NJDOE MODEL CURRICULUM PROJECT

CONTENT AREA: Pre-Algebra	GRADE: 7	UNIT #: 5	UNIT NAME: Geometry

Anticipated ending: First week in June

	STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS
1	Use variables to represent quantities in a real-world or mathematical problem; write and fluently solve simple equations and inequalities, interpret the solutions in the context of the problem and graph the solution set on a number line. [Please note this unit addresses standard 7.EE.4 again to assess fluency.]	7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.
2	Use tools strategically to solve multi-step real-world and mathematical problems involving positive and negative rational numbers in any form (converting between forms as needed) and determine the reasonableness of the answers. [Please note this unit addresses standard 7.EE.3 again to assess fluency.]	7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation

3	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	7.G.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
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		7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. b. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.
4	Write and solve simple algebraic equations involving supplementary, complementary, vertical, and adjacent angles for multi-step problems and finding the unknown measure of an angle in a figure.	7.G.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
5	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

6	Describe, using drawings or written descriptions, the 2-dimensional figures that result when 3-dimemsional figures (right rectangular prisms and pyramids) are sliced from multiple angles given both concrete models and a written description of the 3-dimensional figure.	7.G.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

Major Content **Supporting Content** **Additional Content** (Identified by PARCC Model Content Frameworks). ***Bold type indicates grade level fluency requirements.*** *(Identified by PARCC Model Content Frameworks).*

Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. **Reason abstractly and quantitatively.**
   SLO 4 Represent problems involving geometric concepts algebraically.
3. Construct viable arguments and critique the reasoning of others.
4. **Model with mathematics.**
   SLO 3 Use geometric models of 3-D objects.
5. **Use appropriate tools strategically.**
   SLO 2 Represent problems involving real-world circumstances using the number line.
6. Attend to precision.
7. Look for and make use of structure.
8. **Look for and express regularity in repeated reasoning.**
   SLO 5 Apply the correct formula when solving problems .

All of the content presented at this grade level has connections to the standards for mathematical practices.

Bold type identifies possible starting points for connections to the SLOs in this unit.

Greater Brunswick Charter School Curriculum

Grade level: 7 **Subject: Math** **Unit #: 5**

Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
1	Angle and line relationships	4	To identify the relationships between pairs of lines and angles	*How can I be sure two angle measures are exactly the same?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.494-499
2	Triangle angles	4	To determine the sum of all interior angles of a triangle.	*If I know all the interior angles of triangle always add up to the same total, what can I do with that?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.501-502
3	Triangles	4, 1, 2	To find the missing angle measure in a triangle.	*How can I use an equation to find the missing value I want to know?*	*SLOs #1 and #2 in this unit is about using equations to find real world solutions. This is an opportunity for practice.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.503-508
4	Making triangles	4, 1, 2	To construct a triangle given limited information about its characteristics	*How can I make a drawing with the information I am given?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.509-513
5	Polygons	4	• To find the interior angle measures for regular polygons. • To create a tessellation.	*How does knowing the interior angles of a polygon help me create a tessellation?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.513-517
6	Triangle measures and translations	1, 2, 4, 6	To reinforce the most important points about finding triangle measures and drawing translations.	*Do I know all the important content so far?*		• Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.551-552
7	Triangle measures and translations	1, 2, 4, 6				• Review • Assessment	

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8	Circles and circumferences	5, 3	• To find the circumference of a circle. • To solve problems involving circumference	*How do I use π to find the circumference of a circle?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.558-561
9	Areas of circles	5, 3	• To find the area of a circle. • To solve problems involving area	*How do I use π to find the area of a circle?*	*To help students keep clear the formulas for circumference and area, remind them that area is measure in square units, so the area formula has the r^2 in it.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.563-566
10	Area of composite figures	5, 3	• To find the area of composite figures • To solve problems involving composite figures	*How can I use my knowledge for finding areas of figures to find the area of more complex figures?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.568-572
11	3-dimensional figures	6	To recognize and describe 3-D figures	*What are the differences between 2-D and 3-D figures* *How does an intersection of a plane create different figures than a conic section?*	*Making conic sections less intimidating is a plus here.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.574-578
12	Volume of prisms	3	To find the volume of prisms and composite figures.	*If I know how to find the volume of a cube, is a prism harder?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.580-583
13	Volume of prisms	3	To find the volume of prisms and composite figures.	*If I know how to find the volume of a cube, is a prism harder?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.583-585
14	Circles and Prisms	3, 5, 6		*Do I know enough about the important parts of circles and prisms?*		• Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.621-622

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15	Circles and Prisms	3, 5, 6				• Review • Assessment	
The remainder of this unit contain extensions of the Grade 7 Model Curriculum that may be appropriate for a pre-algebra program.							
16	Volume of cylinders	NA	To find the volume of cylinders and composite figures involving cylinders.	*How is finding the volume of a cylinder like finding the volume of a prism standing on it's end?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.586-590
17	Volume of pyramids and cones	NA	To discover the volume of pyramids and cones	*How is the formula for finding the volume of a pyramid and a cone the same?*	*Emphasize the discovery that the formulas are identical except for the area of the base.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.592-594
18	Volume of pyramids, cones, and spheres	NA	To find the volumes of pyramids, cones, and spheres	*How does the area of a sphere also include the area of its "base" and its height?*	*Only the leading coefficient is different.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.595-599
19	Surface area of prisms	NA	To discover how to and find the surface area of a prism	*How is finding the surface area of a prism a lot like finding the perimeter of a rectangle?*	*Emphasize the process is the same – taking all the sides and adding them together. Only now each is a two-dimensional area instead of a one-dimensional length. And those parts include two bases and folding out the sides.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.601-606
20	Surface area of a cylinder	NA	To discover how to and find the surface area of a cylinder.	*How is find the surface of a cylinder exactly like finding the surface are of a prism?*	*Keep the theme: area of the two bases and folding out the side to form a rectangle.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.608-613
21	Volumes and surface areas	NA	To find the volumes and surface areas of cones, pyramids, and spheres			• Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.623-624
22	Volumes and surface areas					• Review • Assessment	

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23	Transformations	NA	To identify and create transformations of plane figures.	*How can I see the way a figure has moved?*	*This leads to translations, etc.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.519-520
24 25	Translations, reflections on the coordinate plane	NA	To identify and draw translations and reflections.	*What steps need my extra care to draw a translation?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 11-4 p.521-525
26	Rotations on the coordinate plane	NA	• To define, identify, and draw rotations. • To determine rotational symmetry	*What are the key characteristics that tell me if two figures are in rotational symmetry?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 11-5 p.528-532
27	Congruence	NA	To determine if two figures are congruent.	*How many flips, turns, or slides do I need to prove two figures are congruent?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 11-6 p.534-537
28	Dilations	NA	To determine if two figures are dilations of each other.	*How is a scale factor in a dilation like the scale on a map?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 11-7 p.539-543
29	Similarity	NA	To determine if two figures are similar to each other.	*How are congruence and similarity alike and different?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 11-8 p.545-548
30	Transformations of figures	NA		*Do I know enough about the four types of transformations to identify them when I see them?*		• Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.552-554
31	Transformations of figures	NA				• Review • Assessment	MathAccelerated p.

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32	Powers and exponents	NA	To evaluate expressions using exponents.	*How is evaluating an expression with an exponent just like evaluating any other expression?*	*Another topic not listed in Grade 7 SLOs, but useful for a pre-algebra program.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 4-1 p.136-140
33	Negative exponents	NA	To evaluate expressions using negative exponents.	*What simple trick do I need to remember to take care of negative exponents?*	*The simple trick is to flip it over the fraction line to make it positive – when that helps.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 4-2 p.141-145
34	Multiplying and dividing monomials	NA	To evaluate monomials using multiplication and division.	*What do I do with the exponents when I multiply or divide monomials?*		• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.4-3 p.147-151
35	Square roots and cube roots	NA	To evaluate and estimate square and cube roots.	*Which perfect squares and perfect cubes should I memorize?* *How do I estimate a root when the number isn't perfect?*	*The students might find it interesting to represent roots as fractional exponents.* *If you have the time, it would not hurt to expose the students to a little interpolation. It's a skill valuable in life beyond its use in math. This will transition you to the next lesson.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 4-6 p.168-172
36	Roots of non-perfect squares and cubes	NA	To identify and evaluate an irrational number.	*How can I use a number that I can't write as a fraction and doesn't end?*	*It is probably easier to explore this with calculators. Numbers whose repeating decimal doesn't end are irrational.*	• Lesson/Guided Practice • Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated 4-7 p.174-178
37	Exponents of all types	NA	To evaluate an expression with any type of exponent.		*If you want to include the scientific notation sections of the chapter, you're welcomed to .*	• Independent Practice • Intervention/Enrichment • i-Ready	MathAccelerated p.180-182
38	Exponents of all types	NA				• Review • Assessment	

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Word Wall Candidates

Vertical angles	Adjacent angles	Complementary angles	Supplementary angles	Perpendicular angles
Parallel lines	Transversal	Alternate interior angles	Alternate exterior angles	Corresponding angles
Line segment	Vertex	Congruent	Diagonal	Regular polygon
Tessellation	Transformation	Translation	Reflection	Line of reflection
Rotation	Center of Rotation	Rotational Symmetry	Dilation	Edge
Solids	Vertex	Cross section	Base	Face
Exponent	Base			

Authentic Application

Your goal: To find the composite figure that uses the least material while holding a specified volume of a product.

Your role: Member of a team.

Your audience: The members of the class.

The situation: Your team must select two figures to combine into a composite figure.
Select one of the following volumes for your composite figure to hold: 10 in^3, 20 in^3, 25 in^3, or 30 in^3
Find or calculate the figure that will hold the amount of material (volume) you've chosen your figure to hold while using the least amount of material (surface area) to make the composite figure.
Construct the composite figure from construction paper. Use a different color for each part of your composite figure.

Your Product: Proof that the dimensions of your figure require the least amount of material for the volume it will hold.
The neatly completed construction of your composite figure.

Success Criteria: Scoring rubric:

	4 points	3 points	2 points	1 point
Calculation	The composite figure uses the least required material	The composite figure uses the least required material but it doesn't fit together well	The composite figure doesn't use the least required material.	The composite figure doesn't use the least required material and It doesn't fit together well
Construction	The construction is done very neatly and the colors are well selected.	< ---------->		The construction is done very poorly and it is monochrome.