Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 5* / Grade 5 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:05AM

Standard/Module: Proficiency in Operations & Algebra 5.OA.1 (Week 7, 14 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) Connects to 5.OA.2

5th Grade Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 5th Grade , Operations & Algebraic Thinking

5.OA Write and interpret numerical expressions.

- 1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

Enduring Understandings

1. For a given set of numbers there are relationships that are always true, called properties, and these are the rules that govern arithmetic and algebra.
2. There is an agreed upon order for which operations in a numerical expression are performed.
3. The order of operations is a convention which standardizes the way expressions are evaluated and simplified in mathematical fields.

Essential Questions

1. Why is there a standard order of operations?
2. How are the values of an algebraic expression and a numerical expression found?
3. How can you evaluate a numerical expression containing more than one operation?
4. How do you find the value of an expression that includes parentheses/brackets?

Critical Content

Order of Operations

-steps of evaluating:

Parentheses, exponents, multiply/divide, addition/subtraction

Algebra

-expressions

-value

Skills

Vocabulary

1. Students must be able to write and interpret numerical expressions. 2. Students must be able to use given values for variables to evaluate numerical or algebraic expressions with three or more numbers and two or more operations. 3. Students must be able to use the order of operations to simplify and solve basic algebraic expressions. 4. Students must be able to use the order of operations to evaluate expressions with whole numbers and decimals.	Tier 2- variable, corresponding, sequence, simplify, evaluate Tier 3- algebraic expression, term, order of operations

Stage 2: Assessment Evidence

Assessments

Evaluate expressions
Formative: Test: Written

Students use order of operations to simplify expressions without variables.

Stage 3: Learning Plan

Learning Activities	Resources
This standard builds on the expectations of third grade where students are expected to start learning the conventional order. Students need experiences with multiple expressions that use grouping symbols throughout the year to develop understanding of when and how to use parentheses, brackets, and braces. First, students use these symbols with whole numbers. Then the symbols can be used as students add, subtract, multiply and divide decimals and fractions. **Examples:** (26 + 18)4 --->Answer: 176 {[2 x (3+5)] – 9} + [5 x (23-18)] --->Answer: 32	www.illustrativemathematics.org www.illuminations.nctm.org

12 – (0.4 x 2) -->Answer: 11.2 (2 + 3) x (1.5 – 0.5) ----> Answer: 5 { 80 ÷ [2 x (3 ½ + 1 ½)] }+ 100 ---->Answer: 108 To further develop students' understanding of grouping symbols and facility with operations, students place grouping symbols in equations to make the equations true or they compare expressions that are grouped differently. 15 - 7 – 2 = 10 → 15 - (7 – 2) = 10 3 x 125 ÷ 25 + 7 = 22 → [3 x (125 ÷ 25)] + 7 = 22 24 ÷ 12 ÷ 6 ÷ 2 = 2 x 9 + 3 ÷ ½ → 24 ÷ [(12 ÷ 6) ÷ 2] = (2 x 9) + (3 ÷ ½) Compare 3 x 2 + 5 and 3 x (2 + 5)	

Compare 15 – 6 + 7 and 15 – (6 + 7) Students should be given ample opportunities to explore numerical expressions with mixed operations. This is the foundation for evaluating numerical and algebraic expressions that will include whole-number exponents in Grade 6. There are conventions (rules) determined by mathematicians that must be learned with no conceptual basis. For example, multiplication and division are always done before addition and subtraction. **Remember that if you use the acronym PEMDAS, "multiply" is not always before "divide"-- one must go left to right with multiplication and division, and the same is true for multiplication and division. A better way to write PEMDAS is:** **P** **E** **MD (--->) or DM (--->)** **AS (_-->) or SA (--->)** Begin with expressions that have two operations without any grouping symbols (multiplication or division combined with addition or subtraction) before introducing expressions with multiple operations. Using the same digits, with the operations in a different order, have students evaluate the expressions and discuss why the value of the expression is different. For example, have students evaluate 5 × 3 + 6 and 5 + 3 × 6. Discuss the rules that must be followed. Have students insert parentheses around the multiplication or division part in an expression. A discussion should focus on the similarities and differences in the problems and	

the results. This leads to students being able to solve problem situations which require that they know the order in which operations should take place. After students have evaluated expressions without grouping symbols, present problems with one grouping symbol, beginning with parentheses, then in combination with brackets and/or braces. Have students write numerical expressions in words without calculating the value. This is the foundation for writing algebraic expressions. Then, have students write numerical expressions from phrases without calculating them.	

Differentiation Opportunities

Students may believe the order in which a problem with mixed operations is written is

the order to solve the problem. Allow students to use calculators to determine the value

of the expression, and then discuss the order the calculator used to evaluate the

expression. Do this with four-function and scientific calculators.

<< Previous Year

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