Chemistry 121 Names:

Project 2: Conductivity as a Chemical Property

Preparation: Read Section 8.2 in the text. Work with your lab partner.

1. Fill in the tables below; use "**bright**", "**dim**" or "**none**" to characterize brightness. For type of electrolyte, write "**strong**" "**weak**" or "**non**".

Data Table 1 — Water and solutions

Liquid or Solution	Bulb brightness	Type of electrolyte
Distilled water		
Tap water		
Salt (NaCl) solution		
Sugar ($C_{12}H_{22}O_{11}$) solution		
Baking soda ($NaHCO_3$) solution		
Boric acid (H_3BO_3) solution		

Data Table 2 — Liquids of Your Choice

Liquid tested	Bulb brightness	Type of electrolyte

Data Table 3 — Foods of Your Choice

Food Tested	Bulb brightness	Type of electrolyte

Analysis — Fill in the blanks:

2. The **brighter** the bulb shined, the _____ **conductive** the tested material.

3. Looking at the **chemical formulae** in Data Table 1, you can tell that the **electrolytic** solutions conducted electricity because the solutions contained

_____, made by a process called _____.

4. Write a chemical equation for $NaHCO_3$ that demonstrates your answer to question 3.

5. Write a similar chemical equation for H_3BO_3 that demonstrates its electrolyte behavior.

6. To confirm your hypothesis about the nature of conductivity in chemicals, read the labels on the containers of the liquids and foods you tested in the last two tables and determine which **substances** were responsible for the conductivity of the liquids/solids.

7. Count the number of charged species made by $NaHCO_3$ and the number of charged species made by H_3BO_3 . In your view, which substance should have been the stronger electrolyte?

8. What do your observations of $NaHCO_3$ and H_3BO_3 tell you about the **degree of dissociation** of H_3BO_3 compared to $NaHCO_3$? In other words, do all substances have to have a degree of dissociation of 100%?

9. What's one other simple way, besides degree of dissociation, in which **you** could control the conductivity of a solution? Note that most water softeners work under this principle.