

Name _____ Date _____

Worksheet 20.2: Practical on setting up voltaic cells and measuring voltages

(TR material subchapter 20.4, main teaching ideas, activity 2)

Analysis of results

- 1 Record your observations from the experiment, including those which could be evaluated as sources of errors.
- 2 Record the raw quantitative data in a table. You need to include their units and absolute uncertainties where appropriate.
- 3 Write the full chemical and ionic equations for reactions occurring in each cell made.
- 4 Draw the cell diagram for the $\text{Mg}|\text{MgSO}_4||\text{CuSO}_4|\text{Cu}$ cell. On your diagram, mark the negative electrode and the direction of electron flow in the external circuit.
- 5 State the function of the salt bridge.
- 6 Arrange the metals in order of their reactivities (how strong they are as reducing agents) and the metal salts in order of their strengths as oxidising agents.

Evaluation of experiment

- 7 Using the IB Chemistry data booklet, calculate the expected cell potentials for each combination of the voltaic cells you made.
- 8 Calculate the percentage errors in the cell potentials for each cell combination you made.
- 9 Explain why a high-resistance voltmeter (a potentiometer) should be used to measure the cell potential in your experiment.
- 10 Describe the key features of a standard hydrogen electrode.
- 11 Describe three systematic errors in your experiment.
- 12 Suggest improvements for each systematic error mentioned in Question 11.