MATHEMATICS COMMON CORE CURRICULUM Unit 1
North Smithfield Public Schools

TITLE OF UNIT: Relationships between Quantities and Reasoning with Equations COURSE OR GRADE : Algebra 1

DATE PRESENTED: _____DATE DUE: _____ LENGTH OF TIME: 53 Days

OVERVIEW OF UNIT:

Students will solve equations and inequalities using inverse operations.
Students will solve multi step equations and inequalities including variables on both sides and absolute value.
Students will analyze units to solve rates, ratios and proportions.

ESSENTIAL QUESTION, PROMPT, PROBLEM/UNIT

Solving Equations and Inequalities

STANDARDS: Common Core Math Standards – Grade level Categories 9-12

Number and Quantity	Algebra	Functions	Modeling	Geometry	Statistics and Probability
☐ The Real Number System N-RN	☐ Seeing Structure in Expressions A-SSE	☐ Interpreting Function F-If	☐	☐ Congruence G-CO	☐ Interpreting Categorical and Quantitative Data S-ID
☐ Quantities N-Q	☐ Arithmetic with Polynomials and Rational Expressions A-APR	☐ Building Functions F-BF	☐	☐ Similarity, Right Triangles, and Trigonometry G-SRT	☐ Making Inferences and Justifying Conclusions S-IC
☐ The Complex Number System N-CN	☐ Creating Equations A-CED	☐ Linear, Quadratic, and Exponential Models F-LE		☐ Circles G-c	
☐ Vector and Matrix Quantities N-VM	☐ Reasoning with Equations and Inequalities A-REI	☐ Trigonometric Functions F-TF		☐ Expressing Geometric Properties with Equations G-GPE	
☐	☐	☐		☐ Geometric Measurement and Dimensions G-GMD	
☐	☐	☐		☐ Modeling with Geometry G-MG	

STANDARDS: Mathematical Practices grades K-12

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

FOCUS MATHEMATICS STANDARDS: (CUT AND PASTE FROM MAP)

- Reason quantitatively and use units to solve problems **N.Q.1,2,3**
- Interpret the structure of expressions **A.SSE.1**
- Create equations that describe numbers or relationships **A.CED.1,2,3,4**
- Understand solving equations as a process of reasoning and explain the reasoning **A.REI.1**
- Solve equations and inequalities in one variable **A.REI.3**

*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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Applied Learning Standards:

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

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

N.Q.1

Use appropriate scales and units when graphing

Convert a given quantity in a unit rate to a different unit rate, e.g. convert feet per second to miles per hour.

N.Q.2

- Use labels to put the answer into proper context.
- Understand the relationship between quantities in order to construct expressions, equations, relations and functions.

N.Q.3

- Determine reasonable limits and accuracy when solving a real life problem.

A.SSE.1

- Identify parts of an expression (e.g. degree, coefficient, constant) and terms.
- Interpret terms in an expression to simplify and solve.

A.CED.1

- Translate real world situations into mathematical equations and inequalities
- Identify how and why a situation is best represented by an equation, or an inequality

A.CED.2

- Identify how and why a situation is best represented by a system or equations or inequalities.
- Compare graphs of equations and inequalities.

A.CED.3

- Determine if a given point is a viable solution to a system of equations or inequalities, both on a graph and using the equations

A.CED.4

- Explain how and why given formulas are solved for a particular variable

A.REI.1

- Justify each step in the process of solving equations
- Check solutions of equations
- Justify your reasoning when solving an equation
- Properties of operations can be used to change expressions on either side of the equation to equivalent expressions. In addition, adding the same term to both sides of an equation or multiplying both sides by a non-zero constant produces an equation with the same solutions. Other operations, such as squaring both sides, may produce equations that have extraneous solutions.

A.REI.3

- Equations and inequalities are solved using properties of operations, equality, and inequality, which can justify each step of the process.
- Laws of exponents can be used to solve simple exponential equations.

- Determine and justify whether a solution to an equation or inequality is correct
- Explain how operations performed on real numbers affect the relationship between the quantities in an inequality.

PRIOR KNOWLEDGE:

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

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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
Variables and Expressions	1.1	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Solving Equations by Adding and Subtracting	1.2	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Solving Equations by Multiplying and Dividing	1.3	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Quiz			1
Solving 2-Step and Multi-Step Equations	1.4	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Solving Equations with Variables on Both Sides	1.5	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Solving for a Variable	1.6	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Solving Absolute Value Equations	1.7	HMH Mathematics *Explorations in Core Math Algebra 1*	2-3
Quiz			1
Rates, Ratios, and Proportions	1.8	HMH Mathematics *Explorations in Core Math Algebra 1*	2-3
Applications and Proportions	1.9	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Precision and Accuracy	1.10	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Quiz			1
Application: Performance Task Pg 65 (2 class periods with option to finish for homework)	Ch 1	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Graphing and Writing Inequalities	2.1	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Solving Inequalities by Adding and Subtracting	2.2	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Solving Inequalities by Multiplying and Dividing	2.3	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Quiz			1
Solving 2-Step and Multi Step Inequalities	2.4	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Solving Inequalities with Variables on Both Sides	2.5	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Quiz			1
Solving Compound Inequalities	2.6	HMH Mathematics *Explorations in Core Math Algebra 1*	2-3
Solving Absolute Value Inequalities	2.7	HMH Mathematics *Explorations in Core Math Algebra 1*	2-3
Quiz			1
Application: Performance Task Pg 107 (2 class periods with option to finish for homework)	Ch 2	HMH Mathematics *Explorations in Core Math Algebra 1*	2
Review/Practice			3
Unit Assessment			2

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

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

- HMH Mathematics *Explorations in Core Math Grade Algebra 1*

VOCABULARY (CUT AND PASTE FROM CURRICULUM)

- **HMH Mathematics *Explorations in Core Algebra 1***
  - **Chapter 1 Pg 4**
  - **Chapter 2 Pg 72**

OBJECTIVES:

Lesson	Sections	Objective
Variables and Expressions	1.1	Students will interpret, evaluate and write algebraic expressions to model real world situations.
Solving Equations by Adding and Subtracting	1.2	Students will solve equations by adding and subtracting. Students will use properties of equalities to justify their steps.
Solving Equations by Multiplying and Dividing	1.3	Students will solve equations by multiplying and dividing. Students will use properties of equalities to justify their steps.
Quiz		
Solving 2-Step and Multi-Step Equations	1.4	Students will solve 2 step and multi-step equations. Students will use properties of equalities to justify their steps.
Solving Equations with Variables on Both Sides	1.5	Students will solve equations with variables on both sides. Students will use properties of equalities to justify their steps.
Solving for a Variable	1.6	Students will rewrite equations to solve for a different variable. Students will use properties of equalities to justify their steps.
Solving Absolute Value Equations	1.7	Students will solve and graph absolute value equations. Students will use properties of equalities to justify their steps.
Quiz		
Rates, Ratios, and Proportions	1.8	Students will use units to solve real world problems.
Applications and Proportions	1.9	Students will use units to write and solve proportions.
Precision and Accuracy	1.10	Students will use significant digits to report results of calculations based on measurements.
Quiz		Students will write and solve equations to make predictions of real world situations.
Application		
Graphing and Writing Inequalities	2.1	Students will graph and write inequalities.
Solving Inequalities by Adding and Subtracting	2.2	Students will solve inequalities by adding and subtracting. Students will use properties of inequalities to justify their steps.
Solving Inequalities by Multiplying and Dividing	2.3	Students will solve inequalities by multiplying and dividing. Students will use properties of inequalities to justify their steps.
Quiz		
Solving 2-Step and Multi Step Inequalities	2.4	Students will solve 2 step and multi-step inequalities. Students will use properties of inequalities to justify their steps.
Solving Inequalities with Variables on Both Sides	2.5	Students will solve inequalities with variables on both sides. Students will use properties of inequalities to justify their steps.
Quiz		
Solving Compound Inequalities	2.6	Students will solve compound inequalities.
Solving Absolute Value Inequalities	2.7	Students will solve absolute value inequalities.
Quiz		
Application		Students will write and solve inequalities to make predictions of real world situations.
Review/ Practice		
Unit Assessment		

- **Assessments:** see curriculum introduction

- **Formative**
- **Summative**

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