

Grade 5				
Unit <b>3.3</b>	Unit Title <b>Measuring Volume Using Concrete Models</b>	Lesson <b>1 of 2</b>	Day <b>1 – 5</b> <b>(may take fewer days)</b>	
<b>Lesson Focus</b>				
1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question	
<b>5.MD.4</b> Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	<ul style="list-style-type: none"> <li>Define volume as an attribute of solid figures.</li> <li>Measure volumes by counting unit cubes.</li> <li>Estimate volume by using improvised units, such as toothpastes boxes.</li> </ul>	<b>SMP2</b> Reason abstractly and quantitatively. <b>SMP4</b> Model with mathematics.	<ul style="list-style-type: none"> <li>How can you use an everyday object to estimate the volume of a rectangular prism?</li> <li>What is the difference in volume between the two structures you constructed?</li> <li>How you can find the volume of an open box? In general, which shaped box has the greatest volume?</li> </ul>	
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials	
Understand the concept of volume.	Unit cubes Cubic cm Cubic in Cubic ft Improvised units Volume	Miscounting the number of cubes or units because they are difficult to see in illustration.	<b>OnCore</b> Lesson 89 Student pages 177 & 178 <b>K-5 Math Resources</b> <a href="#"><u>3D Structures</u></a> (See Investigations Unit 2 Quick Images ) <a href="#"><u>Four Open Boxes</u></a> (Similar to Maximum Volume Task below) <b>Portfolio Tasks</b> <i>Maximum Volume Tier 1 &amp; 2</i> <i>Nikimoto Pearl Company</i>	
<b>Instruction</b>				
9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)			
Teachers will guide students to define volume as an attribute of solid figures, measure volumes by counting unit cubes. They will help students to estimate volume by using improvised units, such as toothpaste boxes. Teachers may utilize the OnCore Lessons, K- 5 Math Resources , and the portfolio tasks that are provided. They will notice that the K-5 Math Resource <i>3D Structures</i> is similar to the Investigations Unit 2 <i>Quick Images</i> and the <i>Four Open Boxes</i> relates to the portfolio task <i>Maximum Volume</i> .	Students will understand and define volume as an attribute of solid figures. They will measure volume by counting unit cubes, labeling their results as cubic cm, cubic in, or cubic ft depending on the situation. Students will estimate the volume of a container by using improvised units, like toothpaste boxes.			

**Lesson Alignment Guide – Mathematics**  
**Cranston Public Schools**

Grade 5			
Unit <b>3.3</b>	Unit Title <b>Measuring Volume Using Concrete Models</b>	Lesson <b>2 of 2</b>	Day <b>6 – 10</b> <b>(may take fewer days)</b>
<b>Lesson Focus</b>			
1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p><b>5.MD.5</b> 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 would be found by multiplying the edge lengths, equivalently by multiplying the area of the base by the height. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.</p>	<ul style="list-style-type: none"> <li>Find the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes.</li> <li>Find the volume of the same rectangular prism by multiplying the edge lengths.</li> <li>Understand that you will find an equivalent volume measure for the same rectangular prism by multiplying the area of the base by the height. Knowing the area of the base .</li> <li>Multiplication of three whole numbers can be represented using the associative property.</li> </ul>	<b>SMP2</b> Reason abstractly and quantitatively. <b>SMP4</b> Model with mathematics. <b>SMP6</b> Attend to precision.	<ul style="list-style-type: none"> <li>How can you find the volume of a right rectangular prism using unit cubes?</li> <li>How can you find the volume of a right rectangular prism by multiplying the side lengths?</li> <li>How can you find the volume of a right rectangular prism if you know the area of its base?</li> <li>Why do you express volume in cubic units?</li> <li>Can you explain how the associative property may help you multiply three whole numbers?</li> </ul>
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> <li>Use unit cubes to build rectangular prisms.</li> <li>Multiply whole numbers.</li> <li>Calculate the area of a rectangular polygon.</li> </ul>	Right rectangular prism Unit cube Cubic units Associative property Base Area	The tallest container always has the greater volume.	<b>OnCore</b> Lesson 90 Student pages 179 & 180 <b>Investigations</b> Unit 2 SAB pg. 43 <b>NCTM Illuminations</b> <a href="http://illuminations.nctm.org/activitydetail.aspx?id=6">http://illuminations.nctm.org/activitydetail.aspx?id=6</a>
<b>Instruction</b>			
9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)		
Teachers will guide students to understand that they can find the volume of a right rectangular prism (with whole number side lengths) by packing it with cubes, by multiplying the edge lengths, and most importantly in this unit that if they know the area of the base ( or how many cubes fill the base) then they can find the volume by filling the prism with layers equivalent to the area of the base and adding the number of layers or multiplying the area of the base (number of cubes) by the number of layers. This is an introduction to the formula, which is used in next unit.	Students will develop an understanding of how to find the volume of a right rectangular prism as they begin to understand how the formula for volume (which is used in the next lesson) was developed. They will calculate volume by adding the number of cubes, multiplying the side lengths and most importantly understand that they can find the area of the base (by multiplying or adding the cubes) and multiply that area ( bottom layer) by the number of layers it takes to fill the prism.		

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