STEM@CGI
SCIENCE - TECHNOLOGY - ENGINEERING - MATHEMATICS

LEARNING LINKS FOUNDATION

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STEM from Home

Conductors and Insulators

From the time we wake up to the time we go to sleep, we use a multitude of electrical gadgets like fans, air conditioners, switch boards, washing machines, juicer-mixers, televisions, computers etc. to name a few.

Have you noticed that the parts of these gadgets are made up of different types of materials? Some are metallic, some are plastic, rubber or wooden. Wouldn't it be easy to manufacture a device with only one type of material? It could save time and cost to manufacture. There is a reason that components of most electrical devices are manufactured with different materials. Even a simple electric wire is made of metal and coated with a plastic like substance.

The electric wire is made of metal because metal helps electricity pass through easily. Copper is a good conductor of electricity. It is coated with a plastic or rubber like material since these substances are non-conductors of electricity. These are also called as insulators. They help in safe handling of wires.

Thus, we see that different materials could either be good conductors of electricity or insulators which block the passage of electric currents.

In this STEM Pack we will explore the concepts of conductors and insulators. Your challenges include using a simulation tool to test materials and identify conductors and insulators, create a circuit using the most effective conductor and taking a quiz on electricity.

Main Activity: **Conductors or Insulators? Let's Figure It Out!**

Introduction

In this activity you will use a simulation program to identify which daily use objects are conductors or insulators of electricity.

Pre-Work Reading

- Insulators and conductors for kids
- What are Conductors and Insulators?
- 10 Examples of Electrical Conductors and Insulators
- Electricity For Kids | Electricity Facts

What You Will Learn

Identify objects which are conductors or insulators

Getting Started

You can access guidelines for the activity here.

What you will Need

Hardware

A computer connected to the internet.

Software

A modern web browser like Microsoft Edge, Chrome, or Firefox.

Observation Worksheet _ Conductors or Insulators? Let's Figure it out!!

Bonus Activities:

Activity 1: More About Electricity, Conductors and Insulators

We know that matter is made up of atoms - the smallest unit of all matter. Atoms consist of three basic particles: **protons, electrons, and neutrons**. The nucleus (centre) of the atom contains the protons (positively charged) and the neutrons (no charge). The outermost regions of the atom are called electron shells and contain the electrons (negatively charged).

In many materials, the electrons are tightly bound to the atoms. Wood, glass, plastic, rubber, ceramic, etc are all examples of materials in which electrons stick with their atoms. Because these atoms refuse to share their electrons, these materials can't conduct electricity very well, if at all. These materials are **electrical insulators.**

Most metals, however, have electrons that can detach from their atoms and fly around. These are called **free electrons.** The loose electrons make it easy for electricity to flow through these materials, so they are known as **electrical conductors.** The moving electrons transmit electrical energy from one point to another.

Let's take this electricity quiz to test your understanding.

OR

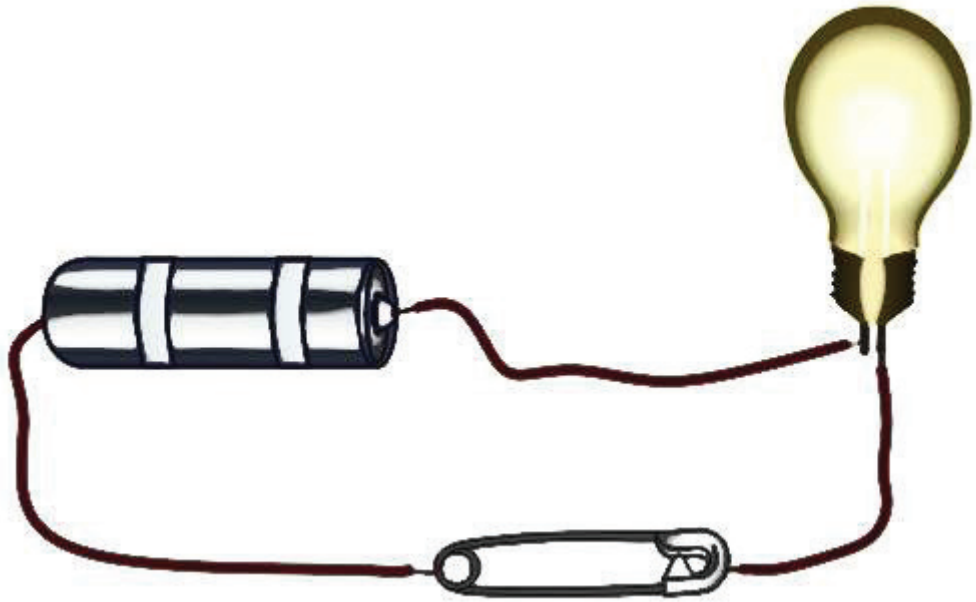
Take this Quiz to check your understanding about conductors and insulators

Challenge Activity: Electric Circuits

We have learnt that a conductor is a material that allows electricity to flow through it. An insulator is a material that electricity cannot flow through.

Your Challenge:

Build a simple circuit with a battery, a light bulb and 3 pieces of insulated wires.



Now use this circuit to test whether a set of objects are insulators or conductors.

Touch the free ends of the wire to the object you are testing. If the light bulb lights up, the object is a conductor. if it does not, the object is made from an insulator.

Prepare a list of simple household objects available at your home e.g., spoons, knives, screwdriver, plier or any other. Observe each of these objects carefully. Make note of materials used in making of their main parts and outer shell or wrapping. Which of these parts are conductors of electricity and which ones are insulators? Test by touching the free ends of your circuit wires to the different parts of the objects to ascertain the same.

Note your observations in the Challenge Activity Worksheet.

Share your circuit design and your observations by uploading a presentation. Your project needs to be handmade but your final submission can be presented digitally using Docs or Presentation software