

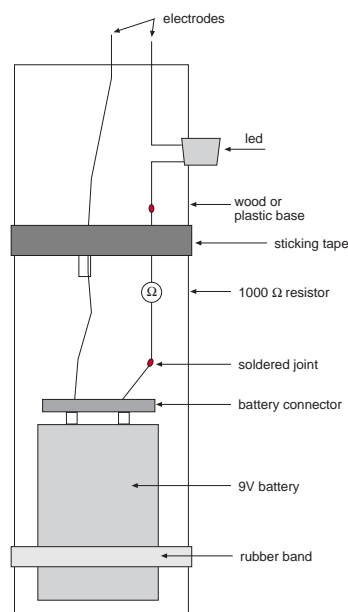
Constructing a Conductivity Meter

Teacher's guide

This procedure gives instructions for constructing a conductivity meter which can be used for testing conductivity of solutions or solids. It is possible for students to make the apparatus themselves and then use it; alternatively students could be given the instruments ready-made. Construction could form a technology project and this method could be seen as a combined science/technology exercise.

Apparatus (per group)

- ▼ One light-emitting diode
- ▼ One 1000 Ω resistor
- ▼ One 9 V battery
- ▼ One battery connector
- ▼ One piece of thin wood or plastic – ca 150 x 25 mm
- ▼ Solder wire or tape
- ▼ Soldering iron
- ▼ Sticking tape
- ▼ One thick rubber band.



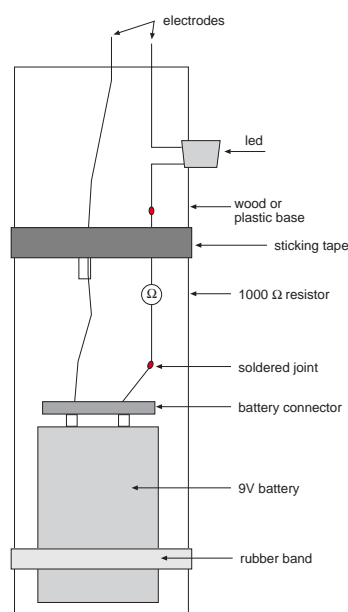
Constructing a Conductivity Meter

Student worksheet

In this experiment, you will be making a conductivity meter which you can use to test the conductivity of solutions and solids such as metals.

Instructions

A diagram of the meter is shown here. Your teacher will give you guidance on how to build the conductivity meter.

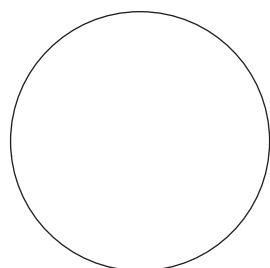


37. Using a microscale conductivity meter

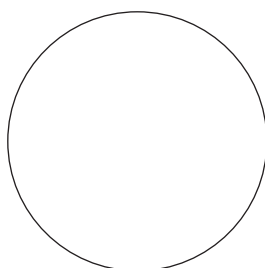
In this experiment, you will be using a conductivity meter to test to see which solids and solutions/liquids conduct electricity.

Instructions

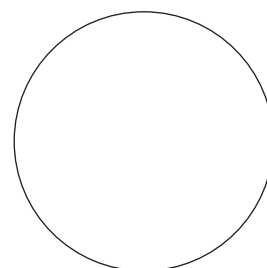
1. Place the clear plastic sheet over this worksheet.
2. Add three drops of each of the solutions to the circles indicated below.
3. Place a small amount of each of the solids in the appropriate circle.
4. Test for conductivity by carefully placing just the tip of the electrodes on the meter in each of the substances in turn.
5. Make a table of your results.
6. Give explanations for your results trying to link the conductivity of a substance with its structure.



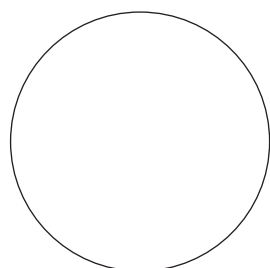
copper sulphate



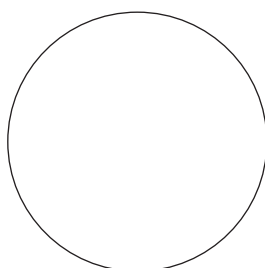
sodium chloride



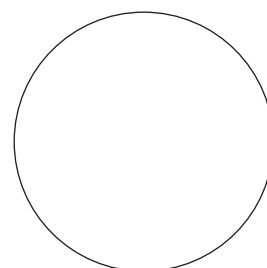
sugar solution



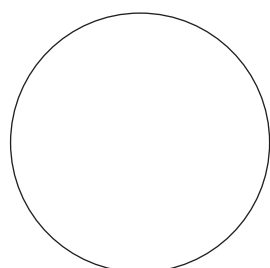
tap water



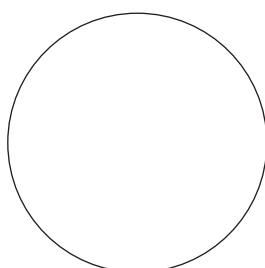
distilled water



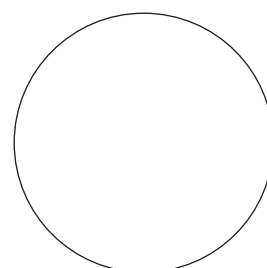
copper foil



iron nail



aluminum foil



pencil 'lead'

37. Using a microscale conductivity meter

Topic

Solutions – conductivity, ions. Metals – conducting electricity.

Level

Pre-16 and post-16.

Timing

15 min.

Description

In this experiment students use the conductivity meter to test the conductivity of solids (eg metals) or solutions. The test is very easy to do and virtually any material could be examined. Students will need to be careful about cross-contamination when testing solutions.

Apparatus (per group)

- ▼ Conductivity meter (see ppxx)
- ▼ Iron nail
- ▼ Pencil lead

Chemicals (per group)

- ▼ Copper sulphate solution
- ▼ Sodium chloride solution
- ▼ Tap water
- ▼ Deionised water
- ▼ Sugar solution
- ▼ Copper foil
- ▼ Aluminium foil

Observations

Metals and solutions/liquids which contain ions should cause the LED to shine. This experiment provides a quick and simple method for testing conductivity. The LED will light for any substance – whether liquid or solid – which conducts.

Safety

Students must wear eye protection.

It is the responsibility of the teacher to carry out a risk assessment.