

OCR (A) Physics GCSE

PAG 06 - Investigating the IV characteristics of circuit elements.

Flashcards

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What kind of power supply should be used for this practical?



What kind of power supply should be used for this practical?

A variable voltage supply.



How else can voltage be varied?



How else can voltage be varied?

Using a variable resistor.



How is current measured?



How is current measured?

Using an **ammeter** wired in series.



How is voltage measured?



How is voltage measured?

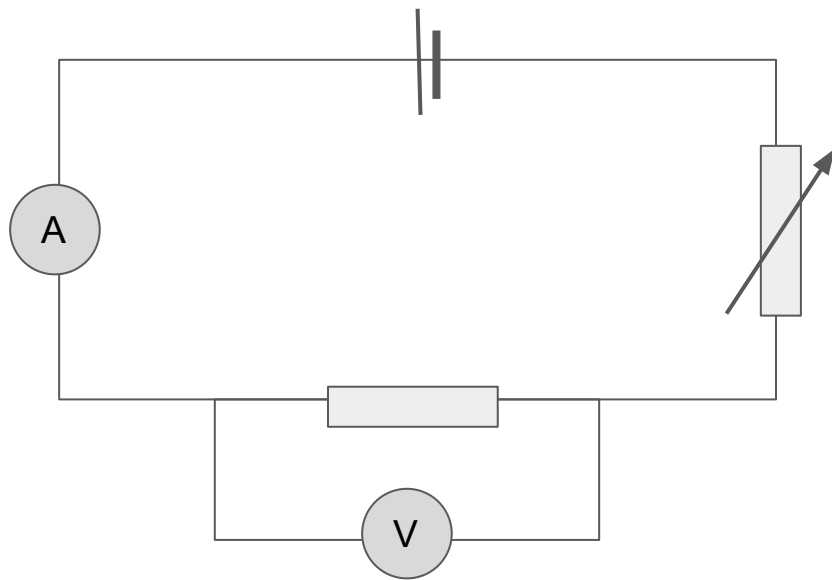
Using a **voltmeter** wired in parallel.



What would a circuit diagram for this procedure look like?



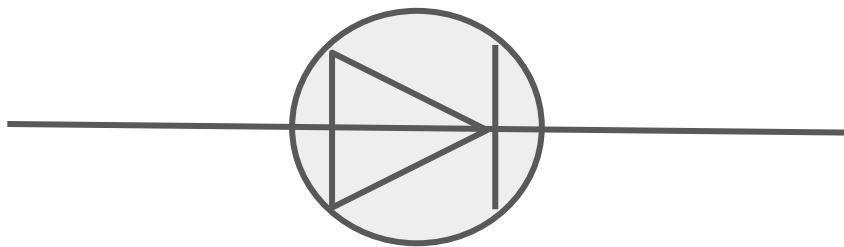
What would a circuit diagram for this procedure look like?



Draw the circuit symbol for a diode.



Draw the circuit symbol for a diode.



Draw the circuit symbol for a resistor.



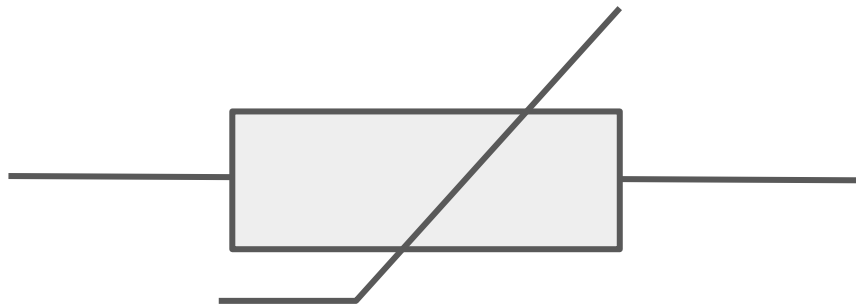
Draw the circuit symbol for a resistor.



Draw the circuit symbol for a thermistor.



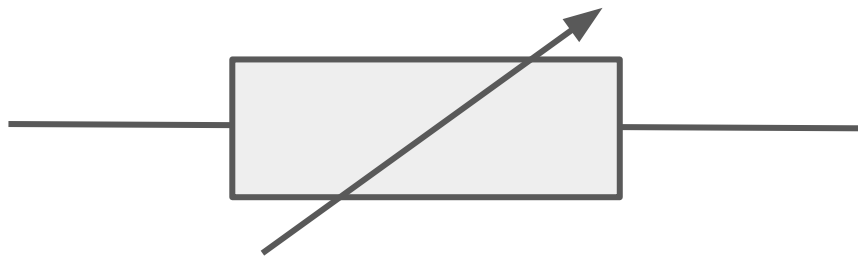
Draw the circuit symbol for a thermistor.



Draw the circuit symbol for a variable resistor.



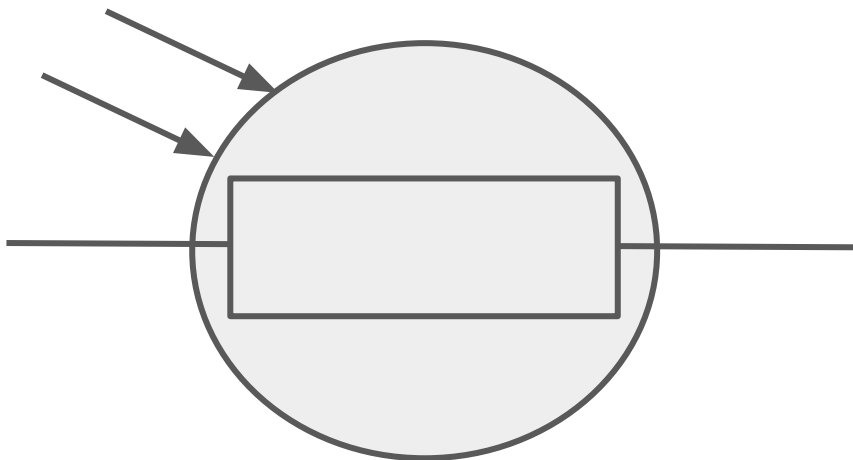
Draw the circuit symbol for a variable resistor.



Draw the circuit symbol for an LDR.



Draw the circuit symbol for an LDR.



What is an **ohmic** conductor?



What is an **ohmic** conductor?

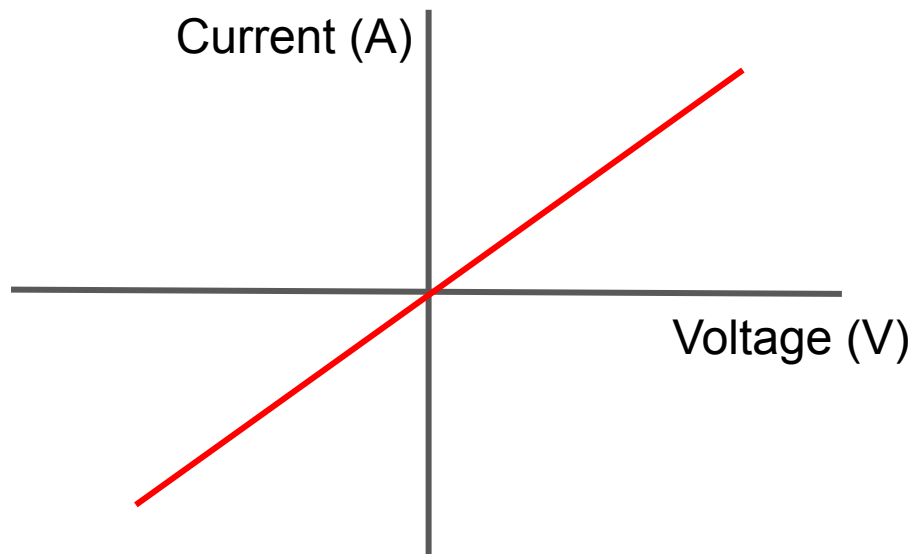
A conductor for which resistance is constant, meaning the conductor's IV characteristic (graph of current against voltage) has a linear (straight line) gradient.



Draw the IV characteristic of an ohmic conductor.



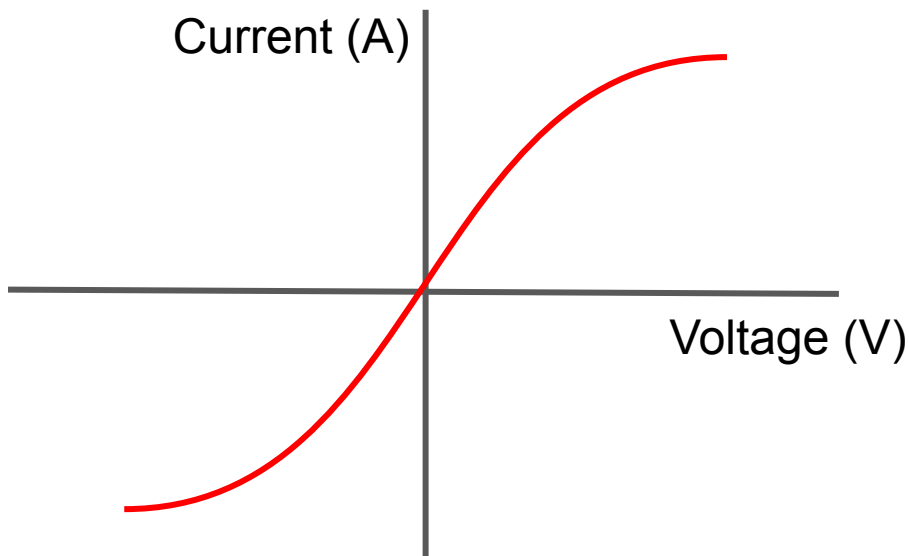
Draw the IV characteristic of an ohmic conductor.



What would you expect the IV characteristic of a filament lamp to look like? Why?



What would you expect the IV characteristic of a filament lamp to look like? Why?



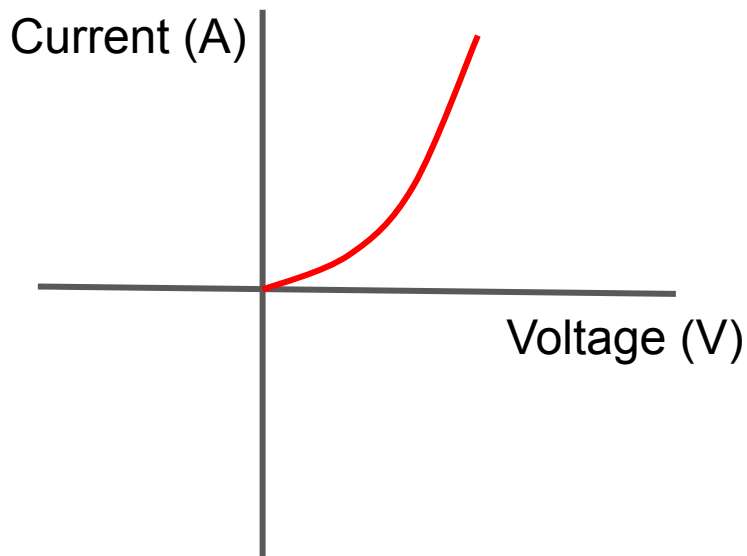
When current flows, the filament produces heat. This increases the resistance of the filament ($R=V/I$).



What would you expect the IV characteristic of a diode to look like?
Why?



What would you expect the IV characteristic of a diode to look like? Why?



Current through a diode flows in one direction only, as it has a very high resistance in the opposite direction.



How does resistance change with temperature?



How does resistance change with temperature?

As temperature increases, ions and electrons have more kinetic energy. This results in more collisions between the stationary metal ions, making it more difficult for electrons to move through the wire and carry a charge. Therefore resistance increases with temperature.



How does increased resistance affect an IV characteristic?



How does increased resistance affect an IV characteristic?

The gradient becomes shallower (less steep).



How do you obtain negative current values?



How do you obtain negative current values?

Reverse the connections to the power supply.



Describe a method for this experiment.



Describe a method for this experiment.

- Set up the circuit with a variable voltage supply
- Set the EMF at 1V intervals from 0V to 6V and measure current and p.d. at every interval
- Reverse the connections and repeat for negative values
- Repeat three times and calculate mean current and p.d.
 - Plot a graph of I against V
 - Repeat for a range of components



What are the safety risks of this procedure?



What are the safety risks of this procedure?

- Risk of electrocution - ensure equipment is properly insulated and safe
- Some components (eg. filament lamp) may heat up so allow cooling time before handling

