

eTech Math Mess Educator’s Guide

Segment Title: Tito’s Pizza

Alignment to Common Core Clusters	<i>6.G Solve real-world and mathematical problems involving area, surface area, and volume.</i>
Critical Focus Area(s) and Rationale	<p><i>6.G.1 Find the area of right triangles and special quadrilaterals (such as a square) by composing and decomposing into rectangular or triangular shpes; apply these techniques in the context of solving real-world mathematical problems.</i></p> <p>When linear measurements change, so do any area or volume measurements in the related plane or solid figures. Area varies as some square of the linear measurements. Volume changes as some cube of the linear measurements. The idea of “twice as big” means different things depending on how many dimensions are being examined. Doubling the length of a side of a square figure creates 4 times the surface area.</p>
Focus for Media Interaction / Suggested Classroom Activities	<p>Tell students that they are going to see a short and entertaining video that contains some important real-life mathematics. After students view the video, the teacher can conduct a discussion about how Tito incorrectly calculated his costs. What information needs to be used? Why is Tito’s estimate of the cost a losing proposition? What is a reasonable cost for the Belly Buster pizza? Can drawings and calculations help us to explain?</p>
Suggested Extension Activities & Resources	<p>Investigate numerous square and rectangular figures. Compare the area of the figure to the area of a geometrically similar figure that has been “stretched”, or “dilated”.</p> <p>What happens to area when we use a “scale factor” or “dilation factor” of 2?; of 3?; of 3/2? How much should Tito change the sides of his pizza if he DOES want it to have a cost of around \$20? (200 square inches is about 14’ per side, since $\sqrt{200}$ is about 14.4 inches.</p> <p>If a pizza is a round pizza, what happens if we double the diameter? Can we use area formulas and drawings to show the variation?</p>

<p>Suggested Formative Assessment Probe & Evidence of Student Understanding</p>	<p>Use a similar problem in an “Agree-Disagree” assessment exit ticket or bellwork ticket.</p> <p>Example: A farmer uses 20 bags of fertilizer for a plot of land that is 50 feet wide by 100 feet long. If, the next year, he makes the plot 100 feet wide and 200 feet long, he should buy 40 bags of fertilizer. Do you agree or disagree with that claim, and what is the evidence for your answer? Use pictures and your understanding of area to justify your answer.</p> <p>Acceptable answer: I disagree. Doubling the length and width will create an area 4 times the size. The farmer will need to buy 4 X 20, or 80 bags of fertilizer.</p>
<p>One Proposed Solution to the Math Mess</p>	<p>Using a drawing, or cut-outs of the squares attached, let one square represent the 10” x 10” pizza. Have students work in groups to ‘build’ a 20” x 20” pizza. They will discover that it takes <i>FOUR</i> of the 10” x 10” pizzas to make the larger one. In other words, Tito loses money if he charges less than \$40.00 for the Belly Buster</p> <p>An alternate approach is to examine the surface area of the pizzas, assuming that the layer of toppings is a consistent ‘covering’. The 10” x 10” pizza contains 100 square inches of surface, but the 20” x 20” pizza requires that 400 square inches is covered!</p>

