Put 10 ml of Na₂SO₄ solution in petri dish. Place pH probe attached to running TI calculator & CBL in solution & record pH. Clip 1 end of 1 double sharpened pencil with alligator clip & other end of alligator clip to one side of battery. Repeat with other double sharpened pencil & other side of battery. Put two open ends of double sharpened pencils in petri dish apart. Fill two plastic vials with water & invert into petri dish. Move one vial over each open end of pencil. Move the pH probe by pencil producing the most gas.

1) pH of solution

2) pH of solution by pencil producing the most gas

3) Name of gas being produced at this electrode

4) Write the half reaction for the reaction occurring at this electrode

5) What is the concentration of the ion produced in the half reaction in this area?

Move the pH probe to the area by the electrode producing the smaller amount of gas

6) What is the pH in the area around the pencil producing the smaller amount of gas?

7) Write the half reaction for the reaction occurring at this electrode

8) What is the concentration of the ion produced in the half reaction in this area?

9) What is reduced?

You need to identify the element that has the following properties: 1. Its outermost (valence) electrons are in the 4th energy level. 2. It has an atomic radius larger than Ru and smaller than Cd. 3. It has a first ionization energy greater than Ru and less than Cd. 4. It has an electronegativity greater than Cd and less than Rh. 5. It has the highest density of the remaining possible choices.

10) What elements in the 4th energy level have atomic radii between Ru & Cd?

11) What elements in the 4th energy level have 1st ionization energies between Ru & Cd?

12) What elements in the 4th energy level have electronegativities between Cd & Rh?

13) What is the mystery element?

A lemon has had 2 slices in its peel. Place a combination of pencil, iron, magnesium and zinc electrodes in different combinations into the slits, connect the alligator wires to the probes & to the leads from a running TI with CBL. Record the voltages of the combinations, & answer the questions.

14) When C is paired with Fe, write the half reaction that occurs at the cathode

15) When C is paired with Fe, write the half reaction that occurs at the anode

16) When Zn is paired with Fe, write the half reaction that occurs at the cathode

17) When Zn is paired with Fe, write the half reaction that occurs at the anode

18) Rank the 3 metals according to chemical activity from highest to lowest. (A high voltage when paired with the carbon indicates high chemical activity)

Put 2 ml of distilled water into each of 4 vials. Measure the pH in each. Put a small piece of CaO in a test tube. Measure the pH. Repeat for MgO. Use a straw and blow into the 4th test tube. Test the pH. Light a match and quickly collect as much of the gas as possible in a vial. Cover the vial & shake to mix smoke and water. Test pH.

19) Write the balanced equation of CaO and water.

20) Write the balanced equation of MgO and water.

21) Write the balanced equation of CO₂ and water.

22) Write the balanced equation of SO₂ and water.

23) How are Ca & Mg classified differently than C & S on the periodic table?

24) What conclusion can we draw about the differences between the reaction of metal and non-metal oxides with water?
Put 10 ml of Na₂SO₄ solution in petri dish. Place pH probe attached to running TI calculator & CBL in solution & record pH. Clip 1 end of double sharpened pencil with alligator clip & other end of alligator clip to one side of battery. Repeat with other double sharpened pencil & other side of battery. Put two open ends of double sharpened pencils in petri dish apart. Fill two plastic vials with water & invert into petri dish. Move one vial over each open end of pencil. Move the pH probe by pencil producing the most gas.

1. pH of solution
2. pH of solution by pencil producing the most gas
3. Name of gas being produced at this electrode
4. Write the half reaction for the reaction occurring at this electrode
5. What is the concentration of the ion produced in the half reaction in this area?
6. What is the pH in the area producing the smaller amount of gas
7. Write the half reaction for the reaction occurring at this electrode
8. What is the concentration of the ion produced in the half reaction in this area?
9. What is reduced?
10. What elements in the 4th energy level have atomic radii between Ru & Cd?
11. What elements in the 4th energy level have 1st ionization energies between Ru & Cd?
12. What elements in the 4th energy level have electronegativities between Cd & Rh?
13. What is the mystery element?
14. When C is paired with Fe, write the half reaction that occurs at the cathode
15. When C is paired with Fe, write the half reaction that occurs at the anode
16. When Zn is paired with Fe, write the half reaction that occurs at the cathode
17. When Zn is paired with Fe, write the half reaction that occurs at the anode
18. Rank the 3 metals according to chemical activity from highest to lowest. (A high voltage when paired with the carbon indicates high chemical activity)
19. Write the balanced equation of CaO and water.
20. Write the balanced equation of MgO and water.
21. Write the balanced equation of CO₂ and water.
22. Write the balanced equation of SO₂ and water.
23. How are Ca & Mg classified differently than C & S on the periodic table?
24. What conclusion can we draw about the differences between the reaction of metal and non-metal oxides with water?