M-GP General Physics Week 4 10/2

1.) Density: 14.0 g/cm^3 → mass / volume

Mass: 24.0 g

Volume:

$D = \frac{M}{V}$ $V = \frac{M}{D} = \frac{24.0\ g}{14.0\ g/cm^3}$ 3 sf

$= 1.71\ cm^3$

2.) Mass: 18.6 g

Volume: $38.2\ cm^3$ $D = \frac{M}{V} = \frac{18.6\ g}{38.2\ cm^3} = 0.487\ g/cm^3$

Density:

3.) Volume: $12.4\ cm^3$ $V(D) = \left(\frac{M}{V}\right)V$ $M = (V)(D)$

Density: $2.60\ g/cm^3$ $= (12.4\ cm^3)(2.60\ g/cm^3)$

Mass: $= 32.2\ g$

1.) 380000. → $3.8 * 10^5$

2.) 0.00058 → $5.8 * 10^{-4}$

3.) 706000000. → $7.06 * 10^8$

4.) 0.000000732 → $7.32 * 10^{-6}$

5.) 891000. → $8.91 * 10^5$

6.) 0.0000091 → $9.01 * 10^{-6}$

Find the number of significant digits.

1.) 5.004 m — 4 sig figs

2.) 0.0047 m — 2

3.) 6000 km — 1

4.) 200. cm — 3

5.) 4009 — 4

6.) 0.002230 m — 4

7.) 9 planets — ∞

8.) 400.03 km — 5

9.) 5.000 cm — 4

Dimensional Analysis

1.) Burritos are amazing. The standard burrito is 6 inches long and delicious. The moon is, at any given time, 238,900 miles from the earth. How many burritos away is the moon from the earth?

12 inches = 1 foot 5,280 feet = 1 mile 1 supreme = beans, guac and queso

Write in scientific notation.

$$238{,}900 \text{ miles} * \frac{5280 \text{ ft}}{1 \text{ mile}} * \frac{12 \text{ in}}{1 \text{ ft}} * \frac{1 \text{ burrito}}{6 \text{ in}} =$$

$$2{,}522{,}784{,}000 \text{ burritos} = 3 * 10^9 \text{ burritos}$$

$3{,}000{,}000{,}000$

2.) Craters be thirsty. A Big Gulp soft drink at 7-11 is 30 ounces. The Grand Canyon is big. Seriously. It has a volume of 5,450,000,000,000 cubic yards.

1 ounce = 1.805 cubic feet 1 cubic yard = 27 cubic feet

Write in scientific notation.

3.) Mo' money, mo (weight) problem. Money is awesome. And money in bin form… as in Scrooge McDuck's money bin… is beyond awesome. (Note: watching an episode of DuckTales is a homework assignment if you have never watched it)

A penny weighs 2.5 grams. Jeff Bezos, owner and founder of Amazon, has a net worth of $145,400,000,000. What would be the weight, in pounds, of Jeff Bezos's fortune if he liquidated all of his assets and exchanged it for pennies?

1 pound = 454 grams

Write in scientific notation.

$$\$145,400,000,000 * \frac{100 \text{ pennies}}{1\ \$} * \frac{2.5 \text{ gram}}{1 \text{ pennies}} * \frac{1 \text{ pound}}{454 \text{ g}}$$

denotes significance $80,000,000,000$

4.) Tim Janus is a great man. He holds the world record for longest belch at 18.1 seconds. Think about that for a second. Imagine it....

Anyway… How many world record Tim Janus belches are there in one year?

1 min = 60 sec 60 min = 1 hr 24 hr = 1 day 365 days = 1 yr

Write in scientific notation.

Cu - Copper

$1\ cm \rightarrow 1\ cm^3$

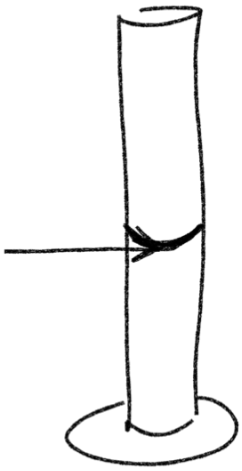
Density ρ

g/cm^3

$cm^3 = mL$

g/mL

$\rho = 8.96\ g/cm^3$



$8.81\ g$

Density

Chromium	$7.19\ g/cm^3$
Cobalt	$8.9\ g/cm^3$
Carbon	$1.82\ g/cm^3$
Niobium	$8.67\ g/cm^3$
Vanadium	$6.0\ g/cm^3$
Titanium	$4.506\ g/cm^3$
Antimony	$6.697\ g/cm^3$
Tungsten	$19.25\ g/cm^3$
Molybdenum	$10.2\ g/cm^3$
Copper	$8.96\ g/cm^3$
Zinc	$7.14\ g/cm^3$
Aluminum	$2.7\ g/cm^3$
Iron	$7.86\ g/cm^3$
~~Bismouth~~	$9.8\ g/cm^3$

$6.8 \rightarrow$ Antimony

$\approx 10 \rightarrow$ Molybdenum

$\approx 6 \rightarrow$ Vanadium