MATHEMATICS COMMON CORE CURRICULUM UNIT #4, Grade 4*
North Smithfield School Department

TITLE OF UNIT: Extend understanding of fractions and solve word problems. Introduction to decimals. GRADE : 4

DATE PRESENTED: **DATE DUE:** **LENGTH OF TIME:** several weeks, quarter, semester

OVERVIEW OF UNIT:

In this unit, students will multiply fractions by whole numbers, use decimal notation for fractions with denominators ten or one hundred, express fractions with denominators of ten as equivalent fractions with denominators of one hundred. Students will also apply the area and perimeter formulas for rectangles, make line plots to display data sets in fractions of a unit and solve addition and subtraction of fraction problems using line plots. Students will solve multi-step word problems with whole numbers and whole number answers using the four operations including problems in which remainders must be interpreted.

ESSENTIAL QUESTION

What models and strategies can be used to multiply a fraction by a whole number? What do benchmark fractions look like in decimal form? How are fractions with a denominator of ten or one hundred represented as decimals? Why does multiplying length times width equal the area of a rectangle? How are area and perimeter related? How does the smallest data entry compare to the largest data entry? What does the remainder represent in a division problem?

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
☐	☐ 4.OA.3	☐	☐ 4.NF.4	☐ 4.MD.3	☐
☐	☐	☐	☐ 4.NF. 5,6	☐ M 4.MD.4	☐
			☐	☐	

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

- ☐ Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers 4.NF.4
- ☐ Understand decimal notation for fractions, and compare decimal fractions. 4.NF. 5,6
- ☐ Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. 4.MD.3
- ☐ Represent and interpret data. 4.MD.4
- ☐ Use the four operations with whole numbers to solve problems. 4.OA.3

Applied Learning Standards:

problem solving communication critical thinking research reflection/ evaluation

Expectations for Student Learning (High School only):

ENDURING UNDERSTANDING:

Students will understand how to multiply a fraction by a whole number, how to apply the area and perimeter formulas for rectangles, make line plots for unit fractions and use them to solve addition and subtraction problems. Students will also solve multi-step word problems with the four operations, including those in which remainders must be interpreted.

PRIOR KNOWLEDGE:

Students have fluency with multiplication and division facts. Students also have experience measuring area by counting squares and multiplying side length, finding perimeter, and solving multi-step word problems, as well as representing fractions on a number line.

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

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STUDENT OBJECTIVES, SKILLS and/or NEW KNOWLEDGE:

- Multiplication of a fraction by a whole number can be modeled as repeated addition of the unit fraction.
- Fractions with denominators of 10 can be expressed as equivalent fractions with the denominator of 100, and can be used as a strategy for adding decimal fractions
- Decimal fractions can be recorded with decimal notation and can be illustrated on a number line.
- The area of a rectangular can be calculated when the lengths of two of the sides of the rectangle are known.
- Knowing the area and the length of one side of a rectangle enables one to determine the lengths of the other three sides.
- Data can be collected and represented in many ways, including graphs or line plots.
- Data can be interpreted, analyzed and compared using graphs or line plots.
- The foundation of a line plot is a number line. Data sets of measurements are recorded with an 'X' above the corresponding value.
- To determine what the remainder represents you must understand the context of the problem.

SUGGESTED PROBLEMS:

4.NF.4 Basic
- http://www.k-5mathteachingresources.com/support-files/multiplying-a-number-by-a-fraction.pdf

4.NF.4 Advanced
- http://www.illustrativemathematics.org/illustrations/857
- http://www.k-5mathteachingresources.com/support-files/decimalriddles.pdf

4.NF.5 Basic
- http://www.k-5mathteachingresources.com/support-files/equivalent-fractions-with-a-denominator-of-100-problems.pdf

4.NF.5 Advanced
- http://www.illustrativemathematics.org/illustrations/153

4.NF.6 Basic
- http://www.illustrativemathematics.org/illustrations/152

4.MD.3 Advanced
- http://www.k-5mathteachingresources.com/support-files/designingazooenclosure.pdf

4.MD.4 Advanced
- http://www.k-5mathteachingresources.com/support-files/objectsinmydesklineplot.pdf (hands on activity)

4.OA.3 Basic
- http://www.illustrativemathematics.org/illustrations/1289
- http://www.k-5mathteachingresources.com/support-files/4oa3multistepwordproblems.pdf
- http://www.k-5mathteachingresources.com/support-files/aremainderofone.pdf (test resource)

4.OA.3 Advanced
- http://www.illustrativemathematics.org/illustrations/1289

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

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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

ADDITIONAL RESOURCES: see curriculum for specifics

enVisionMath, lessons:

- 4.NF.5
  - 12-3, 12-4, 12-5A
- 4.NF.6
  - 12-1, 12-3, 12-5A
- 4.MD.3
  - 14-2, 14-6, 14-7A
- 4.MD.4
  - 16-12B
- 4.OA.3
  - 2-1, 2-2, 5-2, 5-4, 6-1, 6-4, 7-2, 7-3A, 7-7, 8-2, 8-3A, 8-3A, 8-10, 16-12, 18-1, 18-2, 18-3, 18-5

VOCABULARY

- Additive comparison
- Area
- Array
- Base ten
- Benchmark fraction
- Commutative property of multiplication
- Decimal
- Decimal notation
- Decimal point
- Denominator
- Distributive property
- Dividend
- Divisor
- Equation
- Equivalent fraction
- Estimate
- Factors
- Fraction number line
- Fractional part
- Hundredths
- Interval
- Inverse operation
- Line plot
- Mixed Numbers
- Multiplicative comparison
- Numerator
- Numerical data
- Operation
- Partition
- Perimeter
- Products
- Quotient
- Remainder
- Rounding
- Tenths
- Unit fraction

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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

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- **Formative**

- **Summative**

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