# MATHEMATICS COMMON CORE CURRICULUM UNIT*
## North Smithfield Public Schools

**TITLE OF UNIT:** The Number System **COURSE OR GRADE :** 8

**DATE PRESENTED:** _____ **DATE DUE:** _____ **LENGTH OF TIME:** 17 Days

**OVERVIEW OF UNIT:**

**Students will evaluate expressions with rational and irrational numbers. Calculations will include: properties of exponents, square and cube roots and scientific notation.**

**ESSENTIAL QUESTION, PROMPT, PROBLEM/UNIT**

**Rational and Irrational Numbers, Properties of Exponents, Scientific Notation**

**STANDARDS: Common Core Math Standards – Grade level domains 6-8**

| Ratios and Proportional Relationships RP | The Number System NS | Expressions and Equations EE | Functions (grade 8) F | Geometry G | Statistics and Probability SP |
|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| ☐ | ☐ | | | | |
| ☐ | ☐ | | | | |

**: 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:** see curriculum _____ for specific standards, e.g. **(CUT AND PASTE FROM MAP)**

- Know that there are numbers that are not rational, and approximate them by rational numbers. 8 NS.1, 2
- Work with radicals and integer exponents. 8.EE.1,3, 4



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

**Applied Learning Standards:**

problem solving | communication | critical thinking | research | reflection/ evaluation

**ENDURING UNDERSTANDING: (CUT AND PASTE FROM CURRICULUM – ESSENTIAL KNOWLEDGE)**

**PRIOR KNOWLEDGE:**

**STUDENT OBJECTIVES, SKILLS and/or NEW KNOWLEDGE: (CUT AND PASTE FROM CURRICULUM – ESSENTIAL KNOWLEDGE)**

**NS.1**

- The real numbers system contains both rational and irrational numbers. The set of rational numbers contain subsets of numbers that build on each other.
- Every rational number can be written as a ratio of two quantities $\frac{a}{b}$ and as a decimal.
- Every real number has a decimal expansion; rational numbers have a decimal expansion that will either terminate or repeat, where as irrational numbers have a decimal expansion that will not terminate or repeat.
- Square roots of perfect squares are rational numbers; where as square roots of non-perfect squares are irrational numbers.

**NS.2**

- Irrational numbers (such as $\pi$ or $\sqrt{2}$ ) are estimated using truncated decimal expansions, in order to be able to compare and place them on a number line in order from least to greatest.

**EE.1**

- Properties of integer exponents are used to simplify and create equivalent forms of numerical expressions.

**EE.3**

- Very large and very small numbers are represented using a single digit times an integer power of 10 (scientific notation).
- Decimal form can be converted to scientific notation and vice-versa.

**EE.4**

- Operations and rules for exponents are used to determine the value and/or compare numbers in both decimal and scientific notation.
- Calculators and computers display scientific notation in different formats.



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**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

| Lesson | Sections | Resources | Timeframe |
|---|---|---|---|
| **Rational Numbers- Convert between fractions and decimals** | **1.1** | **HMH Mathematics *Explorations in Core Math Grade 8*** | **1** |
| **Integer Exponents- Zero and Negative Exponents** | **3.1** | **HMH Mathematics *Explorations in Core Math Grade 8*** | **1** |
| **Properties of Exponents** | **3.2** | **HMH Mathematics *Explorations in Core Math Grade 8*** | **2** |
| **Scientific Notation** | **3.3** | **HMH Mathematics *Explorations in Core Math Grade 8*** | **1** |
| **Operating with Scientific Notation** | **3.4** | **HMH Mathematics *Explorations in Core Math Grade 8*** | **2** |
| **Quiz** | | | |
| **Squares, Square Roots and Cube Roots** | **3.5** | **HMH Mathematics *Explorations in Core Math Grade 8*** | **1** |
| **Estimating Square Roots** | **3.6** | **HMH Mathematics *Explorations in Core Math Grade 8*** | **2** |
| **Classifying Real Numbers** | **3.7** | **HMH Mathematics *Explorations in Core Math Grade 8*** | **1** |
| **Quiz** | | | |
| **Application-** Start with game from Jossey- Bass then break in groups for HMH Performance Task Pg 135 | **JB Pg 157 HMH 135** | **Jossey-Bass CC Hands-On Activities HMH Mathematics *Explorations in Core Math Grade 8*** | **1** |
| **Review /Practice** | | | **3** |
| **Unit Assessment** | | | **2** |

**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

- HMH Mathematics *Explorations in Core Math Grade 8*
- Jossy-Bass Teaching the Common Core Math Standards with Hands- On Activities
- Kuta Software Website



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**VOCABULARY (CUT AND PASTE FROM CURRICULUM)**

- **HMH Mathematics *Explorations in Core Math Grade 8***
  - **Chapter 1 Pg 4**
  - **Chapter 3 Pg 82**

## OBJECTIVES:

| Lessons | Sections | Objective |
|---|---|---|
| **Rational Numbers- Convert between fractions and decimals** | **1.1** | **Students will write rational numbers as decimals and fractions.** |
| **Integer Exponents- Zero and Negative Exponents** | **3.1** | **Students will evaluate expressions with exponents.** |
| **Properties of Exponents** | **3.2** | **Students will apply properties of integer exponents.** |
| **Scientific Notation** | **3.3** | **Students will write and compare numbers written in scientific notation.** |
| **Operating with Scientific Notation** | **3.4** | **Students will perform four operations using scientific notation.** |
| **Quiz** | | |
| **Squares, Square Roots and Cube Roots** | **3.5** | **Students will evaluate square roots and cube roots.** |
| **Estimating Square Roots** | **3.6** | **Students will estimate and compare irrational numbers.** |
| **Classifying Real Numbers** | **3.7** | **Students will classify real numbers.** |
| **Quiz** | | |
| **Application** | | **Students will apply properties of exponents and perform operations on numbers written in scientific notation.** |
| **Review/ Practice** | | |
| **Unit Assessment** | | |

- **Assessments:** see curriculum introduction
  - **Formative**
  - **Summative**

**SUGGESTED PROBLEMS: (CUT AND PASTE FROM CURRICULUM TEACHING PROBLEMS OR ASSESSMENTS)**