

The Mole



Dimensional Analysis Review

- How many seconds are in 5.0 hours?

Dimensional Analysis Review

- Calculate the number of inches in 26 yards

Stoichiometry

- _____ is just a long word for changing units in chemistry
- Just remember to ALWAYS start with your _____!
- If you can do Dimensional Analysis, you can do stoichiometry



Steps

1. Start with your _____
2. Use _____ and cross out until you get what you wanted
3. Check _____

The Mole

- Chemists need a convenient method for counting accurately the number of atoms, molecules, or formula units in a sample of a substance.
- The _____ (mol) is the SI base unit used to measure the _____ of a substance.

The Mole

- A mole of anything contains _____ representative particles.
- A representative particle is any kind of particle such as atoms, molecules, formula units, electrons, or ions.
- 6.02×10^{23} is called _____ number

Conversion Factor #1

Conversion factor: $\frac{6.02 \times 10^{23} \text{ representative particles}}{1 \text{ mole}}$

Representative Particles

- Anything - _____
- Elements - _____
- Covalent Compounds - _____
- Ionic Compounds - _____
- Ions - _____

Mole – Representative Particle Calculations

- Calculate the number of atoms in 3.50 moles of copper

Another Example

- Calculate the number of molecules in 2.6 moles of H_2O

Another Example

- Calculate the number of formula units in 5.23 moles of NaCl

Mole – Representative Particle Calculations

- How many moles of MgO are in 9.72×10^{23} molecules of MgO?

Another Example

- How many moles are in 4.50×10^{24} atoms of Zinc?

Mass & the Mole

- The mass in grams of 1 mole of a substance is called the _____
- It can also be called:

- To get the molecular weight you just add up all of the masses of all of the elements in a compound

Molecular Weight

- Calculate the molecular weight of the following:

- Ca

- Na

Molecular Weight

- Calculate the molecular weight of the following:
- MgO
- NaCl
- H₂O
- Fe₂O₃

Conversion Factor # 2

$\frac{1 \text{ mole}}{\text{Molecular weight (g)}}$

The molecular mass comes from the periodic table!

Mole – Mass Calculations

- What is the mass of 4.21 moles of iron (III) oxide?

Another Example

- Calculate the mass of 1.630 moles of Na

Mole – Mass Calculations

- How many moles of $\text{Ca}(\text{OH})_2$ are in 325 grams?

Another Example

- How many moles are in 62.17 g of sodium chloride?