**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Student Activity- Reactivity of Metals**

**Learning Objective TRA-1.B** Represent changes in matter with a balanced chemical or net

ionic equation:

**a.** For physical changes.

**b.** For given information about the identity of the reactants and/or product.

**c.** For ions in a given chemical reaction.

**TRA-1.C** Represent a given chemical reaction or physical process with a consistent particulate model.

**Science Practice 2.B** Formulate a hypothesis or predict the results of an experiment.

**6.B** Support a claim with evidence from experimental data.

**Section I: Reactivity of Metals and Metal Ions Lab Activity**

**QUESTION:** How do we determine a ranking for the reactivity of metals?

Instructions: You will be working either on a computer or viewing the simulation live in class. This simulation covers the activity of metals in a redox reaction. Write down your answers as you go through the activity. Go to the following website for the computer simulation:

<https://chemdemos.uoregon.edu/sites/chemdemos1.uoregon.edu/files/Redox2.swf>

(Note this site only works on **Internet Explorer**)

1. Before starting, Look at the beakers of solutions. Which solution has a color and why?

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To start the animation, click on the **circle next to Mg**.

Then click on the box that says, “**Click here to put strips**”

Wait about five seconds and then click on the box that says, “**Click here to remove**”

2. Which of the magnesium strips got plated? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What happened to the colored solution and why?

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Now click on the **circle next to Cu**.

Then click on the box that says, “**Click here to put strips**”

Wait about five seconds and then click on the box that says, “**Click here to remove**”

4. Which of the copper strips got plated? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Did any of the solutions change color this time? Explain why.

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Now click on the **circle next to Zn**.

Then click on the box that says, “**Click here to put strips**”

Wait about five seconds and then click on the box that says, “**Click here to remove**”

6. Which of the zinc strips got plated? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. Did any of the solutions change color this time? Explain why.

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Now click on the **circle next to Ag**.

Then click on the box that says, “**Click here to put strips**”

Wait about five seconds and then click on the box that says, “**Click here to remove**”

8. Which of the silver strips got plated? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Did any of the solutions change color this time? Explain why or why not.

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10. Do all four metals have the same reactivity? Give evidence to support your answer?

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11. Create a reactivity table from high to low that demonstrates the results of this exercise?

**Highest**

**Lowest**

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| --- |
| Reactivity of Metals |
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|  |
|  |

12. If we tested a tin (Sn) strip with these solutions, we would have observed that the tin would

be plated with only the Cu and Ag. Where would we place tin in our reactivity series?

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13. We could have also tested these 4 metals using HCl(aq). Only magnesium and zinc would

react with the HCl(aq). When the reaction occurs, bubbles would be produced. What gas is produced from these reactions?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14. Write both the molecular and the net ionic equation for the reaction between magnesium

and hydrochloric acid.

Molecular: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net Ionic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. We have seen how metals can be plated using ionic solutions. That means that the metal

ions in each solution are being replaced by the atoms of solid metal from the strips. This also means that the metal atoms from the reacting strips are becoming ions and are falling into the ionic solutions. These are clearly redox reactions. Are the solid metals being oxidized or reduced when they react?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

From the simulations we have witnessed, write down all the reactions that occurred between the metal strips and the metal ions.

16. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_