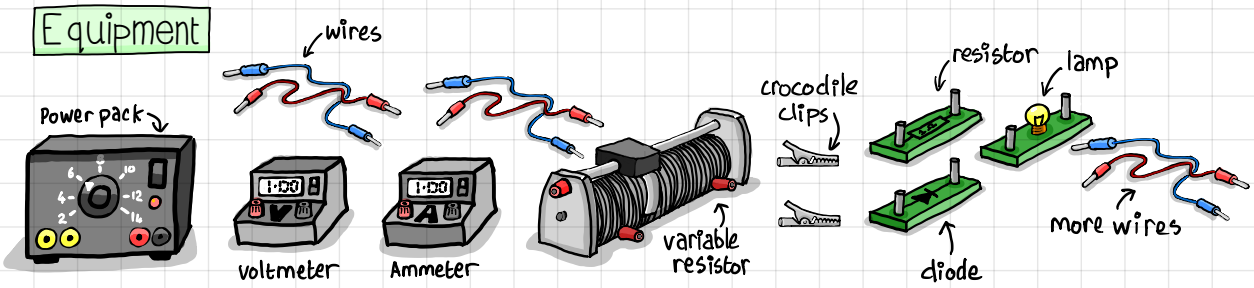
Required practical: I-V characteristics

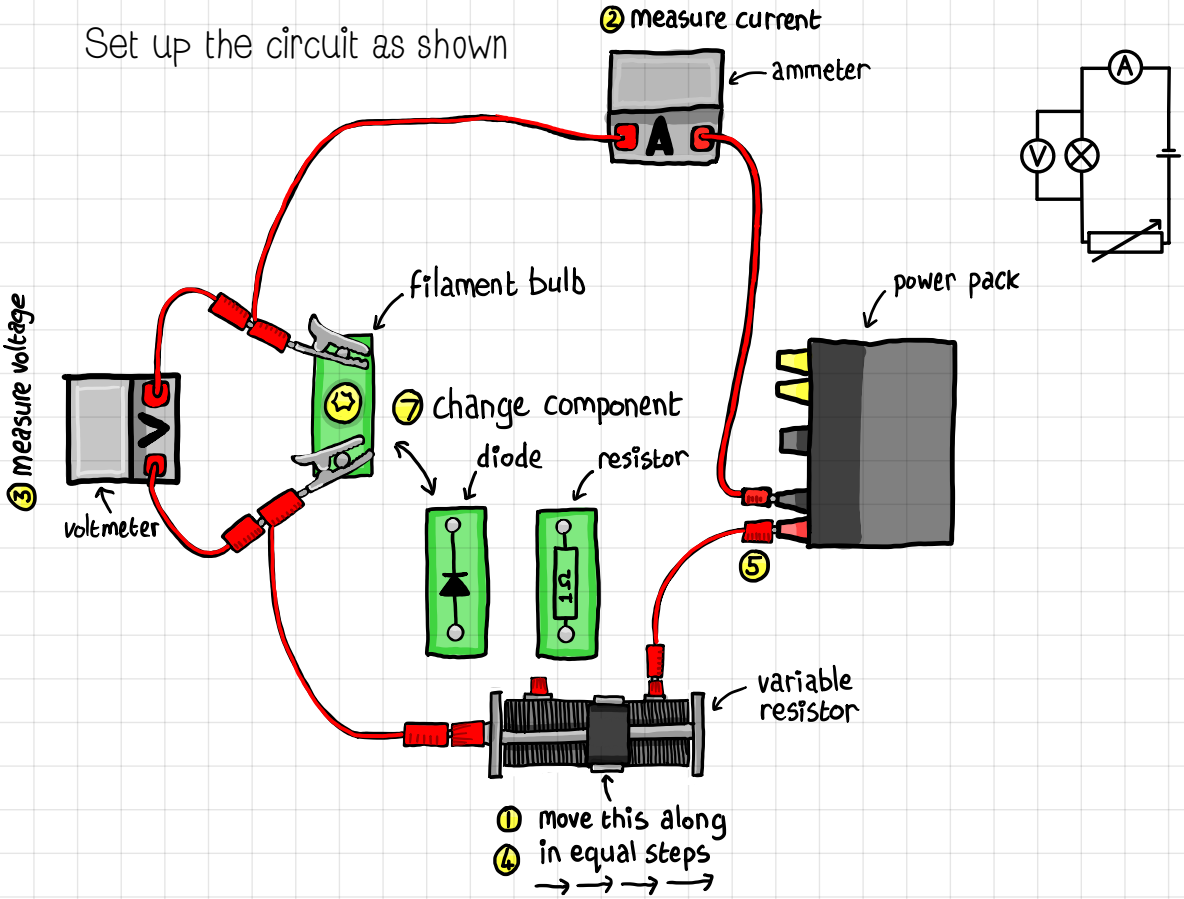
For some resistors, resistance remains constant as the current changes. These are called ohmic resistors. In other resistors, resistance changes with current. By setting up a simple test circuit the I-V characteristics of a resistor can be measured.

Equipment



Method

Set up the circuit as shown



1. Start with the slider of the variable resistor all the way to the left.
2. Measure the current using the ammeter (record if it is + or -).
3. Measure the voltage using the voltmeter (record if it is + or -).
4. Move the slider along a short distance and repeat 2 and 3
5. After collecting 5 values, reverse the direction of the current flow.
6. Repeat steps 1 to 5.
7. Change the component then repeat the experiment.

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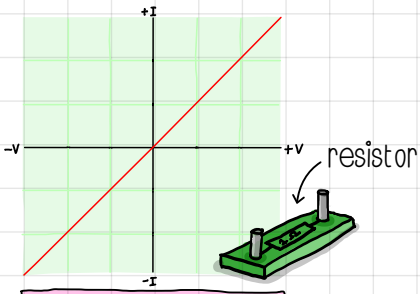
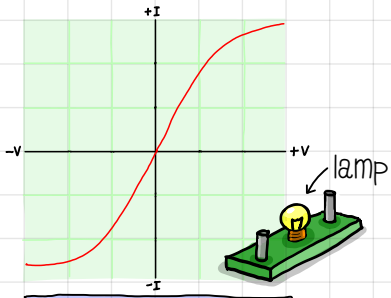
Results

I-V graphs tell us about the characteristics of the resistor being tested. Three components being tested are (ohmic) resistor, filament bulb and diode.



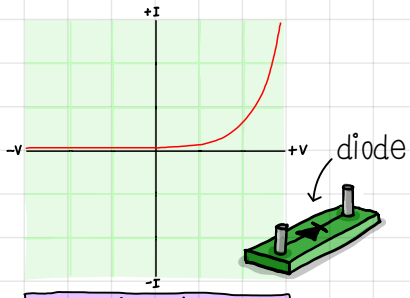
Ohmic conductor

A straight line which passes through zero. The current through the resistor is directly proportional to the voltage. Doubling the energy in the circuit leads to a doubling of the current. This relationship only occurs if the temperature is kept constant.



Filament bulb

The current is not directly proportional to the voltage. Doubling the energy does not cause a doubling of the flow. The more energy that is put into the bulb the harder it is for the current to flow. As the voltage increases so does the temperature of the wire. Increased vibration of the ions due to the temperature increases the resistance of the wire.



Diode

Current flows in one direction. The diode is a semiconductor. The diode has a low resistance in one direction and a high resistance in the opposite direction. Diodes usually require an ohmic resistor to be placed in series with them.

Resistance in thermistors depend on the temperature while the resistance in an LDR is dependence to on light levels.

watch video