


Grade 8 Mathematics

Measurement: Lesson 7

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 () by them.

Purpose of Lesson 7:

- In this lesson, the tutor and the students will
 - ✓ find the volume of cubes and rectangular prisms.

Equipment/Materials Needed:

- Copies of Student Sheet 97
- Paper and pencils
- Chalkboard

Preparations before beginning Lesson 7:

- Run one copy of Student Sheet 97 for each student.
- Have paper and pencils available.

Lesson 7: Measurement

Say:

The *volume* of a rectangular solid is the amount of space inside the solid.

 Give students Student Sheet 97.

Say:

Look at the solids at the top of Student Sheet 97. What kind of figure is shown in A? (rectangular solid) What kind of figure is shown in B? (rectangular solid) What kind of figure is shown in C? (rectangular solid or cube)

Let's look at Figure A. How many cubes are in one layer of the figure? (6) How many layers are there? (2) How many cubes are there in all? (12) If each cube is a one-centimeter cube, how many centimeter cubes are in one layer? (6 centimeter cubes) How many cubes are in the two layers? (12 centimeter cubes) The volume is 12 centimeter cubes or 12 cubic centimeters.

Let's look at Figure B. How many cubes are in one layer? (12) How many layers are there? (2) How many cubes are there in all? (24) If each cube is a one-centimeter cube, what is the volume of the solid? (24 cubic centimeters)

Let's look at Figure C. How many cubes are in one layer? (9) How many layers are there? (3) How many cubes are there in all? (27) If each cube is a one-centimeter cube, what is the volume of the solid? (27 cubic centimeters)

Say:

Let's see whether we can find a shortcut for finding volume. What is the length of Solid A? (3 units) What is the width? (2 units) What is the height? (2 units) If we multiply 3 units \times 2 units \times 2 units, how many cubic units do we get? (12 cubic units) If the units are centimeters, what is the volume of the solid? (12 cubic centimeters) Find the volume of Solids B and C using this method. (24 cubic centimeters; 27 cubic centimeters) The volume of a rectangular solid can be found by multiplying the length times the width times the height. The formula is $V = l \times w \times h$. The formula for the volume of a rectangular solid can be used on a cube, but you often see the formula for the volume of a cube written as $V = s^3$. Why? (The length, width, and height are all the same in a cube; so you can just say side \times side \times side, or s^3 .)

⌚ Have students work the problems on Student Sheet 97.

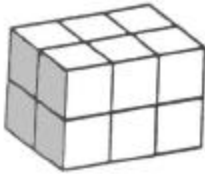
Answers:

1. 1.7 cubic meters
2. 1152 cubic inches
3. 2 ft.
4. surface area
5. volume

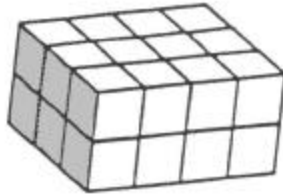
⌚ Have one student summarize today's lesson. *Volume* is a measure of the amount of space in a solid figure.

Student Sheet 97 (Measurement: Lesson 7)

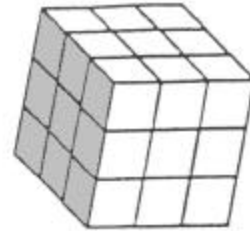
A.



B.



C.



Answers the following questions.

1. Removing a shrub from the yard left a cube-shaped hole measuring 1.2 meters on each side. How much soil is needed to fill the hole? Round your answer to the nearest tenth.
2. The kitchen sink measures 16 in. by 12 in. by 6 in. How much water can the sink hold?
3. A carton that held a refrigerator has a volume of 36 cubic feet. The carton is 6 ft. tall and 3 ft. long. How wide is the carton?
4. Would I use the formula for surface area or for volume if I wanted to find the amount of wrapping paper needed to wrap a box? Explain.
5. Would I use the formula for surface area or for volume if I wanted to find out how much water a swimming pool could hold? Explain.