

Combined Science GCSE Revision Checklists

Physics

Name: _____

Science Teacher: _____

Physics 1 - Paper 3

CP1 - Motion	I Know it!
Describe the difference between weight and mass.	<input type="checkbox"/>
Explain the difference between a vector and a scalar quantity.	<input type="checkbox"/>
Describe the difference between displacement and distance.	<input type="checkbox"/>
Describe the difference between velocity and speed.	<input type="checkbox"/>
Define the terms: acceleration, force, momentum, energy.	<input type="checkbox"/>
Recall formulae relating distance, speed and time.	<input type="checkbox"/>
Use formulae relating distance, speed and time.	<input type="checkbox"/>
Recall typical speeds for walking, running, cycling and travelling by car.	<input type="checkbox"/>
Interpret distance/time graphs (including recognising what the steepness of the line tells you).	<input type="checkbox"/>
Represent journeys on distance/time graphs.	<input type="checkbox"/>
Determine speed from the gradient of a distance/time graph.	<input type="checkbox"/>
Recall the formula relating acceleration, velocity and time.	<input type="checkbox"/>
Use the formula relating acceleration, velocity and time.	<input type="checkbox"/>
Recall the formula relating acceleration, velocity and distance.	<input type="checkbox"/>
Use the formula relating acceleration, velocity and distance.	<input type="checkbox"/>
Recall the acceleration in free fall.	<input type="checkbox"/>
Estimate the magnitudes of some everyday accelerations.	<input type="checkbox"/>
Represent journeys on velocity/time graphs.	<input type="checkbox"/>
Interpret velocity/time graphs qualitatively.	<input type="checkbox"/>
Calculate uniform accelerations from the gradients of velocity/time graphs.	<input type="checkbox"/>
Determine the distance travelled from the area under a velocity/time graph.	<input type="checkbox"/>
CP2- Motion and Forces	
Explain the difference between scalar and vector quantities.	<input type="checkbox"/>
Use arrows to represent the direction and magnitude of forces.	<input type="checkbox"/>
Define a resultant force.	<input type="checkbox"/>
Calculate resultant forces.	<input type="checkbox"/>
Explain whether forces on an object are balanced or unbalanced.	<input type="checkbox"/>
Describe the effect of balanced forces on moving and stationary objects.	<input type="checkbox"/>

Describe the effect of a non-zero resultant force on moving and stationary objects.	<input type="checkbox"/>
H Describe circular motion at constant speed as a changing velocity and hence as an acceleration.	<input type="checkbox"/>
H Describe the force needed to keep an object moving in a circular path.	<input type="checkbox"/>
H Give some examples of objects moving in circular paths and the type of centripetal force involved.	<input type="checkbox"/>
Describe the difference between mass and weight.	<input type="checkbox"/>
List the factors that determine the weight of an object.	<input type="checkbox"/>
Recall the formula for calculating weight.	<input type="checkbox"/>
Calculate weights using the formula.	<input type="checkbox"/>
Change the subject of the weight formula to calculate mass or gravitational field strength.	<input type="checkbox"/>
Describe what an acceleration is.	<input type="checkbox"/>
List the factors that affect the acceleration of an object.	
Recall the formula that relates the factors affecting acceleration.	<input type="checkbox"/>
Use the formula relating force, mass and acceleration.	<input type="checkbox"/>
Change the subject of the formula relating force, mass and acceleration.	<input type="checkbox"/>
H Explain what inertial mass means.	<input type="checkbox"/>
Describe what Newton's Third Law says.	<input type="checkbox"/>
Recall the meaning of 'equilibrium situation'.	<input type="checkbox"/>
Identify action–reaction pairs in familiar situations.	<input type="checkbox"/>
Distinguish between action–reaction pairs and balanced forces.	<input type="checkbox"/>
H Describe how objects affect each other when they collide.	<input type="checkbox"/>
Describe the factors that affect the momentum of an object.	<input type="checkbox"/>
Calculate the momentum of moving objects.	<input type="checkbox"/>
Recall what happens to momentum during a collision.	<input type="checkbox"/>
Use the idea of conservation of momentum to calculate velocities of objects after collisions.	<input type="checkbox"/>
Calculate the force needed to produce a change in momentum in a given time.	<input type="checkbox"/>
Describe how human reaction times are measured.	<input type="checkbox"/>
Recall typical human reaction times and the factors that affect them.	<input type="checkbox"/>
Describe the link between stopping distance, thinking distance and braking distance.	<input type="checkbox"/>
Recall the factors that affect stopping distances.	<input type="checkbox"/>
Describe how different factors affect stopping distances.	<input type="checkbox"/>
Explain the meaning of a 'large deceleration'.	<input type="checkbox"/>
Describe the dangers caused by large decelerations.	<input type="checkbox"/>

Explain why large decelerations cause dangers.	<input type="checkbox"/>
H Recall some typical forces involved in road collisions.	<input type="checkbox"/>
H Use knowledge of changes in momentum to estimate the forces involved in road collisions.	<input type="checkbox"/>
CP3 - Conservation of Energy	
Explain, using examples, that energy is conserved.	<input type="checkbox"/>
Give examples of energy being moved between different stores.	<input type="checkbox"/>
Interpret diagrams that represent energy transfers.	<input type="checkbox"/>
Represent energy transfers using diagrams.	<input type="checkbox"/>
Describe what happens to wasted energy in energy transfers.	<input type="checkbox"/>
Explain some ways in which energy is transferred wastefully by mechanical processes.	<input type="checkbox"/>
Explain some ways of reducing unwanted energy transfers in mechanical processes.	<input type="checkbox"/>
Define what efficiency means.	<input type="checkbox"/>
H Explain how efficiency can be increased.	<input type="checkbox"/>
Recall and use the formula for calculating energy efficiency.	<input type="checkbox"/>
Describe what is meant by electrical resistance.	<input type="checkbox"/>
Explain how energy can be wasted in electrical appliances.	<input type="checkbox"/>
Describe how the National Grid transmits electricity around the country.	<input type="checkbox"/>
Explain why step-up and step-down transformers are used in the National Grid.	<input type="checkbox"/>
H Explain how wasteful energy transfers can be reduced in electrical appliances.	<input type="checkbox"/>
Describe the ways in which energy can be transferred by heating.	<input type="checkbox"/>
Describe ways of reducing unwanted energy transfers using thermal insulation.	<input type="checkbox"/>
Explain how different ways of reducing energy transfer by heating work.	<input type="checkbox"/>
Define the meaning of thermal conductivity.	<input type="checkbox"/>
Describe the effects of the thickness and thermal conductivity of the walls of a building on its rate of cooling.	<input type="checkbox"/>
List the non-renewable energy resources in use today.	<input type="checkbox"/>
Describe the advantages and disadvantages of non-renewable energy resources.	<input type="checkbox"/>
Compare the advantages and disadvantages of non-renewable energy resources.	<input type="checkbox"/>
Explain how the use of non-renewable energy resources is changing.	<input type="checkbox"/>
List the renewable energy resources in use today.	<input type="checkbox"/>
Describe the source of energy for different renewable resources.	<input type="checkbox"/>
Describe the ways in which the different energy resources are used.	<input type="checkbox"/>
Explain why we cannot use only renewable energy resources.	<input type="checkbox"/>
Explain how the use of renewable energy resources is changing.	<input type="checkbox"/>

CP4/5 - Waves, Light and the Electromagnetic Spectrum	
Recall that waves transfer energy and information but do not transfer matter.	<input type="checkbox"/>
Describe waves using the terms frequency, wavelength, amplitude, period and velocity.	<input type="checkbox"/>
Describe the differences between longitudinal and transverse waves.	<input type="checkbox"/>
Give examples of transverse and longitudinal waves.	<input type="checkbox"/>
Recall the equation relating wave speed, frequency and wavelength	<input type="checkbox"/>
Use the equation relating wave speed, frequency and wavelength.	<input type="checkbox"/>
Recall the equation relating wave speed, distance and time.	<input type="checkbox"/>
Use the equation relating wave speed, distance and time.	<input type="checkbox"/>
Describe how to measure the velocity of sound in air.	<input type="checkbox"/>
Describe how to measure the velocity of waves on the surface of water.	<input type="checkbox"/>
Describe what refraction is.	<input type="checkbox"/>
Describe how the direction of a wave changes when it goes from one material to another.	<input type="checkbox"/>
Explain some effects of the refraction of light (explanations in terms of changing speeds are not expected).	<input type="checkbox"/>
H Explain how a change in wave speed can cause a change in direction.	<input type="checkbox"/>
Recall examples of electromagnetic waves.	<input type="checkbox"/>
Describe the common features of electromagnetic waves.	<input type="checkbox"/>
Describe the transfer of energy by electromagnetic waves.	<input type="checkbox"/>
Describe the range of electromagnetic waves that our eyes can detect.	<input type="checkbox"/>
H Describe an effect caused by the different velocities of electromagnetic waves in different substances.	<input type="checkbox"/>
Recall the groups of waves in the electromagnetic spectrum in order.	<input type="checkbox"/>
Recall the colours of the visible spectrum in order.	<input type="checkbox"/>
Describe how the waves in the electromagnetic spectrum are grouped.	<input type="checkbox"/>
H Describe some differences in the ways that different parts of the electromagnetic spectrum are absorbed and transmitted.	<input type="checkbox"/>
H Describe some differences in the ways that different parts of the electromagnetic spectrum are refracted and reflected.	<input type="checkbox"/>
H Describe how long wavelength electromagnetic waves are affected by different substances.	<input type="checkbox"/>
H Explain the effects caused by long wavelength electromagnetic waves travelling at different velocities in different substances.	<input type="checkbox"/>
Describe some uses of radio waves.	<input type="checkbox"/>
Describe some uses of microwaves.	<input type="checkbox"/>
Describe some uses of infrared.	<input type="checkbox"/>

Describe some uses of visible light.	<input type="checkbox"/>
H Describe how radio waves are produced and detected by electrical circuits.	<input type="checkbox"/>
H Describe how short wavelength electromagnetic waves are affected by different substances.	<input type="checkbox"/>
H Explain the effects caused by short wavelength electromagnetic waves travelling at different velocities in different substances.	<input type="checkbox"/>
Describe some uses of ultraviolet radiation.	<input type="checkbox"/>
Describe some uses of X-rays.	<input type="checkbox"/>
Describe some uses of gamma rays.	<input type="checkbox"/>
Describe how the potential danger of electromagnetic radiation depends on its frequency.	<input type="checkbox"/>
Describe the harmful effects of microwave and infrared radiation.	<input type="checkbox"/>
Describe the harmful effects of ultraviolet radiation, X-rays and gamma rays.	<input type="checkbox"/>
Recall the nature of radiation produced by changes in atoms and their nuclei.	<input type="checkbox"/>
Recall that absorption of radiation can cause changes in atoms and their nuclei.	<input type="checkbox"/>
CP6 - Radioactivity	
Describe the structure of an atom (in terms of nucleus and electrons).	<input type="checkbox"/>
State where most of the mass of an atom is found.	<input type="checkbox"/>
State the sizes of atoms and small molecules.	<input type="checkbox"/>
Describe an early model of the atom.	<input type="checkbox"/>
Describe how and why our model of the atom has changed over time, including the plum pudding model and the Rutherford alpha particle scattering.	<input type="checkbox"/>
State what is meant by an isotope.	<input type="checkbox"/>
Represent isotopes using symbols.	<input type="checkbox"/>
Explain how atoms of different elements are different (in terms of numbers of electrons and protons).	<input type="checkbox"/>
Recall the charges and relative masses of the three subatomic particles.	<input type="checkbox"/>
Explain why all atoms have no overall charge.	<input type="checkbox"/>
Describe where electrons are found inside atoms (in terms of shells).	<input type="checkbox"/>
Describe when electrons can change orbit.	<input type="checkbox"/>
Recall what an ion is.	<input type="checkbox"/>
Describe how ionisation occurs.	<input type="checkbox"/>
Describe some of the evidence for the Bohr model of the atom.	<input type="checkbox"/>
Explain what background radiation is.	<input type="checkbox"/>
Describe how radiation measurements need to be corrected for background radiation.	<input type="checkbox"/>

List some sources of background radiation.	<input type="checkbox"/>
Describe how photographic film can be used to detect radioactivity.	<input type="checkbox"/>
Describe how a Geiger-Müller tube works.	<input type="checkbox"/>
Describe how the amount of radioactivity can be measured (in terms of the darkness of photographic film or by attaching a counter to a GM tube).	<input type="checkbox"/>
List five types of radiation that are emitted in random processes from unstable nuclei.	<input type="checkbox"/>
State that the five types of radiation are ionising radiations.	<input type="checkbox"/>
Describe what alpha and beta particles are.	<input type="checkbox"/>
Describe the nature of gamma radiation.	<input type="checkbox"/>
Compare the penetrating abilities of alpha, beta and gamma radiation.	<input type="checkbox"/>
Compare the ionisation abilities of alpha, beta and gamma radiation.	<input type="checkbox"/>
Describe the process of β^- decay.	<input type="checkbox"/>
Describe the process of β^+ decay.	<input type="checkbox"/>
Explain how the proton and mass numbers are affected by different kinds of radioactive decay.	<input type="checkbox"/>
Describe what happens during nuclear rearrangement after radioactive decay.	<input type="checkbox"/>
Balance nuclear equations for mass and charge.	<input type="checkbox"/>
Describe how the activity of a substance changes over time.	<input type="checkbox"/>
State how half-life can be used to describe the changing activity of a substance.	<input type="checkbox"/>
Recall the unit of activity.	<input type="checkbox"/>
Describe how half-life can be used to work out how much of a substance will decay in a certain time.	<input type="checkbox"/>
Carry out calculations involving half-life.	<input type="checkbox"/>
Describe the hazards of ionising radiation in terms of tissue damage and possible mutations.	<input type="checkbox"/>
Explain the precautions taken to reduce the risks from radiation and ensure the safety of patients exposed to radiation.	<input type="checkbox"/>
Explain the precautions taken to reduce the risks from radiation and protect people who work with radiation.	<input type="checkbox"/>
Describe the differences between contamination and irradiation effects.	<input type="checkbox"/>
Compare the hazards of contamination and irradiation.	<input type="checkbox"/>

Physics 2 - Paper 6

CP7/8 - Work & Power Calculations, Action-Reaction Forces and Vector Diagrams	I Know it!
Describe some ways in which the energy of a system can be changed.	<input type="checkbox"/>
Measure the work done by a force.	<input type="checkbox"/>
Recall and use the equation linking work done, force and distance.	<input type="checkbox"/>
Explain what power means.	<input type="checkbox"/>
Recall and use the equation linking power, work done and time.	<input type="checkbox"/>
CP9 - Electricity and Circuits	
Describe the basic structure of an atom (positions, relative masses and relative charges of protons, neutrons and electrons).	<input type="checkbox"/>
Recognise the circuit symbols for a range of common electrical components (cells, including batteries, switches, voltmeters, ammeters and lamps).	<input type="checkbox"/>
Draw diagrams for circuits containing common electrical components, using conventions for positive and negative terminals.	<input type="checkbox"/>
Describe and explain the difference between the brightness of identical lamps in series and parallel circuits.	<input type="checkbox"/>
Describe and explain the effects of different numbers of identical lamps, cells and switches in series and parallel circuits.	<input type="checkbox"/>
Describe the basic structure of an atom (positions, relative masses and relative charges of protons, neutrons and electrons).	<input type="checkbox"/>
Recognise the circuit symbols for a range of common electrical components (cells, including batteries, switches, voltmeters, ammeters and lamps).	<input type="checkbox"/>
Draw diagrams for circuits containing common electrical components, using conventions for positive and negative terminals.	<input type="checkbox"/>
Describe and explain the difference between the brightness of identical lamps in series and parallel circuits.	<input type="checkbox"/>
Describe and explain the effects of different numbers of identical lamps, cells and switches in series and parallel circuits.	<input type="checkbox"/>
Explain the link between the potential difference (voltage) across a battery or a component, the charge passing through it and the amount of energy transferred.	
Recall that the unit of potential difference is the volt and explain it in terms of units of energy and charge (a potential difference of one joule per coulomb).	<input type="checkbox"/>
Recall and use the equation to calculate the energy transferred, the charge that flows or the potential difference. ($E = Q \times V$)	

Explain the link between electric current and electric charge.	<input type="checkbox"/>
Explain electric current in metals in terms of electrons.	<input type="checkbox"/>
Recall and use the equation to calculate the charge that flows, the current or the time the current flows. ($Q = I \times t$)	<input type="checkbox"/>
Explain the link between resistance and current in a circuit.	<input type="checkbox"/>
Define the resistance of a component or circuit ($R = V/I$).	<input type="checkbox"/>
Recall and use the equation to calculate the potential difference, the current or the resistance ($V = I \times R$).	<input type="checkbox"/>
Explain the difference in resistance when two resistors are connected in series or in parallel.	<input type="checkbox"/>
Calculate the currents, potential differences and resistances in series circuits.	<input type="checkbox"/>
Explain the design and construction of series circuits for testing and measuring.	<input type="checkbox"/>
Explain how current changes with potential difference in fixed resistors.	<input type="checkbox"/>
Explain how current and resistance change with potential difference in filament lamps.	<input type="checkbox"/>
Explain how current and resistance change with potential difference in diodes, including light-emitting diodes (LEDs).	<input type="checkbox"/>
Describe how the resistance of a light-dependent resistor (LDR) varies with changing light intensity.	<input type="checkbox"/>
Describe how the resistance of a thermistor varies with changing temperature. (negative temperature coefficient only)	<input type="checkbox"/>
Describe the uses of diodes, LDRs and thermistors.	
Describe the energy transfer that occurs when a current passes through a resistor.	<input type="checkbox"/>
Use the electron and ion model and the idea of electrical work to explain the energy transfer in a resistor and the resulting dissipation of energy in the surroundings.	<input type="checkbox"/>
H Explain how unwanted energy transfers in wires can be avoided.	<input type="checkbox"/>
Recall the advantages of the heating effect of an electric current.	<input type="checkbox"/>
Recall the disadvantages of the heating effect of an electric current.	<input type="checkbox"/>
Use the equation $E = I \times V \times t$ to calculate the energy transferred, the current, the potential difference or the time.	<input type="checkbox"/>
Define power and the units used to measure it. (energy transferred per second in watts)	<input type="checkbox"/>
Recall and use the equation to calculate the power, the energy transferred or the time taken. ($P = E/t$)	<input type="checkbox"/>
Explain how power transfer depends on the potential difference across a device and the current through it.	<input type="checkbox"/>
Recall and use the equation to calculate the electrical power, the current or the potential difference. ($P = I \times V$)	<input type="checkbox"/>
Recall and use the equation to calculate the electrical power, the current or the resistance. (P	<input type="checkbox"/>

= $I^2 \times R$)	
Describe energy transfers from d.c. batteries and the a.c. mains supply to motors and heaters.	<input type="checkbox"/>
Explain the difference between direct and alternating voltage.	<input type="checkbox"/>
Compare alternating and direct current (in terms of movement of charge).	<input type="checkbox"/>
Recall the frequency and voltage of the UK domestic supply.	<input type="checkbox"/>
Describe the power ratings of some domestic electrical appliances and changes in stored energy when they are in use.	<input type="checkbox"/>
Explain the difference between the functions of the live and the neutral wires.	<input type="checkbox"/>
Explain how circuit breakers make circuits safer.	<input type="checkbox"/>
Explain how the earth wire and the fuse make circuits safer.	<input type="checkbox"/>
Explain why switches and fuses are connected in the live wire.	<input type="checkbox"/>
Recall the potential differences between the live, neutral and earth wires.	
Explain the danger of a connection between the live wire and earth.	<input type="checkbox"/>
CP10/11 - Magnetism & The Motor Effect and Electromagnetic Induction	
Describe how magnets affect each other.	<input type="checkbox"/>
Explain the difference between permanent and induced magnets.	<input type="checkbox"/>
Describe the uses of permanent and temporary magnetic materials.	<input type="checkbox"/>
Describe the shapes of magnetic fields, including variations in strength.	<input type="checkbox"/>
Describe how the shape of magnetic fields can be shown using plotting compasses.	<input type="checkbox"/>
Explain how a magnetic compass can be used as evidence for the Earth's magnetic core.	<input type="checkbox"/>
Recall that a current can create a magnetic effect.	<input type="checkbox"/>
Relate the shape and direction of the magnetic field around a straight wire to the direction of the current.	<input type="checkbox"/>
Recall the factors that affect the strength of the magnetic field around a wire.	<input type="checkbox"/>
Describe the magnetic field inside and outside a coil of wire carrying a current.	<input type="checkbox"/>
Explain the shape and strength of the magnetic field around a solenoid.	<input type="checkbox"/>
H Recall that forces are produced when a current flows in a magnetic field.	<input type="checkbox"/>
H Explain what causes the forces produced when a current flows in a magnetic field.	<input type="checkbox"/>
H Recall Fleming's left-hand rule.	<input type="checkbox"/>
H Use Fleming's left-hand rule.	<input type="checkbox"/>
H Use the formula relating force, magnetic field strength, current and length.	<input type="checkbox"/>
Recall the law of conservation of energy.	<input type="checkbox"/>
Recall that the power of an electrical current is given by the current multiplied by the voltage.	<input type="checkbox"/>

Use the formula relating the input and output current and voltage for a transformer.	<input type="checkbox"/>
H Recall the factors that affect the size and direction of an induced potential difference.	<input type="checkbox"/>
H Describe how the magnetic field produced by an induced potential difference opposes the original change.	<input type="checkbox"/>
H Explain how a transformer works.	<input type="checkbox"/>
Recall that transformers can change the voltage of an alternating current.	
Describe how the national grid transmits electricity around the country.	<input type="checkbox"/>
Explain why step-up and step-down transformers are used in the national grid.	<input type="checkbox"/>
CP12/13 - The Particle Model & Forces and Matter	
Describe the arrangements of particles in solids, liquids and gases.	<input type="checkbox"/>
Use the particle model to explain the different properties of solids, liquids and gases.	<input type="checkbox"/>
Recall the formula relating density, mass and volume.	<input type="checkbox"/>
Use the formula relating density, mass and volume.	<input type="checkbox"/>
Use the particle model to explain why solids, liquids and gases have different densities.	<input type="checkbox"/>
Describe what happens to the mass of a substance when it changes state.	<input type="checkbox"/>
Explain how heating affects the particles in a substance or object, including changes of state.	<input type="checkbox"/>
Describe how the temperature of an object changes with time while being heated or cooled to make it change state.	<input type="checkbox"/>
Define the term specific heat capacity.	<input type="checkbox"/>
Define the term specific latent heat.	<input type="checkbox"/>
Explain the difference between specific heat capacity and specific latent heat.	<input type="checkbox"/>
Explain ways of reducing unwanted energy transfer through thermal insulation.	<input type="checkbox"/>
Use the formula relating change in thermal energy, mass, temperature change and specific heat capacity.	<input type="checkbox"/>
Use the formula relating thermal energy, mass and specific latent heat.	<input type="checkbox"/>
Recall that the value of specific latent heat for a substance is different for melting/solidifying and for evaporating/condensing.	<input type="checkbox"/>
Explain how the movement of particles causes gas pressure.	<input type="checkbox"/>
Explain how changing the temperature of a gas affects the speed of its particles.	<input type="checkbox"/>
Explain how temperature affects the pressure of a fixed mass of gas at constant volume.	<input type="checkbox"/>
Explain the significance of absolute zero.	<input type="checkbox"/>
Convert temperatures between the Kelvin and Celsius temperature scales.	<input type="checkbox"/>
Explain that more than one force is needed to distort an object.	<input type="checkbox"/>
Describe the difference between elastic and inelastic distortion.	<input type="checkbox"/>

Describe the relationship between force and extension for a spring.	<input type="checkbox"/>
Describe the relationship between force and extension for a rubber band.	<input type="checkbox"/>
Compare the force–extension relationship for different objects.	<input type="checkbox"/>
Recall the equation that links force, extension and the spring constant.	<input type="checkbox"/>
Use the formula relating force, extension and spring constant.	<input type="checkbox"/>
Recall that work has to be done to stretch a spring.	<input type="checkbox"/>
Use the formula relating the energy transferred to the extension of a spring.	<input type="checkbox"/>