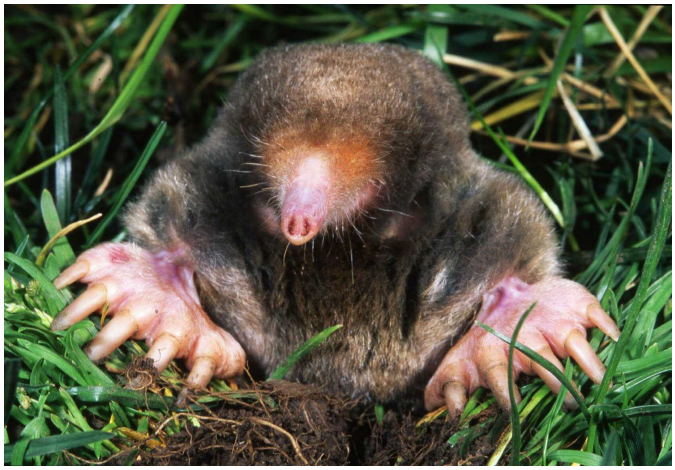
https://www.youtube.com/watch?v=rc5G04nJecI

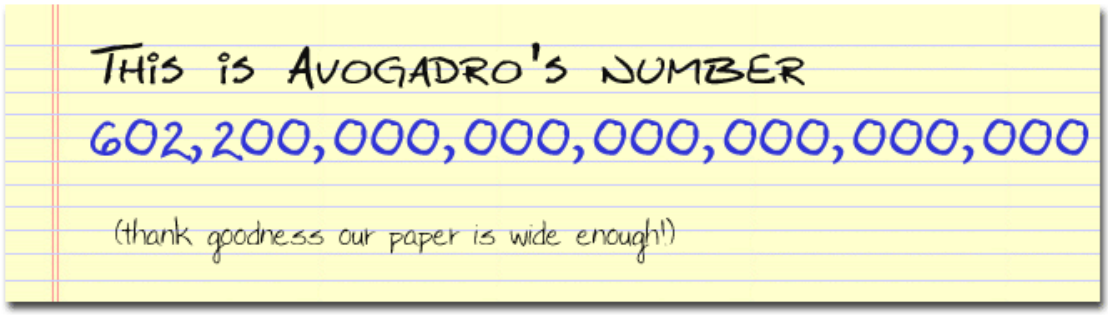
https://www.youtube.com/watch?v=SZ7X2mrUj6o

Atoms, molecules and holy Mole (y)!!!



What is a mole?

- a unit of measurement
- 6.02 x 10^{23} particles (Avogadro's number) make up a mole (602 hexillion)



a HUGE number!!!!!!!

- 1 mol $ = each person on Earth gets 200 000 billion $ (multiply 1 dollar bill by 6.02×10^{23})

1 mol peas = 250 planets the size of Earth, 1m deep

1 mol blood cells = > all blood cells in all humans on Earth

1 mol sand = all sand on Miami Beach

1 mol inches = 8 round trips of the galaxy

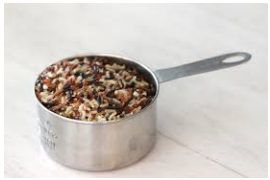
The difference between atoms and molecules:

- Ca = an atom, no chemical bond
- $CaCl_2$ or O_2 = a molecule (more than one atom bonded together) O+O = O2 → compound

A dozen donuts = 12 A dozen bagels = 12




1 cup of sugar = 235 mL 1 cup of rice = 235 mL

1 mole of Cu = 6.02×10^{23} 1 mole of Zn = 6.02×10^{23}

1 mole of $CaCl_2$ = 6.02×10^{23} 1 mole of O_2 = 6.02×10^{23}

- Does the dozen donuts weigh the same as the dozen bagels? No
- Does 1 cup of sugar weigh the same as 1 cup of rice? No
- Does 1 mole Cu weigh the same as 1 mole of Zn? No

https://www.youtube.com/watch?v=TEl4jeETVmg

https://www.youtube.com/watch?v=KAAG0oQ76xw

Molar Mass

https://www.youtube.com/watch?v=b2raanVWU6c

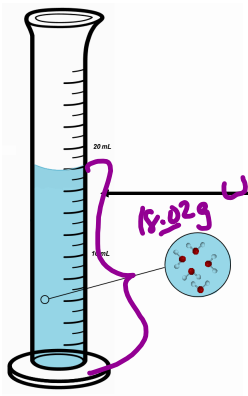
- mass of one mole of a substance measured in g/mol
- molar mass of compounds - add up molar masses of each individual atoms. Use atomic mass on PT.

C	KF	$CaCO_3$
12.01 g/mol	39.10 + 19.00 = 58.10 g/mol	40.08 + 12.01 + 16.00 x3 = 100.09 g/mol

Molar Mass of water = 18.02 g/mol

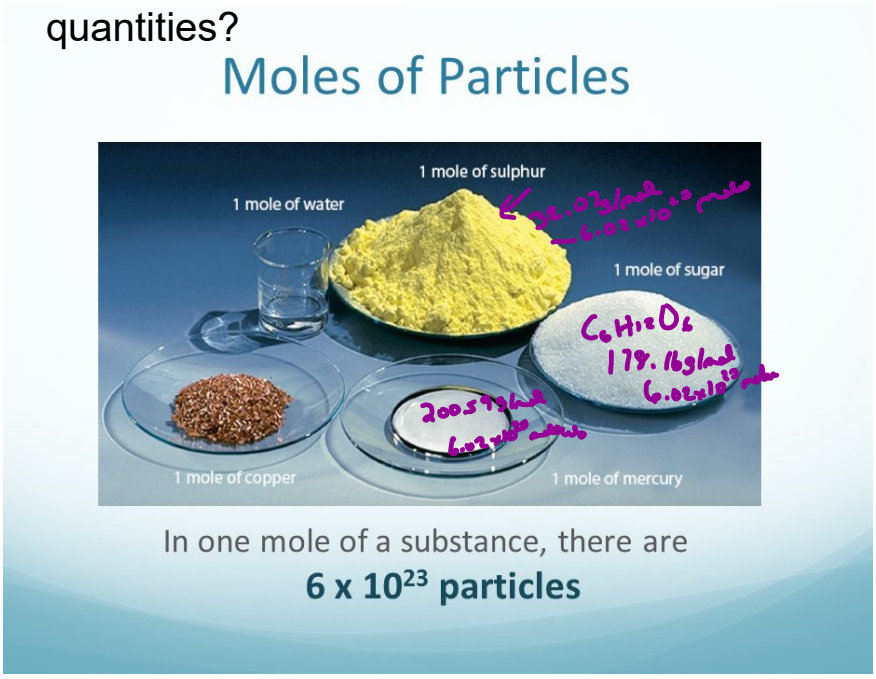
1 mol of H_2O = 6.02×10^{23} molecules

In 18.02 g of water there are 6.02×10^{23} molecules.

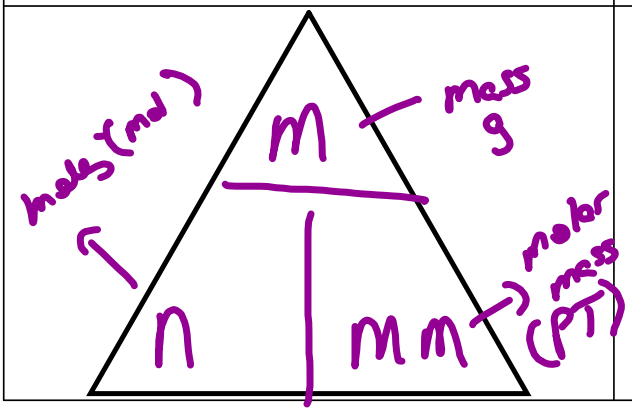
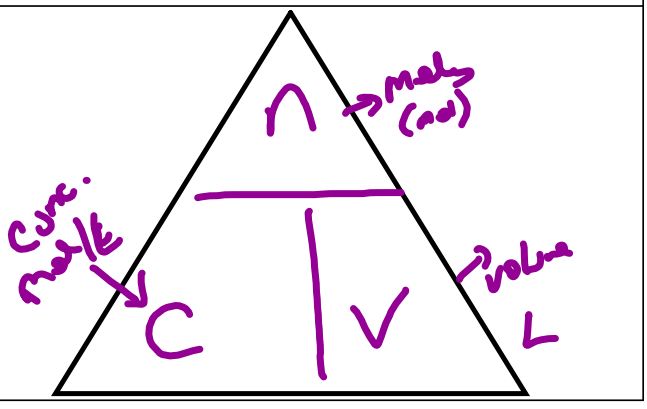


18.02 g → 6.02×10^{23} molecules of water

How do we know these are the right quantities?



Moles formulas

Mole formula #1	Mole formula #2
$n = m/mm$	$n = C \times V$
• n= moles,unit is mol • m= mass,unit is g • mm= molar mass, unit is g/mol	• n= moles, unit is mol • C= molarity, molar concentraion or solution, unit is mol/L or M • V= volume, unit is L
Use when mass given in word problem	• Use when mol/L given in problem • Can also be solved using a ratio instead of formula
	

Things to MEMORIZE

- Molarity and molar concentration means the same thing. Unit is mol/L or M.
- Volume question unit must be in L.
- Atom or molecule question 6.02×10^{23} must be used in answer.
- If there is a 'g' unit if the question the formula n=m/mm is always used first.
- If there is a 'mol/L' unit in the question it can be solved using n = C x V or as a ratio.
- To convert mL to L ÷ by 1000
- To convert mg to g ÷ 1000

Attachments

- Austin_Powers_THE_MOLE.mp4
- Austin_Powers_THE_MOLE.mp4