MATHEMATICS COMMON CORE CURRICULUM UNIT #2, Grade 3*
North Smithfield School Department

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

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

OVERVIEW OF UNIT:

Students will use properties of multiplication, division, addition, and subtraction to solve multi step problems and look for arithmetic patterns.

ESSENTIAL QUESTIONS

- *Can the order of the factors be reversed in a multiplication problem? If so, is this always true?*
- *Can the order of the numbers be reversed in a division problem? If so, is this always true? Why or why not?*
- *What multiplication facts could you use to solve division sentences?*
- *How can multiplication strategies help you solve other facts?*
- *What strategies help you determine the reasonableness of an answer?*
- *What numeric patterns do you see?*

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 3,5,6,7,8,9	☐	☐	☐	☐	
☐	☐	☐	☐	☐	☐	
☐	☐					
☐	☐					

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:

- Understand properties of multiplication and the relationship between multiplication and division. 3.OA.5, 6
- Multiply and divide within 100. 3.OA.7
- Represent and solve problems involving multiplication and division 3.OA.3
- Solve problems involving the four operations, and identify and explain patterns in arithmetic. 3.OA.9

Applied Learning Standards:

problem solving	communication	critical thinking	research	reflection/ evaluation

Expectations for Student Learning (High School only):

ENDURING UNDERSTANDING:

At the end of this unit students will be able to solve two step word problems involving all four operations.

PRIOR KNOWLEDGE:

- Students can use known multiplication facts to determine the unknown fact in a multiplication or division problem.

- 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 is called unitizing, and it requires students to count groups, not just objects. They see the whole as a number of groups of a number of objects. This strategy is a foundation for multiplication in that students should make a connection between repeated addition and multiplication.

STUDENT OBJECTIVES, SKILLS and/or NEW KNOWLEDGE:

- Using arrays, pictures or equal groups, students will solve multiplication and division word problems.

- Understand the properties of multiplication (commutative, associative, distributive) helps us become efficient and flexible problem solvers.

- Students solve multiplication problems with missing factors

- Know from memory all products and quotients of one digit numbers

- Students will study patterns and relationships of multiplication facts and relate it to division.

- Students observe addition and multiplication tables to find patterns and explain how those patterns exist

SUGGESTED PROBLEMS:

_TANDARD	WEBSITE	ADDITIONAL INFO (B, A)
3.OA.3	http://www.illustrativemathematics.org/illustrations/344	Basic
	http://www.illustrativemathematics.org/illustrations/262	Basic
	http://www.illustrativemathematics.org/illustrations/365	Advanced
	http://www.khanacademy.org/math/arithmetic/multiplication-division/delightful_division/e/arithmetic_word_problems_2	Advanced
	http://www.k-5mathteachingresources.com/support-files/building-arrays.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/number-story-arrays-set1.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/x5x10wordproblems.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/3rd-gd-multiplication-word-problems.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/equalrowsinamarchingband.pdf	Advanced
	http://www.k-5mathteachingresources.com/support-files/sharingmarbles.pdf	Advanced
3.OA.5	http://www.khanacademy.org/math/arithmetic/order-of-operations/arithmetic_properties/e/properties_of_numbers_1	Basic
	http://www.k-5mathteachingresources.com/support-files/Split-a-Factor.pdf	Advanced
	http://www.k-5mathteachingresources.com/support-files/Decompose-a-Factor.pdf	Advanced
3.OA.6	http://www.khanacademy.org/math/arithmetic/factors-multiples/divisibility_and_factors/e/divisibility_intuition	Advanced
	http://www.khanacademy.org/math/arithmetic/multiplication-division/long_division/e/division_1.5	Basic
	http://www.k-5mathteachingresources.com/support-files/division-as-unknown-factor.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/multiplicationdivisionstories3oa6.pdf	Advanced
3.OA.7	http://www.k-5mathteachingresources.com/support-files/x2-to-x5-arrays.pdf	Basic
	http://www.k-5mathteachingresources.com/support- files/multiplicationnumberwheel.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/divisionriddlesdoc.pdf	Advanced
	http://www.k-5mathteachingresources.com/support-files/division-spin.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/theproductis3oa7.pdf	Advanced
	http://www.k-5mathteachingresources.com/support-files/theansweris3oa7.pdf	Advanced
3.OA.8	http://www.illustrativemathematics.org/illustrations/13	Basic
	http://www.illustrativemathematics.org/illustrations/1301	Advanced
	http://www.k-5mathteachingresources.com/support-files/3rdgrademultistepproblems.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/twostepwordproblemssetset2.pdf	Advanced
3.OA.9	http://www.illustrativemathematics.org/illustrations/954	Advanced
	http://www.illustrativemathematics.org/illustrations/953	Basic
	http://www.k-5mathteachingresources.com/support-files/oddandevensums.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/oddandevenproducts.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/rollarule.pdf	Basic
	http://www.k-5mathteachingresources.com/support-files/roll-a-rule-two-step.pdf	Advanced
	http://www.k-5mathteachingresources.com/support-files/twostepnumberpatterns3.oa9.pdf	Basic

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.3 solve multiplication and division word problems using strategies to find unknown numbers
- OA.5 show an understanding of multiplication and division properties
- OA.6 solve division sentences with an unknown number

- OA.7 use the relationship of multiplication and division to solve problems fluently
- OA.9 look for and explain patterns in arithmetic

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

Web's Depth of Knowledge
- skill/conceptual understanding
- strategic reasoning
- extended reasoning

Bloom's Taxonomy
- apply
- analyze
- synthesize/create
- evaluate

ADDITIONAL RESOURCES: see curriculum for specifics

- *enVisionMath,*
  - Topics 5,6, 7,8 (3.OA.3)
  - Topic 8, 6-6 (3.OA.5)
  - Topics 7 & 8 (3.OA.6)
  - Topic 8 (3.OA.7)
  - Topics embedded throughout
  - Topics 2-1, 2-2, 5 and 6 (3.OA.9)

- *Newmark Learning Common Core Math Grade 3,*
  - p.p. 61-65 (3.OA.3)
  - p.p. 36-40 (3.OA.5)
  - p.p. 51-55, 66-70 (3.OA.6)
  - p.p. 56-60 (3.OA.7)
  - 41-45 (3.OA.9)

VOCABULARY   OA

Array	Divisors	Even
Missing factor	Dividends	Factor
Associative property	Quotients	Horizontal
Commutative property	Doubling	Multiple
Distributive property	Multiples	Odd
Identity property	Square numbers	Patterns
Part	Skip counting	Product
Whole	Addend	Sum
Zero property	Diagonal	Vertical
Factors	Doubles	

LESSON PLAN for UNIT _____

LESSONS

- ☐ **Lesson # 1** Summary:

- ☐ **Lesson #2** Summary:

- ☐ **Lesson #3** 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**