Filling and Wrapping

Glossary

Base – The bottom face of a 3 dimensional shape

Cone – A three-dimensional shape with a circular end and a pointed end

Cube – A three-dimensional shape with six identical square faces; ie. Ice cube

Cylinder– A three dimensional shape with two opposite faces that are congruent circles

Edge – The line segment formed where two sides of the polygons that make up the faces of a three-dimensional shape meet

Face – A polygon that forms one of the flat surfaces of some three-dimensional shapes

Prism – A three-dimensional shape with a top and bottom that are congruent polygons and faces that are parallelograms

Rectangular Prism – A prism with a top and bottom that are congruent rectangles

Right Prism – A prism whose vertical faces are rectangles

Sphere – A three-dimensional shape such as a ball

Surface Area – The area required to cover a three-dimensional shape. In a prism it is the sum of the areas of all the surfaces

Volume – The amount of space, or the capacity, of a three-dimensional shape. It is the number of unit cubes that will fit into a three-dimensional shape
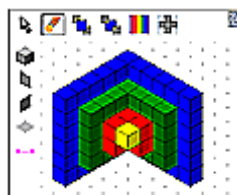

Web Resources

You will find the Factor Game and the Product Game at:

www.illuminations.nctm.org

Learning about length, perimeter, area and volume

Isometric 3-D Drawings

Connected Mathematics Project

Everett Public Schools Mathematics Program

Filling and Wrapping

Geometry and Measurement

Unit Goals:

♦ Understand, calculate and estimate the surface area of 3-D figures
♦ Understand, calculate and estimate the volume of 3-D figures
♦ Find and interpret the dimensions, surface area, and volume of rectangular prisms
♦ Find the dimensions, surface area, and volume of rectangular prisms

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Proposed Time Frame: Approximately 6 weeks

Investigation 1: Building Boxes
* Develop the concept of surface area
* Develop the concept of volume

Investigation 2: Designing Packages
* Find the surface area of a rectangular box
* Determine which rectangular prism has the least (greatest) surface area of a fixed volume

Investigation 3: Finding Volumes of Boxes
* Find volumes of boxes by filling with unit cubes
* Determine that the total number of unit cubes in a rectangular prism is equal to the area of the base times the height (the volume)
* Learn that surface area is the sum of the areas of its faces

Investigation 4: Cylinders
* Find the volume and surface area of a cylinder
* Investigate interesting problems involving the volumes and surface areas of cylinders and prisms

Investigation 5: Cones and Spheres
* Find the volumes of cones and spheres
* Find the relationships among the volumes of cylinders, cones, and spheres

Investigation 6: Scaling Boxes
* Design boxes for given specifications
* Investigate effects of varying dimensions on volume and surface area

Investigation 7: Finding the Volumes of Irregular Objects
* Estimate the volume of an irregularly shaped object by measuring the amount of water it displaces
* Understand the relationship between a cubic centimeter and a milliliter

Tips for Helping at Home

Good questions and good listening will help children make sense of mathematics and build self-confidence. A good question opens up a problem and supports different ways of thinking about it. Here are some questions you might try, notice that none of them can be answered with a simple "yes" or "no".

Getting Started
* What do you need to find out?
* What do you need to know?
* What terms do you understand or not understand?

While Working
* How can you organize the information?
* Do you see any patterns or relationships that will help solve this?
* What would happen if…?

Reflecting about the Solution
* How do you know your answer is reasonable?
* Has the question been answered?
* Can you explain it another way?

At Home:
1. Talk with your child about what's going on in mathematics class.
2. Look for ways to link mathematical learning to daily activities. Encourage your child to figure out the amounts for halving a recipe, estimating gas mileage, or figuring a restaurant tip.
3. Encourage your child to schedule a regular time for homework and provide a comfortable place for their study, free from distractions.
4. Monitor your child's homework on a regular basis by looking at one problem or asking your child to briefly describe the focus of the homework. When your child asks for help, work with them instead of doing the problem for them.

At School
1. Attend Open House, Back to School Night, and after school events.
2. Join the parent-teacher organization.

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