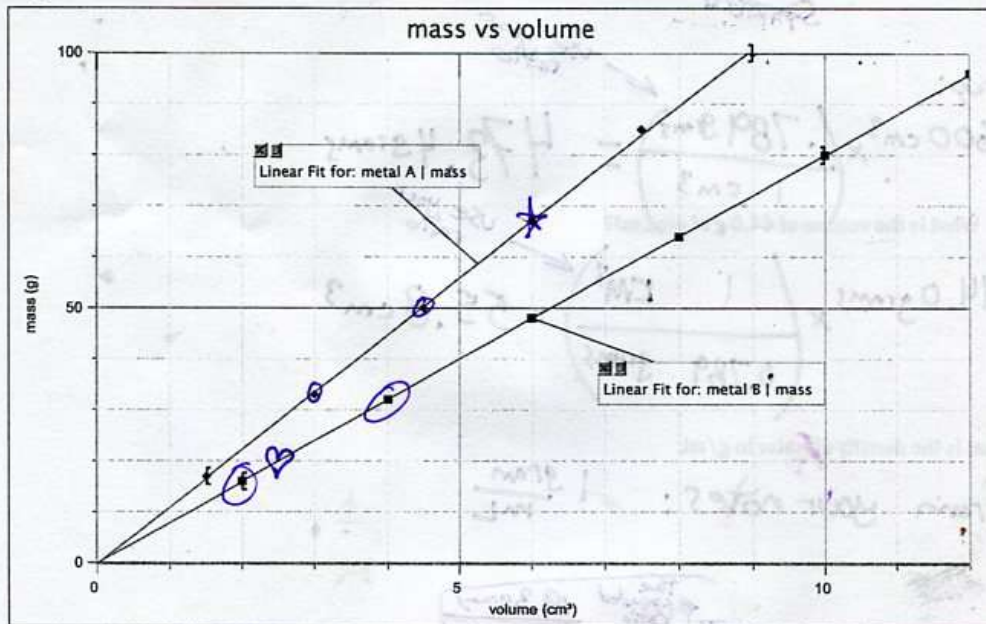# classwork not homework. Solve. Get a stamp. Learn it for the Quiz tomorrow.

mass vs volume

1. Determine the density of each metal (hint: density is just the slope of grams per mL). Show all your work and include appropriate units.

SLOPE FOR METAL "A"

$$\frac{\Delta y}{\Delta x} = \frac{50-32}{4.5-3} = 12 \frac{grams}{cm^3}$$

SLOPE FOR METAL "B"

$$\frac{\Delta y}{\Delta x} = \frac{32-16}{4-2} = \frac{16g}{2cm^3} = 8 \frac{g}{cm^3}$$

2. Don't calculate; just touch the graph with your finger to solve this. From the graph, estimate

  a. the mass of 6.0 cm^3 of metal A.   ✷ 67 grams

  b. the volume of 20 g of metal B.   ♡ 2.5cm^3

  c. mark on the graph how you found the answers above.

3. Use the density of B as a factor to CALCULATE the answer to 2b. Show the set-up including how the units cancel.

① Use $8 \frac{grams}{cm^3}$ as the ratio. Use 20 grams as the starter #.

② Set up: $20 \, grams \times \left(\dfrac{1 \, cm^3}{8 \, grams} \right) = 2.5 cm^3$

expand this to a ratio $\dfrac{.789\ grams}{1\ cm^3}$

4. Ethanol has a density of 0.789 g/cm³.
   a. What is the mass of 600 cm³ of ethanol?

STARTER#

use your ratio

Setup:

$$600\ cm^3 \times \left(\dfrac{.789\ grams}{1\ cm^3} \right) = 473.4\ grams$$

   b. What is the volume of 44.0 g of ethanol?

use your ratio

$$44.0\ grams \times \left(\dfrac{1\ cm^3}{0.789\ grams} \right) = 55.8\ cm^3$$

5. What is the density of water in g/mL

from your notes: $\quad 1\ \dfrac{gram}{mL}$

the expanded ratio is $\dfrac{19.3\ grams}{1\ cm^3}$

Gold has a density of 19.3 g/cm³. A cube of gold measures 57.2cm on each edge:
8.   What is the volume of the cube?
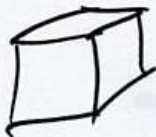
$$volume = Length \times width \times height$$
$$Volume = (57.2\ cm)(57.2\ cm)(57.2\ cm)$$
$$Volume = 187000\ cm^3$$

9.   What is its mass? How many significant figures should you include in your answer and why?

use your ratio

$$187000\ cm^3 \times \left(\dfrac{19.3\ grams}{*\ 1\ cm^3} \right) = 3610000\ grams$$

round to three sig figs

* the "1" has infinite sig figs

Purpose:

Use slope as density.

WARMUP :

Using the smart phone of someone at your table, look at the copper graph from our class website.

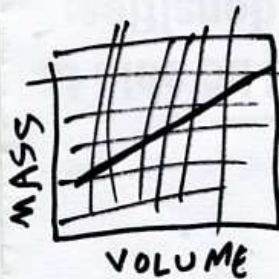Calculate the <u>slope</u> before we start class.

#1 Only memorize one density:

WATER AT $\left(4°C\right)$ is

$1g = 1mL$ so

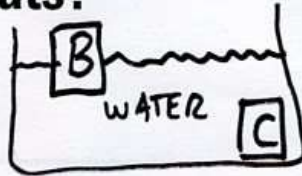density of water is $1\frac{gram}{mL}$

INFINITE

#2 Slopes ARE densities.

← the slope is the density for that line

#3 What floats?

In a mix, the less dense thing floats, the more dense thing sinks.

Water density (at 4°C) is _____ $1 \frac{gram}{mL}$

Therefore you should be able to predict these rough densities:

A: _greater than_ $1 \frac{gram}{mL}$

B: _less than_ $1 \frac{gram}{mL}$

C: _greater than_ $1 \frac{gram}{mL}$