**Domain: 6 RP Standard Code: 3d Teacher Name: John Paul Sorensen**

Adapted from: Smith, Margaret Schwan, Victoria Bill, and Elizabeth K. Hughes. “Thinking Through a Lesson Protocol: Successfully Implementing High-Level Tasks.”

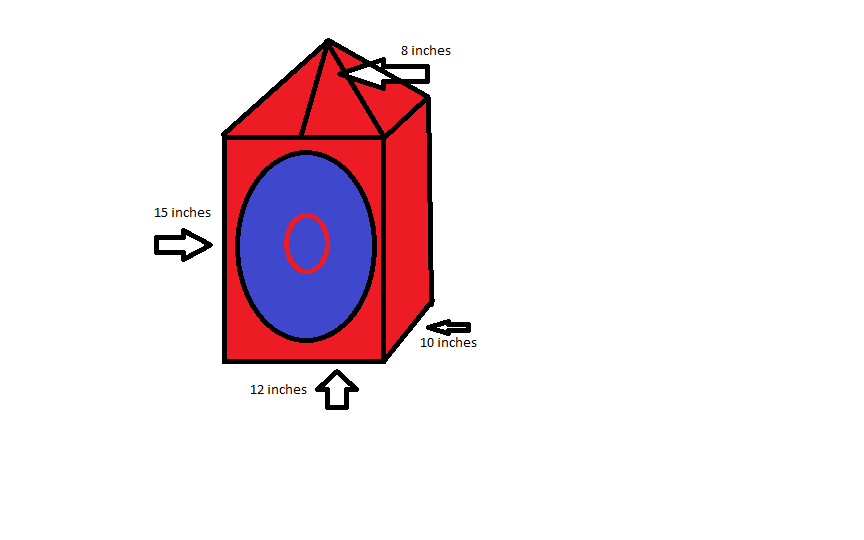
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| **PART 1: SELECTING AND SETTING UP A MATHEMATICAL TASK** | |
| What are your mathematical goals for the lesson? (i.e., what do you want  students to know and understand about mathematics as a result of this lesson?) | Students will be able to use proportions and ratios to solve real world problems about area of polygons  I will… solve real world problems using proportions and ratios.  This activity is designed to be used as a culminating activity to be used at the end of the unit on ratios. |
| * What are your expectations for students as they work on and complete this task? * What resources or tools will students have to use in their work that will give them entry into, and help them reason through, the task? * How will the students work—   independently, in small groups, or in pairs—to explore this task?   * How will students record and report their work? | Students will work together in small groups to solve these problems.  Materials that students may require:  Graph paper  Scratch paper  Rulers  Calculators  Highlighters  Colored writing implements  Brain Power!  Teacher materials: 6 RP 3d DisneyRR.pptx |
| How will you introduce students to the activity so as to provide access to *all*  students while maintaining the cognitive demands of the task? | Go over the power point together for the launch. The final page has the tasks. Remember to reveal them one at a time.   * An over enthusiastic tourist has broken into Disneyland and stolen a part of the E.P. Ripley, the oldest and most valuable of the Disney trains. It is built to 5:8 scale. They have taken the light off of the front. It is a rectangle with a pyramid on top. A new one must be built. The Imagineers have measured the box on the original full sized train. It measured thusly. * How wide should the new box be? * How big should the rectangles that make up the sides be? * How much metal will be required to build the new box? |

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| **PART 2: SUPPORTING STUDENTS’ EXPLORATION OF THE TASK** | |
| As students work independently or in small groups, what questions will you ask to—   help a group get started or make progress on the task?   focus students’ thinking on the  key mathematical ideas in the task?   assess students’ understanding of  key mathematical ideas, problem- solving strategies, or the representations?   advance students’ understanding  of the mathematical ideas? | Guiding questions:   * What are you being asked to do? * What units are you working with? * What do you already know? * What information are you missing? * What information is unimportant? * How could you find that information? * What would that look like? * Does this question require precision?   The teacher will be roaming around and gathering informal assessment data. If this activity is being used correctly, students should already possess the skills and strategies they need.  Deepen student understanding by insisting that they justify their thinking. After they have completed each task, ask if there are other possible ways of representing the data? |
| How will you ensure that students remain engaged in the task?   What assistance will you give or what questions will you ask a  student (or group) who becomes  quickly frustrated and requests more direction and guidance is  solving the task?   What will you do if a student (or group) finishes the task almost  immediately? How will you  extend the task so as to provide additional challenge? | To alleviate frustration:   * Could you draw a picture of that? * Which will be larger, the replacement or the original? * About how much larger do you think it will be? * What other tools could you use? * Could you use anything we have studied recently?   To extend?   * There is a model of the E.P. Ripley that is 1:40 scale to the original full size train. * How wide will the light box be on the small model? * If the model is 6 ½ feet long, how long was the original train?   For incredibly gifted students: What about the glass on the light box? |

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| **PART 3: SHARING AND DISCUSSING THE TASK** | |
| How will you orchestrate the class discussion so that you accomplish your mathematical goals?   Which solution paths do you want to have shared during the  class discussion? In what order will the solutions be presented? Why?   What specific questions will you ask so that students will—  1. make sense of the  mathematical ideas that you want them to learn?  2. expand on, debate, and question the solutions being shared?  3. make connections among the different strategies that are presented?  4. look for patterns?  5. begin to form generalizations?  What will you see or hear that lets you know that *all* students in the class  understand the mathematical ideas that  you intended for them to learn? | Order in which to let students share:   * Have someone show a picture of the box. * Have someone explain how they found the width. * Have someone show the area of the sides. * Have someone show the area of the whole figure. * Have students who did extension activities share their results.   See the solutions page below.  As a final activity, if there is time, have **every** student draw the new light box and label all of the dimensions. Have them highlight all of the dimensions that they understand. Have peers help to explain all unclear measurements. |

Possible solutions



Width = 5/8 = x/12

**Width = 7 ½ inches**

Sides 5/8 = h/15 = L/10

H = 9 3/8 L = 6 ¼

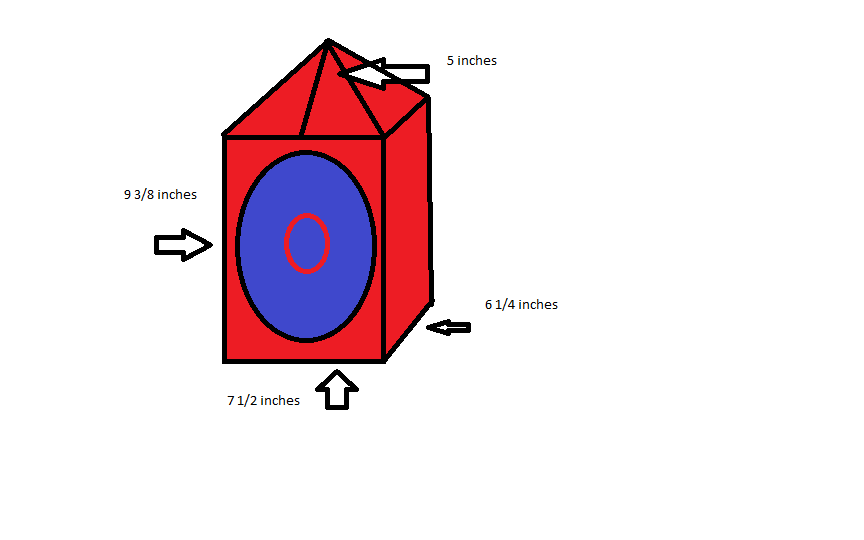
**Area of side = 58 19/32 square inches**

Area of whole with base: (7 ½ x 9 3/8 x 2) + (9 3/8 x 6 ¼ x 2) + (5 x 7 ½) + (5 x 6 ¼) + (7 ½ x 6 ¼) = a

Front/back Sides Ft Pyramid R Pyramid Base

**Area = 373.438 square inches**

**Extensions:**



To find the light box, divide all values by 40. Width = 0.1875 inches.

The real train is 260 feet long.

Good luck on the glass one, I have no idea.