Resistivity

The following equation shows that the resistance of a wire **R** is directly proportional to the length **L** of a wire and inversely proportional to the cross-sectional area **A** of the wire.

$$R = \frac{\rho L}{A}$$

As shown by the equation, knowing the length, cross-sectional area and the material that a wire is made of (and thus, its resistivity ρ) allows one to determine the resistance of the wire.

For a perfect cylindrical wire the cross sectional area is given by. $\boldsymbol{A} = \pi r^2$

Using the data below, determine the **resistivity** of the conductor.

The Average diameter of the conductor when measured with a micrometre is 0.559mm

You must:

1. Plot a graph of the data.
2. Use your graph to determine the **resistivity** of the conductor.

Average resistance (Ω)	Length of conductor. (cm)
0.2	0
0.6	10
0.9	20
1.1	30
1.3	40
1.4	50
1.7	60
1.9	70
2.1	80
2.2	90
2.5	100

(Important) – this work is to be submitted to the head of physics at the start of term.

Assessment criteria

A1 Produces a graph with appropriately labelled axes and with correct units
A2 Produces a graph with sensible scales
A3 Plots points accurately
A4 Draws line of best fit (either a straight line or a smooth curve)
A5 Comments on the trend/pattern obtained
A6 Derives relation between two variables or determines constant
A7 Discusses/uses related physics principles
A8 Attempts to qualitatively consider sources of error