Understanding Volume Worksheet

Grade 5 · Common Core 5.MD.C.3

> Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (a) A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. (b) A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

Practice

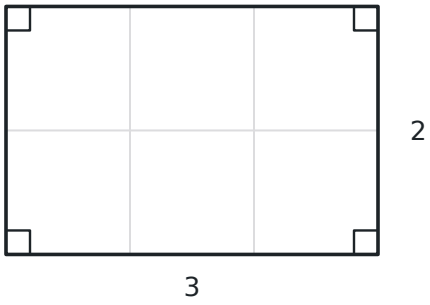
Builds the skill step by step.

1. What is a unit cube?
   A. a box that holds 1 liter
   B. a square with sides 1 unit long
   C. a cube with sides 1 unit long
   D. any small cube

2. What does volume measure?
   A. the area of the bottom
   B. the space inside a solid figure
   C. the weight of an object
   D. the distance around a figure

3. A box is packed with 12 unit cubes, with no gaps or overlaps. What is its volume?

4. The figure shows one layer of unit cubes. What is the volume of this one layer?



5. Which unit could measure volume?

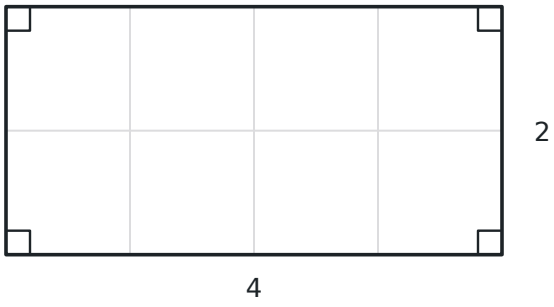
   A. cubic centimeters

   B. centimeters

   C. square centimeters

   D. degrees

6. The figure shows the bottom layer of a prism. The prism has 2 layers like this. What is its volume?



7. Why must unit cubes fit without gaps or overlaps when you measure volume?

   A. So the box is heavier.

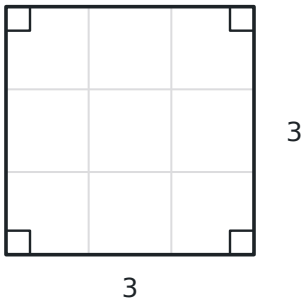
   B. It doesn't matter.

   C. So the cubes look neat.

   D. So every bit of space is counted exactly once.

8. A unit cube has sides 1 centimeter long. What is its volume?

9. The figure shows the bottom layer of a prism. The prism has 3 layers like this. What is its volume?



10. Solid A is made of 8 unit cubes and Solid B is made of 10. How much greater is B's volume?

ALBERT

Name _____ Date _____

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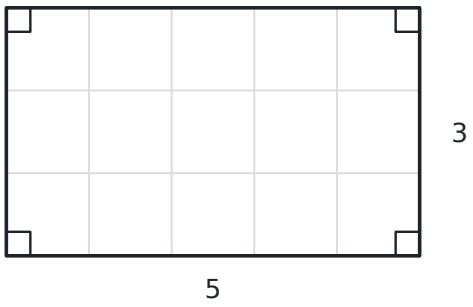
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On Level

Grade-level practice.

1. A box is packed with unit cubes in 2 layers. Each layer has 3 rows of 5 cubes. What is the volume?

2. The figure shows the bottom layer of a prism. The prism has 4 layers like this. What is its volume?



3. One layer of a box holds 24 unit cubes. How many cubes fill 3 layers?

4. Two solids are each built from 12 unit cubes, but they have different shapes. How do their volumes compare?

   A. The wider one is larger.

   B. They are equal.

   C. The taller one is larger.

   D. You can't tell.

5. A solid made of 20 unit cubes has one cube removed. What is its volume now?

6. A prism has 6 unit cubes in its bottom layer and a volume of 30 cubic units. How many layers does it have?

7. A box is packed with 2 layers of 10 unit cubes with no gaps. Explain why its volume is 20 cubic units.

8. A large cube is built from unit cubes, with 2 unit cubes along each edge. How many unit cubes does it use?

9. Sam fills a box with 30 marbles. Why isn't the box's volume 30 cubic units?

   A. He should have used 31 marbles.

   B. Volume is measured in inches.

   C. Marbles are too heavy.

   D. Marbles leave gaps and aren't unit cubes.

10. A stack has 4 layers. Each layer is 3 cubes by 2 cubes. What is its volume?

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Challenge

Multi-step and word problems that stretch it.

1. A large cube has 4 unit cubes along each edge. What is its volume?

2. A box is 5 cubes long, 4 cubes wide and 3 cubes tall. How many unit cubes fill only the bottom 2 layers?

3. A cube is built from 27 unit cubes (3 along each edge), and its outside is painted. How many unit cubes have no paint?

4. A prism has a volume of 36 cubic units. Its bottom layer is 3 cubes by 4 cubes. How many layers tall is it?

5. Box A is 4 by 3 by 2 cubes. Box B is 2 by 2 by 6 cubes. What is the difference in their volumes?

6. Which could be the volume of a box?

   A. 18 cubic inches

   B. 18 inches

   C. 18 square inches

   D. 18 pounds

7. A box is 6 cubes long, 2 wide and 3 tall. It is half full of unit cubes. How many cubes are in it?

8. A cube 2 cm on each edge is built from 1-cm cubes. How many more 1-cm cubes are needed to build a cube 3 cm on each edge?

9. How many cubes 2 cm on each edge fit in a box 4 cm long, 4 cm wide and 2 cm tall?

10. One solid is a tower of 12 unit cubes stacked 1 by 1 by 12. Another is 2 by 2 by 3 cubes. Explain whether they have the same volume.