LAB ACTIVITIES MANUAL

AND SETUP INSTRUCTIONS

Simple Cells Set

SCLKIT-E

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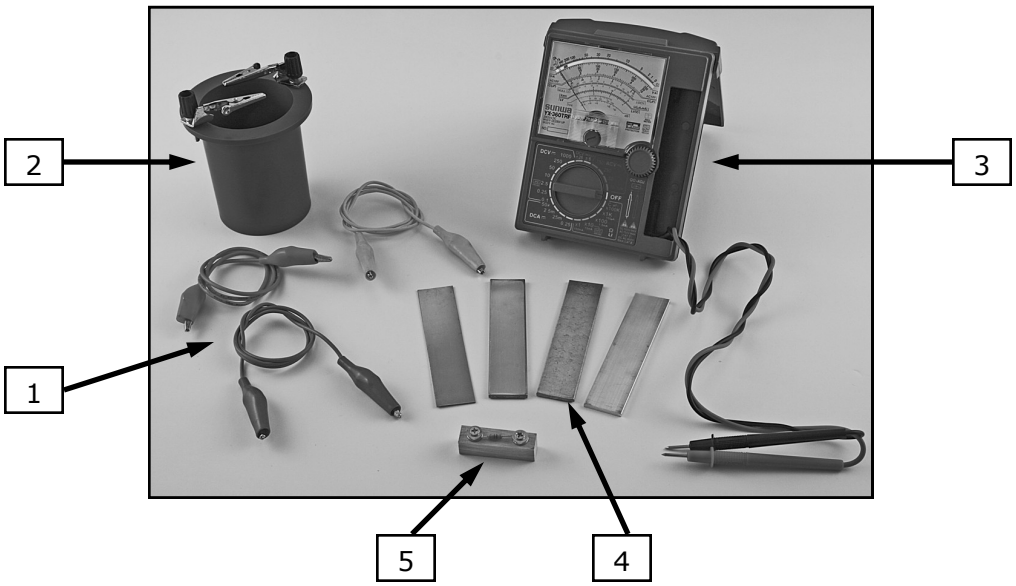
AND SETUP INSTRUCTIONS



Simple Cells Set

LIST OF PARTS IN THE SET

Refer to the keyed illustration above

1. Connecting cables with alligator clip ends, 18" long.—3 each
2. Simple cell with electrode holders and binding posts. Capacity: approx. 300 ml
3. Analog multimeter with probes. Measures voltages and currents
4. Electrodes: 1 each of aluminum, copper, iron, and zinc, each 10 cm x 2.5 cm
5. Mounted load—resistor of approx. 500 Ohms

You need to supply:

Electrolytes: Distilled water, tap water, salt water, vinegar, cola, fruit juice (orange, lemon, grapefruit, and pineapple work well)

DESCRIPTION

The Simple Cells Set offers five activities designed to introduce students to the basic properties of an electric cell consisting of two electrodes of different materials in a liquid electrolyte.

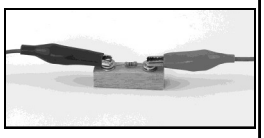
The cell consists of a molded plastic beaker of 300 ml capacity with a wide rim to which two metal brackets are attached by binding posts. The brackets carry alligator clips for holding the electrodes in place and making electrical contact to them. Four electrodes are supplied to allow various pairings of metals to be investigated. They include identical rectangular strips of aluminum, copper, iron, and zinc. The three connecting cables are used with the mounted resistor to create a circuit for the experiment on electrical current. An analog multimeter allows voltages to be measured in the first two activities and currents to be observed in activities four and five.

The activities are observational investigations, and measurements are used for comparisons. No arithmetic skills are required. The same items of equipment are used in multiple experiments, and the general nature of the designs allows teachers to devise further experiments that require only the equipment contained in the set. Each experiment description consists of a Teacher's Manual and a Student Procedure. These are also provided in electronic form (*Microsoft Word 2003* and *Microsoft Publisher 2003*).

SETUP

GENERAL HINTS

- To avoid splashing and spillage, use only about 250 ml of electrolyte in the activities.
- A good supply of paper towels is helpful in maintaining a clean lab environment during these activities.
- Electrodes should be rinsed in water and patted dry between uses to avoid cross-contamination of the electrolytes and corrosion of the electrode surfaces.
- Clean the electrodes before first use, then periodically, with fine emery paper (600 grit is good). This removes oxide and corrosion product to ensure reliable results. This is especially important for the iron and aluminum electrodes.

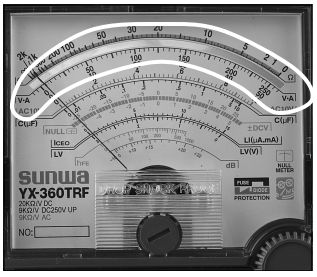


- The cell should be rinsed with water when changing electrolytes, and should also be dried before using distilled water to avoid introducing additional ions.
- When connecting alligator clips to the mounted resisitor load, orienting the clips horizontally makes the connection more stable mechanically and more reliable electrically.

THE ANALOG MULTIMETER

The analog multimeter is a sensitive instrument with more capabilities than are required for these acitivities.

- **EXERCISE CARE WHEN USING THE PROBE TIPS—THE ENDS ARE SHARP!**



- It is convenient for reading the scale to set up the multimeter with the cover as a stand, as described in the instructions accompanying the multimeter.
- The batteries supplied with the meter are only required for measuring resistances, and are not needed for these activities.
- Only two ranges are needed for these activities (see pictures); it can be helpful to mark them with tape on the meter.

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