Building an Activity Series for Metals

An activity series shows which metals are more active than other metals. If a metal strip is placed in a solution of a metal ion causes the ion to precipitate out of solution as a metal, the metal in the strip is more active than the metal in the solution. In this activity, you will carry out a series of reactions between metals, write net ionic equations and the equations for the half-reactions for each reaction that takes place, and and rank the metals in order of decreasing activity.

For example, placing Zn metal in a Cu2+ solution results in the precipitation of Cu metal. The Cu metal does not react with the Zn2+. So:

$Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Cu(s)$
$Cu(s) + Zn^{2+}(aq) \longrightarrow$ No reaction
Thus you can conclude that zinc metal is a more active metal than copper since it reacts in solution, while the copper metal does not. Consequently, zinc metal would be above copper metal on an activity table that lists reactivity from highest to lowest

Materials:
Chemical Splash Goggles will be worn during this lab.

0.1 M solutions of:	Metal strips of (take one of each)
Fe^{3+}	Fe
Zn^{2+}	Zn
Pb^{2+}	Pb
Cu^{2+}	Cu
Al^{3+}	Al
Mg^{2+}	Mg

The solutions are in bottles with a long-stem pipet attached. Use a well plate to hold the solutions.

Procedure:

Devise an efficient way to react each metal with each solution. Observe the product that forms (or not) from each reaction. Construct a data table (you may want to re-write this later, but you will need a table of some kind for recording your original data. Carry out the reactions and record your observations. Write a description of what you see, not just (yes" or a checkmark. You may write NR for those that do not react. Clean each metal strip with distilled water, dry it, and re-use. Return the clean metal strips when you are finished.

Data Table:
Make one.

Analysis and conclusion:
Write a balanced net ionic redox reaction for all combinations that have a reaction. Write the half-reactions for each. Rank the metals in order of activity as your conclusion.