

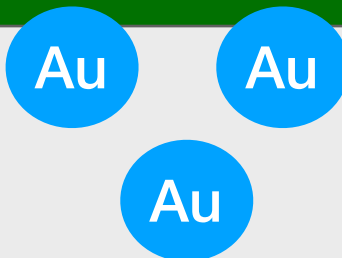

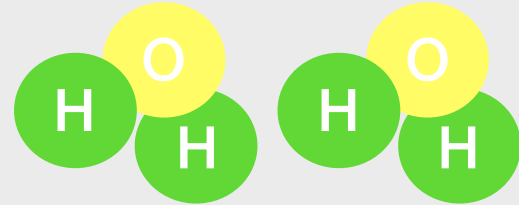

# **The Mole: Definition and Molar Mass**

Unit 7

# Types of Particles

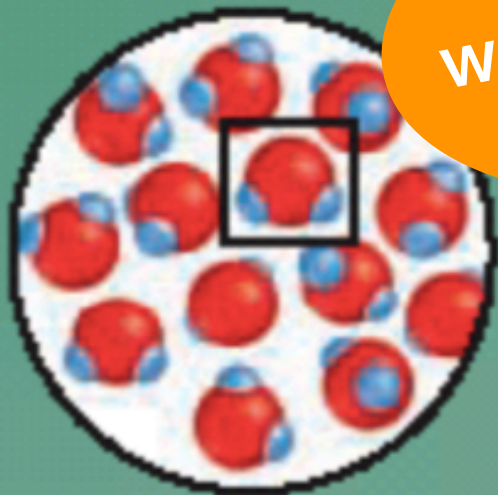
Simplest unit for each type of particle

Write this table!

Particle	Represents	Example	Visual
atom	single element	3 atoms of gold	
ions	charged atoms	2 ions of chloride	
molecule	covalent compounds (nonmetals)	2 molecules H <sub>2</sub> O	
formula unit (f.u.)	ionic compounds (cation & anion)	4 f.u. NaCl	

Molecules = Particles = Atoms = Formula Units

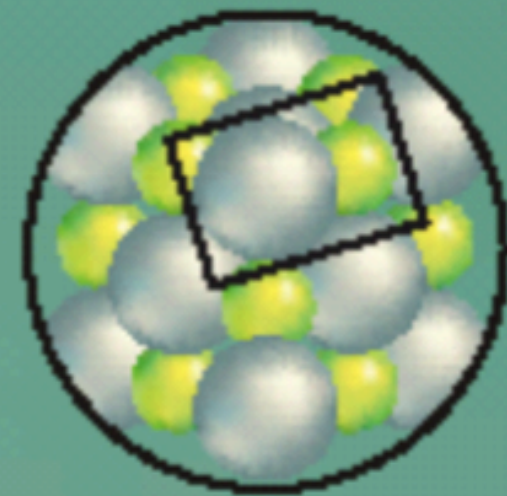
Don't write this, just a visual.



Molecule



Atom



Formula unit



H<sub>2</sub>O



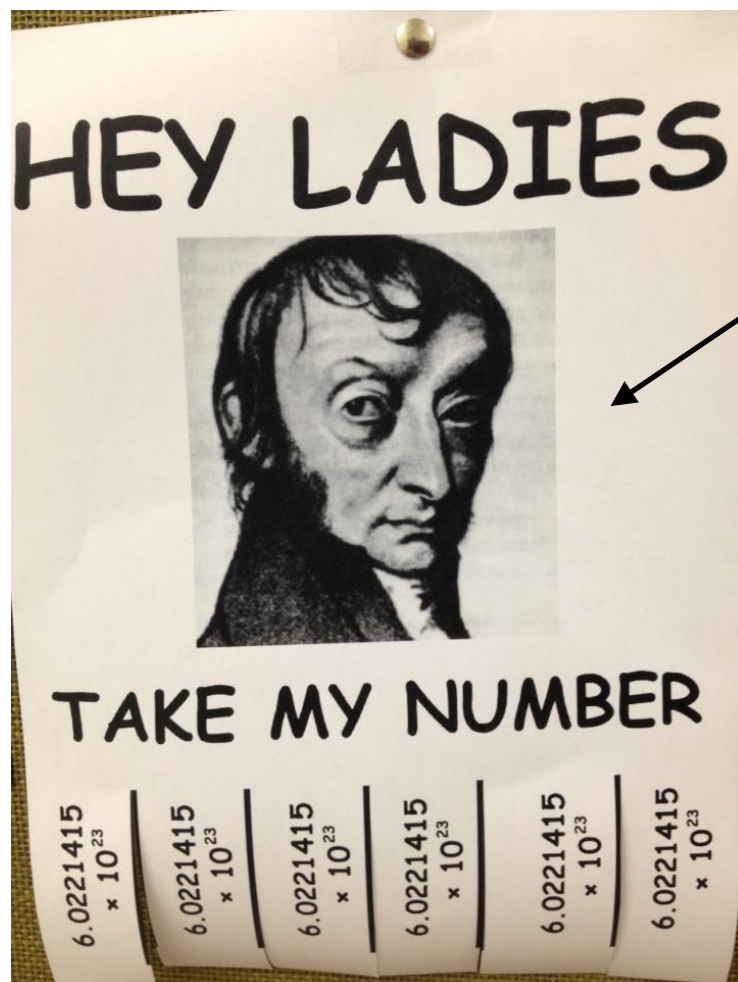
Cu



NaCl

**Mole (mol)** - amount of a substance that equals  $6.02 \times 10^{23}$  particles

\*also known as **Avogadro's number** (scientist that first calculated it)

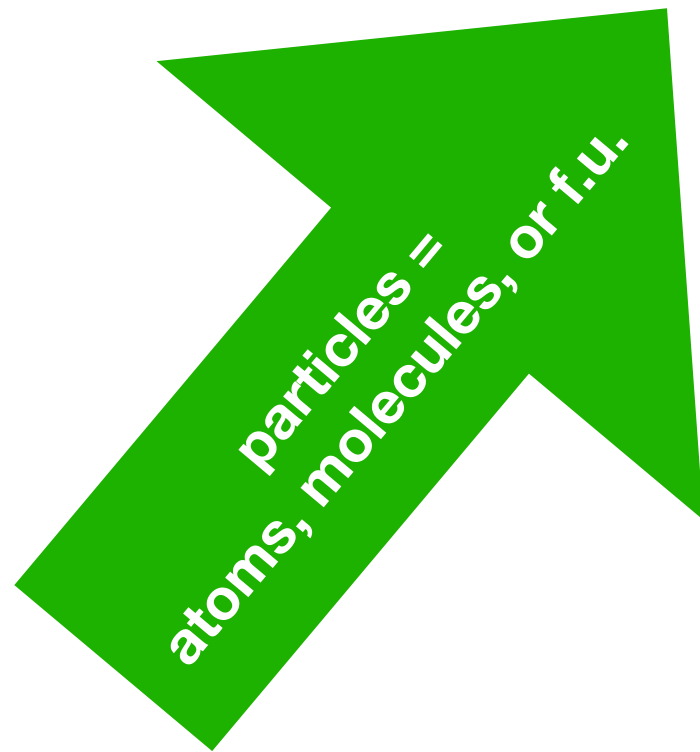


Avogadro!

Not avocado!



1 mole =  $6.02 \times 10^{23}$  particles = Avogadro's number





Draw this diagram!

# Mole Conversions

**mass (g)** ↔ **moles (mol)** ↔ **particles**  
(atoms, molecules, F.U.s)

molar mass from periodic table

\_\_\_\_\_ g = 1 mol

$\frac{\text{_____ g}}{1 \text{ mol}}$  or  $\frac{1 \text{ mol}}{\text{_____ g}}$

Avogadro's number

1 mol =  $6.02 \times 10^{23}$  particles

$\frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ particles}}$  or  $\frac{6.02 \times 10^{23} \text{ particles}}{1 \text{ mol}}$

# Practice

To be done in class.  
For #3 & #4  
leave 2 lines in-between!

1. 1 mol CO<sub>2</sub> = \_\_\_\_\_ molecules CO<sub>2</sub>

2. 1 mol Ag = \_\_\_\_\_ atoms Ag

3.  $4.52 \times 10^{20}$  f.u. NaCl = \_\_\_\_\_ mol NaCl

4. 3.4 mol H<sub>2</sub>O = \_\_\_\_\_ molecules H<sub>2</sub>O

**molar mass** - the mass of 1 mole of a substance in grams

- Also known as *molecular mass, formula mass, or formula weight*
- Molar mass is found by adding the atomic masses of elements on the P.T. and changing the unit to **grams**



# Practice

1. Molar mass of Au?

2. Molar mass of CO<sub>2</sub>?

3. Molar mass of Mg(OH)<sub>2</sub>?

Do in class.  
Leave 1 line below each.