Chemical Reactions and Balancing Chemical Equations Web Quest

Name:_____ Date:_____ Class:_____

Chemical Equations
http://web.archive.org/web/20131203110147/http://www.files.chem.vt.edu/RVGS/ACT/notes/Types_of_Equations.html
Click "Directions"

1. What three things does a balanced equation show you?
   A. The _____ which enter into a reaction.
   B. The _____ which are formed by the reaction.
   C. The amounts of each substance _____ and each _____ produced.
2. What two things must we remember when balancing equations?
   A. Every chemical compound has a _____ which cannot be _____.
   B. A chemical _____ must account for every _____ that is used, which is an application of the Law of _____ of _____.
3. What does the ⟶ mean? _____
4. What does the ⟷ mean? _____

Classic ChemBalancer –
http://funbasedlearning.com/chemistry/chemBalancer/default.htm
(1) Click the button for "Directions" and **read carefully**. Click the "OK" button and return to the game screen.
(2) Click "Start Game" button to give it a try!
(3) Start by adding a "1" in each box and compare the number of atoms of each element you have on each side of the equation.
(4) Change coefficients to balance each equation and click the "Balanced" button to check it. If it is wrong, correct it!
(5) Use the information in the pop-up windows to answer each question and then write the balanced equation before clicking the "OK" button.

#1

What does "ferrum" mean?_____
What color is sulfur?_____

#2

What is HCl?_____
Where is it found in the body?_____

#3

What are pyrotechnics?_____

#4

What was the Hindenberg?_____
What gas was used in it?_____
What gas is used today?_____

#5

What does the symbol “Hg” represent? _____
Why should you never touch it?_____
_____

#6

What gas is produced when calcium metal is dropped in water?_____

#7

What is CH4?_____
What gases is it related to?_____
and _____

#8

What is H2O2? _____
What is it used for?_____
_____

#9

What is ammonia used for today?_____
_____

#10

How is the oxidation of aluminum different from that of iron?_____
_____

#11

What gas is released when potassium permanganate is decomposed?_____
_____

Now go to this website and work on balancing the equations. Read the directions (due to the program you will need to include coefficients of “1”, unlike when we balance normally in class). You can complete a problem and go to the bottom of the page and click “check” whenever you’d like. Use the back button to continue working. Fill in the Coefficients on the follow page.
http://www.sciencegeek.net/Chemistry/taters/EquationBalancing.htm

1. $\square H_2 + \square O_2 \rightarrow \square H_2O$

2. $\square H_2 + \square N_2 \rightarrow \square NH_3$

3. $\square Al_2O_3 \rightarrow \square Al + \square O_2$

4. $\square KClO_3 \rightarrow \square KCl + \square O_2$

5. $\square S_8 + \square O_2 \rightarrow \square SO_2$

6. $\square C_2H_6 + \square O_2 \rightarrow \square CO_2 + \square H_2O$

7. $\square Al_2(SO_4)_3 + \square Ca(OH)_2 \rightarrow \square Al(OH)_3 + \square CaSO_4$

8. $\square P_4 + \square O_2 \rightarrow \square P_2O_5$

9. $\square Ag + \square S_8 \rightarrow \square Ag_2S$

10. $\square Al + \square Br_2 \rightarrow \square AlBr_3$

11. $\square Cr + \square O_2 \rightarrow \square Cr_2O_3$

12. $\square NaClO_3 \rightarrow \square NaCl + \square O_2$

13. $\square AlBr_3 + \square Cl_2 \rightarrow \square AlCl_3 + \square Br_2$

14. $\square Na + \square H_2O \rightarrow \square NaOH + \square H_2$

15. $\square AlI_3 + \square HgCl_2 \rightarrow \square AlCl_3 + \square HgI_2$

16. $\square Ca(OH)_2 + \square H_3PO_4 \rightarrow \square Ca_3(PO_4)_2 + \square H_2O$

17. $\square AgNO_3 + \square K_3PO_4 \rightarrow \square Ag_3PO_4 + \square KNO_3$

18. $\square C_3H_8 + \square O_2 \rightarrow \square CO_2 + \square H_2O$

19. $\square C_2H_2 + \square O_2 \rightarrow \square CO_2 + \square H_2O$

20. $\square C_6H_6 + \square O_2 \rightarrow \square CO_2 + \square H_2O$

Load the simulation *Balancing Chemical Equations*
http://phet.colorado.edu/en/simulation/balancing-chemical-equations

1. Explore the ***Balancing Chemical Equations*** simulation.

   a) What are the different ways that the simulation indicates when an equation is balanced?

2. For each balanced reaction, indicate the total number of molecules in the table below.

Reaction	Total Number of Molecules	
	Reactant Side (Left)	**Product Side (Right)**
Make Ammonia		
Separate Water		
Combust Methane		

3. Is the number of total molecules on the left side of a balanced equation always equal to the number of total molecules on the right side of the equation? Explain your answer.

4. For each balanced reaction, indicate the total number of atoms in the table below.

Reaction	Total Number of Atoms	
	Reactant Side (Left)	**Product Side (Right)**
Make Ammonia		
Separate Water		
Combust Methane		

5. Is the number of total atoms on the left side of a balanced equation always equal to the number of total atoms on the right side of the equation?

6. What is the same on the left and right side of a balanced equation? Explain your answer.

7. Play level 1 and 2 of the balancing equation game. Write down the strategies you use to balance chemical equations.

8. In the simulation, were you able to use noninteger numbers (like ½ or 0.43) for the coefficients in a balanced equation? Why do you think this is?

   a) Which of the following are coefficients you could use in a balanced equation?
   ☐ ½ ☐ ¾ ☐ 1 ☐ 2 ☐ 6 ☐ 9

   b) If you were balancing an equation containing the O_2 molecule, which of the following would be correct representations of O_2 and its coefficient?
   ☐ $\frac{1}{2}O_2$ ☐ O_2 ☐ $3O_2$ ☐ $6O_2$ ☐ $3O$ ☐ $5O_3$

9. What do you have to do to the coefficients of equation I below to get to equation II?
   i. $2\ SnO_2 + 4\ H_2 \rightarrow 2\ Sn + 4\ H_2O$
   ii. $SnO_2 + 2\ H_2 \rightarrow Sn + 2\ H_2O$

   a) Both equation I and II are balanced, but equation I is the correct way to write the balanced equation.

   b) Can you divide equation II by another factor and still have it be correct? Why or why not?

   c) In a complete sentence, write down a method you could use to determine if an equation is written in the correct way.

10. Start level 3 of the balancing equation game. Write down the equations as you solve them, along with any new strategies you needed for balancing.