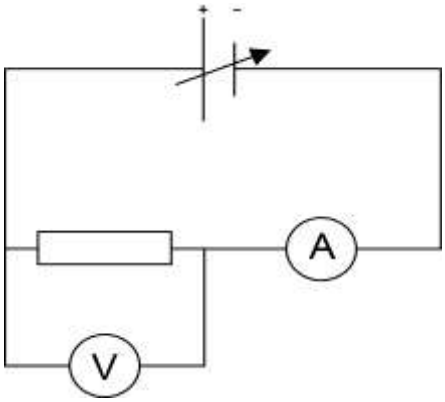
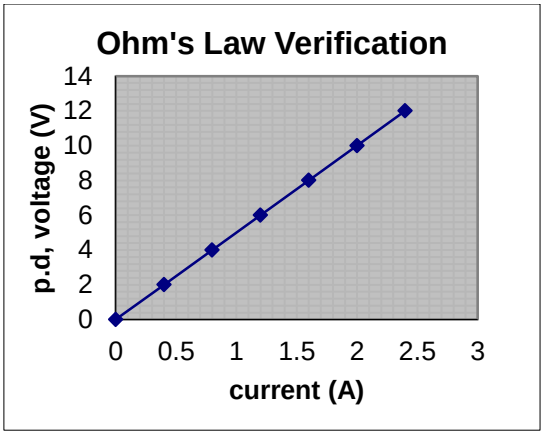
Determining the relationship between V (p.d), current and resistance

N5



- Using a fixed value of resistor, vary the voltage supply to the circuit.
- Measure and note the values of voltage and current.
- Draw a graph of p.d against I, as shown below



This graph shows that

$V \propto I$

V = I x constant

$$\frac{V}{I} = \text{constant}$$

This constant = gradient of the line

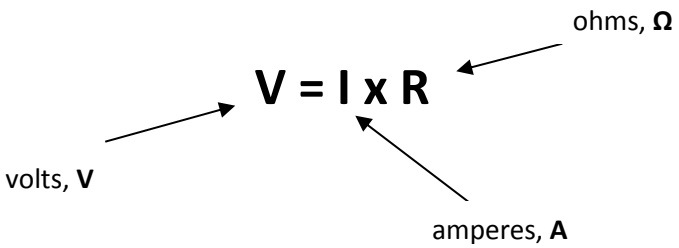
Pick values of potential difference and current from the graph to show that: V/ I = constant.

Potential difference (V)	Current(A)	V/ I = constant
2	0.4	5
4	0.8	5
6	1.2	5
8	1.6	5
10	2.0	5
12	2.4	5

Which quantity from the experiment is equal to a constant value of 5?

- **The size of the resistor.**

Therefore $\frac{\mathbf{V}}{\mathbf{I}} = \mathbf{R}$ and rearranged gives



Carry out calculations using V= I x R

Example 1

A mobile phone has a resistance of 4 Ω and a current of 3 A passing through out, calculate the size of voltage it uses.

V= ?

R = 4Ω

I = 3A

V = I x R

V = 3 x 4

V = 12 V

Example 2

The lamp has a voltage of 230 V and a resistance of 83 Ω, calculate the current passing through the lamp.

V = 230V

R = 83Ω

I =?

V = I x R

230 = I x 83

$\frac{230}{83} = I$

I = 2.8 A

Example 3

An electric fire has a voltage of 230 V and a current of 5 A, calculate the resistance of the fire.

V = 230V

R=?

I = 5A

V = I x R

230 = 5 x R

$\frac{230}{5} = R$

R = 46 Ω