**The Mole – the fundamental unit of chemistry**

**Recall:**

* Atoms are made of protons, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* The vast majority of the atom’s mass is due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* # of protons = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ number



* # of protons + # of neutrons = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ number



But, atoms are almost incomprehensibly small. How small? How can we know anything about the masses of these tiny particles?

* We know that the mass of an oxygen atom is \_\_\_\_\_\_\_\_\_\_times the mass of a hydrogen atom.



* We can use the mole (mol) when dealing with atoms and molecules.
* 1 mole =



**How big is that?**

If you had a mole of pennies and divided it evenly amongst all the people on the earth (approximately 7 billion), how much money would each person have?



If I offered you an automatic 100% for making 6.02x1023 dots on paper, would you do it?



**Practice:**



1. How many atoms of oxygen in 2.5 moles of oxygen gas?



1. How many atoms (of all elements) in 1.3 moles of sodium nitrate?



1. How many moles of carbon dioxide in 1.2x1025 molecules?



1. How many formula units of magnesium fluoride in 16.1 moles?



1. How many atoms of hydrogen in 3.0 moles of glucose (C6H12O6)



So, are we supposed to count all those atoms and molecules????



Fortunately, no! That would be impossible.



* The mass of 1 mole of hydrogen-1 atoms is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_g



* The mass of 1 mole of oxygen atoms is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_g



**The mass of one mole of any element is equal to its atomic mass, but expressed in grams**



To find the molar mass of any compound, simply figure out its molecular mass using the masses as expressed on the periodic table.



**Find the molar mass of the following compounds:**

1. Calcium carbonate



1. Sodium nitrate



1. Silver oxide



1. Nitrogen tribromide



1. Ammonia



1. Potassium sulphide



1. Potassium sulphate



**Find:**

1. The mass of 2.5 moles of carbon dioxide.



1. The number of moles of sodium chloride in 585g



1. The mass of 3.0x10-5 moles of silver nitrate



1. The mass of 0.68 moles of water



1. The number of moles in 4.0 kg of sucrose (C12H22O11)

