GCSE Physics
15 Week Revision Timetable

Some useful websites………

- https://www.bbc.com/bitesize/topics/zqw77p3
- www.gcsepod.com
- www.youtube.com

Check you understand these key terms

- Write down
- State
- Calculate
- Estimate
- Explain
- Describe
- Compare
- Contrast

Here is a summary of the topics to be covered in this revision timetable

Weeks before the exam	Topic
15.	Energy
14.	Electricity – Current, Potential Difference & Resistance
13.	Electricity – Series & Parallel Circuits + Domestic Uses & Safety
12.	Electricity – Energy Transfers + Static Electricity
11.	Particle Model of Matter
10.	Atomic Structure
9.	Forces – Forces & Their Interactions + Work Done & Energy Transfers
8.	Forces – Forces and Elasticity + Moments, Levers & Gears
7.	Forces – Pressure & Pressure Differences **+ *Momentum (HT Only)***
6.	Forces – Forces and Motion (Part 1)
5.	Forces – Forces and Motion (Part 2)
4.	Waves – Waves in Air, Fluids and Solids
3.	Waves – Electromagnetic Waves
2.	Magnetism & Electromagnetism
1.	Space Physics

Paper 1 covers; Energy, Electricity, Particle Model of Matter and Atomic Structure.

Paper 2 covers; Forces, Waves, Magnetism & Electromagnetism and Space Physics.

Weeks to go:	Topic:
15	Energy

Topic	Student Checklist
4.1.1 Energy changes in a system, and the ways energy is stored before and after such changes	Define a system as an object or group of objects and state examples of changes in the way energy is stored in a system
	Describe how all the energy changes involved in an energy transfer and calculate relative changes in energy when the heat, work done or flow of charge in a system changes
	Use calculations to show on a common scale how energy in a system is redistributed
	Calculate the kinetic energy of an object by recalling and applying the equation: ***[$E_k = ½mv^2$]***
	Calculate the amount of elastic potential energy stored in a stretched spring by applying, but not recalling, the equation: ***[$E_e = ½ke^2$]***
	Calculate the amount of gravitational potential energy gained by an object raised above ground level by recalling and applying, the equation: ***[$E_e = mgh$]***
	Calculate the amount of energy stored in or released from a system as its temperature changes by applying, but not recalling, the equation: ***[$\Delta E = mc\Delta\theta$]***
	Define the term 'specific heat capacity'
	Required practical 1: *investigation to determine the specific heat capacity of one or more materials.*
	Define power as the rate at which energy is transferred or the rate at which work is done and the watt as an energy transfer of 1 joule per second
	Calculate power by recalling and applying the ***equations: [$P = E/t$ & $P = W/t$]***
	Explain, using examples, how two systems transferring the same amount of energy can differ in power output due to the time taken

Topic	Student Checklist
4.1.2 Conservation and dissipation of energy	State that energy can be transferred usefully, stored or dissipated, but cannot be created or destroyed and so the total energy in a system does not change
	Explain that only some of the energy in a system is usefully transferred, with the rest ‘wasted’, giving examples of how this wasted energy can be reduced
	Explain ways of reducing unwanted energy transfers and the relationship between thermal conductivity and energy transferred
	Describe how the rate of cooling of a building is affected by the thickness and thermal conductivity of its walls
	Required practical 2: *investigate the effectiveness of different materials as thermal insulators and the factors that may affect the thermal insulation properties of a material.*
	Calculate efficiency by recalling and applying the equation: ***[efficiency = useful power output / total power input]***
	HT ONLY: Suggest and explain ways to increase the efficiency of an intended energy transfer
4.1.3 National and global energy resources	List the main renewable and non-renewable energy resources and define what a renewable energy resource is
	Compare ways that different energy resources are used, including uses in transport, electricity generation and heating
	Explain why some energy resources are more reliable than others, explaining patterns and trends in their use
	Evaluate the use of different energy resources, taking into account any ethical and environmental issues which may arise
	Justify the use of energy resources, with reference to both environmental issues and the limitations imposed by political, social, ethical or economic considerations

Weeks to go: **14**	Topic: Electricity – Current, Potential Difference & Resistance

Topic	Student Checklist
4.2.1 Current, potential difference and resistance	Draw and interpret circuit diagrams, including all common circuit symbols
	Define electric current as the rate of flow of electrical charge around a closed circuit
	Calculate charge and current by recalling and applying the formula: ***[Q = It]***
	Explain that current is caused by a source of potential difference and it has the same value at any point in a single closed loop of a circuit
	Describe and apply the idea that the greater the resistance of a component, the smaller the current for a given potential difference (p.d.) across the component
	Calculate current, potential difference or resistance by recalling and applying the equation: ***[V = IR]***
	Required practical 3: *Use circuit diagrams to set up and check circuits to investigate the factors affecting the resistance of electrical circuits*
	Define an ohmic conductor
	Explain the resistance of components such as lamps, diodes, thermistors and LDRs and sketch/interpret IV graphs of their characteristic electrical behaviour
	Explain how to measure the resistance of a component by drawing an appropriate circuit diagram using correct circuit symbols
	Required practical 4: *use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements*

Weeks to go: 13	Topic: Electricity – Series & Parallel Circuits + Domestic Uses & Safety

Topic	Student Checklist
4.2.2 Series and parallel circuits	Show by calculation and explanation that components in series have the same current passing through them
	Show by calculation and explanation that components connected in parallel have the same the potential difference across each of them
	Calculate the total resistance of two components in series as the sum of the resistance of each component using the equation: ***[$R_{total} = R_1 + R_2$]***
	Explain qualitatively why adding resistors in series increases the total resistance whilst adding resistors in parallel decreases the total resistance
	Solve problems for circuits which include resistors in series using the concept of equivalent resistance
4.2.3 Domestic uses and safety	Explain the difference between direct and alternating voltage and current, stating what UK mains is
	Identify and describe the function of each wire in a three-core cable connected to the mains
	State that the potential difference between the live wire and earth (0 V) is about 230 V and that both neutral wires and our bodies are at, or close to, earth potential (0 V)
	Explain that a live wire may be dangerous even when a switch in the mains circuit is open by explaining the danger of providing any connection between the live wire and earth

Weeks to go:	Topic:
12	# Electricity – Energy Transfers + Static Electricity

Topic	**Student Checklist**
4.2.4 Energy transfers	Explain how the power transfer in any circuit device is related to the potential difference across it and the current through it
	Calculate power by recalling and applying the equations: ***[P = VI]*** and ***[P = I² R]***
	Describe how appliances transfer energy to the kinetic energy of motors or the thermal energy of heating devices
	Calculate and explain the amount of energy transferred by electrical work by recalling and applying the equations: ***[E = Pt]*** and ***[E = QV]***
	Explain how the power of a circuit device is related to the potential difference across it, the current through it and the energy transferred over a given time.
	Describe, with examples, the relationship between the power ratings for domestic electrical appliances and the changes in stored energy when they are in use
	Identify the National Grid as a system of cables and transformers linking power stations to consumers
	Explain why the National Grid system is an efficient way to transfer energy, with reference to change in potential difference reducing current
4.2.5 Static electricity	*PHY ONLY: Describe the production of static electricity by the rubbing of insulating surfaces*
	PHY ONLY: Describe evidence that charged objects exert forces of attraction or repulsion on one another when not in contact
	PHY ONLY: Explain how the transfer of electrons between objects can explain the phenomenon of static electricity, including how insulators are charged and sparks are created
	PHY ONLY: Draw the electric field pattern for an isolated charged sphere
	PHY ONLY: Explain the concept of an electric field and the decrease in its strength as the distance from it increases
	PHY ONLY: Explain how the concept of an electric field helps to Explain the non-contact force between charged objects as well as other electrostatic phenomena such as sparking

Weeks to go: 11	Topic: Particle Model of Matter

TOPIC	Student Checklist
4.3.1 Changes of state and the particle model	Calculate the density of a material by recalling and applying the equation: [$\rho = m/V$]
	Recognise/draw simple diagrams to model the difference between solids, liquids and gases
	Use the particle model to explain the properties of different states of matter and differences in the density of materials
	Required practical 5: *use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids*
	Recall and describe the names of the processes by which substances change state
	Use the particle model to explain why a change of state is reversible and affects the properties of a substance, but not its mass
4.3.2 Internal energy	State that the internal energy of a system is stored in the atoms and molecules that make up the system and is total kinetic and potential energy of all particles in a system
	Calculate the change in thermal energy by applying but not recalling the equation ***[$\Delta E = m\,c\,\Delta\theta$]***
	Calculate the specific latent heat of fusion/vaporisation by applying, but not recalling, the equation: ***[$E = mL$]***
	Interpret and draw heating and cooling graphs that include changes of state. Distinguish between specific heat capacity and specific latent heat
4.3.3 Particle model and pressure	Explain why the molecules of a gas are in constant random motion and that the higher the temperature of a gas, the greater the particles' average kinetic energy
	Explain, with reference to the particle model, the effect of changing the temperature of a gas held at constant volume on its pressure
	Calculate the change in the pressure of a gas or the volume of a gas (a fixed mass held at constant temperature) when either the pressure or volume is increased or decreased
	PHY ONLY: Explain, with reference to the particle model, how increasing the volume in which a gas is contained can lead to a decrease in pressure when the temperature is constant
	PHY ONLY: Calculate the pressure for a fixed mass of gas held at a constant temperature by applying, but not recalling, the equation: ***[pV = constant]***
	PHY & HT ONLY: Explain how work done on an enclosed gas can lead to an increase in the temperature of the gas, as in a bicycle pump

Weeks to go: 10	Topic: Atomic Structure

TOPIC	Student Checklist
4.4.1 Atoms and isotopes	Describe the basic structure of an atom and how the distance of the charged particles vary with the absorption or emission of electromagnetic radiation
	Define electrons, neutrons, protons, isotopes and ions. Relate differences between isotopes to differences in conventional representations of their identities, charges and masses
	Describe how the atomic model has changed over time due to new experimental evidence, inc discovery of the atom and scattering experiments (inc the work of James Chadwick)
4.4.2 Atoms and nuclear radiation	Describe and apply the idea that the activity of a radioactive source is the rate at which its unstable nuclei decay, measured in Becquerel (Bq) by a Geiger-Muller tube
	Describe the penetration through materials, the range in air and the ionising power for alpha particles, beta particles and gamma rays
	Apply knowledge of the uses of radiation to evaluate the best sources of radiation to use in a given situation
	Use the names and symbols of common nuclei and particles to complete balanced nuclear equations, by balancing the atomic numbers and mass numbers
	Define half-life of a radioactive isotope
	HT ONLY: Determine the half-life of a radioactive isotope from given information and calculate the net decline, expressed as a ratio, in a radioactive emission after a given number of half-lives
	Compare the hazards associated with contamination and irradiation and outline suitable precautions taken to protect against any hazard the radioactive sources may present
	Discuss the importance of publishing the findings of studies into the effects of radiation on humans and sharing findings with other scientists so that they can be checked by peer review
4.4.3 Hazards and uses of radioactive emissions and of background radiation	*PHY ONLY: State, giving examples, that background radiation is caused by natural and man-made sources and that the level of radiation may be affected by occupation and/or location*
	PHY ONLY: Explain the relationship between the instability and half-life of radioactive isotopes and why the hazards associated with radioactive material differ according to the half-life involved
	PHY ONLY: Describe and evaluate the uses of nuclear radiation in exploration of internal organs and controlling or destroying unwanted tissue
	PHY ONLY: Evaluate the perceived risks of using nuclear radiation in relation to given data and consequences
	PHY ONLY: Describe nuclear fission and nuclear fusion. Draw/interpret diagrams representing nuclear fission and how a chain reaction may occur

Weeks to go: 9	Topic: Forces – Forces & Their Interactions + Work Done & Energy Transfers

Topic	Student Checklist
4.5.1 Forces and their interactions	Identify and describe scalar quantities and vector quantities
	Identify and give examples of forces as contact or non-contact forces
	Describe the interaction between two objects and the force produced on each as a vector
	Describe weight and explain that its magnitude at a point depends on the gravitational field strength
	Calculate weight by recalling and using the equation: ***[W = mg]***
	Represent the weight of an object as acting at a single point which is referred to as the object's 'centre of mass'
	Calculate the resultant of two forces that act in a straight line
	HT ONLY: describe examples of the forces acting on an isolated object or system
	HT ONLY: Use free body diagrams to qualitatively describe examples where several forces act on an object and explain how that leads to a single resultant force or no force
	HT ONLY: Use free body diagrams and accurate vector diagrams to scale, to resolve multiple forces and show magnitude and direction of the resultant
	HT ONLY: Use vector diagrams to illustrate resolution of forces, equilibrium situations and determine the resultant of two forces, to include both magnitude and direction
4.5.2 Work done and energy transfers	Describe energy transfers involved when work is done and calculate the work done by recalling and using the equation: *[W = Fs]*
	Describe what a joule is and state what the joule is derived from
	Convert between newton-metres and joules.
	Explain why work done against the frictional forces acting on an object causes a rise in the temperature of the object

Weeks to go: 8	Topic: Forces – Forces & Elasticity + Moments, Levers & Gears

Topic	Student Checklist
4.5.3 Forces and elasticity	Describe examples of the forces involved in stretching, bending or compressing an object
	Explain why, to change the shape of an object (by stretching, bending or compressing), more than one force has to be applied – this is limited to stationary objects only
	Describe the difference between elastic deformation and inelastic deformation caused by stretching forces
	Describe the extension of an elastic object below the limit of proportionality and calculate it by recalling and applying the equation: ***[$F = ke$]***
	Explain why a change in the shape of an object only happens when more than one force is applied
	Describe and interpret data from an investigation to explain possible causes of a linear and non-linear relationship between force and extension
	Calculate work done in stretching (or compressing) a spring (up to the limit of proportionality) by applying, but not recalling, the equation: ***[$E_e = ½ke^2$]***
	Required practical 6: *investigate the relationship between force and extension for a spring.*
4.5.4 Moments, levers and gears	*PHY ONLY: State that a body in equilibrium must experience equal sums of clockwise and anticlockwise moments, recall and apply the equation:* ***[$M = Fd$]***
	PHY ONLY: Apply the idea that a body in equilibrium experiences an equal total of clockwise and anti-clockwise moments about any pivot
	PHY ONLY: Explain why the distance, d, must be taken as the perpendicular distance from the line of action of the force to the pivot
	PHY ONLY: Explain how levers and gears transmit the rotational effects of forces

Weeks to go: 7	Topic: Forces – Pressure & Pressure Differences in Fluids **+ *Momentum (HT Only)***

Topic	Student Checklist
4.5.5 Pressure and pressure differences in fluids	*PHY ONLY: Describe a fluid as either a liquid or a gas and explain that the pressure in a fluid causes a force to act at right angles (normal) to the surface of its container*
	PHY ONLY: Recall and apply the equation: ***[p = F/A]***
	PHY & HT ONLY: Explain why the pressure at a point in a fluid increases with the height of the column of fluid above and calculate differences in pressure in a liquid by applying [p = h ρ g]
	PHY & HT ONLY: Describe upthrust an object and explain why the density of the fluid has an effect on the upthrust experienced by an object submerged in it
	PHY & HT ONLY: Explain why an object floats or sinks, with reference to its weight, volume and the upthrust it experiences
	PHY ONLY: Describe a simple model of the Earth's atmosphere and of atmospheric pressure, explaining why atmospheric pressure varies with height above a surface
4.5.7 Momentum	**HT ONLY: Calculate momentum by recalling and applying the equation: *[p = mv]***
	HT ONLY: Explain and apply the idea that, in a closed system, the total momentum before an event is equal to the total momentum after the event
	HT ONLY: Describe examples of momentum in a collision
	PHY & HT ONLY: Complete conservation of momentum calculations involving two objects
	PHY & HT ONLY: Explain that when a force acts on an object that is moving, or able to move, a change in momentum occurs
	PHY & HT ONLY: Calculate a force applied to an object, or the change in momentum it causes, by applying but not recalling the equation: [F = m Δv / Δt]
	PHY & HT ONLY: Explain that an increased force delivers an increased rate of change of momentum
	PHY & HT ONLY: Apply the idea of rate of change of momentum to explain safety features such as air bags, seat belts, helmets and cushioned surfaces

Weeks to go: 6	Topic: Forces – Forces & Motion (Part 1)

Topic	Student Checklist
4.5.6 Forces and motion	Define distance and displacement and explain why they are scalar or vector quantities. Express a displacement in terms of both the magnitude and direction
	Explain that the speed at which a person can walk, run or cycle depends on a number of factors and recall some typical speeds for walking, running, cycling
	Make measurements of distance and time and then calculate speeds of objects in calculating average speed for non-uniform motion
	Explain why the speed of wind and of sound through air varies and calculate speed by recalling and applying the equation: ***[s = v t]***
	Explain the vector–scalar distinction as it applies to displacement, distance, velocity and speed
	HT ONLY: Explain qualitatively, with examples, that motion in a circle involves constant speed but changing velocity
	Represent an object moving along a straight line using a distance-time graph, describing its motion and calculating its speed from the graph's gradient
	Draw distance–time graphs from measurements and extract and interpret lines and slopes of distance–time graphs,
	Describe an object which is slowing down as having a negative acceleration and estimate the magnitude of everyday accelerations
	Calculate the average acceleration of an object by recalling and applying the equation: ***[a = Δv/t]***. Apply, but not recall, the equation: ***[$v^2 – u^2 = 2as$]***
	Represent motion using velocity–time graphs, finding the acceleration from its gradient and distance travelled from the area underneath
	HT ONLY: Interpret enclosed areas in velocity–time graphs to determine distance travelled (or displacement)
	HT ONLY: Measure, when appropriate, the area under a velocity– time graph by counting square
	PHY ONLY: Draw and interpret velocity-time graphs for objects that reach terminal velocity and explain how an object falling from rest reaches its terminal velocity
	PHY ONLY: Interpret and explain the changing motion of an object in terms of the forces acting on it
	Explain the motion of an object moving with a uniform velocity and identify that forces must be in effect if its velocity is changing, by stating and applying Newton's First Law

Weeks to go:	Topic:
5	Forces – Forces & Motion (Part 2)

Topic	Student Checklist
4.5.6 Forces and Motion	Define and apply Newton's second law relating to the acceleration of an object. Recall and apply the equation: ***[F = ma]***
	HT ONLY: Describe what inertia is and give a definition
	Estimate the speed, accelerations and forces of large vehicles involved in everyday road transport
	Required practical 7: *investigate the effect of varying the force on the acceleration of an object of constant mass, and the effect of varying the mass of an object on the acceleration*
	Apply Newton's Third Law to examples of equilibrium situations
	Describe factors that can effect a drivers reaction time. Explain methods used to measure human reaction times and recall typical results
	Interpret and evaluate measurements from data of different reaction times of students. Evaluate the effect of various factors on thinking distance based on given data
	PHY ONLY: Estimate the distance required for an emergency stop in a vehicle over a range of typical speeds
	PHY ONLY: Interpret graphs relating speed to stopping distance for a range of vehicles
	State typical reaction times and describe how reaction time (and therefore stopping distance) can be affected by different factors
	Explain methods used to measure human reaction times and take, interpret and evaluate measurements of the reaction times of students
	Explain how the braking distance of a vehicle can be affected by different factors, including implications for road safety
	Explain how a braking force applied to the wheel does work to reduce the vehicle's kinetic energy and increases the temperature of the brakes
	Explain and apply the idea that a greater braking force causes a larger deceleration and explain how this might be dangerous for drivers
	HT ONLY: Estimate the forces involved in the deceleration of road vehicles

Weeks to go: 4	Topic: Waves – Waves in Air, Fluids and Solids

Topic	Student Checklist
4.6.1 Waves in air, fluids and solids	Describe waves as either transverse or longitudinal, defining these waves in terms of the direction of their oscillation and energy transfer and giving examples of each
	Define waves as transfers of energy from one place to another, carrying information
	Define amplitude, wavelength, frequency, period and wave speed and Identify them where appropriate on diagrams
	State examples of methods of measuring wave speeds in different media and Identify the suitability of apparatus of measuring frequency and wavelength
	Calculate wave speed, frequency or wavelength by applying, but not recalling, the equation: ***[$v = f \lambda$]***and calculate wave period by recalling and applying the equation: ***[$T = 1/f$]***
	Identify amplitude and wavelength from given diagrams. Describe a method to measure the speed of sound waves in air and the speed of ripples on a water surface
	PHY ONLY: Demonstrate how changes in velocity, frequency and wavelength are inter-related in the transmission of sound waves from one medium to another
	Required practical 8: *make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid*
	PHY ONLY: Discuss the importance of understanding both mechanical and electromagnetic waves by giving examples, such as designing comfortable and safe structures and technologies. Describe a wave's ability to be reflected, absorbed or transmitted at the boundary between two different materials
	PHY ONLY: Draw the reflection of a wave at a surface by constructing ray diagrams
	Required practical 9 *(physics only): investigate the reflection of light by different types of surface and the refraction of light by different substances.*
	PHY & HT ONLY: Describe, with examples, processes which convert wave disturbances between sound waves and vibrations in solids
	PHY & HT ONLY: Explain why such processes only work over a limited frequency range and the relevance of this to the range of human hearing, which is from 20 Hz to 20 kHz
	PHY & HT ONLY: Define ultrasound waves and explain how these are used to form images of internal structures in both medical and industrial imaging
	PHY & HT ONLY: Compare the two types of seismic wave produced by earthquakes with reference to the media they can travel in and the evidence they provide of the structure of the Earth
	PHY & HT ONLY: Describe how echo sounding using high frequency sound waves is used to detect objects in deep water and measure water depth

Weeks to go: 3	Topic: Waves – Electromagnetic Waves

Topic	Student Checklist
4.6.2 Electromagnetic waves	Describe what electromagnetic waves are and explain how they are grouped
	List the groups of electromagnetic waves in order of wavelength
	Explain that because our eyes only detect a limited range of electromagnetic waves, they can only detect visible light
	HT ONLY: Explain how different wavelengths of electromagnetic radiation are reflected, refracted, absorbed or transmitted differently by different substances and types of surface
	Illustrate the refraction of a wave at the boundary between two different media by constructing ray diagrams
	HT ONLY: Describe what refraction is due to and illustrate this using wave front diagrams
	Required practical activity 10: *investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.*
	HT ONLY: Explain how radio waves can be produced by oscillations in electrical circuits, or absorbed by electrical circuits
	Explain that changes in atoms and the nuclei of atoms can result in electromagnetic waves being generated or absorbed over a wide frequency range
	State examples of the dangers of each group of electromagnetic radiation and discuss the effects of radiation as depending on the type of radiation and the size of the dose
	State examples of the uses of each group of electromagnetic radiation, explaining why each type of electromagnetic wave is suitable for its applications
	PHY ONLY: State that a lens forms an image by refracting light and that the distance from the lens to the principal focus is called the focal length
	PHY ONLY: Explain that images produced by a convex lens can be either real or virtual, but those produced by a concave lens are always virtual
	PHY ONLY: Construct ray diagrams for both convex and concave lenses
	PHY ONLY: Calculate magnification as a ratio with no units by applying, but not recalling, the formula: [magnification = image height / object height]
	PHY ONLY: Explain how the colour of an object is related to the differential absorption, transmission and reflection of different wavelengths of light by the object

Topic	Student Checklist
4.6.2 Electromagnetic Waves	*PHY ONLY: Describe the effect of viewing objects through filters or the effect on light of passing through filters and the difference between transparency and translucency*
	PHY ONLY: Explain why an opaque object has a particular colour, with reference to the wavelengths emitted
	PHY ONLY: State that all bodies, no matter what temperature, emit and absorb infrared radiation and that the hotter the body, the more infrared radiation it radiates in a given time
	PHY ONLY: Describe a perfect black body as an object that absorbs all the radiation incident on it and explain why it is the best possible emitter
	PHY ONLY: Explain why when the temperature is increased, the intensity of every wavelength of radiation emitted increases, but the intensity of the shorter wavelengths increases more rapidly
	PHY & HT ONLY: Explain and apply the idea that the temperature of a body is related to the balance between incoming radiation absorbed and radiation emitted
	PHY & HT ONLY: Describe how the temperature of the Earth as dependent on the rates of absorption and emission of radiation and draw and interpret diagrams that show this

Weeks to go: 2	Topic: Magnetism & Electromagnetism

TOPIC	Student Checklist
4.7.1 Permanent and induced magnetism, magnetic forces and fields	Describe the attraction and repulsion between unlike and like poles of permanent magnets and explain the difference between permanent and induced magnets
	Draw the magnetic field pattern of a bar magnet, showing how field strength and direction are indicated and change from one point to another
	Explain how the behaviour of a magnetic compass is related to evidence that the core of the Earth must be magnetic
	Describe how to plot the magnetic field pattern of a magnet using a compass
4.7.2 The motor effect	State examples of how the magnetic effect of a current can be demonstrated and explain how a solenoid arrangement can increase the magnetic effect of the current
	Draw the magnetic field pattern for a straight wire carrying a current and for a solenoid (showing the direction of the field)
	PHY ONLY: Interpret diagrams of electromagnetic devices in order to explain how they work
	HT ONLY: State and use Fleming's left-hand rule and explain what the size of the induced force depends on
	HT ONLY: Calculate the force on a conductor carrying a current at right angles to a magnetic field by applying, but not recalling, the equation: ***[F = BIL]***
	HT ONLY: Explain how rotation is caused in an electric motor
	PHY & HT ONLY: Explain how a moving-coil loudspeaker and headphones work

TOPIC	Student Checklist
4.7.3 Induced potential, transformers and the National Grid	*PHY & HT ONLY: Describe the principles of the generator effect, including the direction of induced current, effects of Lenz' Law and factors that increase induced p.d.*
	PHY & HT ONLY: Explain how the generator effect is used in an alternator to generate a.c. and in a dynamo to generate d.c.
	PHY & HT ONLY: Draw/interpret graphs of potential difference generated in the coil against time
	PHY & HT ONLY: Explain how a moving-coil microphone works
	PHY & HT ONLY: Explain how the effect of an alternating current in one coil inducing a current in another is used in transformers
	PHY & HT ONLY: Explain how the ratio of the potential differences across the two coils depends on the ratio of the number of turns on each
	PHY & HT ONLY: Apply the equation linking the p.d.s and number of turns in the two coils of a transformer to the currents and the power transfer
	PHY & HT ONLY: Apply but not recalling the equations: [Vs × Is = Vp × Ip] and [vp / vs = np / ns] for transformers

Weeks to go: 1	Topic: Space Physics

TOPIC	Student Checklist
4.8.1 Solar system; stability of orbital motions; satellites	*PHY ONLY: List the types of body that make up the solar system and describe our solar system as part of a galaxy*
	PHY ONLY: Explain how stars are formed
	PHY ONLY: Describe the life cycle of a star the size of the Sun and of a star which is much more massive than the Sun
	PHY ONLY: Explain how fusion processes lead to the formation of new elements and how supernovas have allowed heavy elements to appear in later solar systems
	PHY & HT ONLY: Explain that, for circular orbits, the force of gravity leads to a constantly changing velocity but unchanged speed
	PHY & HT ONLY: Explain that, for a stable orbit, the radius must change if the speed changes
4.8.2 Red-shift	*PHY ONLY: Explain, qualitatively, the red-shift of light from galaxies that are receding and how this red-shift changes with distance from Earth*
	PHY ONLY: Explain why the change of each galaxy's speed with distance is evidence of an expanding universe
	PHY ONLY: Explain how scientists are able to use observations to arrive at theories, such as the Big Bang theory and discuss that there is still much about the universe that is not understood