# Aluminum Foil Challenge

Calculate the thickness, in atoms of Al, of one layer of aluminum foil. You may assume Al atoms are stacked on top of one another end to end.

Background info:

Density of Al = 2.70 g/cm$^3$

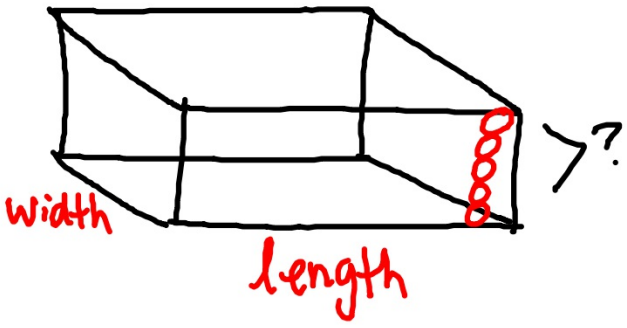
Radius of Al atom = 143 picometers (pm)

1 pm = $10^{-12}$ m

in other words: 1,000,000,000,000 pm = 1 m

Balances and rulers are available for your use.

Record data and calculations on a whiteboard.




mass = _____ g

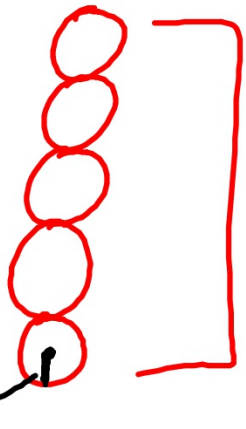
length = 3.52 cm

width = _____ cm

density = 2.70 g/cm$^3$ = $\frac{\text{mass}}{\text{volume}}$

Volume = lwh

h = _____ cm



.016 cm

$$\frac{\text{height pm}}{\text{diameter pm}}$$

143 pm

$1\ cm = 10^{-2}\ m$

$1\ pm = 10^{-12}\ m$

$$\frac{.016\ cm}{} \left| \frac{1\ m}{100\ cm} \right| \frac{1\ pm}{10^{-12}\ m} = \underline{\qquad\qquad}\ pm$$

## Materials : *Common Metals*

| | | |
|---|---|---|
| water | 1000 kg/m$^3$ | (1.00 g/cm$^3$) |
| aluminium | 2700 kg/m$^3$ | (2.70 g/cm$^3$) |
| zinc | 7130 kg/m$^3$ | (7.13 g/cm$^3$) |
| iron | 7870 kg/m$^3$ | (7.87 g/cm$^3$) |
| copper | 8960 kg/m$^3$ | (8.96 g/cm$^3$) |
| silver | 10,490 kg/m$^3$ | (10.49 g/cm$^3$) |
| lead | 11,360 kg/m$^3$ | (11.36 g/cm$^3$) |
| mercury | 13,550 kg/m$^3$ | (13.55 g/cm$^3$) |
| gold | 19,320 kg/m$^3$ | (19.32 g/cm$^3$) |