Introduction to Electrolysis

Name_____ Section_____

1. Complete as many cells as you can from the data collected in the BCE for today's class. Find other students, who did different experiments, to complete the remaining entries.

Current (amps)	Time (s)	Mass (g) Zn deposited	Mass (g) Fe deposited	Mass (g) Ag deposited

2. For each metal (Zn, Fe and Ag), how does the mass plated out at the – electrode depend on time? What data from the table in Q1 supports your claim? Write a proportionality equation using the variables mass and time.

3. For each metal (Zn, Fe and Ag), how does the mass plated out at the – electrode depend on current? What data from the table in Q1 supports your claim? Write a proportionality equation using the variables mass and current.

4. How does the mass of the metal plated out at the – electrode depend on metal (Zn, Fe and Ag)? What data from the table in Q1 supports your claim? Write a proportionality equation using the variables mass and current.

5. Describe the action that causes the metal to plate on to the – electrode (Note: look at in particulate level animation in the Electrolysis Simulation.). Write a chemical equation

(half-reaction) that summarizes your explanation for each of the metals: Zn, Fe and Ag. Summarize similarities and difference among the three half-reactions.

If current is defined as the number of electrons passing through a circuit per unit time, and if the current is the same why do we obtain different masses of metal.

6a. How many zinc atoms plated out on the – electrode for the three experiments for which the time and current were different for zinc in the table in Q1.

b) How many iron atoms plated out on the – electrode for the three experiments for which the time and current were different.

c) How many silver atoms plated out on the – electrode for the three experiments for which the time and current were different.

7. Complete the following table

Current (amps)	Time (s)	#atoms Zn deposited	#atoms Fe deposited	#atoms Ag deposited

8. What new relationship is made evident by these calculations?

9. Write the proportionality between the amount of metal (plated out at the – electrode) and each of the three variables (current, time and ion charge). Indicate what variables are held constant for each proportionality.

10. Write a single proportionality between the amount of metal (plated out at the – electrode) and the three variables (current, time and ion charge).

11. Calculate the magnitude of the constant that will convert the proportionality to an equality.

Given the relationship between current (amps), time (seconds) and the charge on the metal ion,

1. Based on the simulation used for today's BCE, describe the change in amount of metal on each electrode. How are these changes related?

2. What flows from the + electrode in the external circuit via the wire?

3. What causes the direction of the flow?

4. What flows from the + electrode in the solution?

5. What is the mechanism that transfers the amount of metal from one electrode to the other?

7. Describe the action that causes the metal atoms to leave the + electrode. Write a chemical equation that summarizes your explanation.