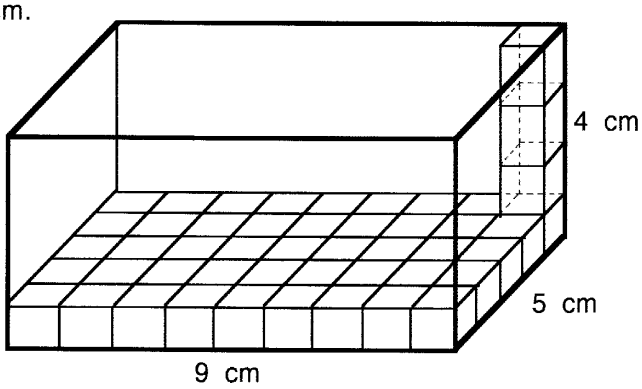
Volume of a Prism

Here's the same rectangular prism we were looking at on page 11-10, except that this time we're not seeing the outside squares. We're looking into it to see how many cubes it would take to fill it. The number of cubes that fit in an object is called the **volume** of the object.

Note that there are 9 cubes along the front edge and that this row of 9 goes back 5 deep. This gives us 9 x 5 or 45 cubes on the floor, or "base" of the prism.



There are 45 cubes on the bottom base. Along the right side, you see that the prism is 4 cubes tall. That means that you could fit four layers of those 45 cubes in the prism. That's 45 x 4 = 180 cubes, or $\underline{\underline{180\ cm^3}}$.

Now think about what we just did. We found the area of the base (length x width) and then multiplied that by the number of layers tall (the height). So, to find the volume of a prism, you just find the area of the base and then multiply that by the height. The formula is: $\boxed{V = Bh}$ where B is the area of the base and h is height.

If it's a rectangular prism, as in the example above, it can be written: $\boxed{V = lwh}$ where l is length, w is width and h is height.

Example: What is the volume of a rectangular prism with length 5m, width 7m, and height 12m?

Solution: Multiply the three numbers: 5m x 7m x 12m = $\underline{\underline{420\ m^3}}$.

Example: Find the volume of this triangular prism.

The base is a triangle. Find its area and then multiply that by the height.

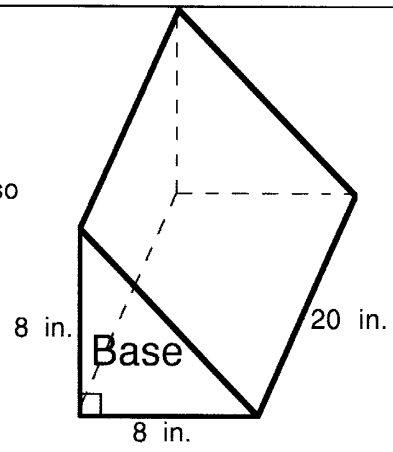
Keep in mind that this prism is lying on its side, so the 20 inch length is the height.

$V = B \cdot h$

Area of a triangle: $b \cdot h \div 2$

$8 \cdot 8 \div 2 \cdot 20$

$64 \div 2 \cdot 20$

$32 \cdot 20$

$\underline{\underline{640\ in^3}}$