

TOTAL SURFACE AREA OF A RECTANGULAR PRISM
and
TOTAL SURFACE AREA OF A CYLINDER
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OVERVIEW

Students will be able to determine the total surface area of a rectangular prism and of a cylinder.

BENCHMARKS

3 - 4th Grade

Measurement

- A. Select appropriate units for perimeter, area, weight, volume (capacity), time and temperature, using: • objects of uniform size; • U.S. customary units; e.g., mile, square inch, cubic inch, second, degree Fahrenheit, and other units as appropriate; • metric units; e.g., millimeter, kilometer, square centimeter, kilogram, cubic centimeter, degree Celsius, and other units as appropriate.
- B. Know that the number of units is inversely related to the size of the unit for any item being measured.
- C. Develop common referents for units of measure for length, weight, volume (capacity) and time to make comparisons.

5 - 7th Grade

Measurement

- A. Select appropriate units to measure angles, circumference, surface area, mass and volume, using: • U.S. customary units; e.g., degrees, square feet, pounds, and other units as appropriate; • metric units; e.g., square meters, kilograms and other units as appropriate.
- B. Convert units of length, area, volume, mass and time within the same measurement system.
- C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders.

8 - 10th Grade

Measurement

- A. Solve increasingly complex non-routine measurement problems and check for reasonableness of results.
- B. Use formulas to find surface area and volume for specified three-dimensional objects accurate to a specified level of precision.
- C. Apply indirect measurement techniques, tools and formulas, as appropriate, to find perimeter, circumference and area of circles, triangles, quadrilaterals and composite shapes, and to find volume of prisms, and cylinders.

Vocabulary

rectangular prism, cylinder, surface area, length, area, volume, square inch, cubic inch

Materials

small boxes (individual size cereal boxes), peanut butter, paper plates, plastic knives, paper towels, Cheezits, gummi worms, masking tape, salt containers (to serve as cylinders), worksheet

Procedure

1. What is another name for rectangular prism? When students respond with the answer “box”, give each student or group of two a rectangular prism in the form of an individual serving size cereal box, with or without the cereal.
2. Give each student a total surface area worksheet. Give each student or group of two students a cereal box, a paper plate, a plastic knife and a paper towel.
3. Now we're going to make a two-dimensional drawing of a 3-dimensional shape. In other words, we are going to look at something 3-D and represent it on a flat surface. This requires spatial perception. By learning to draw this properly, it helps you develop good spatial perception. Draw on the board as you instruct the students to draw on their provided worksheet. Draw a rectangle. Draw a dot in the center of the rectangle. From that dot, draw a dashed line UP the same length as the width of the rectangle. Go back to the dot, and draw a dashed line to the right as long as the length of the rectangle. Complete the new rectangle with solid line segments. Go back to the dot, and draw a dashed line to the bottom left vertex. Connect remaining vertices with solid segments. Explain that the three dashed line segments are the edges you could not see if you were looking at your box in real life. Have students experiment by looking at their box and comparing it to their drawing.
4. Now we are going to find the total surface area of the rectangular prism. The first thing you do is write down the surfaces that you have, top, bottom, front, back, side, side, say it. This has been done for you. Area is measured in square units, for example, square inches, square centimeters, square feet, etc. We are going to use square inches today because I have found a food that is one square inch. Hold up the box of Cheezits, remove a Cheezit to show them and announce that a Cheezit is ONE SQUARE INCH OF YUMMY. It measures one inch on each side.
5. Pour a generous amount of Cheezits on each paper plate.
6. Put a wallop of peanut butter on each paper plate.
7. Spread peanut butter on the top of the box. Then stick the square inch Cheezits on the peanut butter to cover the top using WHOLE Cheezits only. Don't do halves or fractions. We are using whole number only approximate values.
8. Enter the length and width of the top of the box on your worksheet and the area. Do not cover the bottom of the box with Cheezits since we know it is the same as the top.
9. Repeat this procedure for the front and the sides, carefully recording all values as you go.
10. When you are finished, bring your covered box to the platform and place your box with the others to build a Cheezit house.
11. Take a picture of the kids with their completed Cheezit house and send it to the local newspaper and also to the Cheezit company. This makes the whole thing exciting and more memorable for the students.

Informal Assessment

Each student is required to fill out their worksheet accurately and cover their rectangular prism with square inches.

Formal Assessment

Follow this activity with a test. I give only one problem on finding the total surface area of a rectangular prism. This tells me if they learned what they were supposed to learn.

SAY CHEEZ.....ITS

Name _____

Cheezits are one square inch of pleasure. They measure one inch on all sides. When we determine the area of different surfaces, many times our answer will be in square inches. Therefore, it would behoove us to have a good mental image of what a square inch looks like. The objective of this math activity is simple. You will have a concrete mental image of what a square inch looks like. You will have a mental picture of how to actually and literally cover a box with square inches. This image will be valuable to you, anytime you are faced with a surface area problem. In addition, you will improve your spatial perception with respect to viewing a drawing of a 3-dimensional object on a flat piece of paper. So let's get started. The sooner we finish, the sooner we eat!!!

TOTAL SURFACE AREA OF A RECTANGULAR PRISM

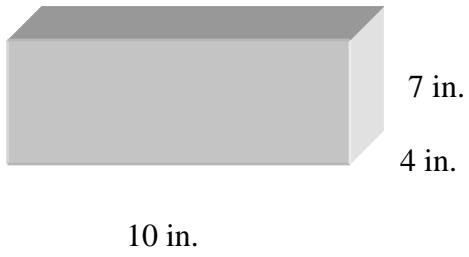
Draw a rectangular prism here.

	Length	Width	Area
TOP			
BOTTOM			
FRONT			
BACK			
SIDE			
SIDE			

TOTAL SURFACE AREA

STOP..... did you put the proper label on your total surface area??? If not, do it NOW!

NAME _____



Find the TOTAL SURFACE AREA of the rectangular prism.