# Power's Path

## Conductor and Insulator

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# Hypothesis:

We think wood is the better conductor because wood catches fire very easily.

We think rubber is a good insulator because we see electricians wearing electric gloves when working and never get shocked.

# Description:

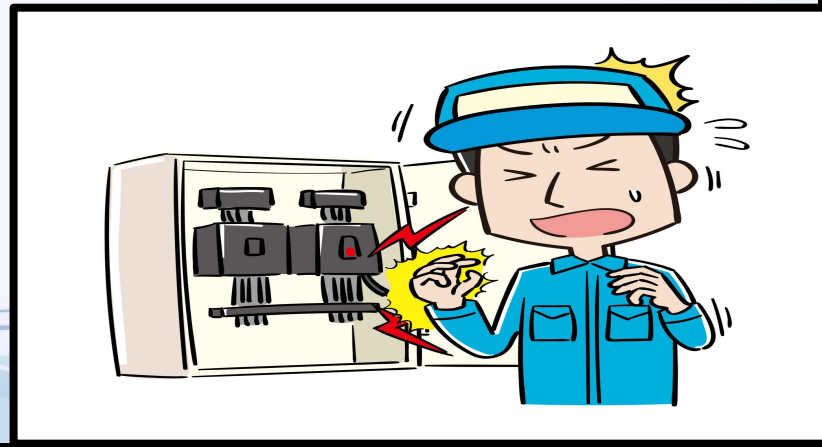
This project investigates the difference between conductor and insulator by testing a variety of everyday materials. The object are tested using a simple electric circuit. Each material is placed in the circuit to observe weather it allows the electric current to flow and complete the circuit.

# Purpose Behind This Project:

We chose this project because more than 4,400 people die a year just because of electric shocks.We made our project so people know how to prevent getting electric shocks.Also we think that this project is a super good and a useful idea that can help save many lives.

# Introduction:

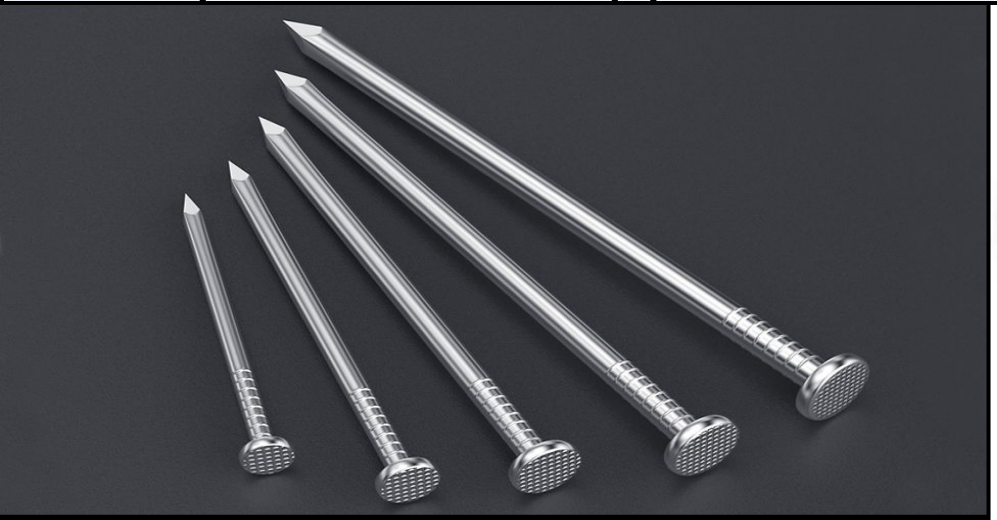
Have you ever wondered why a person who is wearing rubber gloves touches something electric and does not get a shock? But when someone not wearing anything on their hands touch something electric, they get shocked. That's where conductor and insulator come in use.



# What Is A Conductor?

A conductor is a material that allows electricity to move through it very easily. Conductors have electrons that are free to move easily when a force like voltage is applied.

Examples:Steel,Copper etc.



# What is An Insulator?

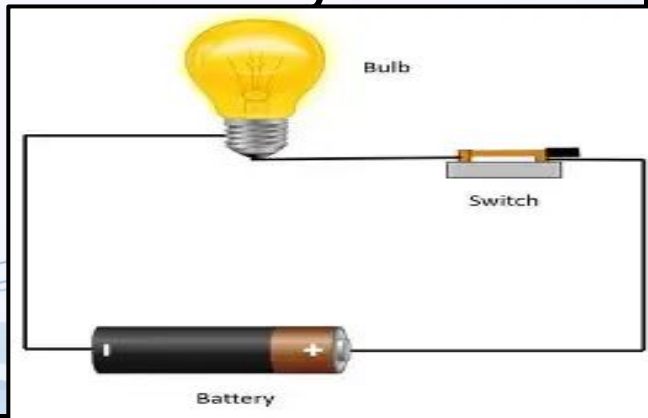
An insulator is a material that does not allow an electric or heat heat current to pass through. Insulators are used to contain or protect energy to protect accidental conduction in electrical circuits and thermal applications.

Examples:Rubber,Plastic,Lapis Lazuli, etc.

# Why Do We Need Conductors?

Conductors are needed to carry electrical current from one place to another. They allow electricity and heat to flow easily. Without conductors most electrical devices would not work.

Example:In a bulb circuit the wire lets electricity reach the bulb so it lights up.



# Why Do We Need Insulators In Our Life?

Insulators are needed for safety, to protect us from electric shock and to stop electricity from escaping.

Example:The rubber gloves used by electricians protect them from electric shock.

# How Do We Use Conductors In Our Life?

In our daily life,conductors play a very important role.Conductors pass power from the smallest gadgets to the largest machines.These materials light up our homes,keep our devices running.

Examples:Electronic Devices, Electrical wiring, etc.

# How Do We Use Insulators In Our Life?

Insulators keep us safe and protected in everyday life by stopping unwanted flow of electricity and heat.They are key to many aspects of our daily lives and play a major role in everything from cooking utensils to the insulation in our walls.

Here are some of the most important real life examples of insulators:

Home Insulation,Utensils handles,Electric wire,etc.

# Materials:

9V Battery X1

Battery Connecter x1

DC Buzzer x1

On/Off Switch x1

12v 1.5W Red LED x1

Cardboard Base x1

Lapis Lazuli x1

Copper coin x1

Nail(steel) x1

Salad Skewer x 1

Electrical Tape Black

Small Motor x1

Black Wire x2

White Wire x3

Red Wire x3

Wood x1

Plastic x1

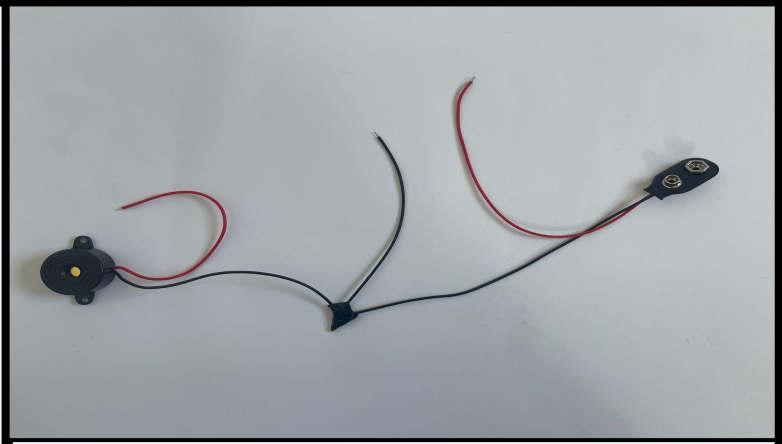
Rubber x1

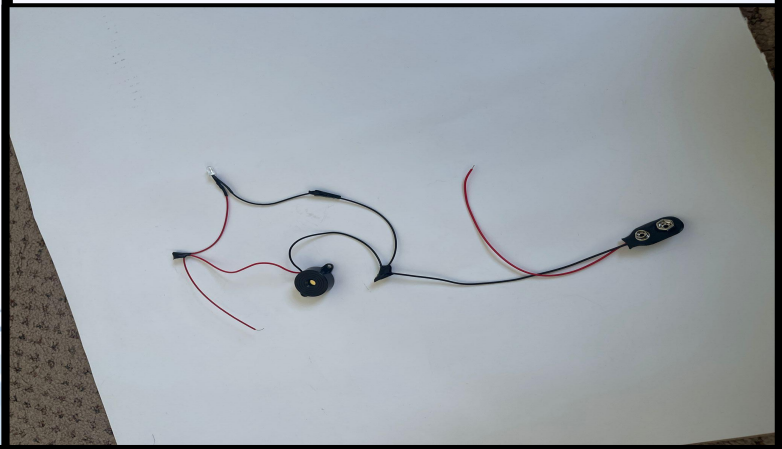
# Experimental Apparatus

We made this design to create a simple closed electric circuit.

The design uses wires,a battery connector,an LED,and a DC buzzer so electricity can flow easily.

We kept the design simple so we could clearly see how conductors work and how electricity travels from one part to another.

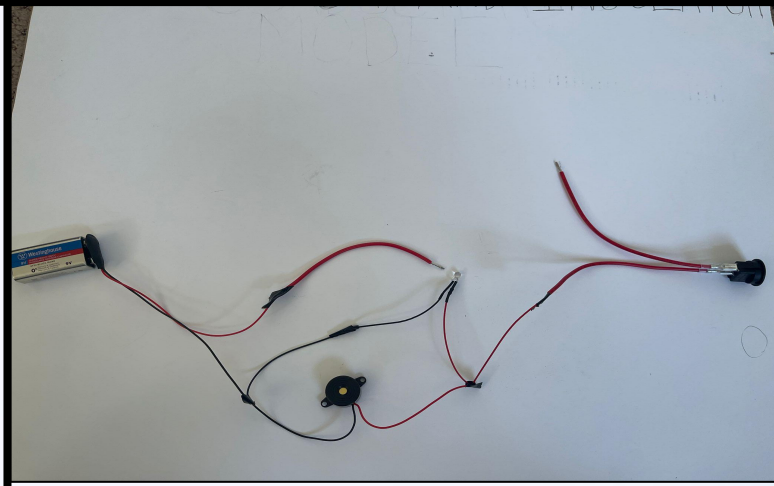


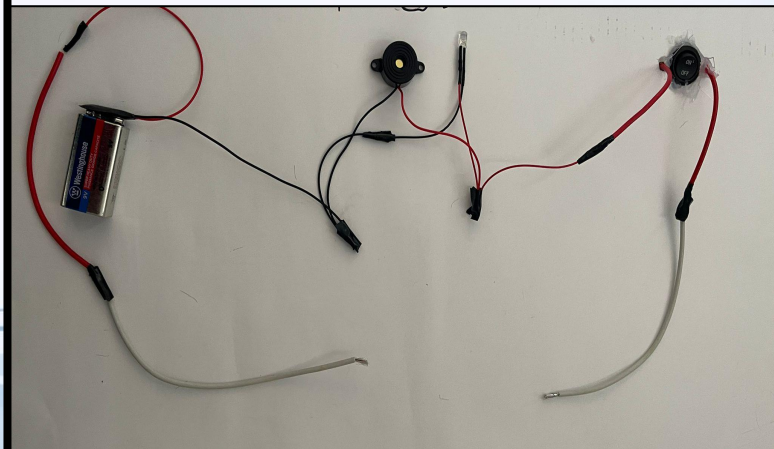


# Improvement in Apparatus :

We made this design a little better by adding a on/off switch and extending the wires.

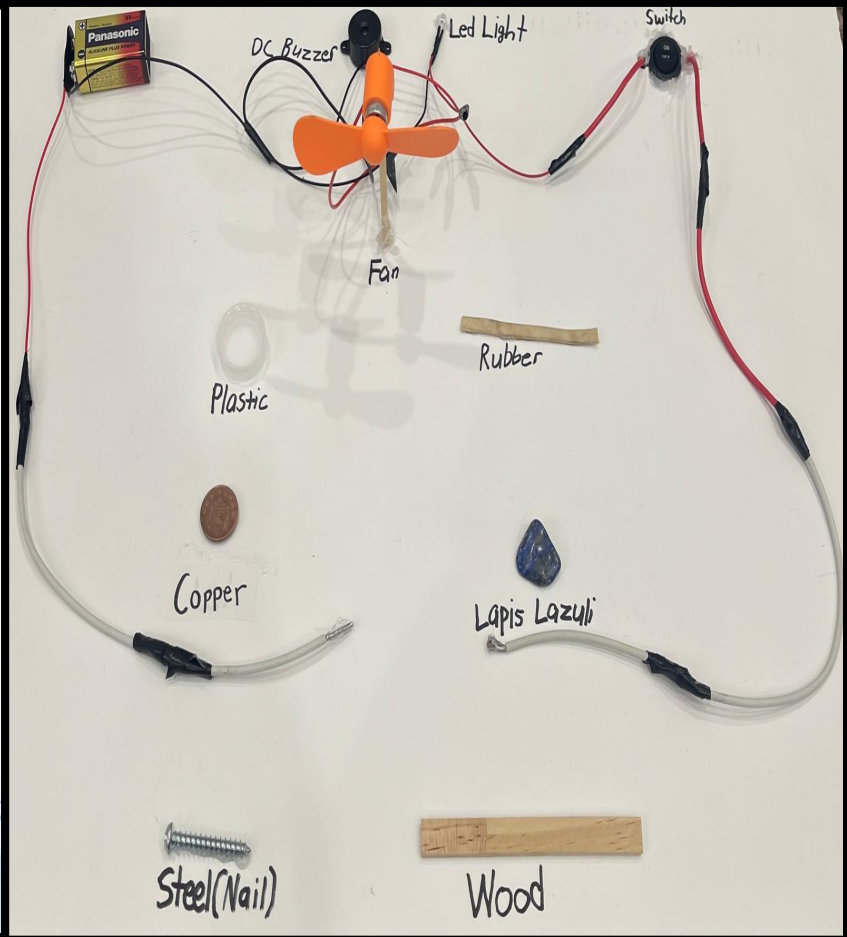
- The switch can turn on and off the electrical circuit.
- Extended wires make it convenient to connect.





# Experimental Apparatus:

We decided to add a fan with a salad skewer to the experiment design.
This design uses a salad skewer, fan,and a motor.
We added the fan to the design to make it a bit more clear that the electrical circuit works.
All the given materials are tested for the movement of fan



# Procedure:

1. Connect the wires to wood and make it a closed circuit.
2. Observe the working of LED/ Fan/ buzzer and note down the readings.
3. Repeat steps for 3 trials.
4. Repeat all the above steps with lapis lazuli, copper, steel, rubber, and plastic.

# Observations:

We are wrong about wood as we thought it is a conductor but it is actually it is an insulator because electricity did not pass through it when we tested in our design.

We are right about rubber and it is an insulator as electricity pass through it.

# Recommendation:

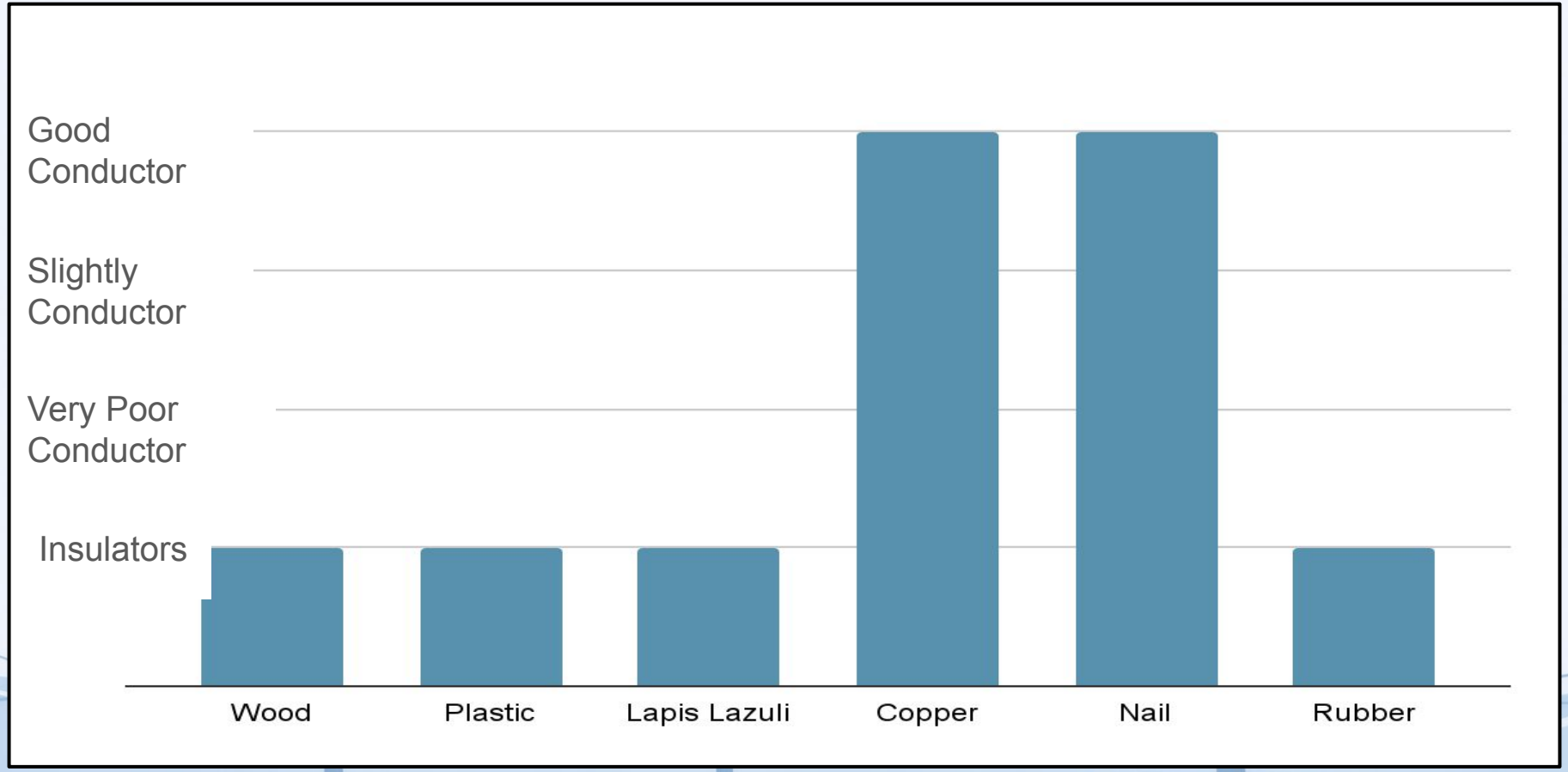
We could make this project in the future,

1. We would use a **multimeter** to measure current or resistance instead of just a LED bulb, buzzer and fan.
2. Control environmental factors (room temperature, airflow)
3. We would explain if heat passes through the object instead of only showing if electricity passes through the object.

# Table:

| Material | Trial 1 | Trial 2 | Trial 3 | Average |
|---|---|---|---|---|
| Wood | Not Working | Not Working | Not Working | Not Working |
| Plastic | Not Working | Not Working | Not Working | Not Working |
| Lapis Lazuli | Not Working | Not Working | Not Working | Not Working |
| Copper | Working | Working | Working | Working |
| Nail | Working | Working | Working | Working |
| Rubber | Not Working | Not Working | Not Working | Not Working |

# Pictorial Representation:



# Variables:

**Manipulated Variables:**

Different materials being tested

**Constant Variables:**

Same buzzer, Same fan, Same switch, Same wires,

Same LED light, Same temperature, Same circuit

**Responding Variables:**

Effect on the electrical apparatus

# Conclusion:

We found out  that Copper and the nail acted as conductors because electricity passed through them, while wood, plastic, lapis lazuli, and rubber acted as insulators because electricity did not pass through them.

# Acknowledgement:

We would like to thank our parents who helped us throughout this project.We would also like to thank our science teacher who guided and corrected us in different ways.

# Research Question:

Which materials—wood, copper, rubber, lapis lazuli, plastic, or a nail—conduct electricity the best, and which ones act as the best insulators?

# Citations:


1. GeeksforGeeks
2. BBC Bitesize
3. Conductors and Insulators
4. What are Electricity Conductors and Insulators with Examples
5. Conductors and Insulators Definition
6. Difference Between Conductor & Insulator
7. Conductors & Insulators: What Are They
8. Conductor vs. Insulator - What's the Difference?

## 5 Electrical conductors

Silver

Gold

Copper

Steel

Sea Water

## 5 Electrical Insulators

Rubber

Glass

Oil

Diamond

Dry wood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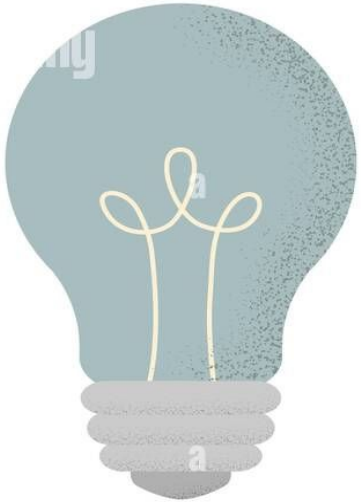

# Trypholed stickers