~~Unit 9, Page 2~~

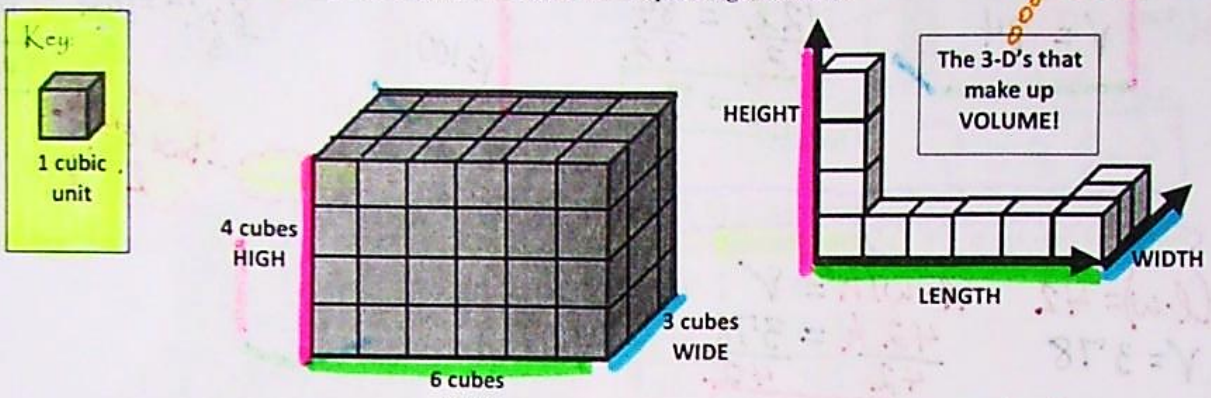
Rectangular Prisms

Measurement of volume is expressed in cubic units such as $in^3, ft^3, m^3, cm^3, or\ units^3$. The volume of a solid is the number of cubic units that can be contained in the solid.

First, let's look at a rectangular solid.

"D" means Dimensions

Example 1: How many cubic units will it take to fill up the figure below?



Name the 3 dimensions of any rectangular prism! length, width, & height

To calculate volume, you simply multiply the l times the w times the h.

Volume of a Rectangular Solid = (length) * (width) * (height)

Formula: $V = lwh$

For the rectangular solid above,

l = 6, w = 3, and h = 4, so

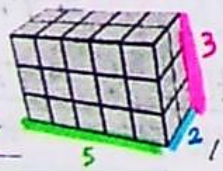
V = (6u)(3u)(4u)

$V = 72\ units^3$

~ or ~ V = (B)h, where B is the base AREA

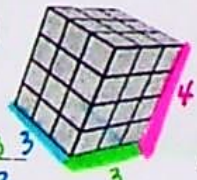
PRACTICE EXAMPLES

Find the volume of the block figures below. Use the formula V = (l·w)h

1) 

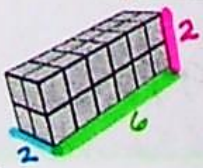
l = 5
w = 2
h = 3

(5)(2)(3)
(10)(3)
V = 30u³

2) 

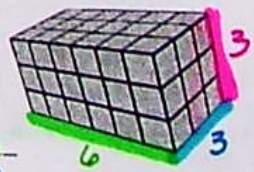
l = 3
w = 3
h = 4

(3)(3)(4)
(9)(4)
V = 36u³

3) 

l = 6
w = 2
h = 2

(6)(2)(2)
(12)(2)
V = 24u³

4) 

l = 6
w = 3
h = 3

(6)(3)(3)
(18)(3)
V = 54u³

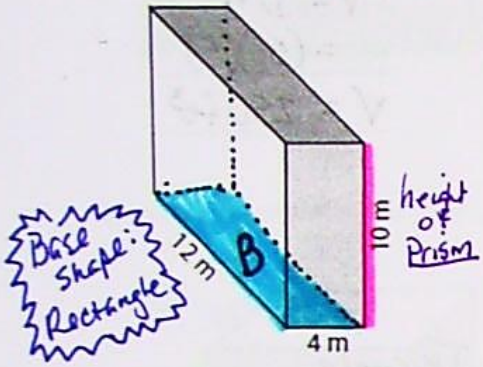
Calculating the Volume of Right Prisms

To find the volume of any right prim, calculate the area of the BASE and multiply by the height.

$V = Bh$, *where* B *is the area of the base.* Capital B... Area of base

Examples

1. Identify the polyhedron by name: Rectangular Prism



Identify the base by name: Rectangle... $A = lw$

Calculate the area of the base:

Show work ⟹

$B = lw$

$B = (4)(12)$

$B = 48\,m^2$

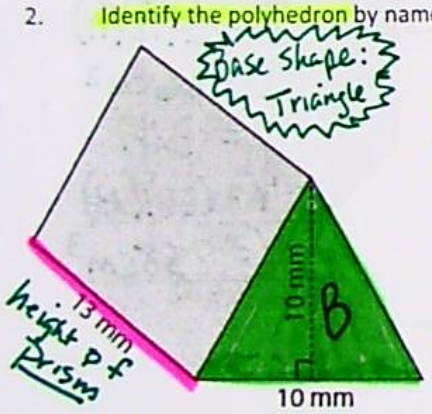
Calculate the volume:

$V = Bh$

$= (48)(10)$

$V = 480\,m^3$

2. Identify the polyhedron by name: Triangular Prism



Identify the base by name: Triangle... $A = \frac{bh}{2}$

Calculate the area of the base:

Show work ⟹

$B = \frac{bh}{2}$

$B = \frac{(10)(10)}{2}$

$B = \frac{100}{2} = 50\,mm^2$

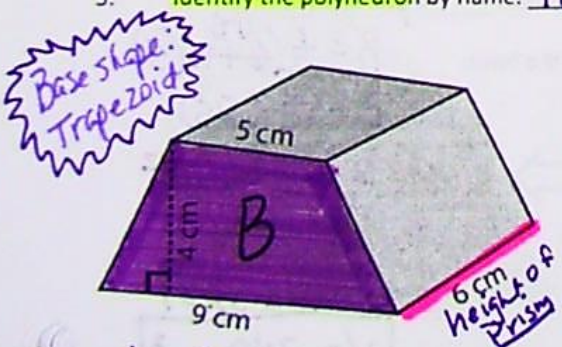
Calculate the volume:

$V = Bh$

$V = (50)(13)$

$V = 650\,mm^3$

3. Identify the polyhedron by name: Trapezoidal Prism



$b_1 = 5$
$b_2 = 9$
$h = 4$
} Trapezoid measures

Identify the base by name: Trapezoid... $A = \frac{1}{2}(b_1 + b_2)h$

Calculate the area of the base:

Show work ⟹

$B = \frac{1}{2}(b_1 + b_2)h$

$B = \frac{1}{2}(5+9)(4)$

$B = \frac{1}{2}(14)(4)$

$B = 28\,cm^2$

Calculate the volume:

$V = Bh$

$V = (28)(6)$

$V = 168\,cm^3$