Exploration: Redox Reactions and Electrochemical Cells Lab Activity Sheet

Task

Explore the principles of redox reactions by constructing a simple electrochemical cell and investigating electron transfer processes.

Materials per Group

- Copper strip
- Zinc strip
- Beakers (2)
- Voltmeter
- Salt solution (0.1M NaCl)
- Copper sulfate solution
- Zinc sulfate solution
- Connecting wires
- Safety goggles
- Gloves

Safety Precautions

1. Wear safety goggles and gloves at all times
2. Avoid direct contact with chemical solutions
3. Wash hands after completing the experiment

Procedure

Step 1: Cell Setup

1. Label two beakers as "Copper Half-Cell" and "Zinc Half-Cell"
2. Fill each beaker with respective metal sulfate solution
3. Place copper strip in copper sulfate solution
4. Place zinc strip in zinc sulfate solution

Step 2: Voltage Measurement

1. Connect voltmeter to metal strips using connecting wires
2. Record initial voltage reading

Data Collection Table

Observation	Copper Half-Cell	Zinc Half-Cell	Voltage Reading
Initial Color			
Color Change			
Voltage (V)			

Analysis Questions

1. Which metal undergoes oxidation? Reduction? Explain your reasoning.

2. Write the half-reaction for the oxidation process.

3. Write the half-reaction for the reduction process.

4. Calculate the overall cell potential.

5. How does this electrochemical cell demonstrate electron transfer?

Conclusion

Explain how the observed reactions demonstrate the principles of redox chemistry and electron transfer, 4 to 5 sentences.

Extension Activity

Research and compare your lab results with commercial battery technologies.

Cleanup

1. Neutralize solutions
2. Dispose of chemicals as instructed
3. Clean and return all equipment

Grading Rubric

- Accurate data collection: 30%
- Correct half-reaction equations: 25%
- Analysis questions: 25%
- Conclusion quality: 20%