IMPORTANCE OF SIG FIGS

-We are always limited by the instrument/technique/conditions that we use to make measurements.

WEIGHING COMPOUNDS

EX: If a pharmacist wanted to weigh out 1 mg of an expensive medicine product, what balance should she or he use?

RULES FOR SIG FIGS

- All nonzero integers are significant

EX: 5.469 = 4 sig figs

- All zeros to the left of the first nonzero digit are NOT significant; these are called place holders

EX: 0.0045 = 2 sig figs

- All zeros between nonzero digits ARE significant

EX: 0.09005 = 4 sig figs

- All zeros at the end of a number that has a decimal point are significant

EX: 56.7800 = 6 sig figs

- Zeros at the end of a whole number may or may not be significant

EX: 500, 500.0, 5.0x10^2, 5.00x10^2 = 1,2, or 3>>> depending how its written

- For exact numbers, there is no uncertainty as to its value

EX: 210 students = all digits significant

MATHEMATICAL OPERATIONS

- Addition and subtraction
    - Units must match
    - Exponent in scientific notation must match

EX: 5.628 x 10^2

+3.2 x 10^2

ANS: 8.8 x 10^2

- Multiplication and Division
    - Goes by LIMITER

EX: 4809 x 45.5 x 300.0 = 6.56 x 10^7

SF: 4 3 4

IN MIXED CASES, ONLY ROUND AT THE END

PERIODIC TABLE

- 92 naturally occurring elements
- In order of increasing atomic number (protons)
- Grouped by properties

DIATOMIC: hydrogen, nitrogen, oxygen, fluorine, chlorine, bromine, iodine

- Atomic Mass: weighted average mass of one atom.

SEC 2.6

- Atoms have mass, and we need to know their mass to weigh out a specific number of atoms
    - very small number: 1 atom of carbon wigs 1.993 x 10^-26 kg
    - kg is not convenient when talking about an atom's mass
    - And we could never weigh out a single atom anyway
- For convenience, Chemists use the expression ATOMIC MASS UNITS (amu)
    - amu is the approx. weight of a proton or a neutron
    - EX; 1 carbon = 12 amu (exact)
- ISOTOPIC MASS
    - the mass of a specific atom (isotope) in amu
    - remember that elements can have several isotopes
- ATOMIC MASS
    - the weighted average of isotopic masses

EX: LITHIUM OCCURS NATURALLY AS A MIXTURE OF 6, 3 Li (7.5%) AND 7,3 Li (92.5%). WHAT IS ITS ATOMIC MASS?

ANS: 6,3 Li = 0.075 x 6.0151 amu = 0.451 amu

7,3 Li = 0.925 x 7.0160 amu = 6.490 amu

CALCULATE AVERAGE OF ISOTOPES FOR ATOMIC MASS

AVOGADRO'S NUMBER

- We cannot count atoms or molecules
- We often use larger quantity expression to describe what we need
- In chemistry, a mole is used a unit of measurement
    - Fundamental SI unit; abbrev. is mol
    - One mole of any element contains 6.022 x 10^23 molecules or atoms
- Number moles (n)
- Molar Mass (M)
- Mass (m)
- n = M/A