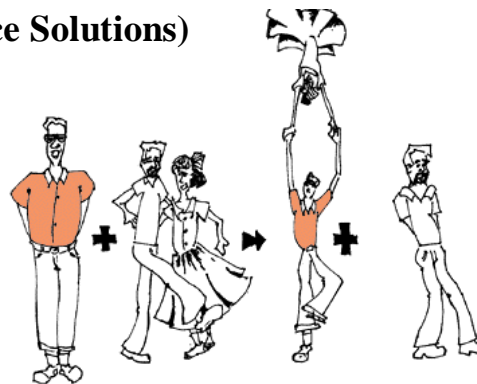


Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

### May I Cut In?: (from Al Guenther's Science Solutions)

**BACKGROUND:** Imagine a boy and a girl dancing. Along comes a bully who pushes the boy away, and dances off with the girl. When this kind of situation takes place with atoms, we call it a single displacement (or single replacement) reaction. In other words, one element (that is more reactive) takes the place of another element in a compound. The equation below shows a single displacement reaction:



**CAUTION: Goggles and aprons are mandatory!** Pay attention to where your test tube is pointed!

**MATERIALS:** Erlenmeyer flaskw/test tube, test tube brush, water dropper, wooden stick, watch glass, copper II chloride, aluminum foil strip, red and blue litmus paper, metric ruler, goggles and apron

**PROCEDURE:** 1. Using the metal scoop, put **1 cm** of copper II chloride in the bottom of your test tube.

What is the molecular formula for chopper II chloride? \_\_\_\_\_

2. Using the water dropper, add enough water so the total solution height is **3 cm**. Gently shake the solution until the copper II chloride is dissolved. What is the formula for water? \_\_\_\_\_

3. Describe all of the changes that take place when the copper II chloride combines with water.

\_\_\_\_\_

4. Crumple the aluminum foil so it easily fits into your test tube. The symbol for aluminum is \_\_\_\_\_.

5. Put your test tube in the Erlenmeyer flask. (to be used as a test tube holder) (point in safe direction)

Using the wooden stick, slide the loosely crumpled aluminum foil strip into the liquid in your test tube.

6. Describe all of the changes that take place in your test tube. \_\_\_\_\_

\_\_\_\_\_

7. This single displacement reaction is also an exothermic reaction. Feel your test tube. What do you suppose

exo means? \_\_\_\_\_ (Hint: think of the words "exit" and "exterior")

What does therm mean? \_\_\_\_\_ (Hint: think of "thermometer" and "thermal underwear")

8. List four characteristics that indicate a chemical change has occurred. \_\_\_\_\_,  
\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,

Has a chemical change occurred in your test tube? Why? \_\_\_\_\_

9. Lay 1 strip of red and 1 strip of blue litmus paper in your watch glass. After the liquid in your test tube has stopped bubbling, pour the liquid (not the solid) on both litmus strips. If the red strip turns blue it is alkaline (base), if the blue turns red the liquid is acid. If neither strip changes (red stays red and blue stays blue) the liquid is \_\_\_\_\_. What is the liquid in your test tube? \_\_\_\_\_

10. Dump the solid in your test tube onto your watch glass. Describe it. \_\_\_\_\_

List the elements in the compounds that were originally put into your test tube? \_\_\_\_\_, \_\_\_\_\_,  
\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ What do you suppose the solid is? \_\_\_\_\_

11. Complete the balanced chemical equation below, which describes what happened in your test tube:



12. This is a typical single displacement reaction. Notice that the aluminum displaces (replaces) the copper in the copper II chloride to form aluminum chloride. This means the copper is kicked out of the compound!

13. The bubbles that you observed during the reaction were hydrogen gas. The symbol for hydrogen is \_\_\_\_\_.

Which compound that contained hydrogen was added to your test tube? \_\_\_\_\_

14. A secondary reaction took place when other compounds in your test tube reacted with water to form a small amount of acid. The acid formed because of the presence of hydrogen. The formula of any acid begins with hydrogen. Some examples of acids:  $\text{H}_2\text{SO}_4$  (sulfuric acid),  $\text{HCl}$  (hydrochloric acid),  $\text{H}_2\text{CO}_3$  (carbonic acid), and  $\text{H}_2\text{NO}_3$  (nitric acid) Which of these acids formed in your test tube? (remember the original compounds)

The acid in my test tube was \_\_\_\_\_ because \_\_\_\_\_.

### CLEAN UP:

15. Dump all solid waste into the solid waste garbage.

16. Rinse the watch glass and Erlenmeyer flask with water and dry off the watch glass.

17. Use the wire test tube brush and scrub the test tube with water. (Remember: no solid down the sinks please!)

18. Throw the stick in the garbage if it is nasty. Get a new one.

19. Dry the tray and put a new paper towel in it.

20. Put the Erlenmeyer flask w/test tube, water dropper, new stick, metric ruler, and sealed litmus paper back in each tray.

21. Fold the aprons and put the goggles back in the drawer.

