

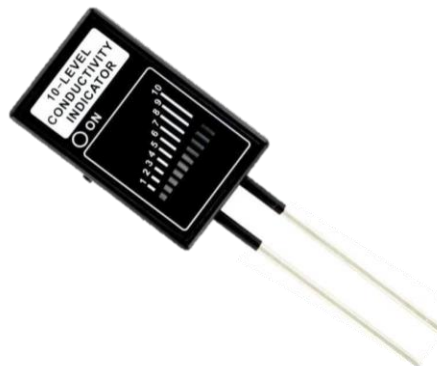
INSTRUCTIONAL GUIDE

Contents

- Conductivity Tester
- Instructional Guide

Recommended for Activity:

- [Safety glasses \(C5-1030\)](#)
- [Assorted Beakers](#)
- [Stirring rods \(62-1008\)](#)
- [Dropper pipets \(06-3025\)](#)
- [Lab apron \(C5-1050\)](#)



Introduction

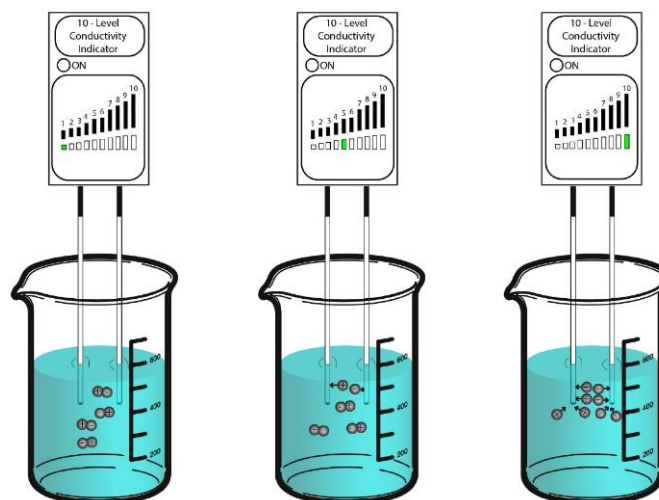
The Conductivity Tester is a useful tool to qualitatively demonstrate the electrical conductivity of an electrolytic solution. Operation is simple, so students can focus on the concepts behind the data they collect. Even simple conductivity tests shed light on fundamental sections of the natural world like acid-base chemistry and serve as a great jumping-off point for discussion of the pH scale.

Background

Electrical conductivity is based on the presence of free electrons. Metals that are good conductors have free electrons, like copper, gold, and silver. If there are few free electrons, there will be little electrical conductivity.

Solutions work the same way—the more free electrons there are, the better the electrical conductivity. Highly ionized solutions have many free electrons and make great conductors. Electrolytes refer to the minerals in your body, or a solution, that contain an electric charge. Strong acids and salts completely ionize when in a solution, and therefore make strong electrolytes. The ions carry the electric charge through the solution creating an electric current.

If the current is sufficient it will light up the LED lights. The stronger the current the more LED lights that will light up.



This provides a purely qualitative process for measuring conductivity. The number of lights does not correspond to a specific conductivity value. The more lights that are illuminated, the more conductive the solution.

Activities

Always use proper safety precautions when working with chemicals. This includes wearing safety goggles and lab coats.

- Set up the solutions to be measured, use the same volume for each.
- Feel free to mix together different solutions to see what combination makes the best conductor
- Measure the level of conductivity for each solution in the chart below. Be sure to note the differences between conductors and draw conclusions as to why one solution is a better conductor than another.

Solution	Level of Conductivity	Notes

After using the device, be sure to rinse off the probes with de-ionized water and dry completely.

NGS Standards

2-PS1-1: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

5-PS1-3: Make observations and measurements to identify materials based on their properties.

MS-PS1-2: Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

HS-PS2-6: Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

Related Products

Deluxe Electrolysis Apparatus (C6-0500) A simple and safe electrolysis apparatus that is used to make Hydrogen and Oxygen gas by passing DC current through water.

Dye Sensitized Solar Cell Kit (P6-2150) Dye Sensitized Solar Cell (DSSC) Kit. Caltech scientists, working with local high school science teachers, have created a self-contained kit for their Juice from Juice project that demonstrates how you can use blackberry and other fruit juices to generate power from sunlight.

Electrochemistry Kit (P6-2160) This supplemental kit expands upon the related chemistry and biology concepts of the Dye Sensitized Solar Cell kit with one activity on electrochemistry.