P3 Module Outline

- Describe that charge is a property of all matter and that there are positive and negative charges. The effects of the charges are not normally seen on bodies containing equal amounts of positive and negative charge, as their effects cancel each other out
- describe the production of static electricity, and sparking, by rubbing surfaces, and evidence that charged objects exert forces of attraction or repulsion on one another when not in contac the understanding that static charge only builds up on insulators
- explain how transfer of electrons between objects can explain the phenomena of static electricity
- *explain the concept of an electric field and how it helps to explain the phenomena of static electricity(separate Science only)*
- recall that current is a rate of flow of charge (electrons) and the conditions needed for charge to flow
- recall that current has the same value at any point in a single closed loop
- recall and use the relationship between quantity of charge, current and time
- describe the differences between series and parallel circuits
- represent d.c. circuits with the conventions of positive and negative terminals, and the symbols that represent common circuit elements
- recall that current (I) depends on both resistance (R) and potential difference (V) and the units in which these are measured
- recall and apply the relationship between I, R and V, and that for some resistors the value of R remains constant but that in others it can change as the current changes
- explain that for some resistors the value of R remains constant but that in others it can change as the current changes
- explain the design and use of circuits to explore such effects
- use graphs to explore whether circuit elements are linear or non-linear
- use graphs and relate the curves produced to the function and properties of circuit elements
- explain why, if two resistors are in series the net resistance is increased, whereas with two in parallel the net resistance is decreased (qualitative explanation only)
- calculate the currents, potential differences and resistances in d.c. series and parallel circuits
- explain the design and use of such circuits for measurement and testing purposes
- explain how the power transfer in any circuit device is related to the potential difference across it and the current, and to the energy changes over a given time
- apply the equations relating potential difference, current, quantity of charge, resistance, power, energy, and time, and solve problems for circuits which include resistors in series, using the concept of equivalent resistance

P3 Formulae to Learn

charge flow (C) = current (A) x time (s) $Q=It$
potential difference (V) = current (A) x resistance (Ω) $V=IR$
energy transferred (J) = charge (C) x potential difference (V) $E=QV$
power (W) = potential difference (V) x current (A) = (current (A))^2 x resistance (Ω) $P = IV = I^2R$
energy transferred (J, kWh) = power (W, kW) x time (s, h) = charge (C) x potential difference (V) $E = Pt = QV$