

EQUATION BALANCING AND MOLECULAR MODELS

INTRODUCTION:

... a balanced equation certain conditions must be met. A reaction is actually the rearrangement of atoms to form something with a new formula and different properties. In this investigation you will observe the relationship of mass, molecules, moles, bonds, and atoms during a chemical reaction. In order to do this, you will examine reactants and compare them with products.

PURPOSE:

To compare mass, number of atoms, number of molecules, number of moles, and number of bonds for the reactants and products in a balanced equation.

MATERIALS:

molecular model kit

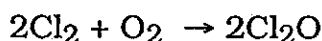
PROCEDURE:

PART A

1. When constructing molecules during this activity, use the following color scheme:
black = carbon
green, orange or purple = halogen family (chlorine, fluorine, bromine, iodine)
blue = nitrogen
yellow = hydrogen
red = oxygen

Make sure all of the atoms are "bonded"; that is **all** the holes are filled with sticks or springs except for nitrogen. Nitrogen should only have three bonds.

2. Construct all the molecules (5 molecules) represented in the following equation:



3. When they are all constructed, **have the teacher initial Part A of your Data Table.**

PART B

1. Use a periodic chart and your models to determine the following: Put your answers in Part B of the Data Table:

- a. The number of atoms of each kind of element on the reactant side and on the product side.
- b. The number of molecules of each compound on the reactant side and on the product side.
- c. The number of chemical bonds (count all sticks and springs) on the reactant side and on the product side.
- d. The formula weight of all the reactant atoms and molecules together and the formula weight of all the product molecules together.

2. Place the product molecules to one side; **DO NOT DISASSEMBLE THEM.**

PART C

1. Take apart the reactant molecules and try to "react" them (reassemble them) to form the products. Do not add or discard any parts, including bonds.

When you have finished this task, **before disassembling anything, have the teacher initial Part C on your Data Table.**

PART D

1. You have data to support that certain things are conserved (kept the same) during a chemical reaction. Identify which are conserved and place your answers in Part D of the Data Table.

PART E

1. Disassemble all atoms and molecules; place the parts back in the box exactly as they were when you started. Leave the lid off the box and show the box to the teacher. **Have the teacher initial Part E of the Data Table.**

EQUATION BALANCING AND MOLECULAR MODELS DATA SHEET

PART A

Teacher initials _____

PART B

	Reactant Side	Product Side
atoms of chlorine		
atoms of oxygen		
total number of atoms		
molecules of chlorine		
molecules of oxygen		
molecules of chlorine oxide		
total number of molecules		
chemical bonds		
total formula weight		

Part C

Teacher initials _____

Part D

- Are atoms conserved? _____
- Are molecules conserved? _____
- Are bonds conserved? _____
- Is formula weight conserved? _____

Part E

Teacher initials _____

QUESTIONS:

1. During a chemical reaction what happens to all the atoms in the reactants?

2. During a chemical reaction can new atoms be produced? Explain?

3. During a chemical reaction can new molecules be produced? Explain?

4. How does the formula weight of all the reactants compare to the total weight of all the products? Explain.

5. How does the Law of Conservation of Matter explain the results of this lab?
