Balancing Equations

- A chemical equation is shorthand way of expressing a chemical reaction.
- Law of Conservation of Matter states that matter cannot be created nor destroyed.
  - This holds true for equations. It means that the number of atoms of an element must be equal on both sides of an equation. In other words, the equation must be balanced.
- In balancing equations, you **CANNOT CHANGE SUBSCRIPTS**! If you change a subscript, you change the substance. That would mean you are no longer balancing the same chemical REACTION anymore.
- How do you make the numbers work out if you can't change them? You add numbers called **COEFFICIENTS**. Sound familiar? Heard that term in math before? You are right! A coefficient is added in front of a compound ONLY, and it distributes to all the elements in the compound.
  - Ex.: $2H_20$ = 2 x 2 H = 4 H
    & 2 x 1 O = 2 O

- Let's try one!

$Al + O_2 \rightarrow Al_2O_3$

Step 1: Is it balanced?

Al=1	Al=2
O=2	O=3

NO!

Step 2: Find least common multiples.

LCM for O's 2 & 3 is 6.

Step 3: Add coefficients and check to see if it is balanced.

$Al + 3O_2 \rightarrow 2Al_2O_3$

Al=1	Al=2x2=4
O=3x2=6	O=2x3=6

NO! O is balanced, but still have to balance Al.

Step 4: Repeat steps 2 & 3 for Al.

2. LCM for Al's 1 & 4 is 4.

3. $4Al + 3O_2 \rightarrow 2Al_2O_3$

Al=4x1=4	Al=2x2=4
O=3x2=6	O=2x3=6

BALANCED!