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|  | PLTW_M_L_4CP |

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| **Activity 6.1.2 Conductivity** |

Introduction

Did you know that your hair may stand up and you might feel tingly if you are near a thunderstorm and are in danger of being too close to a lightning strike? You might experience these signs as the ground builds up positive charges before the strike. Eventually the positive charges will look for a tall object to travel through. If you ever experience these signs, it is best to get indoors quickly or crouch down and balance on the balls of your feet.

Some materials conduct electricity well and are called conductors. Others are very poor conductors and resist conducting electricity. These materials are called insulators. If you look at a cord plugged into a wall, you know that metal (a conductor) runs through the middle of the cord. It is surrounded by a plastic material which is an insulator. Why is the metal conductor surrounded by an insulator?

Equipment

* Material samples
* Digital multimeter

Procedure

In teams of two to three, predict whether materials are good or poor conductors of electricity. You will then test each material and compare the actual conductivity to your predictions.

1. Describe the kind of material that you think would be a *good* conductor. Provide some examples.

Metals would be good conductors, such as copper or iron.

1. Describe the kind of material that you think would be a *poor* conductor. Provide some examples.

Non-metals would be poor conductors, such as helium, or plastic materials.

1. Check with your instructor to make sure that your multimeter is set up correctly to measure conductivity.

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| Provided Material  (name or physical description) | Prediction  (conductor or insulator?) | Meter Indication | Conclusion  (Is the material a better conductor or insulator?) |
| Table | Insulator | 0 ohms | Insulator |
| Chair leg | conductor | 19.3 ohms | Conductor |
| Air | Insulator | 0 ohms | Insulator |
| USB plug | Conductor | 1.3 ohms | Conductor |
| Ruler | Conductor | 2.6 ohms | Conductor |
| Poster | Insulator | 0 ohms | Insulator |
| White Board | insulator | 0 ohms | Insulator |
| Nick’s Arm | Conductor | 0 ohms | Insulator |

Conclusion

1. Were your predictions correct? If not, why were they incorrect?

All but one. I thought Nick’s arm would be conductive, but it didn’t have a reading on the multimeter.

1. What did the items that were better conductors have in common?

They were all metals.

1. What did the items that were better insulators have in common?

They were non-metals

1. Describe three ways you can determine if an object is a conductor or an insulator.
2. Using a multimeter to test the conductivity,
3. by testing to see if it will work in a circuit, or
4. if it is in the matals section of the periodic table.