Geometry Review (Which is the Odd One Out?)

Lesson Overview

Students should have previously explored how to determine: 1) area of rectangles, parallelograms, triangles, and trapezoids; 2) volume of rectangular prisms, cubes, and triangular prisms; and 3) surface area of cubes, rectangular prisms, and square pyramids. This lesson is intended as a culmination of applying previous knowledge and assessing student understanding. Students work in groups to determine which figure in each row is the *Odd One Out*. The *Odd One Out* may be the only one in the row that is correct or it may be the only one in the row that is incorrect. Students may deconstruct figures into its parts, apply known formulas, and/or use notes and tablets to research needed information to assist with determining the *Odd One Out*.

Standards Addressed

CCSS   6.G.1   Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

CCSS   6.G.2   Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\,w\,h$ and $V = b\,h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

CCSS   6.G.4   Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Disciplinary Literacy Best Practices

Thumbs Up, Thumbs Down
Odd One Out
Muddiest Point

Lesson Plan

Time Required – Two 60 Minute Class Periods (Minimum)

(If completing the extend portion of the lesson, include 2 extra 60 min periods or more)

Disciplinary Vocabulary – Area, Surface Area, Nets, Volume, Rectangle, Triangle, Trapezoid, Parallelogram, Rectangular Prism, Square Pyramid, Base, Length, Width, Height

Materials Needed:

- Odd One Out Review Sheet
- Notebook paper
- Paper and Pencil
- Tablet (or other resource device students may wish to use)
- 3 Dimensional Figures with Accompanying Nets (optional but a useful tool for students who still need to see how nets correlate with figures)
- Post-it Notes or Note Cards (or scratch paper)

Assessment: Questioning during Odd One Out, Completed Odd One Out, Muddiest Point

Engage

o The teacher will first have students, individually, complete (in their math notebooks) the following problem: **Which figure has the greatest area? How do you know? Explain the relationship of the area of the triangle and parallelogram when the base and the height are the same.**

10ft | 10ft

12 ft | 12 ft
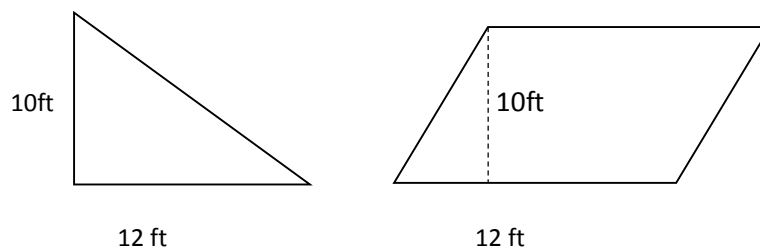
o The teacher will allow students to first work on this problem for a few minutes and monitor student work, asking probing questions while observing based on students' writing in notebooks.

o When time is called, ask who would like to share their thoughts about the opening problem. Once a student shares, whether it is an incorrect or correct response, ask the class quickly to show thumbs up if they agree, thumbs down if they disagree, and thumbs sideways if they are not sure. This gives a quick assessment of where everyone stands. Ask for more responses to the question if needed. Have students adjust responses in their notebooks and make notes if their initial answer was incorrect.

Explore

- o The teacher informs students that they will begin reviewing part of their geometry unit in groups by completing an "Odd One Out" assessment for Area, Surface Area, and Volume. As a group, students will determine their responses for the area, surface area, and volume for each of the figures in the row. The "Odd One Out" may be the only one that is correct or the only one that is incorrect; therefore, they will need to determine their response for each figure in each row. (This is important because some students will stop once they find an incorrect answer.) Once each member in the group agrees on the Odd One Out, students circle it and write an explanation for why it is the Odd One Out. Students show their work within each box or on another sheet of paper. They may use each other, notes, tablets, etc to help them.
- o Assign students groups. Groups in the video were based on how students scored on a given assessment in geometry so that they were mixed ability level.
- o Monitor, observe, and question groups throughout the two-60 minute class periods (or more if needed).

Explain

- The teacher may need to explain to different groups how to deconstruct certain figures in order to determine their answer, even though they may have previously practiced such steps.
- Student groups will explain to other groups how they determined the Odd One Out and why.
- At the end of the lesson, the teacher will hand out post-it notes to each student for personal reflection time. Ask the students to reflect on their work over the last couple of days and write down what is the **muddiest point** for them (what are they struggling with the most) from the Odd One Out sheet. Students then place the post-it note on top of the Odd One Out and hand it in together as an exit ticket for that day.

Extend

- o Create an online learning environment for individual practice of needed areas using a tablet, computer, or other digital source through a tool such as Learn Zillion.org where teachers can personalize learning for each student. Base the personalization for each student on: 1) Observations and dialogue during completion of Odd One Out, 2) Completed Odd One Out, and 3) Muddiest Point – student self-assessment of what he/she knows is a weak area.

Teacher Reflections and Biographical Information

Initially, I created this lesson as a one day review for a 6th grade classroom. Students had already participated in multiple lessons which covered the standards listed above. The Odd One Out strategy was a tool to use for students to review the material. During the first day, I learned that students were struggling with the material and the lesson would take longer than one day. The nets and three-dimensional figures were helpful for students who still needed that concrete visual. Many times, students wanted to jump straight to that final formula they had learned during the unit; however, sometimes, it was best to take them back to deconstructing figures in order to solve. It was helpful for students to have tablets to use as a resource while working in their groups to determine how to solve each figure and find the Odd One Out; however, this also worked against them. They quickly learned that simply asking for a formula can be tricky because sometimes, they are written mathematically different, even though they may mean the same thing. For example, some had looked for area of a trapezoid and the first formula that was shown to them was written differently than what they had been introduced to. As a novice learner, this can be confusing for sixth grade students.

For the muddiest point, I had to ask for specifics – I told students that I didn't want to read that they were just struggling with area. I wanted to know area of what? Or volume of what? Some of them were specific as to say, I know how to do area of rectangles and triangles well but I have trouble when I have multiply decimals and fractions. These are the types of things that we, as teachers, need to know.
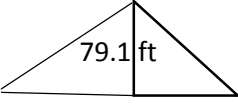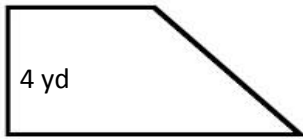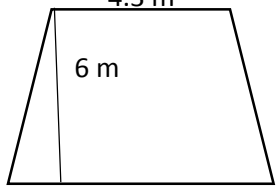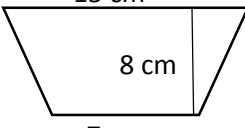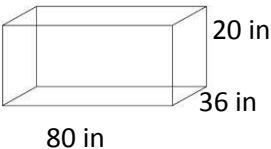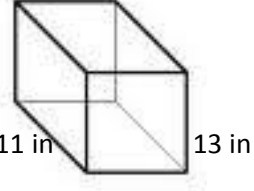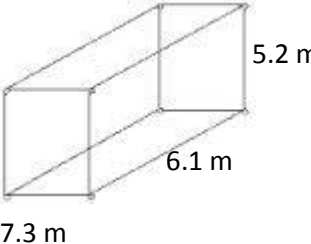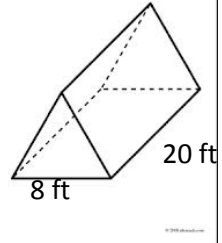
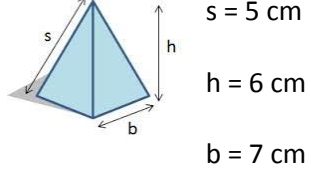Lesson Author:
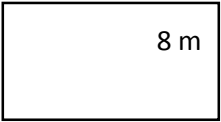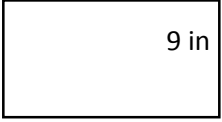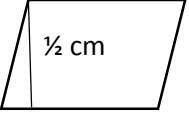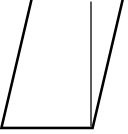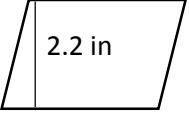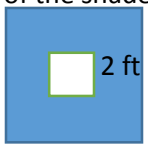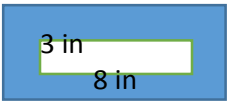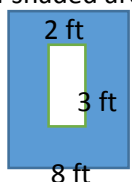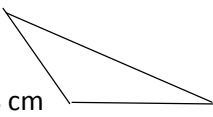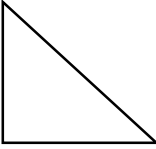
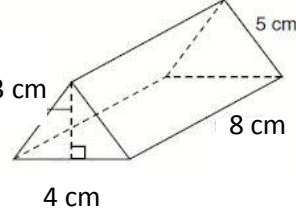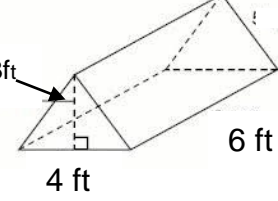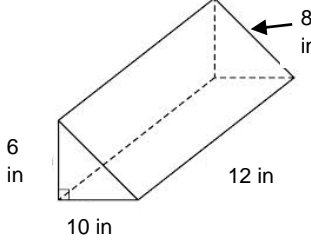Susie Teague, S2TEM Centers SC Education Specialist
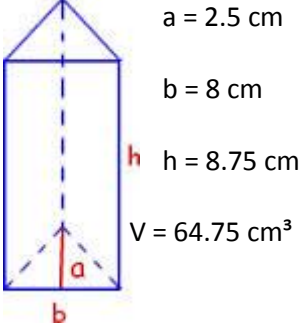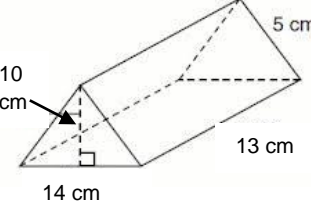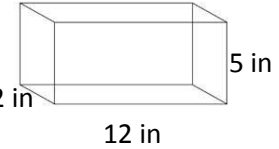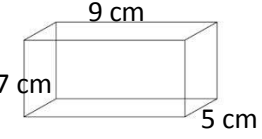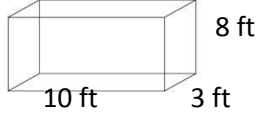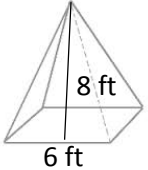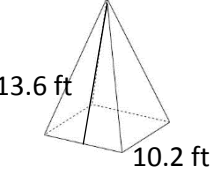
This lesson was written and filmed during the 2nd year of the IQMS Research Project.

Odd One Out: Review of Area, Volume, and Surface Area

Name: _____   Date: _____

Which one is the "odd one out?" Circle the answer that does not belong.			
			Explanation
13 m 8 m A = 104 m²	15 in 9 in A = 135 in²	3 ft 24 in A = 72 in²	
10 cm ½ cm A = 0.5 cm²	16 ft 18 ft A = 144 ft²	4.1 in 2.2 in A = 9.02 in²	
Area of the shaded area: 2 ft 14 ft A = 192 ft²	Area of shaded area: 3 in 25 in 8 in 38 in A = 926 in²	Area of shaded area: 2 ft 11 ft 3 ft 8 ft A = 94 ft²	
8 cm 12 cm A = 96 cm²	4 ½ yd 6 yd A = 13.5 yd²	79.1 ft 190 ft A = 7,514.5 ft²	
12.5 yd 4 yd 14 yd A = 53 yd²	4.3 m 6 m 10.5 m A = 88.8 m²	15 cm 8 cm 7cm A = 88 cm²	

20 in 36 in 80 in V = 57,600 in³	11 in 13 in 26 in V = 3,718 in³	5.2 m 6.1 m 7.3 m V = 2,315.56 m³	
20 ft 8 ft V = 640 ft³	a = 2.5 cm b = 8 cm h = 8.75 cm V = 64.75 cm³	5 cm 10 cm 13 cm 14 cm V = 910 cm³	
5 in 2 in 12 in SA = 120 in²	9 cm 7 cm 5 cm SA = 286 cm²	8 ft 10 ft 3 ft SA = 173 ft²	
8 ft 6 ft SA = 132 ft²	13.6 ft 10.2 ft SA = 381. 48 ft²	s = 5 cm h = 6 cm b = 7 cm SA = 126 cm²	
5 cm 3 cm 8 cm 4 cm SA = 108 cm²	3ft 6 ft 4 ft SA = 84 ft²	8 in 6 in 12 in 10 in SA = 156 in²	