BALANCING CHEMICAL EQUATIONS

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

CRITICAL THINKING QUESTIONS

1. Explore the ***Balancing Chemical Equations*** simulation. Discuss with your group what you find.

    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. As a group, play level 1 of the balancing equation game. Write down the strategies your group uses to balance chemical equations.

8. Start level 2 of the balancing equation game. Take turns in your group to balance the equations in the sim, using your strategies from Level 1, and adding new strategies as needed.

    Each person should be in charge of balancing at least one equation, asking for help from the group as needed. As a group, write down the equations as you solve them.

9. What do you have to do to the coefficients (the numbers in front of the compounds) of equation I below to get to equation II? (equation II is the best way of writing this equation)
    i. $2 SnO_2 + 4 H_2 \rightarrow 2 Sn + 4 H_2O$
    ii. $SnO_2 + 2 H_2 \rightarrow Sn + 2 H_2O$

CHALLENGE QUESTIONS: BALANCE THE EQUATIONS BELOW.
(STRONGLY SUGGEST YOU DO THIS IN PENCIL)

A. __ $NaNO_3$ + __ PbO → __ $Pb(NO_3)_2$ + __ Na_2O

B. __ Ca_3P_2 + __ H_2O → __$Ca(OH)_2$ + __ PH_3

C. __Fe_2O_3 + __ CO → __Fe + __ CO_2

D. __NH_3 + __ O_2 → __ NO_2 + __ H_2O

E. __ H_2SO_4 + __ $B(OH)_3$ → __ $B_2(SO_4)_3$ + __ H_2O

F. __FeS + __O_2 → __Fe_2O_3 + __SO_2

G. __ $C_3H_6O_2$ + __ O_2 → __ CO_2 + __ H_2O