Meden School Curriculum Planning							
Subject	Physics	**Year Group**	12	**Sequence No.**	2	**Topic**	3.5.1 Electricity

Retrieval	Core Knowledge	Student Thinking
What do teachers need **retrieve** from students before they start teaching **new content**?	What **specific ambitious knowledge** do teachers need teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to **development of our students thinking, encouraging them to see the inequalities around them** and 'do something about them!'
GCSE P2 Basics of current, PD and resistance. V_I graphs of lamps, LEDs, thermistors, LDR's and fixed resistors. Ohms law. Concepts of series and parallel circuits and the laws associated with the distribution of current in both types of circuits and the distribution of PD in series circuits. Charge, power and energy transfer equations.	**3.1.1.1 Basics of electricity** Electric current as the rate of flow of charge; potential difference as work done per unit charge. $I = \frac{\Delta Q}{\Delta t}$, $V = \frac{W}{Q}$ Resistance defined as $R = V/I$ **3.1.1.1 Current–voltage characteristics** For an ohmic conductor, semiconductor diode, and filament lamp. Ohm's law as a special case where $I \propto V$ under constant physical conditions. Unless specifically stated in questions, ammeters and voltmeters should be treated as ideal (having zero and infinite resistance respectively). Questions can be set where either I or V is on the horizontal axis of the characteristic graph. **3.5.1.3 Resistivity** Resistivity, $\rho = \frac{RA}{l}$	

	Description of the qualitative effect of temperature on the resistance of metal conductors and thermistors. Only negative temperature coefficient (ntc) thermistors will be considered. Applications of thermistors to include temperature sensors and resistance–temperature graphs. Superconductivity as a property of certain materials which have zero resistivity at and below a critical temperature which depends on the material. Applications of superconductors to include the production of strong magnetic fields and the reduction of energy loss in transmission of electric power. **Required practical 5:** Determination of resistivity of a wire using a micrometer, ammeter and voltmeter. **3.5.1.4 Circuits** Resistors: *in series*, $R_T = R_1 + R_2 + R_3 + \ldots$ *in parallel*, $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$ *Energy and power equations*: $E = IVt$; $P = IV = I^2R = \frac{V^2}{R}$ The relationships between currents, voltages and resistances in series and parallel circuits, including cells in series and identical cells in parallel. Conservation of charge and conservation of energy in dc circuits. 3.5.1.5 Potential Divider The potential divider used to supply constant or variable potential difference from a power supply. Examples should include the use of variable resistors, thermistors, and light dependent resistors (LDR) in the potential divider. 3.5.1.6 Electromotvie Force and Internal Resistance **Required practical 6:** Investigation of the emf and internal resistance of electric cells and batteries by measuring the variation of the terminal pd of the cell with current in it. Students will be expected to understand and perform calculations for circuits in which the	Resistivity is essential in many material applications including resistors in **electrical circuits, dielectrics, resistive heating, and superconducting**. Potential dividers are used in a huge number of everyday appliances. Thermostats for

	internal resistance of the supply is not negligible. EMF is the transfer of energy in Joules per coulomb of charge. Terminal pd is the energy transferred by one coulomb of charge as it passes through the load resistor. Terminal pd = EMF – lost volts due to internal resistance. $\varepsilon = \frac{E}{Q}$ also $\varepsilon = I(R + r)$	heating systems, automatic lighting that comes on in the dark. Volume controls on all devices with sound outputs. Dimmer switches for lighting etc