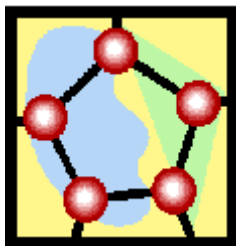


Balancing Chemical Equations Activity



by E.S. Belasic

Objectives :

- ◆ to read chemical equations
- ◆ to identify elements by their chemical symbol
- ◆ to count atoms
- ◆ to identify the coefficients and subscripts in a chemical equation.
- ◆ to label the reactants and products of a chemical equation
- ◆ to balance chemical equations

Materials: These account for one complete set. Color scheme is **VERY** important for visualization during the activity.

on 3x5 Index Cards	2 orange 6's	1 red "Reactants"	CO ₂	Fe	N ₂	Na ₂ SO ₄
4 red 2's	2 black 7's	on 5x8 Index Cards	CH ₄	Fe ₃ O ₄	NH ₃	O ₂
4 blue 3's	2 blue "+"	Al	C ₂ H ₆	H ₂	Na	P ₄
4 green 4's	1 black "yield" sign - -->	Al ₂ O ₃	CaCl ₂	H ₂ O	NaCl	P ₄ O ₁₀
2 purple 5's	1 purple "Products"	C	CaSO ₄	H ₂ O ₂	Na ₂ O	

Pre Lab Questions: Answer the following before you begin the activity:



1. What number represents the **Coefficient**? _____
2. What number represents the **Subscript**? _____
3. What element is represented by the letter "**H**"? _____
4. How many "**H**'s" do you have? _____

Procedure :

1. Using your set of index cards, replicate the chemical equation onto your desk.
2. Label the reactant side and the product side.

Record the following information into Table 1:

3. Identify the elements on the reactant side.
4. Count the number of atoms for each element.
5. Identify the elements on the product side.
6. Count the number of atoms on the product side.
7. Are the 2 sides equal? If not, the equation is not balanced.
8. The index cards numbered 2 - 7 are your **coefficients**. They can **ONLY** be placed in front of the elements. You can **not** change the subscripts.
9. Choose an element that is not balanced and begin to balance the equations.
10. Continue until you have worked through all the elements.
11. Once they are balance, count the final number of Reactants and Products.
12. Write the balanced equation.
13. Can your equation be simplified?

Data :

Table 1 : Chemical Equations (whole page, large boxes, sideways into lab book)

Make the following Equations on your desk	Reactants	Products	Reactants - Final	Products - Final	Balanced Equation
$H_2 + O_2 \rightarrow H_2O$					
$H_2O_2 \rightarrow H_2O + O_2$					
$Na + O_2 \rightarrow Na_2O$					
$N_2 + H_2 \rightarrow NH_3$					
$P_4 + O_2 \rightarrow P_4O_{10}$					
$Fe + H_2O \rightarrow Fe_3O_4 + H_2$					
$C + H_2 \rightarrow CH_4$					
$Na_2SO_4 + CaCl_2 \rightarrow$ $CaSO_4 + NaCl$					
$C_2H_6 + O_2 \rightarrow CO_2 + H_2O$					
$Al_2O_3 \rightarrow Al + O_2$					

Analysis/Results:

1. What does "-->" mean?
2. What side of the equation are the reactants found? products?
3. Why must all chemical equations be balanced?
4. Why can't the subscripts be changed?
5. What does it mean to "simplify" the equation?

Conclusion:

2-3 sentences on what you learned.

TEACHER NOTES:

Answers: <http://www.middleschoolscience.com/chemanswers.htm>

The index cards are a bit time consuming to create. I had some students help at lunch time for a few days. Once done, you can laminate them and have them forever! The materials account for one complete set which is good for 2-3 students to use.

The color coding is very important for visualization. It is easier and quicker to locate the elements that you are trying to balance. If everything is in black ink, its harder to distinguish the equation contents.

I use this towards the end of my chemistry unit, its a great assessment tool because it involves a vast amount of abilities that were learned during the chemistry unit. I do the 1st two problems with the students to guide then through the procedure, and make sure they understand what is expected. This activity takes about 2 - 3 "45 minute" class periods. I follow up with a worksheet as a homework assignment.