Conductivity of Compounds

Introduction

Salt and sugar both dissolve easily in water, but the solutions they form have an important difference. One is an ionic compound, and when it dissolves, it dissociates into ions. The ions are free to move in solution, and that solution, therefore conducts electricity and is classified as an electrolyte. The other, however, is a covalent compound; its molecules remain whole when they dissolve. With no ions, that solution doesn't conduct electricity and is classified as a non-electrolyte.

This investigation involves testing several different compounds. When you measure the conductivity of each, you will find some that are good conductors, some are fair or poor conductors, and some are non-conductors. Using the conductivities that you have measured, you will decide which are electrolytes and which are non-electrolytes.

Problem:

How can conductivity of a solution help you to classify the type of compound?

Safety:

Wear your safety glasses at all times during the investigation. Use and dispose of the chemicals as specified by your teacher. Wash your hands thoroughly before leaving the laboratory.

Materials:

Safety goggles	conductivity tester	wash bottle	Test tubes
various solutions	distilled water	test tube rack	250 mL beaker

Procedure:

1.) Log onto the computer, open up logger pro under vernier software. Open the 'chemistry with computers' file and choose electrolyte.
2.) Obtain one of the solutions and place the conductivity tester in the solution. When the reading has stabilized, record the conductivity value in your data table.
3.) RINSE THE CONDUCTIVITY TESTER WITH THE WATER IN THE WASH BOTTLE BEFORE PLACING IT IN THE NEXT SOLUTION.
4.) Repeat with the remaining solutions. When you have finished with the lab, dispose of the solutions as instructed by your instructor.
5.) Clean up your work area and wash your hands before leaving the lab area.

Conclusion Questions:

1. What type of bonding do you think the good conductors of electricity have? Explain your reasoning as to why these type of solutions are good conductors.
2. What type of bonding do you think the non-conductors of electricity have? Explain your reasoning as to why these type of solutions do not conductors
3. What criterion did you establish for whether a solution was an electrolyte or a non-electrolyte?
4. What conclusions can you draw from this investigation?

Name:	Class Period:
Lab Partner	Lab Partner

Complete the following table

Solution	Conductivity	Electrolyte (strong, weak, non)

Answer to the conclusion questions

1. _____

_____

2_____

_____

3. _____

_____

4. _____

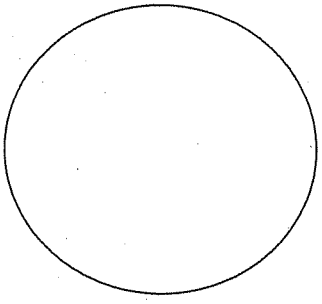
_____

CHEM ASAP

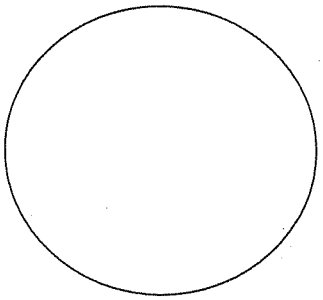
CHAPTER 17 Simulation 20

Select a solute: Sugar, Salt, Vinegar, HCl

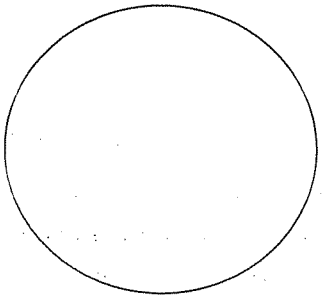
Draw the Particle Diagram



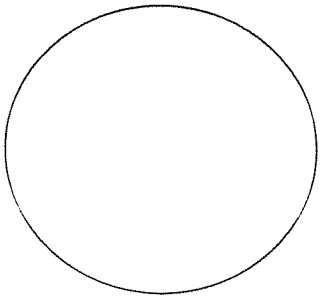
Sugar



Salt



Vinegar



HCl

Which of the following solutions are electrolytes?

What is necessary for a solution to conduct electricity?

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1) A substance that conducts an electrical current when dissolved in water is called

A) a catalyst B) a metalloid C) a nonelectrolyte D) an electrolyte

2) Which species can conduct an electric current?

A) $CH_3OH(aq)$ B) $HCl(aq)$ C) $NaOH(s)$ D) $H_2O(s)$

3) Which compound is an electrolyte?

A) CH_3OH B) $C_6H_{12}O_6$ C) $CaCl_2$ D) CCl_4

4) Water containing a dissolved electrolyte conducts electricity because the solution contains mobile

A) electrons B) ions C) molecules D) atoms

5) Which compounds are *both* classified as electrolytes?

A) NH_4Cl and KCl

B) NH_4Cl and $C_6H_{12}O_6$

C) $C_6H_{12}O_6$ and CH_3OH

D) KCl and CH_3OH

6) As additional solid KCl is added to a saturated solution of KCl, the conductivity of the solution

A) decreases B) increases C) remains the same