

## Electrolytes and Non-electrolytes

### PRE-LAB DISCUSSION:

Substances that are capable of conducting an electric current in solution are known as electrolytes. Substances that do not conduct an electric current in solution are known as non-electrolytes. Among electrolytes, the ability to conduct varies greatly. Some substances are excellent conductors, while others conduct only slightly. Conductivity meters can be used to measure the ability of various solutions to conduct. However, quality conductivity meters are expensive. Your instructor will provide you with some inexpensive conductivity testing devices that use light emitting diodes (LED's) and a nine volt battery. Below you will find a relative scale of conductivity from 0 (non-conductor) to 4 (excellent conductor). You will use this scale in conjunction with your conductivity tester in order to quantify the conductivity of various solutions.

Conductivity Scale for Conductivity Measurements			
Scale	Red LED	Green LED	Conductivity
0	off	off	very low or none
1	dim	off	low
2	medium	off	medium
3	bright	dim	high
4	very bright	medium	very high

**MAKE YOUR CLAIM:** Prior to performing the lab, predict which solutions will conduct an electric current (are electrolytic) and which solutions will not conduct (are non-electrolytes).

### PROCEDURE:

#### **ALWAYS wear goggles when working in the laboratory!**

1. Obtain a clean, dry well plate from your lab drawer. It is crucial that the wells be clean and dry – contamination could significantly alter your results.
2. Place samples of the solutions to be tested, in wells, away from one another. Be certain to place enough solution in the wells to make testing possible, but not so much as to overflow the well and contaminate other solutions. It is suggested that you place the spot plate on a piece of paper, and label the paper in order to distinguish one solution from another.
3. Obtain a conductivity tester, and connect the nine-volt battery to the snap connectors. **BE CAREFUL NOT TO TOUCH THE EXPOSED WIRE OF THE ELECTRODES THAT ARE USED FOR TESTING. *Note: IF the LED lights do not light up with ANY of the solutions you test, take the conductivity tester to your instructor to be checked.***
4. Test the first solution by placing both electrodes in the well. Record the response of the LED's in your Data section.
5. Rinse the electrodes with distilled water between each test to avoid contamination of the wells that remain to be tested.
6. Continue testing each solution, washing the electrodes thoroughly between tests.
7. When all of the tests are complete, thoroughly rinse the spot plate in the sink, and rinse a second time with distilled water.
8. Disconnect the nine volt battery from the conductivity tester. Return the conductivity tester to the counter where you found it.

## **RESULTS**

For each solution tested, record the intensity of light produced from each LED. Use the following descriptive terms as used on the previous page:

OFF, DIM, MEDIUM, BRIGHT, VERY BRIGHT

<b>Substance Tested</b>	<b>Red LED</b>	<b>Green LED</b>	<b>Conductivity</b>
Pure water			
Tap Water			
Sodium Chloride solution			
Ethanol in pure water			
Sugar in pure water			
0.2 Molar hydrochloric acid solution (HCl)			
Soda			
Gatorade			
Ammonium hydroxide solution (a base)			

In your abstract, be sure to address whether the results support or refute all, or part of your claim. To what general groups of compounds do the electrolytic substances belong? To what general groups of substances do the non-electrolytic substances belong?