Bell Ringer #12:

Socrative Room Name:
LEVEL70WARRIOR

Chemical Conversions

http://drmoad.weebly.com/

Agenda

Bell Ringer
Error Analysis Video
Chemical Conversion Problems
Mole & Molecular Weight Lab
Exit Ticket

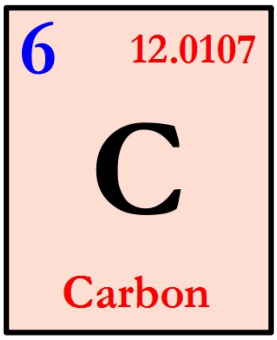
Chemical Conversion Homework

http://drmoad.weebly.com/

Reminder!
(Due Friday)

Error Analysis Video

Atomic Mass



Molecular Mass

6 12.0107	1 1.00794	7 14.00674
C	H	N
Carbon	Hydrogen	Nitrogen

Typical analytical chemistry labs have an instrument called a mass spectrometer that will tell you about the molecular mass of a molecule.

Imagine you work for a crime lab and analyze toxic chemical samples. What is the molecular mass of this toxin that you would expect to measure if its chemical formula is $C_{10}H_{15}N$?

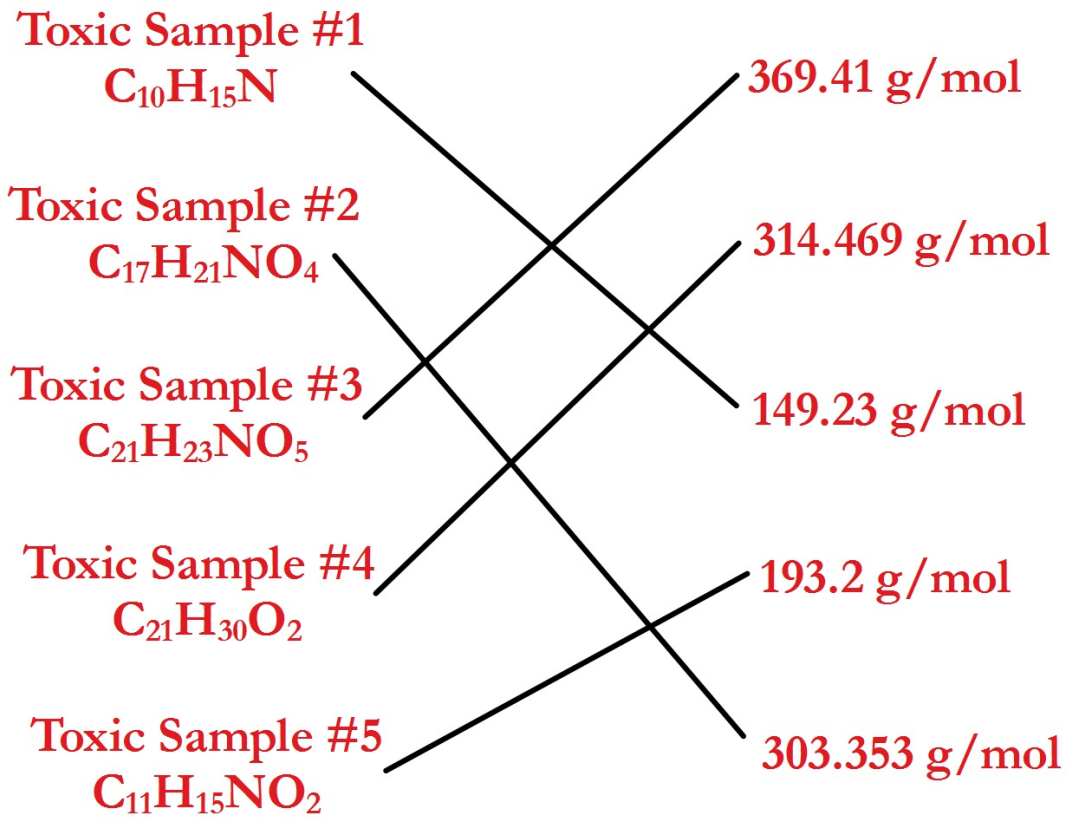
Crime Lab Mix Up - Group Work

Match the chemical to its molecular weight

Toxic Sample #1 $C_{10}H_{15}N$	369.41 g/mol
Toxic Sample #2 $C_{17}H_{21}NO_4$	314.469 g/mol
Toxic Sample #3 $C_{21}H_{23}NO_5$	149.23 g/mol
Toxic Sample #4 $C_{21}H_{30}O_2$	193.2 g/mol
Toxic Sample #5 $C_{11}H_{15}NO_2$	303.353 g/mol

Crime Lab Mix Up

Answers



Conversion Maps - One Step

Convert from grams to moles.

grams → moles

$$\frac{g}{1} \times \frac{\text{mol}}{g} = \text{mol}$$

Convert from moles to grams.

moles → grams

$$\frac{\text{mol}}{1} \times \frac{g}{\text{mol}} = g$$

Conversion Maps - One Step

Convert from molecules to moles.

molecules → moles

$$\frac{\text{molecules}}{1} \times \frac{\text{mol}}{6.022\times10^{23}} = \text{mol}$$

Convert from moles to molecules.

moles → molecules

$$\frac{\text{mol}}{1} \times \frac{6.022\times10^{23}}{\text{mol}} = \text{molecules}$$

Conversion Maps - Two Step

Convert from molecules to grams.

molecules → moles → grams

$$\frac{\text{molecules}}{1} \times \frac{\text{mol}}{6.022\times10^{23}} \times \frac{g}{\text{mol}} = g$$

Convert from grams to molecules.

grams → moles → molecules

$$\frac{g}{1} \times \frac{\text{mol}}{g} \times \frac{6.022\times10^{23}}{\text{mol}} = \text{molecules}$$

Conversion Maps - Multiple Steps

Convert from Diet Pepsi to Diet Coke.

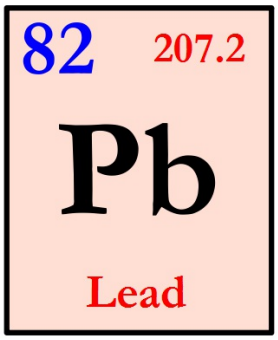
23.2 Pepsi = 1 Sprite
1.5 Diet Pepsi = 1 Pepsi
7.3 Coke = 1 Sprite
2.6 Diet Coke = 1 Coke
5.5 Diet Cokes = 1 Diet Dr. Pepper
14.3 Diet Dr. Pepper = 1 Dr. Pepper

Diet Pepsi → Pepsi → Sprite → Coke → Diet Coke

$$\frac{\text{Diet Pepsi}}{1} \times \frac{\text{Pepsi}}{\text{Diet Pepsi}} \times \frac{\text{Sprite}}{\text{Pepsi}} \times \frac{\text{Coke}}{\text{Sprite}} \times \frac{\text{Diet Coke}}{\text{Coke}} = \text{Diet Coke}$$

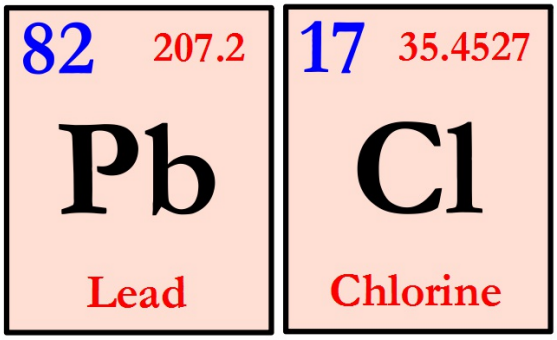
Chemical Conversion Problems

25 g of lead equals how many atoms of lead?

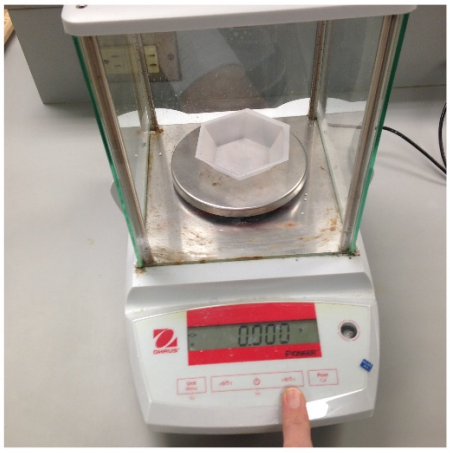


Chemical Conversion Problems

25 g of $PbCl_4$ equals how many molecules of $PbCl_4$?

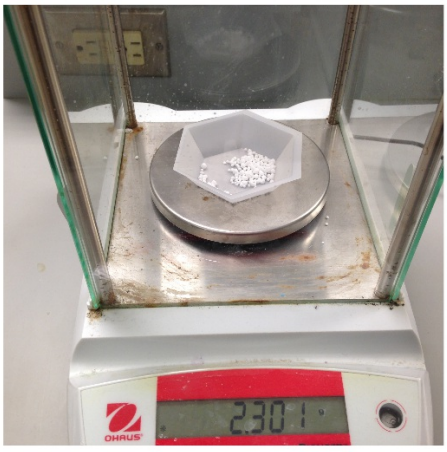


Using the Analytical Balance



(1) Using the analytical balance, zero out the balance with an small empty weigh tray.

(2) Remove the empty weigh tray from the balance place a small scoop of solid calcium chloride into the tray.



(3) Place the tray back on the balance and measure it's mass. Record in the Data Table (record every digit shown on the analytical balance - do not round). Include units with recorded mass.

(4) Clean up any mess!

Mole and Molecular Weight Lab

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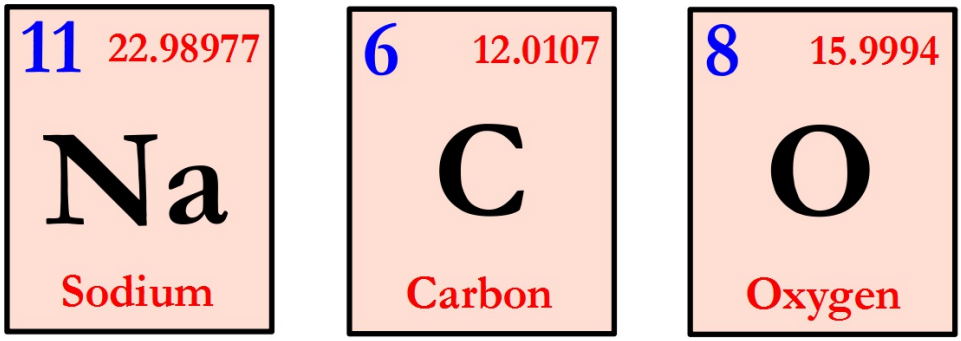
Molecular Mass



Find the molecular mass of Na_2CO_3.

$$(2 \times 22.98977) + (1 \times 12.0107) + (3 \times 15.9994)$$
$$= 105.98844\, g / \text{mol}$$

Chemical Conversion Problems

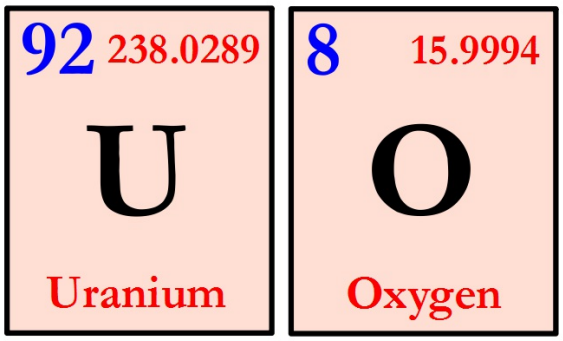
How many moles of oxygen are in a 76 gram sample of oxygen?

$$(2 \times 15.9994) = 31.9988\,g / \text{mol}$$

$$\frac{76\,g\,O_2}{1} \times \frac{\text{mol}}{31.9988\,g} = 2.3751\,\text{mol}\,O_2$$

Chemical Conversion Problems

0.0045 moles of U_3O_5 is equal to _____ grams

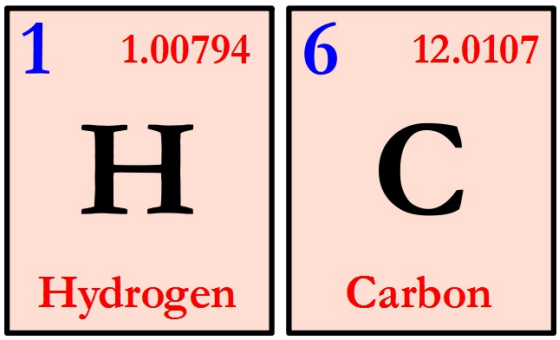


$$(3 \times 238.0289) + (5 \times 15.9994) = 794.0837\, g / \text{mol}$$

$$\frac{0.0045 \text{mol} U_3O_5}{1} \times \frac{794.0837\, g}{\text{mol}} = 3.5734\, g \text{ of } U_3O_5$$

Chemical Conversion Problems

Convert 24 grams of CH_4 into molecules of CH_4.



$$(1 \times 12.0107) + (4 \times 1.00794) = 16.04246\ g / \text{mol}$$

$$\frac{24\ g\ CH_4}{1} \times \frac{\text{mol}}{16.04246\ g} \times \frac{6.022 \times 10^{23}}{\text{mol}}$$

$$= 9.009 \times 10^{23}\ \text{molecules of}\ CH_4$$

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Moles to Grams Conversion