MATHEMATICS COMMON CORE CURRICULUM UNIT*
North Smithfield Public Schools

TITLE OF UNIT: Unit 5 - Geometry   **COURSE OR GRADE :   7 Accelerated**

DATE PRESENTED: _____ DATE DUE: _____ LENGTH OF TIME: 25

OVERVIEW OF UNIT:

Students will draw, construct, and describe geometric figures and describe the relationships between them, including congruence and similarity. They will apply these concepts to solve real-life problems.

> **ESSENTIAL QUESTION, PROMPT, PROBLEM/UNIT**
> **How does an understanding of congruence and similarity help solve problems regarding objects we encounter in daily life?**

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)**

- Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 7.EE.3, 4

- Draw, construct, and describe geometrical figures and describe the relationships between them.   7.G.3, 5

- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. 7.G.4, 6

- Understand congruence and similarity using physical models, transparencies, or geometry software. 8 .G.1,2

Applied Learning Standards:

problem solving	communication	critical thinking	research	reflection/ evaluation

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

Students will be able to construct and identify geometric figures, and solve problems involving congruence and similarity.

PRIOR KNOWLEDGE:
- ☐ Apply and extend previous understandings of arithmetic to algebraic expressions.
- ☐ Solve real-world and mathematical problems involving area, surface area, and volume.

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

7.EE.3
- Mental math and estimation strategies for calculations in problem solving contexts extend from students' work with whole number operations and are used to check reasonableness of answers.
- Students can fluently move between fractions, decimals and percents in order to solve multi-step real world and mathematical problems.

7.EE.4
- Real-world problems can be represented and solved using visual models, equations or inequalities.
- Real-world situations can be represented and solved using linear equations with rational numbers of the form $px+q = r$ and $p(x+q) = r$.
- Real-world situations can be represented and solved using linear inequalities with rational numbers of the form $px+q < r$ and $p(x+q) > r$.
- Solutions sets for inequalities are graphed on number lines.

7.G.4
- Pi is derived by finding the ratio of the circumference to the diameter for any circle.
- The circumference of a circle is $2\pi r$ or πd .
- Using the fact that circumference of a circle is $2\pi r$; the area formula of a circle can be derived to be πr^2 .

7.G.5
- Equations can be written and used to find the value of missing angles in multi-step problems involving complementary, supplementary, adjacent and vertical angles

7.G.6
- The volume of a prism is calculated by taking the area of the base times the height ($V = B \times h$).
- Surface area of prisms and pyramids is calculated by finding the sum of the area of each of its faces.

8.G.1
- Translating a point, line, line segment or angle does not change any attributes of that object, it will just move the object to a new location.
- When a point is reflected across a line that reflected point stays the same distance from the line of reflection as the original point.
- When a line segment or angle is rotated, reflected or translated, the length of that line segment and measure of the angle will not change.

8.G.2
- A sequence of rotations, reflections, and/or translations to a two-dimensional figure will create a congruent two-dimensional figure.

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

Lessons	Resources	Timeframe
Building blocks of geometry	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 8 Lesson 1**	**1**
Classifying Angles	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 8 Lesson 2**	**1**
Line and Angle Relationships	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 8 Lesson 3** **Holt McDougall *Mathematics Explorations in Core Math Grade 8* Chapter 5 Lesson 1**	**1**
Unit 5 Quiz 1		**1**
Review of solving equations containing rational numbers	**Refer to:** **Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 11 Lesson 1-3**	**1**
Perimeter and Circumference	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 9 Lesson 1**	**1**
Area of Circles	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 9 Lesson 2** **Holt McDougall *Mathematics Explorations in Core Math Grade 8* Chapter 6 Lesson 1**	**1**
Area of Irregular Figures	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 9 Lesson 3**	**1**
Unit 5 Quiz 2		**1**
Introduction to Three-Dimensional Figures	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 9 Lesson 4**	**1**
Surface Area of Prisms and Cylinders	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 9 Lesson 6**	**1**
Application: Surface Area of Nets	**Jossey-Bass CC Hands-On Activities Pg. 63**	**2**
Volume of Prisms and Cylinders	**Holt McDougall *Mathematics Explorations in Core Math Grade 7* Chapter 9 Lesson 4** **Holt McDougall *Mathematics Explorations in Core Math Grade 8* Chapter 6 Lesson 2**	**1**
Volume of Pyramids and Cones	**Holt McDougall *Mathematics Explorations in Core Math Grade 8* Chapter 6 Lesson 3**	**1**
Volume of Spheres	**Holt McDougall *Mathematics Explorations in Core Math Grade 8* Chapter 6 Lesson 4**	**1**
Unit 5 Quiz 3		**1**
Congruence	**Holt McDougall *Mathematics Explorations in Core Math Grade 8* Chapter 5 Lesson 5**	**1**
Similarity and Congruence Transformations	**Holt McDougall *Mathematics Explorations in Core Math Grade 8* Chapter 5 Lesson 7**	**1**
Identifying Combined Transformations	**Holt McDougall *Mathematics Explorations in Core Math Grade 8* Chapter 5 Lesson 8**	**1**
Unit 5 Quiz 4		**1**
Additional Review/Practice		**3**
Unit Assessment		**1**

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

- Holt McDougall Mathematics Explorations in Core Math Grade 7
- Holt McDougall Mathematics Explorations in Core Math Grade 8
- Jossey-Bass Teaching the Common Core Math Standards with Hands-On Activities
- Continental *Finish Line Mathematics Grade 8*
- Holt Course 2
- Holt Course 3
- McDougall Littell Pre-Algebra

VOCABULARY   (CUT AND PASTE FROM CURRICULUM)

- Area
- Base
- Circumference
- Congruent
- Diameter
- Dimension
- Height
- Net
- Orientation
- Plane section
- Radius
- Scale

OBJECTIVES:

Lessons	Objective
Building blocks of geometry	**Students will identify and describe basic geometric figures.**
Classifying Angles	**Students will classify pairs of angles.**
Line and Angle Relationships	**Students will use knowledge of angles to solve problems with figures.**
Unit 5 Quiz 1	
Review of solving equations containing rational numbers	
Perimeter and Circumference	**Students will find the circumference of a circle.**
Area of Circles	**Students will find the area of a circle.**
Area of Irregular Figures	**Students will find the area of irregular figures.**
Unit 5 Quiz 2	
Introduction to Three-Dimensional Figures	**Students will identify cross sections of three-dimensional figures.**
Surface Area of Prisms and Cylinders	**Students will find the surface area of prisms and cylinders.**
Application: Surface Area of Nets	**Students will calculate surface area using the net of a figure.**
Volume of Prisms and Cylinders	**Students will find the volume of prisms and cylinders.**
Volume of Pyramids and Cones	**Students will find the volume of pyramids and cones.**
Volume of Spheres	**Students will find the volume of spheres.**
Unit 5 Quiz 3	
Congruence	**Students will prove that two figures are congruent.**
Similarity and Congruence Transformations	**Students will translate, reflect, and rotate figures, observing which properties and preserved and which are not.**
Identifying Combined Transformations	**Students will compare transformations of congruent figures and transformations of similar figures.**
Unit 5 Quiz 4	
Additional Review/Practice	
Unit Assessment	

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

  - **Summative**

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

Write an equation or inequality to model the situation. Explain how you determined whether to write an equation or inequality and the properties of the real number system that you used to find a solution.

- The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

  Example:
- Using a clay model of a rectangular prism, describe the shapes that are created when planar cuts are made diagonally, perpendicularly, and parallel to the base.
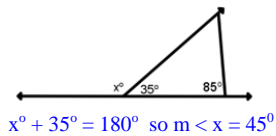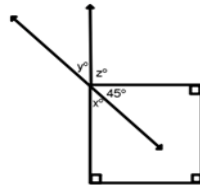

Examples:

- The seventh grade class is building a mini golf game for the school carnival. The end of the putting green will be a circle. If the circle is 10 feet in diameter, how many square feet of grass carpet will they need to buy to cover the circle? How might you communicate this information to the salesperson to make sure you receive a piece of carpet that is the correct size?

- Students measure the circumference and diameter of several circular objects in the room (clock, trash can, door knob, wheel, etc.). Students organize their information and discover the relationship between circumference and diameter by noticing the pattern in the ratio of the measures. Students write an expression that could be used to find the circumference of a circle with any diameter and check their expression on other circles.

- Students will use a circle as a model to make several equal parts as you would in a pie model. The greater number the cuts, the better. The pie pieces are laid out to form a shape similar to a parallelogram. Students will then write an expression for the area of the parallelogram related to the radius (note: the length of the base of the parallelogram is half the circumference, or πr, and the height is r, resulting in an area of $\pi r2$. Extension: If students are given the circumference of a circle, could they write a formula to determine the circle's area or given the area of a circle, could they write the formula for the circumference?
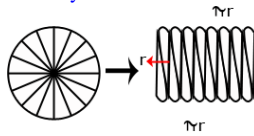
- Set and solve an equation to find the value of angle x.

$x^o + 35^o = 180^o$ so $m < x = 45^0$

Set and solve equations to find the missing angle measures.

Possible solutions:

$x + 45^o = 90^o$ $m\angle x = 45^o$

$m\angle x = m\angle y$ $45^o = m\angle y$

$y + z + 45^o = 180^o$ $45^o + z + 45^o = 180^o$ $m\angle z = 90°$

Examples:
- Choose one of the figures shown below and write a step by step procedure for determining the area. Find another person that chose the same figure as you did. How are your procedures the same and different? Do they yield the same result?
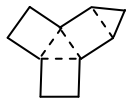
- A cereal box is a rectangular prism. What is the volume of the cereal box? What is the surface area of the cereal box? (Hint: Create a net of the cereal box and use the net to calculate the surface area.) Make a poster explaining your work to share with the class.
- Find the area of a triangle with a base length of three units and a height of four units.
- Find the area of the trapezoid shown below using the formulas for rectangles and triangles
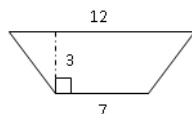
** For sample assessment problems, see curriculum document located on NSMS T: drive.