

# AQA Physics GCSE

## Required Practical 4

### I-V Characteristics

Method taken from [AQA Required Practical Handbook](#)

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### Aim:

To investigate the I-V characteristics of a variety of circuit elements, using circuit diagrams to construct appropriate circuits.

### Equipment List:

- Ammeter
- Milliammeter
- Voltmeter
- 12V, 24W filament lamp
- Resistor (e.g.  $100\Omega$ , 1W)
- Diode & Protective Resistor (e.g.  $10\Omega$ )
- Variable Resistor (e.g.  $10\Omega$ , 5A)
- Variable Power Supply (12V)
- Connecting Leads

### Method:

1. Construct the circuit shown in the diagram below.
2. Set the variable power supply or variable resistor to the lowest setting for potential difference.
3. Record the current and voltage over the resistor.
4. Increase the current from the power supply by 2V and repeat your readings.
5. Change the resistor to a filament lamp and repeat the experiment.
6. Change the filament to a diode and protective resistor (to restrict high currents flowing through the diode), ensuring the diode is the correct direction to allow the flow of current through. Change the ammeter to a milliammeter, since the current measured will be smaller than for the other components.
7. Plot a graph of current against potential difference for each component.

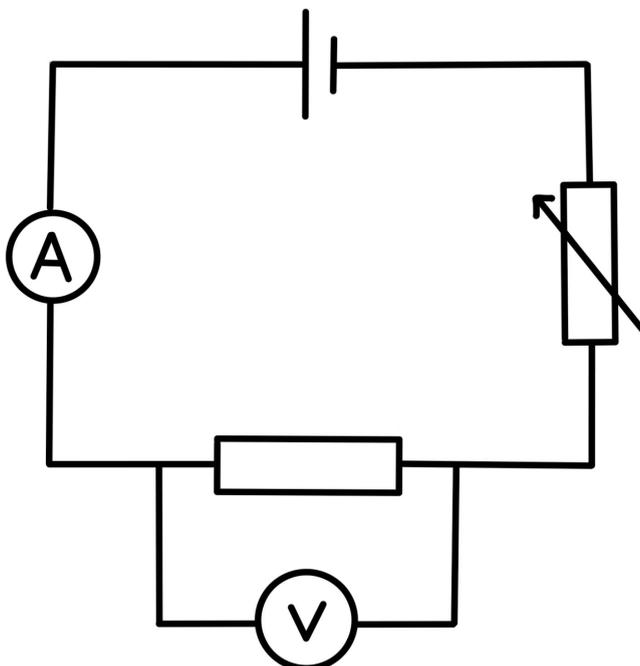
### Expected Results:

Components can be described as ohmic or non-ohmic. Ohmic conductors follow Ohm's Law (resistance is constant) and so the graph of an ohmic conductor will be a straight line through the origin. The resistor should be ohmic.

Non-Ohmic conductors have a resistance that varies with current. The I-V graph of a non-ohmic conductor won't be linear. The filament lamp and diode are non-ohmic conductors.



**Diagram:**



**Safety Precautions:**

- Wires and components may become hot after a current passes through. Allow to cool before handling.
- Disconnect the power supply when not taking readings to prevent overheating.
- Be aware that too high a voltage may damage components and cause excessive heating. Switch your circuit off if you think the voltage is too high.

