**Resistors and Ohm’s Law**

**Purpose:**

To use Ohm’s Law to check if the resistance of a resistor matches its coloured bands.

**Materials:**

* Ammeter
* Voltmeter
* Wires
* 3 1.5V cells
* 3 Resistors with different resistances
* Switch

**Procedure:**

1. Use the coloured bands to read the resistance of each resistor.
2. Connect the ammeter, 1 1.5V cell, switch and one of the resistors in a series circuit.
3. Connect the voltmeter to both ends of the resistor to measure the voltage difference across the resistor.
4. Close the switch briefly and measure the voltage and the current. Record your results.
5. Repeat the experiment using two, then three, cells connected in series.

**Data and Observations:**

|  |  |  |
| --- | --- | --- |
| **Resistor #1** | | |
| **Coloured Code (in order)** |  | |
| **Resistance from colour code** |  | |
| **Voltage (V)** | **Current (A)** | **Resistance** |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Resistor #2** | | |
| **Coloured Code (in order)** |  | |
| **Resistance from colour code** |  | |
| **Voltage (V)** | **Current (A)** | **Resistance** |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Resistor #3** | | |
| **Coloured Code (in order)** |  | |
| **Resistance from colour code** |  | |
| **Voltage (V)** | **Current (A)** | **Resistance** |
|  |  |  |
|  |  |  |
|  |  |  |

**Analysis Questions:**

1. Draw a circuit diagram for your set up with one cell.
2. Use your tables to answer the following questions:
   1. Using the calculated resistances for resistor #1, calculate the average resistance.
   2. Is the average calculated value within the tolerance of the colour code on the resistor?
3. Use your tables to answer the following questions:
   1. Using the calculated resistances for resistor #2, calculate the average resistance.
   2. Is the average calculated value within the tolerance of the colour code on the resistor?
4. Use your tables to answer the following questions:
   1. Using the calculated resistances for resistor #3, calculate the average resistance.
   2. Is the average calculated value within the tolerance of the colour code on the resistor?
5. As the current through an individual resistor increased, what happened to the voltage across the same resistor?
6. As the current through an individual resistor increased, what happened to the resistance?

**Concluding Questions:**

1. Give a possible reason for the calculated value of the resistance not matching the value obtained from the colour code.