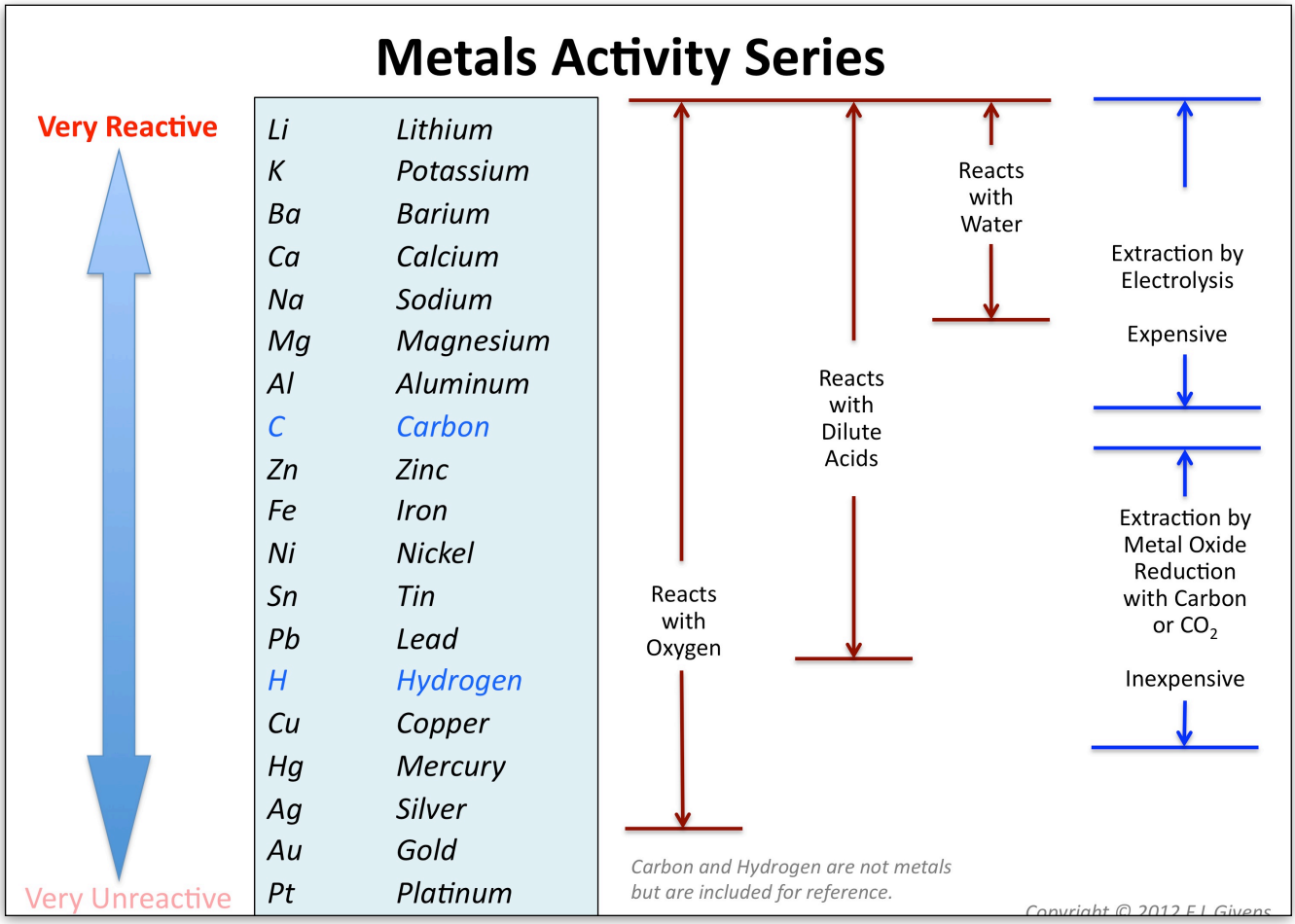
Lab: Metal Activity & Table J

Unit 11 - Oxidation & Reduction

Regents & IB Chemistry 11



Pre-Lab

1. Find the metal reactivity series in Reference Table J. What is meant by 'activity series'? See page 333 in your textbook...

2. Using Table J, how would you rank the relative reactivity of gold, magnesium and copper? **Explain** how you know.

3. Historically speaking, aluminum and iron were discovered by humans thousands of years **after** gold and silver were discovered. Gold and silver, though discovered much earlier, are much less abundant on Earth. Explain why gold and silver were among the first metallic elements discovered. (Base your explanation on the relative reactivity of the metals.)

4. In the lab, what three **metal atoms** will you be testing?

5. What are the four **metal cations** you will use?

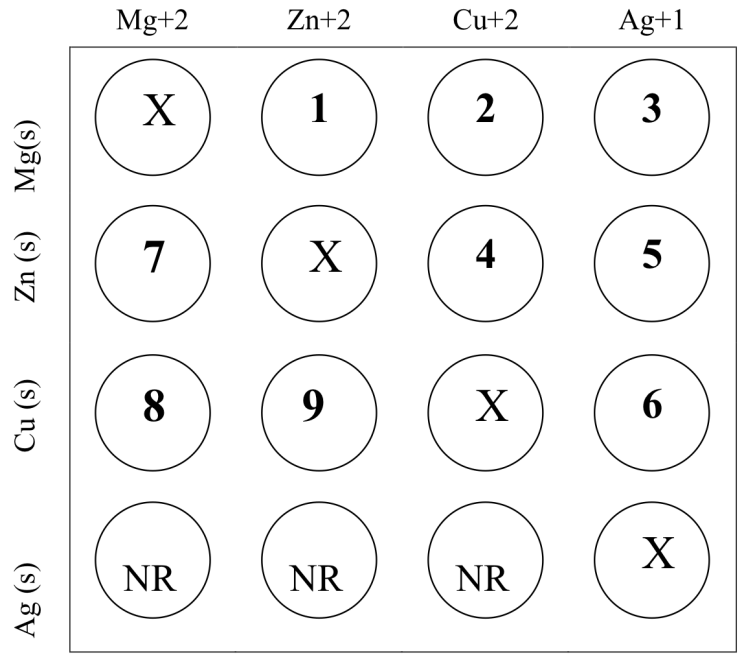
Lab

Purpose - To test the atom/ion relationships on Table J (Metal Reactivity Series).

Safety: *Wear safety goggles at all times. Some solutions may stain your skin, so avoid skin contact.*

Procedure and Observations

1. Place metals and solutions in a clean well plate according to the picture on the next page. We are not testing solid silver. (Why not?)
2. Make detailed observations (bubbling, color change) in the data table below the picture.
3. Clean and dry your well plate, then return all materials exactly as you found them.
4. NR = No Reaction



Trial #	Atom/Ion Combination	Observations	Spontaneous reaction? Yes/ No	Relationship of Atom to Ion
1				
2				
3				
4				
5				
6				
7				
8				
9				

Table J Lab Questions

1. Rank the four metals used in the this lab (including silver), in order of their relative reactivities (less reactive --> more reactive). Explain how you decided to do this, based on your observations.

2. You did not use silver metal in the experiment. However, you did use silver solution. Why would it have been pointless to put silver metal in contact with the metal ion solution of the other 3 metals?

3. What is the 'rule' for using table J to determine reactivity? How can you predict whether a reaction will be spontaneous or not?

4. Write the oxidation half-reaction equations for each of the metals that showed reactions. For example, if you would have used sodium in the experiment, the half-reaction equation would look like this: **$Na(s) \rightarrow Na^{+} + 1e^{-}$**

    1. Mg(s) ----->
    2. Zn(s) ----->
    3. Cu(s) ----->

5. Write the reduction half-reaction equations for the ions that formed metals. For example, if you would have use sodium solution in the experiment, the half-reaction equation would look like this: **$Na^{+1} + 1e^{-} \rightarrow Na(s)$**

    1.
    2.
    3.