

LAB: Developing an Activity Series

Introduction:

In a single displacement reaction, a more reactive metal bumps out or displaces a less reactive metal from an ionic compound. For example, the metal **calcium** can displace **magnesium** from the ionic compound **magnesium chloride** to form the metal **magnesium** and the ionic compound **calcium chloride**. Single displacement reactions can also occur between a non-metal and an ionic compound. To predict whether a single displacement reaction will occur between the element and the compound, charts called **activity series** have been developed - one for metals and one for non-metals such as the halogens.

In this lab, you will develop an activity series for several metals by observing the reactions between pairs of metals, one in element form and the other in compound form. You will then be able to rank how reactive each metal is and thereby create an activity series similar to the one we have been using in class.

Procedure:

1. Get a clean microplate and place a small, similarly sized piece of metal in each well as instructed by the teacher. Make sure that any coating on the metal has been removed by rubbing it on sand paper. What is the coating on the metal? Why do you need to remove it?
2. To each well, add enough aqueous ionic compound to cover the metal, once again as instructed.
3. Carefully observe each well, looking for evidence of a reaction taking place. You may find it helpful to place the tray on a white piece of paper or to lift it up and observe it on the underside.
4. Record your observations in a chart, indicating whether a reaction has occurred.

Discussion Questions:

1. In this lab, what evidence suggested that a chemical reaction had taken place?
2. a) Complete the following chart:

Metal	Number of reactions

- b) In what way is the number of reactions that a metal undergoes related to its reactivity?
 - c) Organize the metals that you tested from the most reactive to the least reactive.
 - d) Where should hydrogen be placed in your list? Explain **using results from your lab**.
 - e) Compare your list to the activity series on page 126. Suggest a reason(s) for any discrepancies.
3. Suggest ways that the results of this lab could be improved.