**Title: Conductors and Insulators**

**Objectives:**

* Students will investigate which household items can be used to complete a circuit.
* Student will be able to identify and define conductors and insulators.

**Important questions:**

* How does electricity travel from one place to another?
* Which objects can be used to complete a circuit?
* Why do some objects conduct electricity and others do not?

**Instructions:**

Complete this document by completing data tables and answering questions.

Step 1: Click this link: [Circuit Construction Kit: DC (HTML5)](https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc)

**Exploration Phase:**

Make a circuit to light up the bulb using only wires and one battery.

*Questions:*

1. How can you edit each part of your circuit?
2. Can you add a switch?
3. How can you reset your screen?

**Explanation Phase:**

**Aim:** Students will investigate which household items can be used to complete a circuit.

***Did you know* D batteries only put out 1.5 volts. Set the battery voltage to 1.5v.**

Use the following items to create a closed circuit then fill in the chart below.

|  |  |  |
| --- | --- | --- |
| Item | Light bulb turned on | Light bulb did not turn on |
| Paper clip |  |  |
| pencil |  |  |
| dog |  |  |
| hand |  |  |
| dollar |  |  |
| coin |  |  |
| eraser |  |  |

Questions:

1. Which items can be used to complete a circuit to light up the bulb?
2. What do all the items that lit up the bulb have in common?
3. Do you think you can light up the bulb with any items in your home? (pick atleast 2)
4. Why did you choose those items in question 3?

**Application Phase:**

Objects that allow electricity to flow through them are called **conductors.**

Objects that do **not** allow electricity to flow through them are called **insulators.**

**Analyze your data. Place each item in the table below**

|  |  |
| --- | --- |
| **CONDUCTORS** | **INSULATORS** |
|  |  |

**Click the button where it says “lab” on your simulation screen.**

1. Make a circuit that lights up the bulb using the items from the table below.
2. Use the brown and copper battery from the menu.
3. Set the battery voltage at 1.5v.
4. Increase the voltage of the battery and record how the light is affected.

Draw a picture of the light bulb in each box. Use labels to describe the brightness of the light.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Coin | Eraser | Dog | Pencil | Hand |
| Low battery voltage  1.5v |  |  |  |  |  |
| Medium battery voltage  \_\_\_\_\_\_\_v |  |  |  |  |  |
| High battery voltage  \_\_\_\_\_\_\_v |  |  |  |  |  |

Questions:

1. Looking at your data, fill in the following table.

|  |  |
| --- | --- |
| **CONDUCTORS** | **INSULATORS** |
|  |  |

1. Compare the table above to the table you filled in earlier of the same kind. Did any items change positions? If so, which ones?
2. After comparing your results, how would you modify the definition of **insulator**?