MATHEMATICS COMMON CORE CURRICULUM UNIT #3 Grade 6*
North Smithfield School Department

TITLE OF UNIT: Equations and Inequalities   **GRADE**: 6

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

OVERVIEW OF UNIT:

In this unit, students will write, solve, and graph equations and inequalities. They will apply formulas to find area, surface area, and volume of polygons in real-world problems.

> ### ESSENTIAL QUESTIONS
> *How do you determine if a real-world situation will be represented by an equation or inequality?*
> *How are equalities and inequalities graphed on a number line?*
> *How can formulas and nets be used to find area, volume, and surface area?*

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
☐	☐	☐ 6.EE.5, 6, 7, 8	☐	☐ 6.G.1, 2,	☐
☐	☐	☐	☐	☐	☐
☐	☐				
☐	☐				

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:

- Reason about and solve one-variable equations and inequalities. 6.EE.5, 6, 7, 8
- Solve real-world and mathematical problems involving area, surface area, and volume. 6.G.1, 2, 4

Applied Learning Standards:
problem solving   communication   critical thinking   research   reflection/ evaluation

ENDURING UNDERSTANDING:

- Students will be able to determine whether an equation or inequality best solves a real-world situation.

- Students will accurately graph equations and inequalities using closed or open circles on a number line.

- Students will use various techniques (composing and decomposing polygons, applying formulas, and using nets) in the context of solving real-world problems with area, surface area, and volume.

PRIOR KNOWLEDGE:
- Students will recognize and understand the concept of volume measurement
- Students will be able to use a variety of units to measure volume.
- Students will be able to calculate the volume of rectangular prisms by using the formula.
- Students will be able to calculate the area of a rectangle.

STUDENT OBJECTIVES, SKILLS and/or NEW KNOWLEDGE:

6.EE.5   Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

`6.EE.6`   Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

`6.EE.7`   Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.

`6.EE.8`   Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

`6.G.1`   Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into solving triangles and other shapes; apply these techniques in the context of real-world and mathematical problems.

`6.G.2`   Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\,w\,h$ and $V = b\,h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems

`6.G.4`   Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems

SUGGESTED PROBLEMS:

6.EE.5 Basic
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/673/original/illustrative_mathematics_673.pdf?1353977620

6.EE.6 Basic
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/425/original/illustrative_mathematics_425.pdf?1343856927

6.EE.7 Basic
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/001/107/original/illustrative_mathematics_1107.pdf?1346088511

6.EE.8 Basic
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/642/original/illustrative_mathematics_642.pdf?1343856929

6.G.1 Basic
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/656/original/illustrative_mathematics_656.pdf?1343856939 (2 only)

6.G.2 Basic
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/657/original/illustrative_mathematics_657.pdf?1343856937
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/534/original/illustrative_mathematics_534.pdf?1343856945
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/535/original/illustrative_mathematics_535.pdf?1343856946

6.G.2 Advanced
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/537/original/illustrative_mathematics_537.pdf?1343856948

6.G.4 Basic
- http://www.opusmath.com/common-core-standards/6.g.4-represent-three-dimensional-figures-using-nets-made-up-of-rectangles-and

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

- 6.EE.5
  - Represent equations and inequalities by using balance models (scale and bar).
- 6.EE.6
  - Connect writing expressions with story problems and/or drawing pictures.
  - Create a problem situation that can be solved using a given equation.
- 6.EE.7
  - Use effective strategies and prior knowledge to create and solve equations based on real-world situations.
- 6.EE.8
  - Represent a solution set for an equation or inequality on a number line using arrows with closed and open circles.
- 6.G.1
  - Create real-world situations to apply techniques (composing and decomposing) in determining the area of polygons.
- 6.G.2
  - Create real-world situations to apply the formulas and techniques to find the volume of rectangular and triangular prisms and other 3-D figures.
- 6.G.4
  - Given a 3-D figure model, create a net to calculate the surface area. (Use tool on NCTM's Illuminations website)
  - Make and test conjectures by determining what is needed to create a specific 3-D figure.

UNIT 3 ASSESSMENT

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	- apply
- strategic reasoning	- analyze
- extended reasoning	- synthesize/create
	- evaluate

ADDITIONAL RESOURCES: see curriculum for specifics
- *Exploration in Core Math , Holt Mc Dougal*
- *Holt Grade 6 Mathematics*

VOCABULARY

6.EE.5
- Variable
- Inverse
- Scale model
- Bar model

6.EE.6
- Algebraic expression
- Equation
- Solution

6.EE.7
- Substitute

6.EE.8
- Closed circle
- Open circle
- Inequalities

6.G.1
- Polygons
  - Triangles – right, equilateral, scalene, isosceles, acute, obtuse
  - Quadrilateral – rectangles. Squares, parallelograms, trapezoids, rhombus
- Kite
- Proportions
- Composing
- Decomposing

- Perimeter
- Area

6.G.2
- Volume
- Capacity
- Unit cube
- Fractional cubic unit
- Fractional edge lengths
- Polyhedron
  - (right) rectangular prism
  - Triangular prism
  - Cube
  - (right) rectangular pyramid
  - Triangular pyramid
- Rectangular prism
- Right rectangular prism

6.G.4
- Surface area
- Net
- 3D figure

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

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**

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