Name:_____
Blk:_____Date:_____

Chemistry 11
MULIPLE UNIT CONVERSIONS

In our last lesson we learned how to do SIMPLE UNIT CONVERSIONS, ~~today~~ now we are going to investigate more complicated problems.

Ex.1 If Tim Hortons® donuts are$5.35/doz, and there are 12 donuts/doz, how many individual donuts can be bought for $21.40?

C = # of individual donuts

A = $21.40

B = this time there are multiple conversion factors:

$\frac{\$5.35}{1\ \text{doz donuts}}$ OR $\frac{1\ \text{doz donuts}}{\$5.35}$

$\frac{1\ \text{doz donuts}}{12\ \text{donuts}}$ or $\frac{12\ \text{donuts}}{1\ \text{doz donuts}}$

A • B = C

PUT IT ALL TOGETHER

$$\$21.40\left(\frac{1\ \text{doz donuts}}{\$5.35}\right)\left(\frac{12\ \text{donuts}}{1\ \text{doz donuts}}\right) = 48\ \text{donuts}$$

Ex 2. How many seconds are there in a 365 day calendar year?

C = # s

A = 365 days

B = this time there are multiple conversion factors:

1 day = 24 hr
1 hr = 60 min
1 min = 60 s

PUT IT ALL TOGETHER

$$365\ \text{days}\left(\frac{24\ \text{hr}}{1\ \text{day}}\right)\left(\frac{60\ \text{min}}{1\ \text{hr}}\right)\left(\frac{60\ \text{s}}{1\ \text{min}}\right) =$$

31,536,000 s

or $3.1536 \cdot 10^7$ s

Ex. 3. The gas tank of a Canadian car holds 39.5 L of gasoline. If 1 L of gasoline is equal to 0.264 gal (gallons) and the price of gas at the pump in Blaine, Washington is $2.65 US/gal. What is the cost of filling up an empty Canadian Car if $1US = $1.30 CDN?

C = $CDN

A = 39.5 L

B = this time there are multiple conversion factors:

"B"

1 L = 0.264 gal

$2.65 US = 1 gal

$1 US = $1.30 CDN

PUT IT ALL TOGETHER

$$39.5\,L\left(\frac{0.264\,gal}{1\,L}\right)\left(\frac{\$2.65\,US}{1\,gal}\right)\left(\frac{\$1.30\,CDN}{\$1\,US}\right)=$$

$35.92 CDN

Seatwork/Homework: Exercises 3 – 10

Practice!

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3. An old barometer hanging on the wall of a mountain hut has a reading of 27.0 inches of mercury. If 1 inch of mercury equals 0.0334 atm ("atmospheres") and 1 atm = 101.3 kPa ("kilopascals"), what is the pressure reading of the barometer, in kilopascals?

4. It requires 334 kJ of heat to melt 1 kg of ice.
   (a) The largest known iceberg had a volume of about $3.1 \times 10^{13}\ m^3$. How much heat was required to melt the iceberg if 1 m^3 of ice has a mass of 917 kg?
   (b) The explosive "TNT" releases 1.51×10^4 kJ of energy for every kilogram of TNT which explodes. Provided that all the energy of an explosion went into melting the ice, how many kilograms of TNT would be needed to melt the iceberg in part (a) of this question?

5. Sugar costs \$0.980/kg. 1 t = 1000 kg. How many tonnes ("t") of sugar can you buy for \$350?

6. The Cullinan diamond, the largest diamond ever found, had an uncut volume of 177 mL. If 1 mL of diamond has a mass of 3.51 g and 1 carat = 0.200 g, how many carats was the Cullinan diamond?

7. How many kilometres ("km") will a car travelling at 120 km/h go in: (a) 0.25 h? (b) 12 min?

8. Solve the following, using the fact that beakers cost \$8.40 per dozen.
   (a) Harry drops 3 dozen beakers. How much will the Chemistry teacher charge Harry?
   (b) Harry drops another 5 dozen beakers (clumsy!). If Burger Bob's hamburgers cost \$1.50 each, how many hamburgers could clumsy Harry have bought for the same amount of money as he has to pay for the second batch of beakers?
   (c) Harry does not learn very quickly, and breaks a third batch of beakers. If he has to pay \$13.30, what is the number of beakers he breaks the third time? (Express your answer in actual numbers of beakers, rather than in "dozens of beakers".)

9. An ancient Celtic chicken farmer wished to purchase a gift for his wife. The gift was worth 2 horses. At the local market, 3 horses were worth 5 cows, 1 cow was worth 4 hogs, 3 hogs were worth 4 goats, and 1 goat cost 9 chickens. How much was the gift going to cost the farmer, who had to pay in chickens?

10. If 1 yard = 3 feet, 1 foot = 12 inches and 1 centimetre = 0.3937 inch, how many centimetres are there in 5 yards?