

NJDOE MODEL CURRICULUM

CONTENT AREA: Mathematics

GRADE: 5

UNIT: # 2

UNIT NAME: Geometric Measures and Understanding Volume

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
1	Understand and measure volume by counting the total number of same size cubic units required to fill a figure without gaps or overlaps.	5.MD.3b, MD.4	<p>Recognize volume as an attribute of solid figures and understand concepts of volume measurement.</p> <p>b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.</p> <p>Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft and improvised units</p>
2	<p>Know a cube with a side length of 1 unit is called a “unit cube” and can be used to measure volume.</p> <p>Choose an appropriate cubic unit based on the attributes of the 3-dimensional figure you are measuring.</p>	5.MD.3a, MD.4	<p>Recognize volume as an attribute of solid figures and understand concepts of volume measurement.</p> <p>a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.</p> <p>Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft and improvised units</p>
3	Show that the volume of a right rectangular prism found by counting all the unit cubes is the same as the formulas $V = l \times w \times h$ or $V = B \times h$.	5.MD.5a	<p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>a. Find the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes, and show that the volume is the same as it would be found by multiplying the height by the area of the base. Represent threefold whole number products as volumes, e.g. to represent the associative property of multiplication.</p>
4	Explain how both volume formulas relate to counting the cubes in one layer and multiplying that value by the number of layers (height).	5.MD.5b	<p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>b. Apply the formula $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.</p>
5	Find the volume of a composite solid figure composed of two non-overlapping right rectangular prisms.	5.MD.5c	<p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.</p>

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
6	Apply formulas to solve real world and mathematical problems involving volumes of right rectangular prisms and composites of same.	5.MD.5	<p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>a. Find the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes, and show that the volume is the same as it would be found by multiplying the height by the area of the base. Represent threefold whole number products as volumes, e.g. to represent the associative property of multiplication.</p> <p>b. Apply the formula $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.</p> <p>c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.</p>
7	Write numerical expressions when given a word problem or a scenario in words and use words to interpret numerical expressions.	5.OA.2	<p>Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</p>

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.

SLO #2 Choose the appropriate cubic unit based on the figures attributes and ensure that the measurement is valid.

SLO #7 Explain the correspondences between expressions represented in word problems or scenarios and numerical expressions.

2. Reason abstractly and quantitatively.

SLO #1 Understand and make sense of volume quantities.

SLO #1 Use quantitative reasoning to create a coherent representation of volume.

SLO #4 Use quantitative reasoning to create a coherent representation of both volume formulas.

SLO #7 Understand and make sense of quantities and their relationships to one another in numerical expressions and numerical expressions represented in word problems.

3. Construct viable arguments and critique the reasoning of others.

SLO #4 Understand assumptions and definitions regarding volume to explain attributes of volume.

SLO #4 Explain and justify conclusions made about volume.

4. Model with mathematics.

SLO #3 Map the relationship between counting all the cubes and using the volume formula.

SLO #6 Apply previously learned concepts about multiplication and volume to solve real world volume problems.

SLO #7 Apply previously learned concepts about numerical expressions and word problems in order to solve problems that involve both.

5. Use appropriate tools strategically.

6. Attend to precision.

SLO #4 Communicate and explain precisely how both volume formulas relate to counting cubes in one layer and multiplying the value by the number of layers.

7. Look for and make use of structure.

SLO #5 Look for and discern patterns when finding the volume of a composite solid figure composed to two right rectangular prisms.

8. Look for and express regularity in repeated reasoning.

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

Greater Brunswick Charter School Curriculum

Grade level: 5		Subject: Math			Unit #: 2		
Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
1	Geometry		To determine readiness for content	<i>What do I already know?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.889-902
2	Polygons		To identify types of polygons	<i>Why is it important to know the names of different shaped polygons?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.903-908
3	Triangles		To measure the sides and angles of triangles			<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.909-914
4			To classify and name the types of triangles	<i>How does the name of a triangle depend on the length of its sides and the measure of its angles?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.915-920
5	Quadrilaterals		To measure the sides and angles of quadrilaterals	<i>What tools do I need to measure angles and sides?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.923-928
6			To classify and name the types of quadrilaterals	<i>How does the name of a quadrilateral depend on the length of its sides and the measure of its angles?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.929-934
7	Three dimensional figures	1, 2	To recognize the 3-dimensional shape that will result from a 2-dimensional layout.	<i>How can I use folds and lengths to help me see a 3-dimensional figure?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.935-940

Grade level: 5

Subject: Math

Unit #: 2

Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
8	Three dimensional figures	1, 2	To classify and name three dimensional rectangular prisms.	<i>What characteristics of each type of rectangular prism help me to know its name?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.941-946
9	Polygons and rectangular prisms	1, 2	To determine areas of weakness and make improvement	<i>What do I need to know better?</i>		<ul style="list-style-type: none"> Differentiated intervention as appropriate Review practice Independent practice i-Ready 	MyMath p.947-948
10	Polygons and rectangular prisms					<ul style="list-style-type: none"> Review Assessment 	MyMath p.
11	Volume of rectangular prisms	1, 2, 3, 4	To find the volume of a rectangular prisms by seeing or imagining, then counting the number of cubic units in the figure	<i>How do I know where the cubes are to count the volume in a rectangular prism?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.949-954
12			To use the volume formula to compute the area of rectangular prisms	<i>How is the base the most important part of a rectangular area for finding the volume?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.955-960
13	Composite figures	1, 2, 3, 4, 5, 6	To count the number of cubic units in a composite figure to determine the total volume	<i>How can different sizes of rectangular prisms be joined together to make a bigger volume?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.961-966
14			To combine the volume of rectangular prism parts (using the volume formula) to find the volume of a composite figure	<i>Can I see the different rectangular prisms in a composite figure and see the length of each side to find the volume of each part and add them together?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.967-972

Grade level: 5		Subject: Math			Unit #: 2		
Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
15	Problems with prisms	6	To use the volume formula to solve real world problems	<i>How can I see the picture of the rectangular prism in my mind when I read a problem so I can solve it better?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.973-978
16	Volume of rectangular prisms	1, 2, 3, 4, 5, 6	To determine areas of weakness and make improvement	<i>What do I need to know better?</i>		<ul style="list-style-type: none"> Differentiated intervention as appropriate Review practice Independent practice i-Ready 	MyMath p.979-982
17	Volume of rectangular prisms	1, 2, 3, 4, 5, 6				<ul style="list-style-type: none"> Review Assessment 	
18	Expressions and patterns	7	To determine readiness for the content	<i>What do I already know about this?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.473-480
19	Numerical expressions	7	To create numerical expressions from simple real world situations	<i>How can I make something real into something with numbers?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.481-486
20	Order of Operations	7	To compute numerical operations in the correct order to obtain an accurate result	<i>Why is it important to know which operations to do first and next?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.487-492
21	Converting words to numerical expressions	7	To convert words directly into numerical expressions	<i>How can I make words speak math to me?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.493-498
22						<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.499-506

Grade level: 5

Subject: Math

Unit #: 2

Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
23	Numerical expressions form words	7				<ul style="list-style-type: none"> Review Assessment 	
24	Geometric patterns	7	To continue the pattern established by a series of geometric figures			<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.507-512
25	Numerical patterns	7	<ul style="list-style-type: none"> To continue the pattern established by a series of numbers To determine the expression that will yield the continuing pattern 	<i>How can I predict what will come from what I've seen?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.513-518
26	Map reading		To find locations on a map by using a grid	<i>How can a grid help me finds things on a map?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.519-524
27	Ordered pairs		To identify the x and y coordinates for a position on a grid or map	<i>How can using numbers for a position on a map help me locate things?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.525-530
28	Movement patterns		To identify the constant of change and the next points	<i>How can I predict where something is going to be from what I know about where it has been?</i>		<ul style="list-style-type: none"> Lesson Guided practice Independent practice i-Ready 	MyMath p.531-536
29	Patterns	7	To determine areas of weakness and make improvement	<i>What do I need to know better?</i>		<ul style="list-style-type: none"> Differentiated intervention as appropriate Review practice Independent practice i-Ready 	MyMath p.537-540
30	Patterns	7				<ul style="list-style-type: none"> Review Assessment 	

Grade level: 5		Subject: Math			Unit #: 2		
Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
<u>Word Wall Candidates</u>							
	Attribute		Triangle	Acute	Obtuse		Right
	Scalene		Isosceles	Equilateral	Triangular prism		Rectangular Prism
	Parallelogram		Rhombus	Rectangle	Square		Pentagon
	Hexagon		Octagon	Polygon	Unit Cube		Volume
	Vertex		Edge	Face	Congruent		Net
	Composite		Base	Evaluate	Order of operations		Numerical expression
	Sequence		Ordered pair	Coordinate plane	Origin		X-coordinate Y-coordinate
<u>Authentic Application</u>							
	Your Goal: Design a new school						
	Your Role: You have been selected as the chief architect and design planners. You must design and draw up a design for the new school. It's all up to you! You must work as a team with your group to make the new design.						
	Your Audience: The Board of Trustees who will make the decision to select a design.						
	The Situation: Because it will be too small, the school is set to be demolished next summer. The new school will be built on a site just a few minutes from here. But what should it look like? How big should it be? How many classrooms should it have? What shape should they be? How will they all fit together?						
	Your Product: You will design a school building that will be able to hold two classes for each, Grades K to 8, a library, a cafeteria, a gymnasium, and all the other rooms a school needs. You do the research. You will draw it on paper with dimensions for each side and compute the volume by finding the volume of each area in your composite figure.						
	Success Criteria: Scored on a scale of 1 (Least) to 4 (Most): Does your school have all the rooms it needs? Is your school design drawn neatly? Are the rooms big enough for students to use? Are the dimensions shown on the design? Is the total area computed correctly and displayed on the design?						