



CHEMISTRY EXPERIMENT WORKSHEET

Elective 3 Chemistry Secondary 5
Topic: Electrolyte and Nonelectrolyte Solution

Students Identity

Group Members Name:

Day, Date:

Learning Objectives:

1. Students can explain the properties of various types of substances and solutions based on their differences in electrical conductivity.
2. Students can analyze and predict whether various unknown solution samples are electrolytes or nonelectrolytes.

Phase 1: Introduction to Concepts

Instruction: Read and discuss the following concepts with your group members. You can also explore your curiosity on the other resource in internet.

A. Solution

Solution is a homogeneous mixture consisting of a solvent and a solute. The solvent is always in the liquid state, while the solute can be either liquid or solid.

B. Main Components of a Solution:

- **Solvent:** The substance that dissolves, usually present in larger quantities (Example: water).
- **Solute:** The substance being dissolved, usually present in smaller quantities (Example: salt).

C. Electrolyte and Non-electrolyte Solution

An electrolyte solution is a solution that can conduct an electric current. Electrolyte solutions can conduct electricity because they contain free ions coming from the solute, which has dissociated into positive and negative ions. Electrolyte solutions are divided into two types: strong electrolyte solutions and weak electrolyte solutions:

- **Strong electrolyte solution** is a solution that conducts electricity well. This is because the solute in a strong electrolyte solution completely dissociates in water to form positive ions (cations) and negative ions (anions).
- In contrast, **weak electrolyte solutions** are poor conductors of electricity. This is because the solute in a weak electrolyte solution only partially dissociates into its ions, resulting in the formation of only a small number of ions.

Phase 2: Answering Questions and Making a Hypothesis

What substances in a solution which are required to conduct an electric current?

Answer: _____

Which of the following four substances—salt solution, sugar solution, coconut oil, and vinegar—are electrolytes and which are nonelectrolytes? Write your hypothesis!

Answer:

Phase 3: Experiment

Equipments:

- Beaker Glass 100 mL (4 items)
- Spoon
- Multimeter
- Copper metal

Materials:

- Salts or NaCl (3 teaspoons)
- Sugar or Sucrose (3 teaspoon)

- Acetic acid or vinegar (50 mL)
- Coconut oil
- Aquadest/distilled water (H₂O)

Procedures:

- Prepare a salt solution and a sugar solution by mixing 3 teaspoons each of sugar and salt into 50 mL of distilled water (aquadest) and stirring until dissolved in a beaker (have been prepared by teacher).
- Prepared acetic acid solution by mixing the 40 mL of acetic acid with 10 mL aquadest to the beaker (have been prepared by teacher).
- The teacher give labels for each solution with sample A, B, C, and D.
- Measure and record the electric current from each sample using a multimeter.
- Students must guess what is sample A, B, C, and D based on their electric current.

Phase 4: Data Collection

Fill the data in this table based on the experiment!

Samples	Name of The Chemicals	Electric Current (A)	Types of Solution		
			Strong Electrolyte	Weak Electrolyte	Nonelectrolyte
	NaCl Solution				
	Sucrose/Sugar Solution				
	Acetic Acid Solution				
	Coconut oil				

Phase 5: Data Analysis

Discuss with your friends and answer the questions based on the data that have been collected!

1. Which sample is a strong electrolyte solution? How do you know?

Answer

2. Why electrolyte solution can conduct electricity well?

Answer

3. Do sucrose and coconut oil solutions qualify as electrolytes or nonelectrolytes? In your opinion, are the ions formed in those substances?

Answer

4. In your opinion, are there more or fewer ions produced by a vinegar solution, if we compared it to the salt (NaCl) solution and a sucrose solution?

Answer

Phase 6: Conclusion

Write your conclusion based on the experiment results and analysis!