GEOMETRY LESSON TRADITIONAL/BDM
Topic: Surface Area and Volume (1oth Grade)

TRADITIONAL

Objectives

- Know how to calculate surface area and volume for various 3-D figures
- Know and use Cavalieri's Principle to compare volumes
- Know and use other volume and surface area formula to compare shares.

Activities

- Read Chapter 10 in USCMP Geometry
- Go through all the formula and examples
- Exploration 22, p. 482: "Containers making small amounts can appear to hold more than they do by making them long and thin. Give some examples.

Assessments

- Odd-numbered problems in full Chapter Review, pp. 516-519
- Progress self-test p. 515
- Homework: Each 3rd question in sub-chapter review and completion of explorations

BACKWARD DESIGN MODEL

Stage 1 – Desired Results

Established Goal(s): **NH Math Standards** (G)

4a. K-12 Broad Goal: Students will name, describe, model, classify, and compare geometric shapes and their properties with an emphasis on their wide applicability in human activity.

1a. K-12 Broad Goal: Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content.

Understanding(s): (U)

Students will understand that...

- The adaptation of mathematical models and ideas to human problems requires careful judgment and sensitivity to impact.
- Mapping three dimensions onto two (or two onto three) may introduce distortions.
- Sometimes the best mathematical answer is not the best solution to "real-world" problems.

Essential Question(s (Q)

- How well can pure mathematics model messy, real-world situations?
- When is the best mathematical answer not the best solution to a problem?
- How do you design the most economical packaging?

Students will know... (K)

- formulae for calculating surface area and volume
- Cavalieri's Principle

Students will be able to... (S)

- calculate surface area and volume for various 3-dimensional figures
- use Cavalieri's Principle to compare volumes

Stage 2 – Assessment Evidence

Performance Task(s): (T)

- Packaging problem: what is the ideal container for shipping bulk quantities of M & M's packages cost-effectively to stores? (Note: the "best" mathematical answer - a sphere - is not the best solution to this problem.)
- Consult to the UN on the least controversial 2-dimensional map of the world.

Other Evidence: (OE)

a. odd-numbered problems in full Chapter Review, pp. 516-519

b. progress self-test p. 515

c. homework: each 3rd question in sub-chapter reviews and completion of the explorations

Stage 3 – Learning Plan

Learning Activities: (selected) (L)

- Investigate the relationship of surface areas of various containers and volume (e.g. tuna fish cans, cereal boxes, Pringles, candy packages, etc.).
- Investigate different map projections to determine their mathematical accuracy (i.e. degree of distortion).

a. Read Chapter 10 in UCSMP Geometry
b. Exploration 22, p. 504
c. Exploration 22, p. 482
d. Exploration 25, p. 509