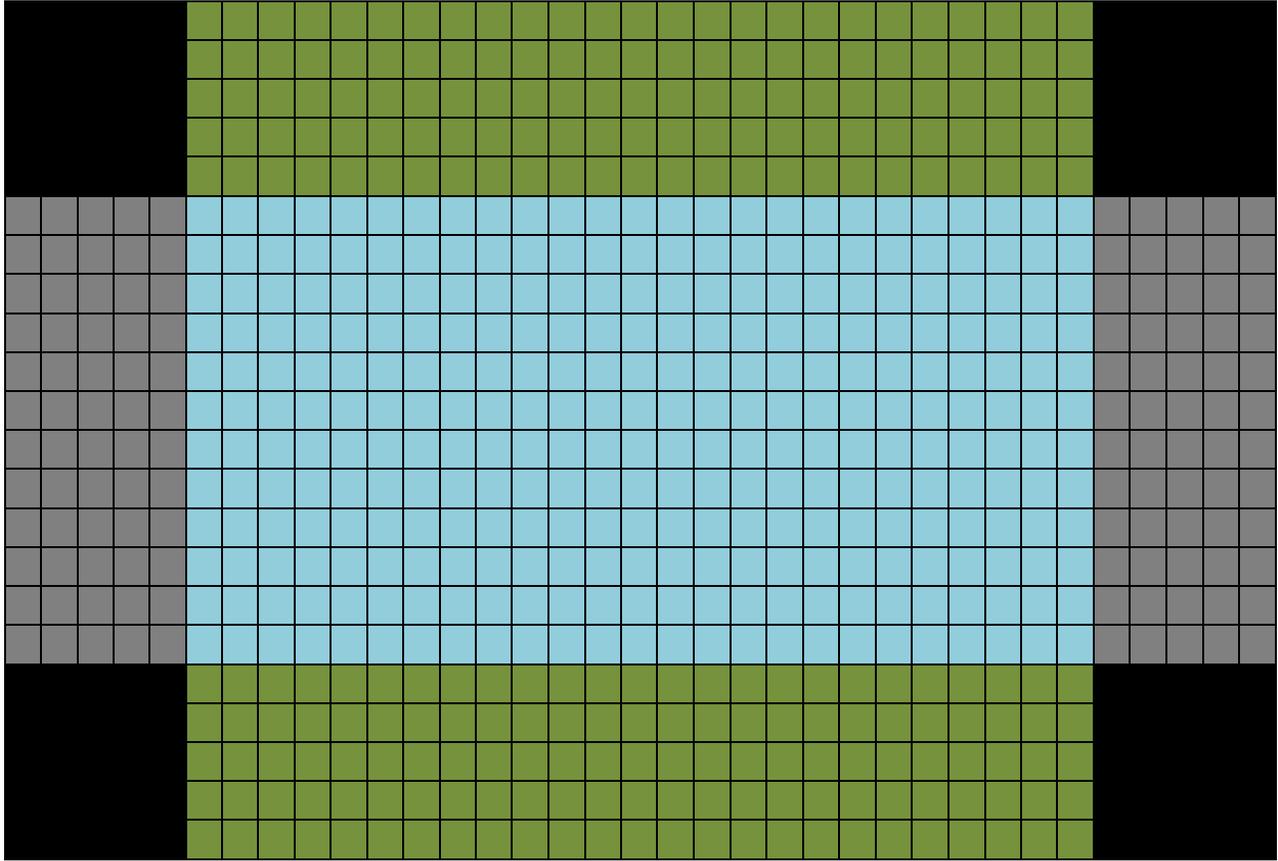


## eTech Math Mess Educator’s Guide

### Segment Title: The Bulging Briefcase

<p><b>Alignment to Common Core Clusters</b></p>	<p><b>6.RP</b> <i>Connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems</i></p> <p><b>6.G</b> <i>Solve real-world and mathematical problems involving area, surface area, and volume.</i></p>
<p><b>Critical Focus Area(s) and Rationale</b></p>	<p><b>6.RP.3d</b> <i>Use ratio and reasoning to convert measurement units, manipulate, and transform units appropriately when multiplying quantities.</i></p> <p><b>6.G.4</b> <i>Represent three dimensional figures made up of rectangles and triangles; apply techniques in the context of solving real-world mathematical problems.</i></p> <p>This segment builds upon the expectations of 5<sup>th</sup> grade number sense to examine ratio &amp; proportion and geometric representations of area and volume through a real-world mathematical problem. Student representations, drawings, and use of mathematical practices are developed while in pursuit of a reasonable solution. In this problem, students are forced to consider area and volume concepts using non-standard units – a stack of paper money.</p>
<p><b>Focus for Media Interaction / Suggested Classroom Activities</b></p>	<p>Prior to viewing: Tell students that they are going to see an entertaining animation about a situation that might be seen in an old-time ‘cops-and-robbers’ movie. Ask them to look for, and make notes, of any information they think would be important in solving the problem in which the central character finds himself.</p>
<p><b>Suggested Extension Activities &amp; Resources</b></p>	<p>Discuss students’ ideas within the class. Introduce the concept of the “Fermi Problem” – working from small scale measurements as stepping stones to measurements of greater scale. Have students measure the size of a piece of U.S. paper currency and discuss how they might estimate the value of stacks of money. How might the money be</p>

	<p>arranged in the briefcase to determine the supposed value of its contents?</p>
<p><b>Suggested Formative Assessment Probe</b></p>	<p>Present students with alternative problems to consider in which the briefcases' dimensions and/or monetary denominations have been changed. Have them estimate other measures, such as the weight of the briefcase if filled with paper dollars – or SILVER DOLLARS! Present Agree-Disagree Exit Slips that must include justifications for answers and the necessary mathematics that provides the justification.</p> <p>Example: Agree or Disagree? – a rectangular money storage box that measures 3" tall by 8" long by 4" wide would be enough space to store \$250 in quarters or \$500 in half-dollars.</p>
<p><b>One Proposed Solution to the Math Mess</b></p>	<p>A stack of one-hundred \$50 bills measures about 6" x 2.5" X ½" Laid sideways in this briefcase, you can get two rows front-to-back, 10 rows left-to-right, and 10 stacks high in the 5".</p> <p>This is approximately 200 stacks of \$5,000 : actually around 1 million bucks is a pretty close estimation, and worthy of a mathematical argument!</p> <p>Now if the bills were \$100s, the 'take' would be significantly more (Double?)</p> <p>Engage your students in a mathematical argument to determine reasonable methods to estimate, and internalize why the volume in a rectangular solid is an accumulation of height, length, and width that we try to generalize in a formula.</p> <p><b>Agree or Disagree?</b> <b>The bank robber's boss is going to be very disappointed with the amount of money that is stuffed into the briefcase.</b> What is your justification for your answer? Use words, drawings, and numbers to justify your answer.</p>



Use this net to show how the briefcase would look. Cut out the corners and fold up the front, back and sides to make a rectangular volume that could be filled.

**BACK**

**SIDE**

**BOTTOM**

**SIDE**

**FRONT**