Lesson Title	The Louis Vuitton Project, using 3rd degree equations
Length of Lesson	100 minutes
Created By	John DuFour
Subject	Geometry, Algebra II
Grade Level	10-12
State Standards	Geometry 4c, Algebra II 4c
DOK Level	2

DOK Application:
Construct a cube of maximum volume, model the dimensions of the cube using algebraic expressions, and show that the volume of the cube can be maximized using mathematically derived dimensions.

National Standards:
Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools.

Graduate Research Element: None

Student Learning Goal:
Understand that math is used to solve real-world problems. Understand that math provides unique, optimum solutions. Understand that rigorous approaches to problems solving are more valuable than trial and error approaches. Understand how the volume of a rectangular solid is calculated.

Materials Needed (supplies, hand-outs, resources):
Presentation (Louis Vuitton Inc.), 11" X 5.5" paper, tape, scissors

Lesson Performance Task/Assessment:
Complete 3-D cube, inquiry questions.

Lesson Relevance to Performance Task and Students:
Students can physically compare all cubes completed to the cube that has been constructed using the dimensions provided by mathematical analysis. Students can physically see that the cube constructed using math is indeed the largest cube! The utility of math is clearly demonstrated.

Anticipatory Set/Capture Interest:
Given a single sheet of paper, construct the largest cube possible!

Guided Practice:
See presentation, introduction of anticipatory set, discuss the problem challenge of making a cube of maximum size, and demonstrate complete mathematical solution. Compare all cubes to math generated cube.

Independent Practice:
See presentation (Louis Vuitton Inc.); make a cube of maximum volume.

Remediation and/or Enrichment:
Guided seat work, one-on-one assistance will be available. Individual IEP's will be supported. Partner help may be allowed on a case by case basis.

As an enrichment opportunity, students can derive a algebraic expression that defines the volume of a cube.

Check(s) for Understanding:
Inquiry responses.

Closure:
Discuss the value of performing math calculations and the potential benefits to industry.

Possible Alternate Subject Integrations:
Calculus I, max-min problems

Teacher Notes:
Hold up the maximum size cube that has been constructed from mathematically derived dimensions to all other cubes that have been constructed by trial and error. Show the students the power of math! Lesson can be adjusted simply by withholding information, and or allowing the students to solve the problem completely.