Academic Chemistry **Name _____**
Single Replacement Lab **Date _____**

Problem: Which metals replace each other in single-replacement reactions?

Materials (per group):

- Four small pieces of the following metals: Cu, Mg, Fe, Zn
- Dilute solutions of the following compounds: Hydrochloric acid, copper (II) chloride, magnesium chloride, iron (III) chloride, and zinc (II) chloride
- 4 test tubes

Procedure:

1) Make small labels for each of the four test tubes: each label should list one of the metals being used.
2) Place a piece of each individual metal into each of the four test tubes.
3) Add enough hydrochloric acid to cover each of the metals in the four test tubes. Allow the reactions to proceed a minute or two and record **observations** for each of the four reactions (*such as, bubbles form, color change, temperature change*).
4) Pour the solution down the drain, but **do not let the metals go down the drain**, dump the reacted metals in the trash.
5) Get the same four metals and place them individually in each of the four test tubes. This time, add enough copper (II) chloride solution to cover each of the metals in the four test tubes. Allow the reactions to proceed a minute or two and record **observations** for each of the four reactions (*such as, bubbles form, color change, temperature change*).
6) Repeat step 5 again using each of the three remaining solutions: magnesium chloride, iron (III) chloride and zinc (II) chloride.

Record your observations in the data table below:

Metals **S o l u t i o n s**

	Hydrochloric acid	Copper (II) chloride	Magnesium chloride	Iron (III) chloride	Zinc (II) chloride
Cu					
Mg					
Fe					
Zn					

Analysis and Questions (*use a separate sheet of paper to answer*):

1) For each reaction, write out the balanced chemical equation. If there was no reaction, write the reactants followed by the yields arrow and NR (no balancing necessary).

   For example:
   A reaction that ***occurs*** is: **Mg + 2HCl → $MgCl_2$ + H_2**, while a reaction that ***does not occur*** is: **Cu + HCl → NR**

2) Which of the metals reacted with the most compounds?

3) Which metal reacted with the fewest compounds?

4) List the metals you reacted from most reactive to least reactive?