

Student Revision Notes (age 14 – 16): Ohm's Law & Resistance

The current through a certain wire depends on two things:

- (a) the voltage (potential difference) between its ends
- (b) the resistance of the wire

The relationship between changes in voltage and changes in current was discovered by Ohm. Ohm's Law states that:

"The ratio of the current in a conductor to the potential difference (voltage difference) between its ends is a constant as long as the temperature stays constant."

This constant is called the **resistance** of the conductor. Ohm's Law can be written as the following equation:

$$\text{Resistance (R)} = \text{Voltage (V)} / \text{Current (I)} \quad \text{or} \quad R = V/I$$

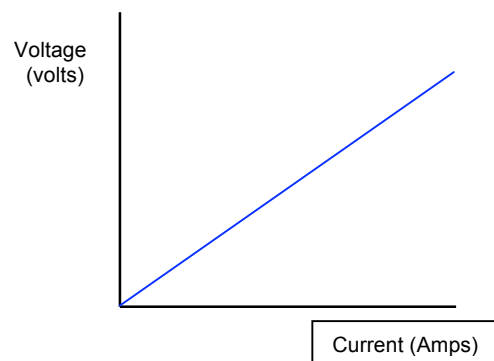
Resistance is measured in units called **Ohms (Ω)**. The resistance of a piece of wire is 1 ohm if a current of 1 A flows through it when a voltage of 1 V is applied between its ends.

If you plot a graph of current through a piece of wire against the voltage applied, you should get a result like the one shown in the diagram. (Remember that the temperature of the wire must not change).

Ohm's Law is often written:

$$\text{Voltage} = \text{Current} \times \text{Resistance}$$

$$\text{or} \quad V = IR$$

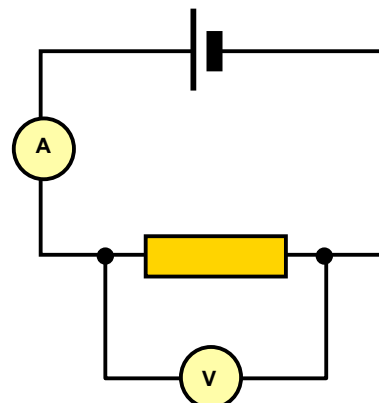


Using an ammeter and a voltmeter to measure resistance

To measure the resistance of say a piece of wire or a resistor we must find the voltage (potential difference) between its two ends and the current flowing through it. To do this we use the circuit shown in the diagram.

Remember:

An ammeter is always connected in series with the component and a voltmeter is always connected in parallel with the component.



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Linked Resources

www.twothirtyvolts.org:

Ohm's Law & Resistance (14-16) Student Quiz