Unit 1 - *Expressions, Equations and Volume*

Overview

In this unit, students use the study of volume to review and extend a host of skills and concepts related to multiplication. Students investigate a scenario in which they find different ways to arrange 24 cubes into a rectangular prism. These prompts a deep look at the associative and commutative properties of multiplication as students use expressions with parenthesis to represent different rectangular prisms. Students develop major multi-digit multiplications strategies to solve real world and mathematical problems in elegant and efficient ways. The link between multiplication and division is revisited through the lens of the area model and extended into dividing 3-digit and 2-digit numbers. In addition, as a precursor to unit 2, students will be introduced to the money model with fractions while solving problems of the day.

21st Century Skills: Analyzing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 1 Make sense of problems and persevere in solving them
MP3 Construct viable arguments and critique the reasoning of others
MP5 Use appropriate tools strategically
MP6 Attend to precision

Write and interpret numerical expressions.
CCSS.MATH.CONTENT.5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

CCSS.MATH.CONTENT.5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

Transfer:

Students will be able to independently use their learning in new situations to...

1. Draw conclusions about graphs, shapes, equations, or objects (analyzing)
2. Apply familiar mathematical concepts to a new problem or apply a new concept to rework a familiar problem.
3. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (analyzing)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Mathematicians apply the mathematics they know to solve problems occurring in everyday life.
2. Mathematicians continually evaluate their process and the reasonableness of the intermediate results.
3. Computation involves taking apart and

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

A. What math tools/models/strategies can I use to solve the problem?
B. How can I use what I know to help me find what is missing?
C. In what ways can numbers be composed and decomposed?

<table>
<tr>
<td rowspan="3">CCSS.MATH.CONTENT.5.MD.C.3.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.

CCSS.MATH.CONTENT.5.MD.C.5.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 height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

CCSS.MATH.CONTENT.5.MD.C.3
Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

CCSS.MATH.CONTENT.5.MD.C.3.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.

CCSS.MATH.CONTENT.5.MD.C.4
Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

CCSS.MATH.CONTENT.5.MD.C.5
Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</td>
<td>combining numbers using a variety of approaches.
4. Mathematicians clearly communicate their thinking and justify their decisions.</td>
<td>D. What is the best way to show my thinking?</td>
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<td colspan="2">Acquisition:</td>
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<td>Students will know…

1. the difference between an expression and an equation
2. how to calculate volume
3. the methods for multiplying multi-digit numbers
4. Vocabulary: equation, factor, multiple, expression, evaluate, volume, dimension, associative property of multiplication, commutative property of multiplication, quotient</td>
<td>Students will be skilled at…

1. interpreting numerical expressions without evaluating them
2. solving multiplication problems (two 2-digit numbers) using multiple methods
3. using strategies to solve multi-step expressions mentally.
4. dividing and interpreting the remainder
5. finding the volume of rectangular prism
6. finding the dimensions of a given volume
7. finding factors of whole numbers
8. evaluating expressions
9. writing expressions based on a written statement
10. solving for an unknown value to complete an equation
11. identifying factor pairs for a whole number between 1 and 100
12. solving multi-step story problems involving division with remainders</td>
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