P7 Magnetism and Electromagnetism

Poles of a Magnet	Magnets, poles and the rules of attraction/repulsion. Permanent and induced magnetism.	Green	Amber	Red
Magnetic Fields	Definition of a magnetic field. Field lines and shapes of magnetic fields around bar magnets. What a compass is (a magnet that is pivoted and free to rotate) and how it behaves in a magnetic field.	Green	Amber	Red
Motor effect	Shape of field around a current carrying wire (right hand corkscrew rule) Field due to a coil (solenoid) and how to increase its field strength (right hand grip rule). Explaining how an electromagnetic device works (e.g. bell, relay etc.). Description of the motor effect interaction of the field due tot the current and the external magnetic field). Fleming's left-hand rule to predict the direction of the force on a current-carrying conductor. Force = magnetic Flux density × current × length $F = B\,I\,l$ The workings of a d.c motor (split rig commutator, brushes sustaining rotation). The workings of a moving coil loudspeaker and headphones (physics only).	Green	Amber	Red
Electromagnetic induction (Physics only)	Description of the generator effect: How a potential is induced in a conductor. The magnetic field created as a result always opposes the field/change that produced it. Recall the factors that affect the size and direction of the induced potential difference. Explain uses of the generator effect in devices.	Green	Amber	Red
Uses of the generator effect (Physics only)	Alternators and dynamos – how they generate ac and dc. Draw and interpret graphs of induced ac potential differences/currents. How microphones use the generator effect.	Green	Amber	Red
Transformers (Physics only)	Structure of a step-up/step-down transformer and reasons How a potential difference is induced. explain how the effect of an alternating current in one coil in inducing a current in another is used in transformers. Introduced the following equations: $\frac{V_p}{V_s} = \frac{N_p}{N_s}$ And from the conservation of energy: Power = a constant $V_s \times I_s = V_p \times I_p$	Green	Amber	Red

	• explain how the ratio of the potential differences across the two coils depends on the ratio of the number of turns on each • calculate the current drawn from the input supply to provide a particular power output Apply the equations given on the Physics equation sheet. • apply the equation linking the pds and number of turns in the two coils of a transformer to the currents and the power transfer involved, and relate these to the advantages of power transmission at high potential differences (P1 as well).			