**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!!
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| ***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*.***O2H2*\*\*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 reactantsH2OO2H2 *+* *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 inventoryH2OO2H2 *+ \_\_\_ 2* *H O = H O x 2 2 2 2 1*DoubleThis!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