

Lesson 10: Word equations to balanced equations.

Step #1: Identify the substance as ionic or covalent.

Step #2: If the substance is an element, determine if it is diatomic.

Q: How?

A: Use the 7+1 rule. (See the periodic table below)

Q: What does it mean when an element is diatomic?

A: It means the element exists as a molecule made up of two of the same type of atom.

Diatomic Elements on the Periodic Table

Diatomic Molecules: H_2 , N_2 , O_2 , F_2 , Cl_2 , Br_2 , I_2 , At_2

Diatomic Molecules: H ₂ , N ₂ , O ₂ , F ₂ , Cl ₂ , Br ₂ , I ₂ , At ₂																					
1 H Hydrogen																	2 He Helium				
3 Li Lithium	4 Be Beryllium															5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon
11 Na Sodium	12 Mg Magnesium															13 Al Aluminum	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton				
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon				
55 Cs Cesium	56 Ba Barium	57-71 Lanthanides	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon				
87 Fr Francium	88 Ra Radium	89-103 Actinides	104 Db Dubnium	105 Db Dubnium	106 Db Dubnium	107 Db Dubnium	108 Db Dubnium	109 Mt Meitnerium	110 Ds Darmstadtium	111 Ds Darmstadtium	112 Cn Copernicium	113 Nh Nihonium	114 Fl Flerovium	115 Mc Moscovium	116 Lv Livermorium	117 Ts Tennessine	118 Og Oganesson				

Orally: Although Astatine is in this group of elements, we will not use it as it is a very rare radioactive element that has a very short half-life.

Step #3: Write the skeleton reaction (i.e., the unbalanced equation) with reactants on the left and products on the right separated by an arrow.

- Use crossing over for ionic substances
- Use the prefix system for covalent substances

Step #4: Balance the equation.

Example:

Word Equation: iron (III) oxide + hydrogen $\rightarrow$ water + iron

Skeleton Equation: $\text{Fe}_2\text{O}_3 + \text{H}_2 \rightarrow \text{H}_2\text{O} + \text{Fe}$

Balanced Equation: $\text{Fe}_2\text{O}_3 + \underline{2}\text{H}_2 \rightarrow \underline{3}\text{H}_2\text{O} + \underline{2}\text{Fe}$

Practice/Homework:

Work through several examples from BLM 2-18 and assign the rest for homework.

Extra practice will be put on Moodle.