UNIT 1 PLANNING OPTION

5TH GRADE

WHOLE NUMBER PLACE VALUE & OPERATIONS; VOLUME

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Identify Essential Questions

1. *How are place value patterns repeated in numbers?*
2. *How can place value help me multiply and divide?*
3. *How do I solve real-world problems involving volume?*

Clarify Standards

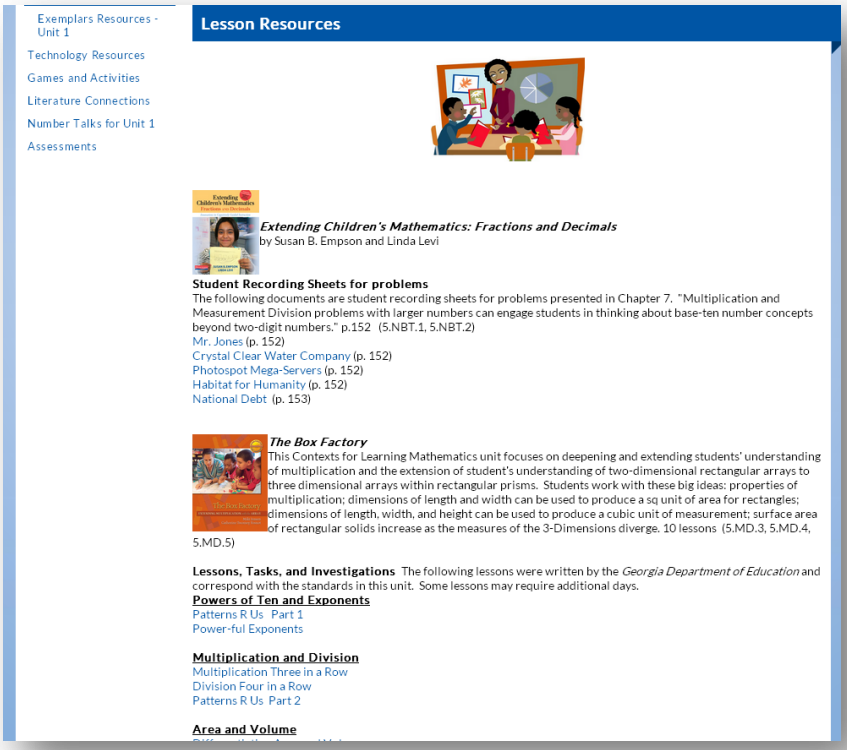
- Read overview of year to see progression of standards throughout the year
- Vertical alignment:
    - Progression Documents
    - Instructional Strategies
    - ECM book
    - 4^{th} Grade
        - Solve equations involving all four operations (throughout 4.OA and 4.NBT)
        - Interpret multiplication as comparison situation (4.OA.1)
        - Find all factor pairs for numbers up to 100 (4.OA.4)
        - Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right (4.NBT.1)
        - Write and expanded form and number name (word form) for multi-digit whole numbers (4.NBT.2)
        - Solve problems using place value (4.NBT.4, 4.NBT.5)
        - Multiply a four-digit number by a one-digit number (4.NBT.5)
        - Multiply two two-digit numbers (4.NBT.5)
        - Find whole number quotients with remainders for up to 4-digit divisors and 1-digit dividends (4.NBT.6)
- Content Emphasis
    - Use parentheses, brackets, and braces to evaluate expressions (5.OA.1)
    - Interpret numerical expressions without calculating them (5.OA.2)
    - Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left (5.NBT.1)
    - Explain patterns of a product when multiplying by a power of 10 with whole numbers (5.NBT.2)
    - Fluently multiply multi-digit numbers using standard algorithm (5.NBT.5)
    - Solve for whole number quotients with remainders of up to four-digit divisors and up to 2-digit dividends (5.NBT.6)
    - Recognize volume (5.MD.3)
    - Measure volume by filling and counting cubes (5.MD.4)
    - Relate volume to multiplication and division (5.MD.5) by finding volume of rectangular prism (5.MD.5a), applying volume formulas (5.MD.5b), and determine the volume of shapes that are composed of combined rectangular prisms (5.MD.5c)
- Look for “Big Ideas” and Coherency within standards
    - Placed standards together so teachers can develop lesson plans and assess more than one standard at a time
        - 5.NBT.1 and 5.NBT.2
        - 5.MD.3, 5.MD.4, and 5.MD.5

Divide the Unit & Distribute Standards

(Answer Essential Questions)

Week	Standards	Structure/Resource Type
1	5.NBT.1 A digit in one place represents 10 times as much… 5.NBT.2 Explain patterns in number of zeros when multiplying by powers of 10 5.NBT.5 Fluent multiply multi digit numbers pushing strategies 5.OA.1 Use parentheses, brackets, or brace 5.OA.2 Write simple expressions	• Push strategies using base 10 (multiplication) • ECM problems (# in each group is a multiple of 10) • Number Talks and problem discussion • Look online at unit resources and choose those related to the standards being taught each week.
2	5.NBT.1 A digit in one place represents 10 times as much… 5.NBT.2 Explain patterns in number of zeros when multiplying by powers of 10 5.NBT.6 Find whole number quotients 4 digit by 1 digit 5.OA.1 Use parentheses, brackets, or braces 5.OA.2 Write simple expressions	• Push strategies using Base 10 (measurement division) • ECM measurement division problems (number in each group is a multiple of 10) • Number Talks and problem discussion • Look online at unit resources and choose those related to the standards being taught each week.
3	5.MD.3 Cubic Units 5.MD.4 Counting Cubic Units 5.MD.5 Connecting packing to the formula 5.OA.1 Tie to 5.MD.5 Through use of properties of operations 5.OA.2 Tie to 5.MD.5 through use of properties of operations	• Look online at unit resources and choose those related to the standards being taught each week. https://grade5commoncoremath.wikispaces.hcpss.org/Grade+5+Home http://www.engageny.org/resource/grade-5-mathematics

Gather and Study Resources



Exemplars Resources - Unit 1
Technology Resources
Games and Activities
Literature Connections
Number Talks for Unit 1
Assessments

Lesson Resources

Extending Children's Mathematics: Fractions and Decimals
by Susan B. Empson and Linda Levi

Student Recording Sheets for problems
The following documents are student recording sheets for problems presented in Chapter 7. "Multiplication and Measurement Division problems with larger numbers can engage students in thinking about base-ten number concepts beyond two-digit numbers." p.152 (5.NBT.1, 5.NBT.2)
Mr. Jones (p. 152)
Crystal Clear Water Company (p. 152)
Photospot Mega-Servers (p. 152)
Habitat for Humanity (p. 152)
National Debt (p. 153)

The Box Factory
This Contexts for Learning Mathematics unit focuses on deepening and extending students' understanding of multiplication and the extension of student's understanding of two-dimensional rectangular arrays to three dimensional arrays within rectangular prisms. Students work with these big ideas: properties of multiplication; dimensions of length and width can be used to produce a sq unit of area for rectangles; dimensions of length, width, and height can be used to produce a cubic unit of measurement; surface area of rectangular solids increase as the measures of the 3-Dimensions diverge. 10 lessons (5.MD.3, 5.MD.4, 5.MD.5)

Lessons, Tasks, and Investigations The following lessons were written by the *Georgia Department of Education* and correspond with the standards in this unit. Some lessons may require additional days.
Powers of Ten and Exponents
Patterns R Us Part 1
Power-ful Exponents

Multiplication and Division
Multiplication Three in a Row
Division Four in a Row
Patterns R Us Part 2

Area and Volume

5th Math, Unit1 (3 weeks) Whole Number Place Value & Operations; Volume

Unit 1: Instructional Strategies and Background Knowledge for 5th Grade Math CCSS

Students will build on their work from Fourth grade **using various strategies based on place value to multiply and divide multi-digit whole numbers**. Students will only be scored on **four digits by one digit** in first quarter. They will continue to use these different strategies (i.e. area model, base ten model, array, etc.) throughout the year to solidify their understanding until the standard algorithm is applied in the fourth quarter. Students will **experience finding volume** of rectangular prisms and understand concepts related to volume. Notation for finding volume will develop from these experiences.

How are place value patterns repeated in numbers? How can place value help me multiply and divide? How do I solve real-world problems involving volume?

Week 1	Monday	Tuesday	Wednesday	Thursday	Friday
# Talks that push fluency	During # talks you will want to use the area model, rectangular arrays and base 10 models, # talks . You will also want to focus on the power of 10. You will want students to use the notation of finding volume **5.NBT.5 Use area model rectangular arrays, and base 10 models** **5.OA.1 5.OA2** Resource Guide for using *Number Talks* in Unit 1 Supplemental Number Talks for Unit 1 Number Talks Resources for 3rd-5th Grades				
Standards/MP	**5NBT1 (2,7),** 5NBT2 (2,7), 5NBT5 (F), 5OA1 (7), 5OA2 (7)				
Goal and Task: *4-digit by 1-digit multiplication problems with multiples of 10 in each group. *Build order of operation through discussion and Minds on Math	I use my understanding of place value understanding to solve problems. I see patterns when I multiplying by multiples of 10.				
Lesson	(4 x 100) (25 X 100) (258 x 100)	(8 x 1000) (26 X 1000) (478 X 1000)	(36,000 x 10) (30,450 x 10) (14,560 X 100)	Foldable for exponents 100 x 100 1000 x 1000 $10^3 \times 10^5$ $10^2 \times 10^4$ $3 \times 10^3 \bigcirc 4 \times 10^2$ $4 \times 10^4 \bigcirc 7 \times 10^5$	9×10^3 720×10^4 4025×10^3 $10^4 = 40000$
Fluency/ Assessment	**5.NBT.5** Make the Largest Product Make the Smallest Product **5.NBT.2** Multiplying a Whole Number by a Power of 10 Dividing a Whole Number by a Power of 10 ***Assessment of learning***				

Make or Locate Summative Assessments

1. The following equations involve different quantities and use different operations, yet produce the same result. Show and explain why this is true.

   $413 \times 10^2 = 41300$ $4{,}130{,}000 \div 10^2 = 41300$

2. Solve the equations below.

   a. $423 \div 7 =$_____ b. $1225 \div 6$ _____

   Explain how estimation will help check the reasonableness of your answers.

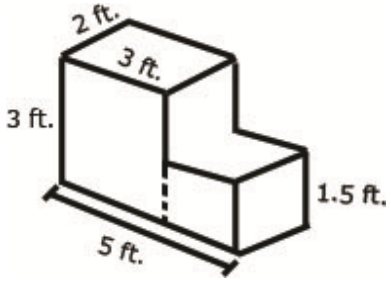
   c. $423 \div 7 =$_____ d. $1225 \div 6$ _____

3.

a. A rectangular container that has a length of 30 cm, a width of 20 cm, and a height of 24 cm. Calculate the volume and label in cubic units.

b. The rectangular container from Part A is filled with water to a depth of 15 cm. When an additional 6.5 liters of water is poured into the container, some water overflows. How many liters of water overflow the container? Use words, pictures, and numbers to explain your answer. **(Remember 1 cm^3 = 1 mL.)**

4. Calculate the volume and label in cubic units. Write and explain your work using equations



A Progression Toward Mastery				
Assessment Task Item and Standards Assessed	**STEP 1 Little evidence of reasoning without a correct answer. (1 Point)**	**STEP 2 Evidence of some reasoning without a correct answer. (2 Points)**	**STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer. (3 Points)**	**STEP 4 Evidence of solid reasoning with a correct answer. (4 Points)**
1 **5.NBT.1** **5.NBT.2**	The student is unable to provide a correct response.	The student attempts but is not able to accurately show or explain reasoning fully.	The student correctly shows but does not show full reasoning, or explains reasoning fully. Work may not match explanation	The student correctly: ▪ Shows movement of digits. ▪ Explains movement of units to the left for multiplication and movement of units to the right for division.
2 **5.NBT.1** **5.NBT.2** **5.NBT.6**	The student is unable to solve and estimate either the dividend or the divisor to a one-digit fact.	The student solves and estimates the dividend and divisor, but not to a one-digit fact.	The student correctly solves and estimates to a one-digit fact for either Part (a) or Part (b).	The student correctly solves and estimates both Part (a) and Part (b) to a one-digit fact. Solve a and b. Estimate c and d. a. 60 R 3 b. 204 R 1 c. 420 ÷ 7 = 6 d. 1200 ÷ 6 = 200
3 A & B **5.MD.3** **5.MD.5**	The student is unable to find the volume of the water that has overflowed and is unable to explain the reasoning used.	The student finds the volume of the water that has overflowed, but is unable to explain the reasoning used.	The student makes a calculation error in finding the volume of the water that has overflowed, but is able to clearly explain the reasoning used.	The student finds the volume of the water that has overflowed to be 1.1 L and uses words, numbers, and pictures to clearly explain the reasoning used.
4 **5.MD.4** **5.MD.5**	The student is unable to find the volume and write the equation	The student can to find the volume but and not write the equation	The student makes a calculation error in finding the volume, but is able to write the equation	The student finds the volume and writes the correct equation

Plan for Formative Assessment & Feedback

Things to Remember about Assessment and Feedback:

- Starts with a goal.
- Plan for feedback.

Items That Can Be Used for Formative Assessment:

- Scoring guides
- ECM Strategy Level Charts
- Classroom Work
- Fluency Interviews

Types of Feedback:

- Expert feedback (teacher given)
- Clarifying feedback from peers (discussion, pair-share, cooperative learning)
- Reflective feedback from self (self-scoring)
- Listening in feedback (discussion)

Plan for Daily Lessons