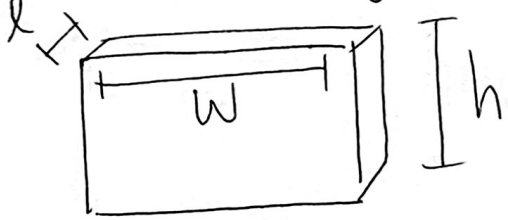
Noteset 1k - In Class Notes

Volume of Solids

The volume of a solid with known geometry (shape) can be found by equation.

Cube/Rectangle



$$V = \ell \cdot w \cdot h$$

Re: $1\,cm^3 = 1\,mL$

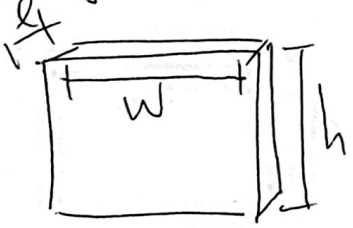
Cylinder

(note: $r = \frac{d}{2}$ (diameter))

$$V = \pi \cdot r^2 \cdot h$$

Density (D) can be calculated through the density equation ($D = \frac{m}{V}$)

Ex:



$\ell = 2.9\,cm$ $w = 1.3\,cm$

$h = 3.8\,cm$ $m = 13.6\,g$

$V =$ ___ mL $D =$ ___ g/mL

$V_{cube} = \ell \cdot w \cdot h$

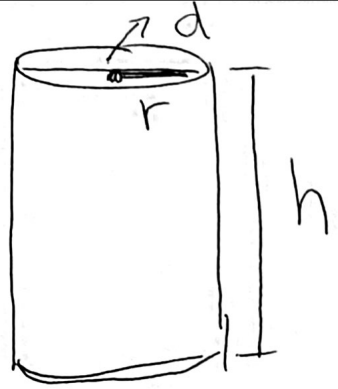
$V_{cube} = 2.9\,cm \cdot 1.3\,cm \cdot 3.8\,cm$

$= \underline{14.33\,cm^3\,(mL)}$

$D = \frac{m}{V} = \frac{13.6\,g}{14.33\,mL}$

$= \underline{0.95\,g/mL}$

Ex 2:



$r = \frac{d}{2} = \frac{3.6\,cm}{2}$

$r = 1.8\,cm$

$d = 3.6\,cm$ $r = \_\_ cm$

$h = 7.3\,cm$ $V = \_\_ cm^3\ (mL)$

$m = 36.2\,g$ $D = \_\_ g/mL$

$V = \pi \cdot r^2 \cdot h$

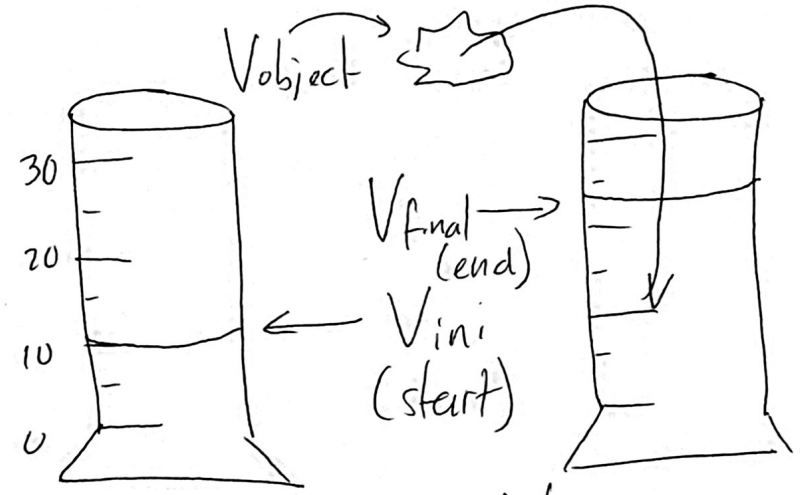
$V = \pi \cdot 1.8\,cm^2 \cdot 7.3\,cm$

$V = 74.30\,cm^3\,(mL)$

$D = \frac{m}{V} = \frac{36.2\,g}{74.30\,mL} = 0.49\,g/mL$

Volume by Difference

The volume (v) of an irregular (not normal) shape can be found in a water bath / graduated cylinder



$V_{object} = V_{final} - V_{ini}$

$V_{ini} = 10.0\,mL$

$V_{final} = 23.2\,mL$

$V_{obj} = 23.2\,mL - 10.0\,mL$

$= 13.2\,mL$

$V_{obj} = \_\_ mL$