

## Grade 5

<b>Unit</b>  <b>3.4</b>	<b>Unit Title</b> <b>Measuring Volume Using Formulas</b> <b>Fluently Multiply Multi-digit Whole Numbers ..</b>	<b>Lesson</b>  <b>1 of 3</b>	<b>Day</b>  <b>1 - 3</b>
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### Lesson Focus

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><b>b.</b> Apply the formula <math>V = l \times w \times h</math> and <math>V = b \times h</math> 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>	<ul style="list-style-type: none"> <li>•Understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying the dimensions.</li> <li>•Use a formula to find the volume of a rectangular prism.</li> <li>•Relate multiplication and addition to finding the volume of a rectangular prism.</li> <li>•Understand the relationship between the two volume formulas <math>V = b \times h</math> and <math>V = l \times h \times w</math>.</li> </ul>	<ul style="list-style-type: none"> <li>•<b>SMP2</b> Reason abstractly and quantitatively.</li> <li>•<b>SMP4</b> Model with mathematics.</li> <li>•<b>SMP7</b> Look for and make use of structure.</li> </ul>	<ul style="list-style-type: none"> <li>•What is the relationship between finding the volume of a rectangular prism using unit cubes and multiplying the dimensions?</li> <li>•How can you use a formula to find the volume of a rectangular prism?</li> <li>•What is the relationship between <math>V = b \times h</math> and <math>V = l \times w \times h</math>?</li> <li>•How can you use the strategy <i>make a table</i> to compare the volumes?</li> </ul>
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> <li>•Understand the concept of volume.</li> <li>•Use a formula to find the area or a rectangle.</li> <li>•Multiply whole numbers.</li> </ul>	<p>Area Volume Formula</p>	<p>Not labeling cubic units. Understanding the difference between mass, weight and volume. Volume being the amount of space a 3-D object takes up.</p>	<p><b>OnCore</b> Lesson 91 &amp; 92 Student pages 181-184 <b>K-5 Math Resources</b> <a href="#"><u>Ordering Rectangular Prisms by Volume</u></a> <a href="#"><u>Designing a Toy Box</u></a> <a href="#"><u>Designing a Cereal Box</u></a></p>

### Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide students to understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying the dimensions. They will help students to relate multiplication and addition to finding the volume. Teachers will provide real world problem solving tasks that make use of both volume formulas. Using both volume formulas (<math>V = l \times w \times h</math> or <math>V = b \times h</math>) will guide students to understand the relationship between the two. Teachers have available the OnCore lessons 91 &amp; 92 or K-5 Math Resources listed to help students master this concept.</p>	<p>Students will understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying dimensions. They will solve real world problems using the volume formulas (<math>V = l \times w \times h</math> or <math>V = b \times h</math>) and through this problem solving understand the relationship between the two formulas. Students will practice this concept using materials provided by the classroom teacher. Which may include the OnCore student pages 181 – 184 or the K-5 Math Resource activities.</p>

Grade 5			
Unit	Unit Title	Lesson	Day
3.4	Measuring Volume Using Formulas Fluently Multiply Multi-digit Whole Numbers ..	2 of 3	4 - 7
Lesson Focus			
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><b>c.</b> Recognize volume as additive. Find volume 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>	<ul style="list-style-type: none"> <li>•Calculate the volume of solid figures composed of non-overlapping (composite) right rectangular prism.</li> <li>•Determine the volume in cubic centimeters of real world applications.</li> <li>•Understand how the dimensions of a box change as the volume changes (doubles or halves). Or you double or half just one</li> </ul>	<ul style="list-style-type: none"> <li>•<b>SMP2</b> Reason abstractly and quantitatively.</li> <li>•<b>SMP4</b> Model with mathematics.</li> <li>•<b>SMP7</b> Look for and make use of structure.</li> </ul>	<ul style="list-style-type: none"> <li>•How do you calculate the volume of non-overlapping (composite) right rectangular prisms?</li> <li>•How would you find the volume “a real world problem solving example”?</li> <li>•What happens to the volume of a box when all the dimensions double? Or all dimensions are halved ?</li> <li>•What could the dimensions of a 2 x 2 x 3 box be if you want the volume of the box to be double the size?</li> </ul>
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Understand and correct use the formulas for volume.	Non-overlapping Composite	Expect the volume to double if you double all the side lengths or equal half if you half the side lengths.	<p><b>OnCore</b> Lesson 93 Student Pages 185 &amp; 186</p> <p><b>Investigations</b> Snap-ins Unit 2 Session 1.5A Student pages C9-13 Unit 2 Session 2.4A Assessment Student pages C14 – 19</p>

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## ***Instruction***

### **9. Instruction Practices (What are the teachers doing)**

Teachers will guide students to calculate the volume of solid figures composed of non-overlapping (composite) right rectangular prism. They will provide real world applications for the students to determine the volume in cubic centimeters. Teachers will provide examples that will lead students to understand how the volume of a box will change when the dimensions are doubled or halved and how the dimensions of a box would change if you want the volume to be double in size using the Investigations Snap-in materials. Teachers may also use OnCore Lesson 93.

### **10. Learning Practices (What are the students doing)**

Students will calculate the volume of solid figures composed of non-overlapping (composite) right rectangular prisms. They will solve real world applications and determine the volume in cubic centimeters. They will practice this concept using both the OnCore and Investigations materials. Students will understand how the volume of a box will change when the dimensions are doubled or halved and how the dimensions of a box would change if you want the volume to be double the size using the Investigations Snap-in materials.

<b>Grade 5</b>			
<b>Unit 3.4</b>	<b>Unit Title Measuring Volume Using Formulas Fluently Multiply Multi-digit Whole Numbers ..</b>	<b>Lesson 3 of 3</b>	<b>Day 8 - 10</b>
<b>Lesson Focus</b>			
1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.	<ul style="list-style-type: none"> <li>Show fluency in multiplication of multi-digit whole numbers using the standard algorithm.</li> </ul>	<ul style="list-style-type: none"> <li>SMP2 Reason abstractly and quantitatively.</li> <li>SMP7 Look for and make use of structure.</li> </ul>	<ul style="list-style-type: none"> <li>How does understanding place value help you in using the standard algorithm?</li> <li>What strategies would you use to help you determine what the largest product or smallest product would be if given 4 single digits?</li> </ul>
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Fluently multiply single digit numbers.	Place value Standard algorithm	<ul style="list-style-type: none"> <li>Incorrectly regrouping.</li> <li>Incorrectly lining up numbers.</li> </ul>	<b>Worksheets/Problems</b> Developed by the teacher. <b>K-5 Math Resources</b> <a href="#"><i>Make the Largest Product</i></a> <a href="#"><i>Make the Smallest Product</i></a> <b>Envision</b> Enrichment 7.4A <i>Slippery Digits</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 show fluency in multiplication of multi-digit whole numbers using the standard algorithm. The few materials provided will help the teachers know if the student has understanding, but practice examples with the algorithm will need to be provided by the teacher. This standard has been practiced throughout the year, and teachers may find that not ALL students will be considered fluent by the end of the year, some will need interventions through the end of the year.		Some students will show fluency in multiplication of multi-digit whole numbers using the standard algorithm. Other students may need continued intervention to become fluent with the algorithm by the end of the year. The materials provided will help the teachers know how the students are progressing with their understanding of multiplication but the students will need to be provided with practice examples to show their fluency with the algorithm.	

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