Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Activity Series Lab: upload full lab**

Guiding Question: Are all metals equally reactive?

Materials: Magnesium, iron, aluminum, zinc, magnesium solution, iron solution, zinc solution, magnesium solution, spot plate, toothpicks.

Pre-Lab Questions:

1. When a pure metal atom reacts, do they tend to undergo oxidation or reduction? Explain in terms of electrons.
2. Write a balanced half reaction for an aluminum atom becoming an aluminum ion.

Procedure:

1. Place one small scoop of iron metal in 4 separate spots on the spot plate.
2. Add 2 drops of each solution to the metals and record which have a visible chemical change in the data table below. Record changes such as color changes, bubbling, odor, and/or phase changes.
3. Repeat steps 1-2 with additional metal samples.

|  | Fe+2 solution | Al+3 solution | Mg+2 solution | Zn+2 solution |
| --- | --- | --- | --- | --- |
| Fe |  |  |  |  |
| Al |  |  |  |  |
| Mg |  |  |  |  |
| Zn |  |  |  |  |

Post-Lab Questions:

1. Did the metals react in a solution of the same metal? For example, did Fe react in Fe+2 solution? Explain why this pattern exists in terms of transferring electrons.
2. Explain what is happening between the Aluminum metal and the Fe+2 solution that is causing a chemical change to be observed.
3. Rank the metals in order from least reactive to most reactive and explain your ranking.
4. Choose three reactions you observed and provide the half reactions and full reaction to show the transfer of electrons that occurred.

| Oxidation Half Reaction | Reduction Half Reaction |
| --- | --- |
|  |  |
| Full Reaction | |
|  | |
| Oxidation Half Reaction | Reduction Half Reaction |
|  |  |
| Full Reaction | |
|  | |
| Oxidation Half Reaction | Reduction Half Reaction |
|  |  |
| Full Reaction | |
|  | |

1. Take out Table J of your Chemistry Reference Tables. Does your reactivity ranking match Table J? Provide examples.
2. If we reacted **Sodium** metal with these solutions, which solutions would show a reaction?
3. If we reacted **Cobalt** metal with these solutions, which solutions would show a reaction?

1. If we reacted **Silver** metal with these solutions, which solutions would show a reaction?
2. If we reacted **Iron** metal with a Li+ solution, would a reaction be observed?
3. Unknown metal X reacts with the Fe+2 solution only. Where would it fall in the activity series?