

Name: _____ Lab Partner(s): _____

Single Replacement Reactions Lab

Purpose: To observe the relative reactivity of metals.

Background: Single replacement reactions are a common type of chemical reaction. A more reactive metal (one higher in the activity series) will displace a less reactive metal from a compound.

Materials: metals (copper, iron, and zinc), 96-well reaction plate, 0.1 M copper(II) nitrate ($\text{Cu}(\text{NO}_3)_2$), 0.1M iron(III) nitrate ($\text{Fe}(\text{NO}_3)_3$), 0.1 M zinc nitrate ($\text{Zn}(\text{NO}_3)_2$), sandpaper, scissors

Procedure:

- (1) Put five drops of $\text{Cu}(\text{NO}_3)_2$ solution in each of the following wells: A1, D1, and G1. (Note that you should be leaving empty wells between these. This helps prevent contamination.)
- (2) Put five drops of $\text{Fe}(\text{NO}_3)_3$ solution in each of the following wells: A4, D4, and G4.
- (3) Put five drops of $\text{Zn}(\text{NO}_3)_2$ solution in each of the following wells: A7, D7, and G7.
- (4) Sand each piece of metal to remove any coating, making sure bare metal is exposed.
- (5) Put a piece of Cu in wells A1, A4, and A7.
- (6) Put a piece of Fe in wells D1, D4, and D7.
- (7) Put a piece of Zn in wells G1, G4, and G7.
- (8) Allow several minutes for reactions to take place. Record observations in the table below. If no reaction is observed, write *NR*.
- (9) Dispose of solid metals in the trash and thoroughly clean the reaction plate.

Results:

		Solutions		
		$\text{Cu}(\text{NO}_3)_2$	$\text{Fe}(\text{NO}_3)_3$	$\text{Zn}(\text{NO}_3)_2$
Metals	Cu			
	Fe			
	Zn			

Questions:

- (1) _____ was the most reactive metal since it reacted with both _____ and _____.
- (2) On the back of this page, list the three metals vertically with the most reactive at the top. Add an arrow labelling "decreasing reactivity." (You are making a very small activity series.)
- (3) Give the balanced chemical equation for each reaction that occurred. Include (*aq*) or (*s*) for each reactant and product.