

## Project Overview

### **Facts and Stats**

Subject Areas: Geometry

Length (Weeks): 2 - 3 weeks

Grade Levels: 9th

Quarter Used: 3rd

### **Project Summary**

Students design packages for mini-oreos using cylinders, prisms, cones, and pyramids. They will calculate the surface area and volume of each container in order to determine the cost of the packaging material and the capacity.

### **Project Overview**

The goal of this project is for students to develop the formulas used for surface area and volume for the four basic solid shapes: prism, pyramid, cylinder, and cone. Using a hands-on approach, the students will build the shapes and use nets to find surface area. They will investigate how surface area and volume are different, and how volume is calculated. These skills will be applied to a real-world problem, of designing a package for a product. Students are placed in the role of the designers for Nabisco. Their challenge is to design packages for the new Mini Oreos. Each group must decide what factors are important in packaging designs, and build their package under those specifications. Considerations need to be made for cost of production, capacity, and size. As a final activity, students will present their packages for judging.

### **Content Standards Addressed**

**8.0** Students know, derive, and solve problems involving volume, lateral area, and surface area of common geometric figures.

**9.0** Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.

**10.0** Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.

### **S.C.A.N.S. or 21st Century Skills Addressed**

Math Content - students develop and use formulas

Collaboration - students work in groups to design their packages

Written Communication - students compose a written report

Oral Communication - students present their work to a panel

Technology Literacy - students use word processing, power point, internet, etc.

Critical Thinking - students derive formulas

### **Driving Question or Problem Statement**

How can we determine the surface area and volume of a package?

### **Scaffolding Activities and Assignments**

Derive surface area formulas

Create packages for each shape

Calculate the surface area and cost for each package

Derive volume formulas

Calculate volume and capacity of each package