**How can I balance an equation? Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Why does an equation have to “balance”?**   * It tells us how much will be needed to make a given amount of a new substance (like a recipe!) * Law of Conservation of Mass. * The **mass** (of all atoms) you start with has to equal the mass (all of the atoms) that you end with (they can be re-arranged) * The **number** and **kind of atom** you start with has to be the **same as** the **number and kind of atoms** at the end. * This is the “balanced” part!! | |
| ***Getting started…***  ***1.* You need to have an equation with all the chemical formulas written for you** *(the next time your work with this you will be able to generate your own formulas for the equations!!! But for now… work with the ones I throw at you!*  *2****.* Draw boxes around all the chemical formulas*.***  O2  H2  *\*\*Once you make the box,* ***do not go in there*** *with your pencil or pen…ever!!!.*  *+*  H2O  ***3. See what you have by making an “inventory” of the atoms present.*** *For example:*  Not balanced, too many oxygen atoms in the reactants  H2O  O2  H2  *+*  *H O = H O*  *2 2 2 1*  ***4.* Write numbers in front of each of the boxes until the inventory**for each element is the same on both sides of the arrow.  There are two on the reactants side!! I have to **“double**” the oxygen in this water molecule with a coefficient– then start over with my inventory  H2O  O2  H2  *+ \_\_\_ 2*  *H O = H O  x 2 2 2 2 1*  Double  This!  Now these are out of “balance  *New: 2 2√ = 4 2****√***  *New: 4√ 2√ = 4√ 2√*  ***Balanced equation: 2 H2 + 1 O2 2H2O*** |
| * Whenever you change a number, make sure to update the inventory - it is like a puzzle! * When the number and type of atoms on the left equals the number and type on the right,   (your inventory is equal on both sides)- the equation is balanced.   * Tip: I find that making “odd” atoms “even” - multiply the formula by (2)-really helps!   for example: 1 H20 has only one oxygen atom, but **2**H20 has two- this makes it easier to balance out the other atoms – (4 hydrogen) really helps! |

**Reminder**: **1**-boxes **2**-inventory **3**- balance out the “inventory” using coefficients to get common multiples of atoms **4**- double check to see that the reactant atoms balance with the product atoms

1. \_\_ + \_\_ --> \_\_ + \_\_

BeCl2

NaF

BeF2

NaCl

Na Cl Be F **=** Na Cl Be F  
 1 1 1 2 1 2 1 1

Try some on your own:

1. \_\_FeCl3 + \_\_Be3(PO4)2 --> \_\_BeCl2 + \_\_FePO4
2. \_\_AgNO3 + \_\_LiOH --> \_\_AgOH + \_\_LiNO3
3. \_\_Mg + \_\_Mn2O3 --> \_\_MgO + \_\_Mn

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**Solutions for the practice problems:**

1. 2 FeCl3 + 1 Be3(PO4)2 --> 3 BeCl2 + 2 FePO4

2. 1 AgNO3 + 1 LiOH --> 1 AgOH + 1 LiNO3 3. 3 Mg + 1 Mn2O3 --> 3 MgO + 2 Mn