student participation