

Surface Area of a Rectangular Prism

Reporting Category	Measurement
Topic	Determining the surface area of a rectangular prism
Primary SOL	7.5b The student will solve practical problems involving the volume and surface area of rectangular prisms and cylinders.
Related SOL	7.5a, 7.5c

Materials

- Sets of gift boxes in three sizes
- Rulers
- Graph paper
- Small reward for each student (e.g., a free homework pass, pencil, eraser)
- Surface Area Recording Sheet (attached)

Vocabulary

area, length, width, height, surface area, rectangular prism (earlier grades)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Prior to the lesson, cover one large gift box with paper. Use one color for the top and bottom, another color for the front and back, and a third color for the right and left sides.
2. Prior to the lesson, prepare sets of gift boxes—enough that when the class is divided into groups of four, each group receives one set. Start with one small gift box, and place a small reward inside the box. Place the small box inside a medium box. Place the medium box inside a larger box.
3. Begin the lesson by presenting the gift-wrapped box to introduce the concept of surface area. Facilitate a discussion concluding that the top and bottom have the same area; the front and back have the same area; and the left and right sides have the same area. Rotate the box to allow students to see that any of the surfaces could be the top, bottom, front, back, left, or right.
4. Have students draw on graph paper the representation of the gift box. Have them use colored pencils to indicate that opposite sides have the same areas.
5. Ask students how to determine the area of the top. Measure and calculate the area, and write this value on the board. Continue in the same manner with the front, back, and sides. Facilitate a discussion to determine what is needed to find the surface area of the box. Add the areas together to calculate the surface area.
6. Place students into groups of four. Give each group a set of boxes and a copy of the Surface Area Recording Sheet. Direct groups to determine the surface area of the first, largest box. Only when a group has found the correct surface area may they proceed to the next, smaller box. When students finish their third box correctly, they will find the small reward placed in the last box.

7. When all students have completed the activity, use their results to develop the formula for surface area of a rectangular prism. Give students additional problems to practice with the formula.

Assessment

- **Questions**
 - What does the formula for surface area mean?
 - Why is surface area measured in square units?
- **Journal/Writing Prompts**
 - Describe to another student what surface area is and how to find it.
 - Explain how surface area differs from the volume of a rectangular prism.

Extensions and Connections (for all students)

- Ask students to find the surface area for a triangular prism.
- Have each student create a rectangular prism and ask a partner to solve for the surface area.

Strategies for Differentiation

- Have students use cubes to build a rectangular prism. Have them find the surface area by counting the cubes on each side.
- Make a T-chart with length, width, and height to assist in calculating the surface area.
- On the Surface Area Recording Sheet, modify the problem to include top, bottom, right, left, front, and back.

Surface Area Recording Sheet

Name _____ Date _____

Box 1: Area of the top: _____ x2 = _____

Area of the right side: _____ x2 = _____

Area of the front: _____ x2 = _____

Surface Area: _____

Box 2: Area of the top: _____ x2 = _____

Area of the right side: _____ x2 = _____

Area of the front: _____ x2 = _____

Surface Area: _____

Box 3: Area of the top: _____ x2 = _____

Area of the right side: _____ x2 = _____

Area of the front: _____ x2 = _____

Surface Area: _____

The formula for finding the surface area of a rectangular prism is:

Surface Area =