1	**Defining the problem**
	Vary p and measure B OR p is the independent variable and B is the dependent variable.
	Keep V constant or potential difference between the ends of each conductor constant.
	Methods of data collection
	Labelled diagram of workable experiment including: • conductors in parallel connected in series to power supply and resistor • circuit symbols for (variable) resistor and power supply • X labelled and one other label from L, P, Q, p and q.
	Voltmeter connected in parallel with conductors (to measure V) and conductors in parallel connected to a power supply.
	Method to measure L **and** p **and** q e.g. use a rule / ruler / calipers.
	Method to measure B, e.g. use a (calibrated) Hall probe **and** adjust / rotate probe until maximum value.
	Method of Analysis
	Plots a graph of B against $\frac{1}{p}$ or equivalent. Do not accept logarithms.
	B against $\frac{1}{p}$: $Y = \frac{L \times \text{gradient}}{AV}$ $\frac{1}{p}$ against B : $Y = \frac{L}{AV \times \text{gradient}}$
1	B against $\frac{1}{p}$: $Z = \frac{q \times y\text{-intercept}}{\text{gradient}}$ OR $Z = \frac{Lq \times y\text{-intercept}}{YAV}$ $\frac{1}{p}$ against B : $Z = -q \times y$-intercept
	Additional detail including safety considerations Any **six** from:
	D1 precaution linked to high current / hot conductors, e.g. use gloves / switch off power supply when not measuring B / between measurements / allow conductors to cool
	D2 keep A **and** L **and** q constant
	D3 use calipers / micrometer to measure diameter / d of conductor **and** $A = \frac{\pi d^2}{4}$
	D4 repeat measurements of d in different positions **and** average d
	D5 method to determine the position of X in relation to the conductors, e.g. divide L by two to find the midpoint of P / Q **and** use a set square / protractor / plumb line to mark X OR divide L by two to find the midpoint of P / Q **and** use a grid to mark X
	D6 measure B (using Hall probe) first in one direction and then in the opposite direction and average B OR Measure B with current / p.d. in one direction and then in the opposite direction and average B
	D7 additional detail on measuring p and / or q, e.g. measure to the conductor and add on the radius

1	D8 description of method to keep q constant, e.g. tape / adhesive putty to fix conductor Q to the bench OR for vertical methods fix conductor Q in clamp(s) attached to stand(s) to keep q constant
	D9 method to keep P and Q parallel, e.g. measure the separation (between the conductors) at different points
	D10 relationship valid if a straight line is produced (with a y-intercept = $\frac{YZAV}{Lq}$). Do not accept passing through the origin.
	D11 method to keep V constant, e.g. adjust / change variable resistor / power supply to keep voltmeter reading constant.