MATHEMATICS COMMON CORE CURRICULUM UNIT #1, Grade 3
North Smithfield School Department

TITLE OF UNIT: Foundations for Multiplication, Division, Addition, and Subtraction   **GRADE :**   3

DATE PRESENTED: _____ **DATE DUE:** _____ **LENGTH OF TIME:** Several weeks

OVERVIEW OF UNIT:

Students will use place value to perform multi-digit arithmetic including solving problems involving multiplication and division.

ESSENTIAL QUESTIONS
- *How can you find the total number of objects in equal groups?*
- *How can a set of objects be put into equal groups?*
- *How can multiplication facts help you to divide?*
- *How can you round numbers?*
- *What does place value mean? How does it affect its value?*
- *How can you use addition or subtraction to solve problems?*
- *How can you multiply by multiples of 10,100, 1,000?*

STANDARDS: Common Core Math Standards – Grade level domains K-5

Counting and Cardinality **CC**	Operations and Algebraic Thinking **OA**	Number and Operations in Base Ten **NBT**	Number and Operations – Fractions **NF**	Measurement and Data **MD**	Geometry **G**
☐	☐ OA 1,2,4	☐ NBT 1,2,3	☐	☐	☐
☐	☐	☐	☐	☐	
☐	☐				
☐	☐				

STANDARDS: Mathematical Practices grades K-12

1. **Make** sense of problems and persevere in solving them
2. **Reason** abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. **Model** with mathematics ★
5. **Use** appropriate tools strategically
6. **Attend** to precision
7. **Look** for and make use of structure
8. **Look** for and express regularity in repeated reasoning

FOCUS MATHEMATICS STANDARDS:

- Represent and solve problems involving multiplication and division. 3.OA.1, 2, 4
- Use place value understanding and properties of operations to perform multi-digit arithmetic. 3.NBT.1, 2, 3

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Applied Learning Standards:

problem solving	communication	critical thinking	research	reflection/ evaluation

ENDURING UNDERSTANDING:

At the end of this unit students will be able to fluently add and subtract numbers within 1,000 as well as multiply and divide facts 0-12.

PRIOR KNOWLEDGE:

- In Grade 2, students found the total number of objects using rectangular arrays, such as a 5 x 5, and wrote equations to represent the sum. This strategy is a foundation for multiplication because students should make a connection between repeated addition and multiplication.

- Prior to implementing rules for rounding students need to have opportunities to investigate place value. A strong understanding of place value is essential for the developed number sense and the subsequent work that involves rounding numbers.

- Building on previous understandings of the place value of digits in multi-digit numbers, place value is used to round whole numbers. Dependence on learning rules can be eliminated with strategies such as the use of a number line to determine which multiple of 10 or of100, a number is nearest (5 or more rounds up, less than 5 rounds down).

- Strategies used to add and subtract two-digit numbers are now applied to fluently add and subtract whole numbers within 1000. These strategies should be discussed so that students can make comparisons and move toward efficient methods.

- Understanding what each number in a multiplication expression represents is important. Multiplication problems need to be modeled with pictures, diagrams or concrete materials to help students understand what the factors and products represent. The effect of multiplying numbers needs to be examined and understood.

STUDENT OBJECTIVES, SKILLS and/or NEW KNOWLEDGE:

- Using models of equal groups, students write multiplication sentences and identify factors and products.

- Students will write division sentences using models to solve problems involving sharing.

- Students will identify the quotient, dividend, and divisor in division sentences.

- Students will write related division and multiplication facts when given numbers within a fact family.

- Students round up to four digit whole numbers to the nearest tens or hundreds using place value.

- Add and subtract numbers fluently within 1,000 with and without regrouping.

- There is a relationship between addition and subtraction (inverse operations).

- Students will use patterns and mental math to multiply by multiples of 10,100,1000.

SUGGESTED PROBLEMS:

3.OA.1	http://www.k-5mathteachingresources.com/support-files/arraypicturecards.pdf http://www.pearsonsuccessnet.com/snpapp/iText/products/0-328-30260-0/data/pdfs/nt3_05_32.pdf
3.OA.2	http://www.k-5mathteachingresources.com/support-files/Sharing-or-Grouping.pdf http://www.pearsonsuccessnet.com/snpapp/iText/products/0-328-30260-0/data/pdfs/nt3_07_18.pdf
3.OA.4	http://www.k-5mathteachingresources.com/support-files/missingnumbersmultiplication.pdf http://www.k-5mathteachingresources.com/support-files/whatisthemissingnumberdivision.pdf https://docs.google.com/file/d/0B-A9qMIF_l6UMzc5NzFkY2ItMjA3MS00NTQzLWE 0OGEtY2RlMDE0OTY5MzNm/edit?usp=drive_web&pli=1
3.NBT.1	http://www.illustrativemathematics.org/illustrations/745 http://www.illustrativemathematics.org/illustrations/156 http://www.illustrativemathematics.org/illustrations/71 http://www.k-5mathteachingresources.com/support-files/round-up-or-down.pdf
3.NBT.2	http://www.khanacademy.org/math/arithmetic/addition-subtraction/sub_borrowing/e/subtraction_4 http://www.k-5mathteachingresources.com/support-files/3-digit-addition-split.pdf http://www.k-5mathteachingresources.com/support-files/doublingto1000.pdf
3.NBT.3	http://www.khanacademy.org/math/arithmetic/multiplication-division/multi_digit_multiplication/e/multiplication_2 http://www.khanacademy.org/math/arithmetic/multiplication-division/multi_digit_multiplication/e/multiplication_1.5 http://www.k-5mathteachingresources.com/support-files/multiplying-multiples-of-ten-problems.pdf

ACTIVITIES, PRODUCTS, PERFORMANCE, and ASSESSMENTS: see curriculum introduction

1. Application to real world problems
2. Creating charts/collecting data
3. Collaboration - interpersonal
4. Conferencing
5. Exhibits
6. Graphic organizers
7. Graphing
8. Interviews
9. Journals
10. KWL charts
11. Mathematical Practices
12. Modeling ★
13. Oral presentations
14. Problem/Performance based/common tasks
15. Real-life applications involving graphing
16. Represent numbers
17. Rubrics/checklists (mathematical practice, modeling)
18. Technology
19. Summarizing and note-taking
20. Tests and quizzes
21. Writing genres Arguments/ opinion Informative

- OA.1 model equal groups to show multiplication problems
- OA.2 model how to partition objects into equal groups
- OA.4 relates known multiplication facts to division
- NBT.1 use models to represent numbers
- NBT.2 add and subtract using algorithms
- NBT.3 mentally multiply multiples of 10,100,1000

HIGHER ORDER THINKING SKILLS: Web's Depth of Knowledge 2 – 4 or Bloom's Taxonomy

Web's Depth of Knowledge	Bloom's Taxonomy
• skill/conceptual understanding • strategic reasoning • extended reasoning	• apply • analyze • synthesize/create • evaluate

*Referenced templates from *Common Core Curriculum Maps, English Language Arts* and *The Understanding By Design Guide to Creating High Quality Units*

ADDITIONAL RESOURCES: see curriculum for specifics

- *enVisionMath,*

  o Topic 5 (3.OA.1)

  o Topics 7 & 8 (3.OA.2)

  o Topic 8 (3.OA.4)

  o Topics 1, 2-4 (3.NBT.1)

  o Topics 2,3,4 (3.NBT.2)

  o Topics 5-7. 18-1 (3.NBT.3)

- *Newmark Learning Common Core Math Grade 3,*

  o p.p. 31-35 (3.OA.1)

  o p.p. 51-55 (3.OA.2)

  o p.p. 66-70 (3.OA.4)

  o p.p. 6-10 (3.NBT.1)

  o p.p. 11-25 (3.NBT.2)

  o p.p. 46-50 (3.NBT.3)

VOCABULARY

OA

- Array
- Dividend
- Divisor
- Equal groups
- Equation
- Equation
- Fact family
- Factors
- Multiplication
- Partitioned
- Product
- Quotients
- Whole numbers

NBT

- Base ten
- Difference
- Digits
- Equation
- Estimate
- e
- Factor
- Halfway point
- Landmark numbers
- Multiple
- Multiply
- Pattern
- Place value
- Product
- Regroup
- Round
- Rounding
- Sum
- Total
- Value

LESSON PLAN for UNIT _____

LESSONS

☐ <u>**Lesson # 1**</u> **Summary:**

☐ <u>**Lesson #2**</u> **Summary:**

☐ <u>**Lesson #3**</u> **Summary:**

OBJECTIVES for LESSON # _____

☐ **Materials/Resources:**

☐ **Procedures:**

- **Lead –in**

- **Step by step**

- **Closure**

☐ **Instructional strategies:** see curriculum introduction

☐ **Assessments:** see curriculum introduction
  o **Formative**

  o **Summative**