

## Grade 8 Mathematics

### Measurement: Lesson 5

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes and all information outside the boxes should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students, will have an arrow symbol ( $\downarrow$ ) by them.

*Purpose of Lesson 5:*

- In this lesson, the tutor and the students will
  - ✓ find the surface area of rectangular solids.

*Equipment/Materials Needed:*

- Copies of Student Sheets 73 and 74
- Paper and pencils
- Cereal box or some type of box that can be cut (optional)
- Scissors

*Preparations before beginning Lesson 5:*

- Run one copy of Student Sheets 73 and 74 for each student.
- Have paper and pencils available.
- Find a box to cut apart. (Optional)

## Lesson 5: Measurement

Say:

**In this lesson, you will learn about the *surface area* of solid figures. Let's review some ideas that we know about solids. A *solid* is a three dimensional figure. It has length, width, and height. The flat surfaces of a solid are called *faces*. If the faces of a solid are all polygons, it is called a *polyhedron*. A *prism* is a special type of polyhedron in which two of the faces are parallel and congruent. The parallel faces are called *bases*. We can find the area of faces and bases.**

**In this lesson, you will find the surface area of two types of prisms, rectangular prisms and cubes. The *surface area* of a prism is the sum of the areas of all the faces of the prism. Surface area is important when figuring the amount of material needed to cover packages, furniture, and other solid figures.**

└ Give students Student Sheet 73. If you have a cereal box or some rectangular prism, cut it so that you can lay it flat. If not, use Student Sheet 73 to illustrate how to find the surface area.

Say:

**When you find the surface area of a solid, you are finding the area of the entire surface. Sometimes it helps to cut the figure apart and lay it flat. The box on Student Sheet 73 has been cut and laid flat. If you find the area of each of the six rectangles formed and add them up, you find the surface area of the figure.**

└ Have students answer the questions on Student Sheet 73.

Answers:

1.  $2\text{ cm} \times 3\text{ cm}$ ; 6 sq. cm
2. F
3.  $2\text{ cm} \times 4\text{ cm}$ ; 8 sq. cm
4. E
5.  $3\text{ cm} \times 4\text{ cm}$ ; 12 sq. cm
6. D
7. 52 sq. cm

Say:

**Suppose the rectangular solid on Student Sheet 73 had been a cube with each edge measuring 3 cm. How could you easily find the surface area?** (Each face would have an area of 9 sq. cm. There are six faces, so the surface area would be  $6 \times 9$  sq. cm or 54 sq. cm)

] Give students Student Sheet 74.

Answers:

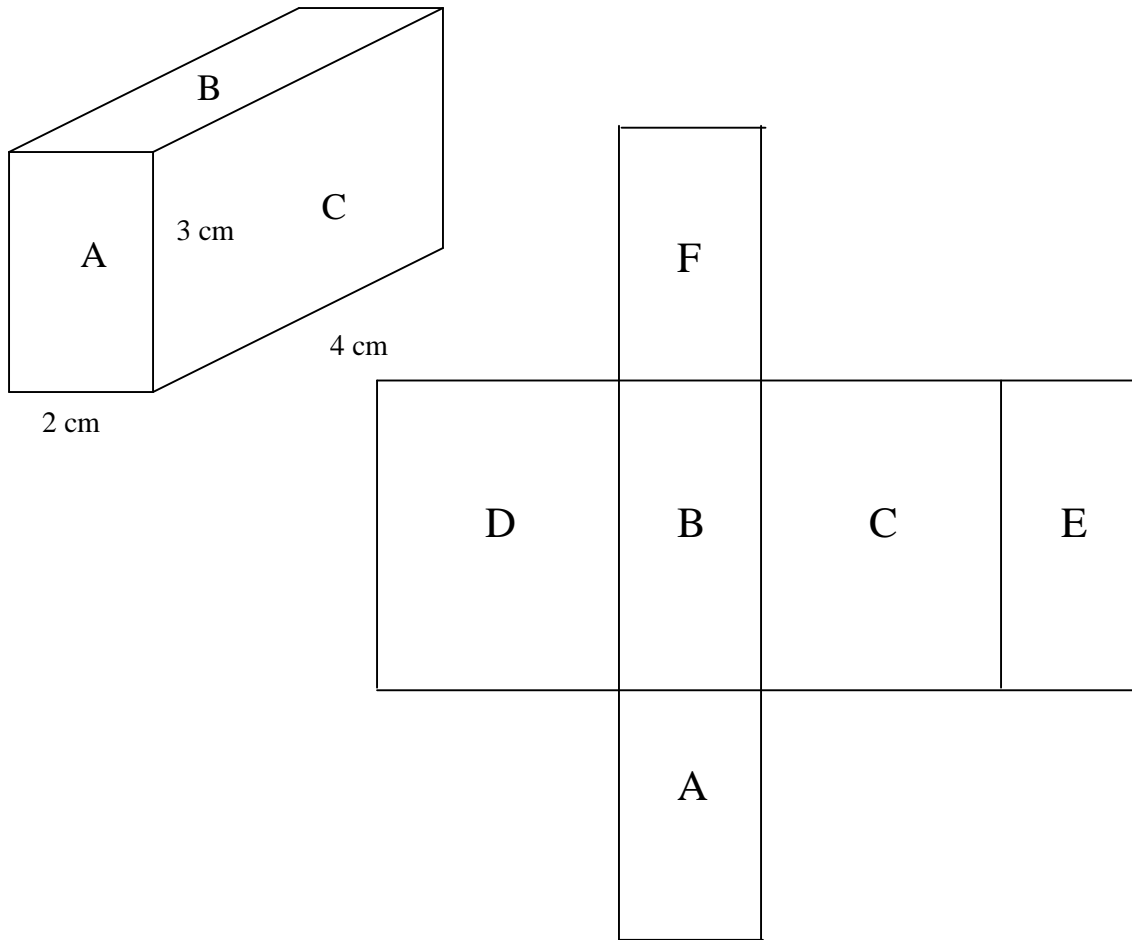
1. 184 sq. in. of paper
2. 413.34 sq. cm of fabric
3. Both are correct. Leroy used the same figures as John. He just saw that  $48 + 42 + 56 + 48 + 42 + 56$  is two sets of  $48 + 42 + 56$ .

Say:

Remember that, when you are taking the LEAP test, if you forget how to find the surface area of a rectangular solid, the formula is on the Reference Sheet.

] Have one student summarize today's lesson. Surface area is easy if you think of adding the areas of all of the faces of a solid figure.

**Student Sheet 73 (Measurement: Lesson 5)**

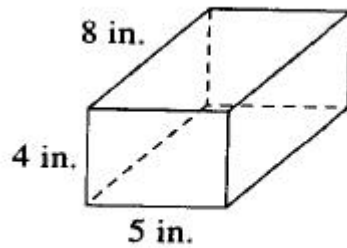


1. What is the length and width of rectangle A? What is the area of rectangle A?
2. What other rectangle has the same area as A?
3. What is the length and width of rectangle B? What is the area of rectangle B?
4. What other rectangle has the same area as rectangle B?
5. What is the length and width of rectangle C? What is the area of rectangle C?
6. What other rectangle has the same area as rectangle C?
7. What is the surface area of this solid?

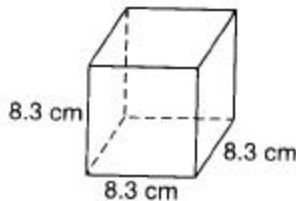
## Student Sheet 74 (Measurement: Lesson 5)

Answer the following questions.

1. A storage box measures 8 inches by 4 inches by 5 inches. The box is sitting in Myra's front room; she wants to cover the box with paper. How much paper would she need to cover the box, including the top and bottom?



2. When displaying books at the book fair, Renee likes to cover the display boxes with pretty fabric. How much fabric would she need to cover this display box?



3. John said that, to find the surface of the rectangular solid below, he added the following areas:  $48 \text{ sq. cm} + 42 \text{ sq. cm} + 56 \text{ sq. cm} + 48 \text{ sq. cm} + 42 \text{ sq. cm} + 56 \text{ sq. cm}$ . Leroy said that the way that he found the surface area was to add the areas,  $48 \text{ sq. cm} + 42 \text{ sq. cm} + 56 \text{ sq. cm}$ , and multiply this sum by 2. Who was correct? Explain.

