**Lesson 6: Resistance**

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**TASK 1: CALCULATE THE RESISTANCE**

1. Draw a circuit diagram showing a circuit with a battery and a bulb in the box below.
2. Add an ammeter and a voltmeter to your circuit diagram. Show your teacher.
3. If your diagram is correct, collect the equipment. You will need:
   * A battery
   * 5 wires
   * A voltmeter
   * An ammeter
   * A selection of objects to calculate the resistance of (a bulb, a resistor, a metal key, pencil lead)
4. Connect up the components as shown in your circuit diagram. Check that the bulb lights up; if it does not, check you have connected the circuit correctly. If it still doesn’t light up, let your teacher know.
5. Write down the reading from the **ammeter** and then the **voltmeter** in the bulb column of the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Object** | **Bulb** | **Resistor** | **Key** | **Pencil lead** |
| **Potential difference across object (V)** |  |  |  |  |
| **Current in circuit (A)** |  |  |  |  |
| **Resistance of object (Ω)** |  |  |  |  |

1. Remove the bulb from the circuit and replace it with the resistor. Write down readings from the voltmeter and ammeter.
2. Remove the resistor from the circuit and put the key in its place. Although you cannot plug the wires into the key, you can touch the two wires to opposite sides of the key. Write down the readings from the voltmeter and ammeter in the table.
3. Replace the key with the pencil lead. Write down the readings from the voltmeter and ammeter in the table.
4. Calculate the resistance of each object using the formula **RESISTANCE = POTENTIAL DIFFERENCE ÷ CURRENT**, and write the result in the table.

**QUESTIONS (in your book)**

1. a. Why was the potential difference the same (or nearly the same) every time?

b. How could the potential difference be increased? How could it be decreased?

1. Which object had the highest resistance?
2. Which object had the lowest resistance?
3. Which object was the best conductor?
4. Which object was the best insulator?
5. a. Why was the potential difference the same (or nearly the same) every time?

b. How could the potential difference be increased?

c. How could it be decreased?

1. EXTENSION: Try putting objects from your pencil case in the circuit. Can you find an object for which the reading on the ammeter is 0? What do you think that means?