5th Grade Unit 6: Geometry & Volume
A Real World Experience in Two Parts

5.G.B.3 Understand that attributes belonging to a category of two-dimensional figures that also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.
MP 3 I can construct viable arguments and critique the reasoning of others.
MP 4 I can look for and make use of structure.

Part One: Math in Poetry

As a way to share your ability to categorize geometric plane shapes, you will create a geometric poetry anthology with personally authored original poems complete with author's notes for each poem. In creating the anthology, you will explore various geometric shapes' attributes and classifications and covey your knowledge through poetry. This is your chance to experiment and play with language and math! Be creative! Have fun!

Task 1: Create a list of various topics that interest you. With each topic, generate words and/or phrases that you associate with these topics. During the unit, you can continue to add to this list and use this list to help you with different poetry topics.

Task 2: Create a list of various two-dimensional shapes. With each of the shapes you list, generate a list of attributes that you use to identify each shape and generate a list of categories that fit the shape. You will later use these notes to help you design your poetry structure and/or description. {Remember you can classify shapes by side attributes and/or angle attributes.}

e.g. square [four equal sides, each interior angles measure 90^o]:

- *quadrilateral because it has four sides*
- *parallelogram because it has two pairs of parallel sides*
- *rectangle because it is a parallelogram with each interior angle measuring 90^o*
- *rhombus because it is a parallelogram with equal sides*
- *square because it is a rhombus with each interior angle measuring 90^o*

Task 3: Draft several poems about several topics. Craft your poems into specific plane shapes, or craft poems about various plane shapes. For each poem, explain in an author's note how your poem can be categorized similarly to how plane figures are categorized. Show your diverse knowledge of geometric shapes and how to categorize geometric shapes based on several different attributes such as side length, side position, angle measure etc. Pay particular attention to the shapes you learned about in this unit that can fit into several categories. Your anthology can be centered on a specific theme or an eclectic collection of poems. You may produce the finished copy of each poem in a variety of formats including but not limited to handwritten, Microsoft WORD, Google DOC, Google DRAW, Google PRESENTATION, Google SITES, IBook etc.

Task 4: Assemble your anthology with you poems in published form. Make sure that there is a complete and accurate Author's note with each poem. Self evaluate your anthology using the rubric and attach it to the last page of your anthology.

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5. MD.C.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
MP 1 I can make sense of problems and preserve in solving them.
MP 5 I can use appropriate tools strategically

Part Two: Creating A Container

Your class has many math manipulatives such as fraction bars, pattern blocks, counters, colored tiles, etc. In order to maintain this valuable resource, the manipulatives need adequate storage. You will design a storage box to hold the manipulatives so that these supplies are accessible for use during math class. It is important to know the volume of the container so that you can be assured that all the manipulatives fit into the container. Since you are learning how to calculate the volume of a rectangular prism specifically, you will design the container in any useful shape as long as the component parts of the container are rectangular prisms.





Task 5: Look at the Base Ten Blocks in your classroom, measure in centimeters (cm) the length, width, and height of a unit block in the set.

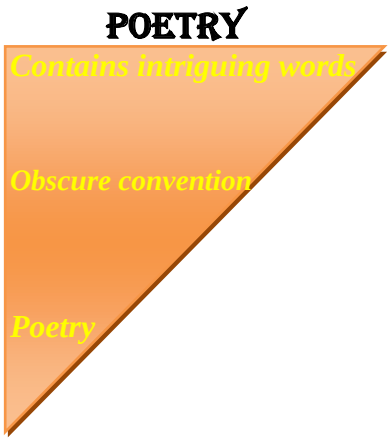
Next, view the various math manipulatives in your classroom. Using the unit blocks, estimate the volume in cm^3 of each type of manipulative. Create a chart/table to keep track of this information.

Task 6: Calculate the approximate total volume of all the manipulatives you have in the class in terms of cubic centimeters (cm^3).

Next, draft a design for the container that will hold all of the manipulatives. It may be helpful to use grid paper when you are drafting the design. Remember, your design can be a rectangular prism or an irregular figure that you can decompose into rectangular prisms.

Task 7: Finalize your design. Label the length, width, and height of the component rectangular prisms. Calculate and label the volume of the component prisms. Calculate and label the total volume of the container you designed.

Math in Poetry *(sample poems)*



Author's note: This is a right isosceles poem titled Poetry. I consider it a right isosceles poem because there is the same number of words in the first line as there is number of lines in the poem. Like an isosceles triangle, two of the three sides of the poem are "equal." In addition, two of the sides of the poem are perpendicular and form an angle that measures 90° like a right triangle.

SQUARE

Four equal side lengths

But, is a ***square***

Four equal angle measures

Could be a rectangle

Author's note: This is a square poem titled Square. I consider it a square poem because like a square each line or side has four words ("equal" length). Similarly, the adjacent lines or sides are perpendicular, and the opposite lines or sides are parallel like squares. In addition, the poem contains the specific definition of a square.

Numbers by JoAnne Growney

One
added
forever,
joined by zero,
paired to opposites–
these build the integers,
base for construction of more
new numbers from old: ratios,
radical roots and transcendentals,
transfinite cardinals–conceptions bold!

Author's note: This scalene triangle poem develops the concept of numbers through increasing line lengths that builds a triangle with different side lengths like a scalene triangle.

Trapezoid

I think I'll ask my uncle Floyd,
About this shape called trapezoid,

He's the one that's good at shapes,
Like purple circles, oval grapes...
Squished up square shape,
Trapezoid!!!
A name that leaves my brain annoyed!!!

Why can't I learn this red shape's name?

It was Monday's,
Math class aim!
I can't remember trapezoid,
It leaves my brain in such a void…
Can it catch things like a trap! (trapezoid)

Can you wear it like a cap!

Flip it over- makes a boat,
In the water it might float!

Trapezoid, A shape unique!
A definition's what I seek!
So what's this shape called trapezoid?
Here are the words,
Of Uncle Floyd...
Floyd the master,
Of most math,
Pointed out,
The perfect path,
The math of shapes,
Geometry!
And guess what Floyd,
Said to me,
"Trapezoid, listen well, has 2 straight sides, parallel..."
That was it,
That was all,
8 short words,
Floyd had gall!
I couldn't help but feel annoyed,
By quadrilateral,
Trapezoid…

By: Mr. R

Author's note: This poem titled Trapezoid defines a trapezoid and develops a clever way to remember the attributes of a trapezoid. In addition, some of the stanzas are in the shape of a trapezoid.

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Part One: Math in Poetry Part Two: Create a Container

Extending	All of the meeting criteria *plus*: Anything above and beyond proficient criteria that enhances demonstration of mathematical understanding *(e.g. explaining shapes in relation to placement on a coordinate plane, designed and accurately calculated the volume of another type of three dimensional container etc.)*
Meeting	**Part One** Includes six different poems At least one poem about a trilateral shape At least one poem about a quadrangle shape Uses accurate mathematical language Uses accurate visual representation of geometric shapes Author's notes include accurate and complete understanding of the shapes' attributes Author's notes include accurate and complete understanding of the shapes' classifications **Part Two** Clear sketch of container Accurately label dimensions of the container on the sketch Accurately calculate Total Volume and label on the sketch
Developing	**Part One** Includes six different poems AND Is missing two of the other meeting criteria for part one **Part Two** One of the Meeting criteria for part two is missing or inaccurate
Beginning	**Part One** Includes less five or less different poems AND Is missing two of the other meeting criteria for part one **Part Two** Two or more of the Meeting criteria for part two are missing
Comments	