

Name _____ Date _____

Chemistry Class _____ Chem Instructor _____

Directed Learning Assignment -- Identifying Types of Reactions

Reaction Type #1: Decomposition

Here is an example of a decomposition reaction:



In science we often use models to understand things better. For this exercise we are going to think of a decomposition reaction like a divorce of two people. Here is a pictorial representation:



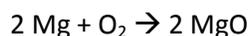
Notice how the boy and girl initially start out as a couple, but after the reaction, they are each single. If you compare the reaction above involving mercury and oxygen and you compare it to the “people reaction” you can see that:



In the decomposition of mercury(II) oxide, the compound spits up into the elements that make the compound, mercury and oxygen.

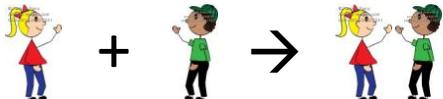
Reaction Type #2: Combination or Synthesis

Here is an example of a combination, or synthesis reaction:



1. Now it's your turn. Use the “people elements” to build a model for this reaction. If a decomposition reaction is like a divorce, then a combination reaction is like a _____. (Hint: It starts with an “m” and rhymes with carriage.)

Here is what a combination reaction would look like with people:

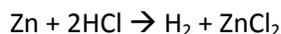


2. Now compare the reaction involving magnesium and oxygen above to the people reaction. What do each of the people represent?



Reaction Type #3: Single Replacement

Here is an example of a single replacement reaction:



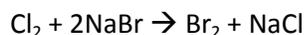
Here is a single replacement reaction represented by people:



3. In your own words, describe what is happening in the "people reaction".
4. Comparing the reaction of Zn to HCl above to the "people reaction", indicate which person represents each element in the reaction: Zinc, Hydrogen, or Chlorine.



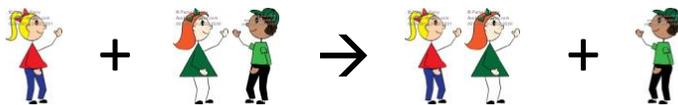
Here is another example of a single replacement reaction:



Now here is the above equation represent by people:



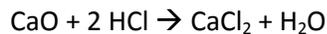
5. How is the above equation different than the single replacement reaction given at the top of the page?
6. What is wrong with the following "people reaction"? Why would this "reaction" not take place?



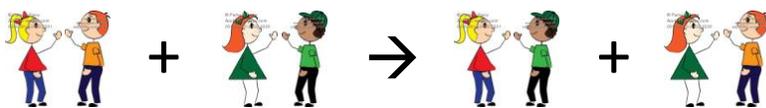
7. Consider the following single replacement reaction: $\text{Cl}_2 + \text{NaBr} \rightarrow ???$
What do you think the new compound of this reaction will be? Will chlorine replace Na and form a compound with Br, or will chlorine replace Br and form a compound with Na? How do you know?

Reaction Type #4: Double-Replacement Reaction

Here is an example of a double-replacement reaction



Here is the above reaction represented by people:



8. Comparing the double-replacement reaction give at the top of the page to the “people reaction”, indicate which person represents each element in the reaction: calcium, oxygen, hydrogen, and chlorine?



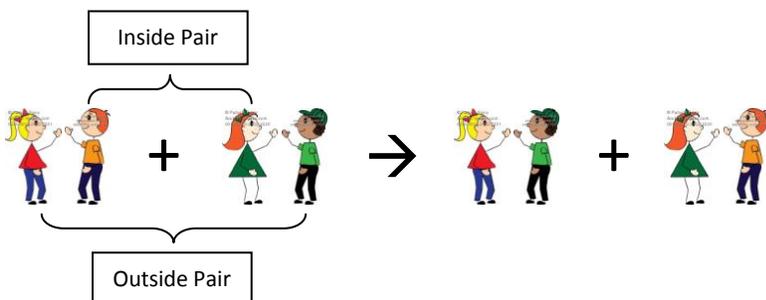
9. In your own words, describe what is happening with this people reaction.

10. What is wrong with the following “people reaction”? Why would this “reaction” not take place?



11. Consider the “people reaction” again. (See below.)

When predicting the products of a double-replacement reactions the rule is to “combine the outside pair and the inside pair”. What does this statement mean?



Practice

Classify the following reactions as combination, decomposition, single replacement, or double replacement

