Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

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

Wednesday, October 31, 2012, 11:06AM

Standard/Module: Proficiency in Base 10 5.NBT.5 (F) (Week 7, 6 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 5.NBT.6, 5.NBT.7, 5.OA.1, and 5.OA.2

5th Grade Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 5th Grade , Number & Operations in Base Ten

5.NBT Perform operations with multi-digit whole numbers and with decimals to hundredths.

- 5. Fluently multiply multi-digit whole numbers using the standard algorithm.

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. Numbers can be approximated by numbers that are close. Numerical calculations can be approximated by replacing numbers with other numbers that are close and easy to compute with mentally.
3. Numbers can be used for different purposes, and numbers can be classified and represented in different ways.
4. Each operation with rational numbers has more than one algorithm. Most algorithms for operations with rational numbers, both mental math and paper and pencil, use equivalence to transform calculations into simpler ones.
5. Mathematics contents and practices can be applied to solve problems.

Essential Questions

1. How can you estimate products?
2. How can you use compatible numbers to estimate products?
3. How can you use the Distributive Property to write expressions and solve equations?
4. How do you multiply by 1-digit number?
5. How do you multiply by 2-digit numbers?
6. How do you multiply 3-digit numbers by 2-digit numbers?
7. How can you draw a picture or diagram to help you choose an operation and solve a problem?

Critical Content

Estimation

-compatible numbers

-rounding

Operations

-multiplication

-algorithm

-mental math

-equivalence

Problem Solving

-draw a picture

-expressions

-equations

-Distributive property

Skills	Vocabulary
1. Students will use rounding or compatible numbers to estimate whole number products. 2. Students will use the Distributive Property to simplify expressions and solve equations. 3. Students will multiply multi-digit numbers by a one digit number. 4. Students will multiply two-digit numbers by two-digit numbers. 5. Students will multiply greater numbers. 6. Students will draw pictures/diagram and write an equation.	Tier 2- equivalence, compatible, rounding, estimate Tier 3- algorithm, underestimate, overestimate, distributive property, partial products, equations, expression

Stage 2: Assessment Evidence

Assessments

Multiply whole-dgiti numbers
Formative: Test: Written

Student compute problems involving whole number multiplication and justify why their answer is correct.

Stage 3: Learning Plan

Learning Activities	Resources
This standard refers to fluency which means students	

select and use a variety of methods and tools to compute, including objects, mental computation, estimation, paper and pencil, and calculators. They work flexibly with basic number combinations and use visual models, benchmarks, and equivalent forms. They are accurate and efficient (use a reasonable amount of steps), and flexible (use strategies such as the distributive property or breaking numbers apart (decomposing and recomposing) also using strategies according to the numbers in the problem, 26 x 4 may lend itself to (25 x 4) + 4 where as another problem might lend itself to making an equivalent problem 32 x 4 = 64 x 2)). This standard builds upon students' work with multiplying numbers in third and fourth grade. In fourth grade, students developed understanding of multiplication through using various strategies. While the standard algorithm is mentioned, alternative strategies are also appropriate to help students develop conceptual understanding. The size of the numbers should NOT exceed a three-digit factor by a two-digit factor. In prior grades, students used various strategies to multiply. Students can continue to use these different strategies as long as they are efficient, but must also understand and be able to use the standard algorithm. In applying the standard algorithm, students recognize the importance of place value. **Examples:** -123 x 34. When students apply the standard algorithm, they, decompose 34 into 30 + 4. Then they multiply 123 by 4, the value of the number in the ones place, and then multiply 123 by 30, the value of the 3 in the tens place, and add the two products. *-There are 225 dozen cookies in the bakery. How many cookies are there?* **Student 1** 225 x 12 I broke 12 up into 10 and 2.	

225 x 10 = 2,250 225 x 2 = 450 2,250 + 450 = 2,700 **Student 2** 225x12 I broke up 225 into 200 and 25. 200 x 12 = 2,400 I broke 25 up into 5 x 5, so I had 5 x 5 x12 or 5 x 12 x 5. 5 x12= 60. 60 x 5 = 300 I then added 2,400 and 300 2,400 + 300 = 2,700. **Student 3** I doubled 225 and cut 12 in half to get 450 x 6. I then doubled 450 again and cut 6 in half to get 900 x 3. 900 x 3 = 2,700. **Student 4** Draw an array model for 225 x 12: 200 x 10, 200 x 2, 20 x 10, 20 x 2, 5 x 10, 5 x 2 Because students have used various models and strategies to solve problems involving multiplication with whole numbers, they should be able to transition to using standard algorithms effectively. With guidance from the teacher, they should understand the connection between the standard	

algorithm and their strategies. Instructional Strategies Connections between the algorithm for multiplying multi-digit whole numbers and strategies such as partial products or lattice multiplication are **necessary for students' understanding.** You can multiply by listing all the partial products. 234 × 8 1872 The multiplication can also be done without listing the partial products by multiplying the value of each digit from one factor by the value of each digit from the other factor. Understanding of place value is vital in using the standard algorithm. In using the standard algorithm for multiplication, when multiplying the ones, 32 ones is 3 tens and 2 ones. The 2 is written in the ones place. When multiplying the tens, the 24 tens is 2 hundreds and 4 tens. But, the 3 tens from the 32 ones need to be added to these 4 tens, for 7 tens. Multiplying the hundreds, the 16 hundreds is 1 thousand and 6 hundreds. But, the 2 hundreds from the 24 tens need to be added to these 6 hundreds, for 8 hundreds. As students developed efficient strategies to do whole number operations, they should also develop efficient strategies with decimal operations. As students developed efficient strategies to do whole number operations, they should also develop efficient strategies with decimal operations. Students should learn to **estimate** decimal computations **before** they compute with pencil and paper. The focus on estimation should be on the meaning of the numbers and the operations, not on	

how many decimal places are involved. For example, to estimate the product of 32.84 × 4.6, the estimate would be more than 120, closer to 150. Students should consider that 32.84 is closer to 30 and 4.6 is closer to 5. The product of 30 and 5 is 150. Therefore, the product of 32.84 × 4.6 should be close to 150. *(Writing equations horizontally encourages using mental math).* Have students use estimation to find the product by using exactly the same digits in one of the factors with the decimal point in a different position each time. For example, have students estimate the product of 275 × 3.8; 27.5 × 3.8 and 2.75 × 3.8, and discuss **why** the estimates should or should not be the same.	

Differentiation Opportunities

Students might compute the sum or difference of decimals by lining up the right-hand digits as they would whole number. For example, in computing the sum of 15.34 + 12.9, students will write the problem in this manner:

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  15.34
+  12.9
  16.63
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To help students add and subtract decimals correctly, have them **first estimate** the sum or difference. Providing students with a decimal-place value chart will enable them to place the digits in the proper place.

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