AQA Physics GCSE Student Checklist

P1 Conservation and dissipation of energy

Name ..... Class ..... Date .....

Conservation and dissipation of energy

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P 1.1 Changes in energy stores	I can state some examples of energy stores.	☐	I can describe a wide range of energy stores in different contexts.	☐	I can describe the nature of energy stores in detail including the relationship between objects.	☐
	I can state the processes that can transfer energy from one store to another.	☐	I can describe changes in energy stores in terms of the process that causes the change.	☐	I can explain factors that affect the size of changes in energy stores.	☐
	I can identify changes in some energy stores using simple systems.	☐	I can use quantitative descriptions of changes in energy stores.	☐	I can represent energy changes graphically, accounting for changes in all stores.	☐
P1.2 Conservation of energy	I can state that energy is conserved in any transfer.	☐	I can apply the law of conservation of energy in straightforward situations.	☐	I can apply the law of conservation of energy to explain why forces cause heating effects.	☐
	I can state that energy is dissipated (is no longer useful) when it heats the environment.	☐	I can describe changes in energy stores explaining why energy ceases to be useful.	☐	I can describe closed systems and the changes to energy stores within them using the principle of conservation of energy.	☐
	I can investigate the energy transfers in a pendulum and bungee.	☐	I can describe the energy changes in a range of experiments and account for energy dissipation to the surroundings.	☐	I can evaluate in detail experiments to investigate energy changes.	☐

AQA Physics GCSE Student Checklist

P1 Conservation and dissipation of energy

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P1.3 Energy and work	I can state that energy is measured in joules (J).	☐	I can describe the action of frictional forces on objects and the associated heating effect.	☐	I can use the principle of conservation of energy and forces to explain why objects become heated by frictional forces.	☐
	I can calculate the work done by a force.	☐	I can use the equation for work done to calculate distances or size of forces.	☐	I can apply the equation for work done in a wide range of contexts.	☐
	I can measure the work done by a force experimentally.	☐	I can use repeat values to measure the work done by a force experimentally.	☐	I can evaluate in detail an experiment to measure work done, explaining why there is variation in the measurements.	☐
P1.4 Gravitational potential stores	I can state the factors that affect the change in the gravitational potential energy store of a system.	☐	I can describe the effect of different gravitational field strength on the gravitational potential energy store changes of a system.	☐	I can perform calculations using rearrangements of the gravitational potential energy store equations.	☐
	I can calculate the gravitational potential energy store of a system using the weight of an object and its height.	☐	I can calculate the gravitational potential energy store of a system using the mass gravitational field strength, and height.	☐	I can apply gravitational potential energy store equations in a wide range of contexts.	
	I can measure the gravitational potential energy store changes in a system with a simple practical activity.	☐	I can describe energy changes that involve a heating effect as opposed to movement of an object.	☐	I can account for all changes of energy during falls or increases in height, including health effects.	☐
P1.5 Kinetic and elastic stores	I can state the factors that affect the size of a kinetic energy store of an object.	☐	I can calculate the kinetic energy store of an object.	☐	I can perform calculations involving the rearrangement of the kinetic energy equation.	☐
	I can state the factors that affect the elastic potential energy store of a spring.	☐	I can calculate the elastic potential energy store of a stretched spring.	☐	I can perform calculations involving the rearrangement of the elastic potential energy equation.	☐
	I can describe energy transfers involving elastic potential energy and kinetic energy stores.	☐	I can investigate the relationship between the energy stored in a spring and the kinetic energy store of an object launched from	☐	I can perform a wide range of calculations involving transfer of energy.	☐

AQA GCSE Physics

Student Checklist

P1 Conservation and dissipation of energy

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P1.6 Energy dissipation	I can identify useful and wasted energy in simple scenarios.	☐	I can analyse energy transfers to identify useful and less useful energy transfers.	☐	I can use a wide range of energy stores and physical processes to decide on wasted and useful energy transfers.	☐
	I can describe energy dissipation in terms of heating the surroundings.	☐	I can describe energy dissipation and how this reduces the capacity of a system.	☐	I can apply the concept of energy dissipation in a wide range of scenarios.	☐
	I can measure the frictional force acting on an object.	☐	I can investigate the factors that affect frictional forces.	☐	I can evaluate in detail an experiment to measure the frictional forces acting on an abject.	☐
P1.7 Energy and efficiency	I can describe an efficient transfer as one that transfers more energy by a useful process.	☐	I can calculate the efficiency of a range of energy transfers.	☐	I can describe design features that can be used to improve the efficiency of an energy transfer.	☐
	I can state that the efficiency of a simple energy transfer is always less that 100%.	☐	I can use the law of conservation of energy to explain why efficiency can never be greater than 100%.	☐	I can rearrange the efficiency equation to find input or total output energy.	☐
	I can describe the energy transfers carries out by electrical devices.	☐	I can describe the processes that waste energy in electrical devices.	☐	I can explain the operation of electrical devices in terms of forces and electric current.	☐
P1.8 Electrical appliances	I can list some electrical appliances.	☐	I can rank electrical devices in terms of their power.	☐	I can compare electrical devices in terms of efficiency.	☐
	I can survey a range of electrical devices and their operation.	☐	I can compare mains-powered and battery-powered devices.	☐	I can calculate the efficiency of an electrical device.	☐
	I can calculate the efficiency of a simple energy transfer.	☐	I can investigate the efficiency of a motor.	☐	I can evaluate in detail an efficiency investigation to justify conclusions.	☐

AQA GCSE Physics

Student Checklist

P1 Conservation and dissipation of energy

Name ..... Class ..... Date .....

P1.9 Energy and power	I can state the unit of power as the watt and kilowatt.	☐	I can calculate the energy transferred by an electrical device.	☐	I can compare the power ratings of devices using standard form.	☐
	I can, with support, rank electrical appliances in order of power.	☐	I can calculate the efficiency of a device from power ratings.	☐	I can apply the efficiency equation in a range of situations, including rearrangement of the equation.	☐
	I can identify 'wasted' and 'useful' energy transfers in electrical devices.	☐	I can find the wasted power of a device.	☐	I can combine the electrical power equation with other equations to solve complex problems.	☐

AQA GCSE Physics
Student Checklist

P2 Energy transfer by heating

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P2.1 Energy transfer by conduction	I can describe materials as good or poor thermal conductors.	☐	I can analyse temperature change data to compare the thermal conductivity of materials.	☐	I can explain the different thermal conductivities of materials using the free electron and lattice vibration explanations of conduction.	☐
	I can compare the thermal conductivities of materials in simple terms.	☐	I can describe the changes in the behaviour of the particles in a material as the temperature of the material increases.	☐	I can evaluate the results of an experiment into thermal conductivity in terms of repeatability and reproducibility of data, and the validity of conclusions drawn from the data.	☐
	I can relate the thermal conductivities of a material to the uses of that material in familiar contexts.	☐	I can apply understanding of thermal conductivity in reducing energy dissipation through the choice of appropriate insulating materials.	☐	I can justify the choices of material involved in insulation or conduction using the concept of thermal conductivity and other data.	☐
P2.2 Specific heat capacity	I can describe materials in terms of being difficult or easy to heat up (increase the temperature of).	☐	I can describe the effects of changing the factors involved in the equation.	☐	I can evaluate materials used for transferring energy in terms of their specific heat capacity.	☐
	I can state the factors that affect the amount of energy required to increase the temperature of an object.	☐	I can calculate the energy required to change the temperature of an object.	☐	I can use the specific heat capacity equation to perform a wide range of calculations in unfamiliar contexts.	☐
	I can, with some support, measure the specific heat capacity of a material.	☐	I can measure the specific heat capacity of a material and find a mean value.	☐	I can evaluate in detail the results of an experiment to measure specific heat capacity.	☐

AQA GCSE Physics Student Checklist

P2 Energy transfer by heating

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P2.3 Heating and insulating buildings	I can state some design features used to prevent energy transfer to the surroundings in the home.	☐	I can describe how some design features used to reduce energy dissipation from a home work.	☐	I can evaluate in detail design features used to reduce the rate of energy loss from the home.	☐
	I can calculate the payback time of a simple home improvement feature.	☐	I can compare home improvement features in terms of payback time.	☐	I can decide on home improvement features using payback time and savings beyond the payback time.	☐

AQA GCSE Physics
Student Checklist

P3 Energy resources

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P3.1Energy demands	I can identify which fuels are renewable and which are non-renewable.	☐	I can outline the operation of a fossil fuel burning power station.	☐	I can compare energy use from different sources and different societies from available data.	☐
	I can identify activities that require large energy transfers.	☐	I can outline the operation of a nuclear power station.	☐	I can compare fossil fuels and nuclear fuels in terms of energy provided, waste, and pollution.	☐
	I can state that biofuels are carbon neutral whereas fossil fuels are not.	☐	I can explain why biofuels are considered carbon neutral.	☐	I can discuss some of the problems associated with biofuel use and production.	☐
P3.2 Energy from wind and water	I can state that wind turbines, wave generators, hydroelectric systems, and tidal systems are renewable energy resources.	☐	I can describe the operation of a wind farm.	☐	I can compare the operation of hydroelectric, wave, and tidal systems in terms of reliability, potential power	☐
	I can state some simple advantages or disadvantages of renewable energy systems.	☐	I can describe the operation of a hydroelectric system.	☐	I can explain in detail the purpose, operation, and advantages of a pumped storage system.	☐
	I can outline the operation of a renewable energy source.	☐	I can suggest the most appropriate energy resource to use in a range of scenarios.	☐	I can justify the choice of an energy resource by using numerical and other appropriate data.	☐
P3.3 Power from the Sun and the Earth	I can explore the operation of a solar cell.	☐	I can compare and contrast the operation of solar cells (photovoltaic cells) with solar heating panels.	☐	I can analyse the power output of a variety of energy resources.	☐
	I can state one difference between solar cells and solar heating systems.	☐	I can describe the operation of a solar power tower.	☐	I can calculate the energy provided by a solar heating system by using the increase in water temperature.	☐
	I can state that radioactive decay is source of heating in geothermal systems.	☐	I can describe the operation of a geothermal power plant.	☐	I can plan in detail an investigation into the factors that affect the power output of a solar cell.	☐

AQA GCSE Physics
Student Checklist

P3 Energy resources

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P3.4 Energy and the environment	I can list some environmental problems associated with burning fossil fuels.	☐	I can describe the effects of acid rain and climate change.	☐	I can evaluate methods of reducing damage caused by waste products of fossil fuels and nuclear fuels.	☐
	I can identify the waste products of fossil fuels and nuclear fuel.	☐	I can describe techniques to reduce the harmful products of burning fossil fuels.	☐	I can discuss in detail the problems associated with nuclear accidents and the public perception of nuclear safety.	☐
	I can state simple advantages and disadvantages of a variety of renewable energy resources.	☐	I can compare a wide range of energy resources in terms of advantages and disadvantages.	☐	I can evaluate the suitability of an energy resource for a range of scenarios, taking into account a wide range of factors.	☐
P3.5 Big energy issues	I can rank the start-up times of various power stations.	☐	I can use base load and start-up time data to explain why some power stations are in constant operation whereas others may be switched on and off.	☐	I can use capital and operational costs of energy resources to evaluate their usefulness.	☐
	I can compare some of the advantages and disadvantages of various energy resources.	☐	I can compare energy resources in terms of capital and operational costs.	☐	I can form persuasive arguments for or against a variety of energy resources.	☐
	I can discuss the construction of a power plant in the local area in simple terms by using information provided.	☐	I can debate the construction of a power plant in the local area by using a wide range of information, much of which is provided.	☐	I can debate the construction of a power plant in local area by using a wide range of information, much of which is independently researched.	☐

AQA GCSE Physics

Student Checklist

P4 Electric circuits

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P4.1 Current and charge	I can identify circuit components from their symbols.	☐	I can describe the operation of a variable resistor and a diode and their effects on current.	☐	I can explain the nature of an electric current in wires in terms of electron behaviour.	☐
	I can draw and interpret simple circuit diagrams.	☐	I can calculate the charge transferred by a steady current in a given time.	☐	I can perform a range of calculations, including rearrangement of the equation $Q=It$.	☐
	I can construct a simple electrical circuit.	☐	I can construct an electrical circuit and accurately measure the current.	☐	I can measure the current in a circuit accurately and use it to calculate the rate of flow of electrons.	☐
P4.2 Potential difference and resistance	I can state that resistance restricts the size of a current in a circuit.	☐	I can calculate the potential difference.	☐	I can describe potential difference in terms of work done per unit charge.	☐
	I can state Ohm's law and describe its conditions.	☐	I can calculate the resistance of a component.	☐	I can rearrange equations for resistance and potential difference.	☐
	I can measure the current and potential difference in a circuit to determined the resistance.	☐	I can measure the effect of changing the length of a wire on its resistance in a controlled experiment.	☐	I can investigate a variety of factors that may affect the resistance of a metal wire, such as the current through it, length, cross-sectional area, and metal used.	☐

AQA GCSE Physics

Student Checklist

P4 Electric circuits

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P4.3 Component characteristics	I can identify the key characteristics of electrical devices.	☐	I can describe the resistance characteristics of a filament lamp.	☐	I can explain the resistance characteristics of a filament lamp in terms of electrons and ion collisions.	☐
	I can identify components from simple *I*–*V* graphs.	☐	I can describe the characteristics of diode and light-emitting diode.	☐	I can determine the resistance of a component based on information extracted from an *I*–*V* graph.	☐
	I can state the operation of a diode in simple terms.	☐	I can investigate the resistance characteristics of a thermistor and a LDR.	☐	I can compare the characteristics of a variety of electrical components, describing how the components can be used.	☐
P4.4 Series circuits	I can state that the current in any part of a series circuit is the same.	☐	I can find the potential difference across a component in a circuit by using the p.d. rule.	☐	I can explain, in detail, why the current in a series circuit is the same at all points by using the concept of conservation of charge (electrons).	☐
	I can calculate the potential difference provided by cell combinations.	☐	I can calculate the current in a series circuit containing more than one resistor.	☐	I can analyse a variety of series circuit to determine the current through, p.d. across, and resistance of combinations of components.	☐
	I can calculate the total resistance of two resistors placed in series.	☐	I can investigate the resistance of series circuits with several components.	☐	I can evaluate in detail the investigation of series circuits and explain discrepancies.	☐

AQA GCSE Physics

Student Checklist

P4 Electric circuits

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P4.5 Parallel circuits	I can identify parallel sections in circuit diagrams.	☐	I can measure the p.d. across parallel circuits and explain any discrepancies.	☐	I can analyse parallel circuits in terms of current loops.	☐
	I can state the effect of adding resistors in parallel on the size of the current in a circuit.	☐	I can describe the effect on the resistance in a circuit of adding a resistor in parallel.	☐	I can calculate the current at any point in a circuit.	☐
	I can state that the p.d. across parallel sections of a circuit is the same.	☐	I can investigate the effect of adding resistors in parallel on the size of the current in a circuit.	☐	I can evaluate in detail an investigation into the effect of adding resistors in parallel on a circuit.	☐

AQA GCSE Physics Student Checklist

P5 Electricity in the home

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P5.1 Alternating current	I can state that the UK mains supply is a high-voltage alternating current supply.	☐	I can describe the characteristics of the UK mains supply.	☐	I can explain the process of half-wave rectification of an a.c. source.	☐
	I can state simple differences between a.c. and d.c. sources.	☐	I can compare a.c. traces in terms of period and amplitude (voltage).	☐	I can analyse a.c. traces with an oscilloscope to determine the voltage and frequency.	☐
	I can describe how the trace on an oscilloscope changes when the frequency or amplitude of the signal is changed.	☐	I can operate a cathode ray oscilloscope to display an a.c. trace.	☐	I can compare and contrast the behaviour of electrons in a wire connected to d.c. and a.c. supplies.	☐
P5.2 Cables and plugs	I can identify the live, neutral, and earth wires in a three-pin plug.	☐	I can discuss the choices of materials used in cables and plugs in terms of their physical and electrical properties.	☐	I can explain why it is not necessary for some appliances to be earthed.	☐
	I can identify the key components of a typical three-pin plug and socket.	☐	I can describe why a short circuit inside a device presents a hazard.	☐	I can explain when there will be a current in the live, neutral, and earth wires of an appliance.	☐
	I can identify simple and obvious hazards in electrical wiring.	☐	I can identify a variety of electrical hazards associated with plugs and sockets.	☐	I can discuss in detail the hazards associated with poor electrical wiring.	☐
P5.3 Electrical power and potential difference	I can state that the power of a device is the amount of energy transferred by it each second.	☐	I can calculate the power of systems.	☐	I can measure and compare the power of electrical devices and explain variations in readings.	☐
	I can describe the factors that affect the rate of energy transfer by a current in a circuit.	☐	I can calculate the power of electrical devices.	☐	I can calculate the electrical heating caused by resistance.	☐
	I can explain why different fuses are required electrical devices in simple terms.	☐	I can select an appropriate fuse for a device.	☐	I can combine a variety of calculations to analyse electrical systems.	☐

AQA GCSE Physics
Student Checklist

P5 Electricity in the home

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P5.4 Electrical currents and energy transfer	I can state that an electric current consists of a flow of charge (electrons in a wire).	☐	I can calculate the charge transferred by a current in a given time.	☐	I can perform calculations involving rearrangement of the equations $Q = It$ and $E = VQ$.	☐
	I can identify the factors that affect the energy transfers in a circuit.	☐	I can calculate the energy transferred by a charge passing through a potential difference.	☐	I can explain how energy is conserved in terms of current and p.d. during energy transfers by an electric current.	☐
	I can state that a battery or power supply provides energy to a current whereas a resistor causes a transfer of energy to the surroundings.	☐	I can apply the law of conservation of energy in a circuit.	☐	I can use algebra to combine the equations $Q = It$ and $E = VQ$ to form the relationships $E = VIt$ and $P = IV$.	☐
P5.5 Appliances and efficiency	I can describe the factors that affect the cost of using various electrical devices.	☐	I can calculate energy transfer in kilowatt-hours.	☐	I can convert between relevant units during calculations of energy transfer.	☐
	I can calculate energy transfer in joule.	☐	I can convert between efficiencies stated in percentages and those stated in decimal forms.	☐	I can analyse the use of a variety of electrical devices to determine their costs of operation.	☐
	I can state that energy transfer can be measured in kilowatt-hours.	☐	I can calculate the power rating of a device from the energy transferred and the time of operation.	☐	I can compare a range of electrical devices in terms of efficiency using calculations to support any conclusions.	☐

AQA GCSE Physics
Student Checklist

P6 Molecules and matter

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P6.1 Density	I can describe density as a property of a material and not a particular object.	☐	I can explain why some materials will float on water.	☐	I can use the density equation in a wide variety of calculations.	☐
	I can state that the density of a material is the mass per unit volume.	☐	I can calculate the density of materials.	☐	I can use appropriate significant figures in final answers when measuring density.	☐
	I can calculate the volume of some regular shapes and the density of materials, with support.	☐	I can measure the density of a solid and a liquid.	☐	I can evaluate in detail the experimental measurement of density, accounting for errors in measurements.	☐
P6.2 States of matter	I can describe the simple properties of solids, liquids and gases.	☐	I can describe the arrangement of the particles in a solid, liquid, and gas.	☐	I can describe the forces acting between particles in a solid, liquid, and gas.	☐
	I can name the changes of state.	☐	I can explain the behaviour of a material in terms of the arrangement of particles within it.	☐	I can describe the changes in the energy of individual particles during changes of state.	☐
	I can state that there are changes in stores of energy associated with a material when its temperature is increased.	☐	I can describe the changes in behaviour of the particles in a material during changes of state.	☐	I can explain in detail why the density of a material changes during a change of state, using a particle model.	☐
P6.3 Changes of state	I can state that the melting point of a substance is a temperature at which it changes from a solid to a liquid and vice versa.	☐	I can state that the melting and boiling points of a pure substance are fixed.	☐	I can describe how the melting and boiling points of a substance can be changed.	☐
	I can state that the boiling point of a substance is the temperature at which it changes from a liquid to a gas and vice versa.	☐	I can use the term ‘latent heat’ to describe the energy gained by a substance during heating for which there is no change in temperature.	☐	I can describe in detail the behaviour of the particles during changes of state.	☐
	I can describe the process of melting and boiling.	☐	I can find the melting or boiling point of a substance by using a graphical technique.	☐	I can evaluate data produced by a heating experiment to discuss the reproducibility of the measurement of a melting point.	☐

AQA GCSE Physics
Student Checklist

P6 Molecules and matter

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P6.4 Internal energy	I can state that the internal energy of a system increases as it is heated.	☐	I can describe how the internal energy of an object can be increased by heating.	☐	I can use the concepts of kinetic and potential energy to explain changes in internal energy.	☐
	I can identify which changes of state are related to increases in internal energy and which are related to decreases.	☐	I can describe how the behaviour of particles changes as the energy of a system increases.	☐	I can describe the changes in the size of intermolecular forces during changes of state.	☐
	I can outline the behaviour of particles in solids, liquids, and gases.	☐	I can describe the energy changes by heating between objects within the same system.	☐	I can explain in detail why the pressure of a gas increases as it is heated.	☐
P6.5 Specific latent heat	I can state that heating a material will increase its internal energy.	☐	I can describe the changes in particle bonding during changes of state.	☐	I can perform a variety of calculations based on the latent heat equation.	☐
	I can describe energy changes during melting and vaporisation.	☐	I can calculate the latent heat of fusion and latent heat of vaporisation for a substance.	☐	I can combine variety of equations to solve problems involving heating.	☐
	I can measure the latent heat of vaporisation for water.	☐	I can measure the latent heat of fusion for water.	☐	I can evaluate the reproducibility of a measurement of latent heat based on collated data.	☐
P6.6 Gas pressure and temperature	I can state that as the temperature of a gas in a sealed container increases, the pressure of the gas increases.	☐	I can describe the behaviour of particles in a gas as the gas is heated.	☐	I can describe the linear relationship between changes in temperatures and pressure for a gas.	☐
	I can describe a gas as consisting of a large number of rapidly moving particles.	☐	I can outline Brownian motion and how this provides evidence for the particle nature of matter.	☐	I can explain Brownian motion in terms of particle behaviour and collisions, relating the speeds of smoke particles and air molecules.	☐
	I can describe pressure as being caused by collisions of gas particles with the walls of its container.	☐	I can describe the relationship between an increase in the temperature of a fixed volume of a gas and the increase in pressure of the gas.	☐	I can describe in detail how the relationship between the pressure of a gas and its temperature can be investigated.	☐

AQA GCSE Physics
Student Checklist

P6 Molecules and matter

Name ..... Class ..... Date .....

AQA GCSE Physics Student Checklist

P7 Radioactivity

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P7.1 Atoms and radiation	I can name the three types of nuclear radiation.	☐	I can describe some safety precautions used when dealing with radioactive materials.	☐	I can describe in detail the decay of an unstable nucleus.	☐
	I can name the three sub-atomic particles found in an atom (proton, neutron, and electron).	☐	I can describe how a Geiger counter can be used to detect radiation.	☐	I can explain the similarities and differences between nuclear radiation and visible light.	☐
	I can identify some sources of background radiation.	☐	I can identify natural and man-made sources of background radiation.	☐	I can describe the relative penetrating powers of the three types of nuclear radiation.	☐
P7.2 The discovery of the nucleus	I can identify the Rutherford (nuclear) model of an atom.	☐	I can describe he plum pudding model of the atom.	☐	I can compare the plum pudding model, Rutherford model, and Bohr model of the atom in terms of the evidence for	☐
	I can identify the locations of protons, neutrons, and electrons in the nuclear model.	☐	I can describe the evidence provided by the Rutherford scattering experiment.	☐	I can explain how Rutherford and Marsden's experiment caused a rejection of the plum pudding model.	☐
	I can state that electrons can move between fixed energy levels within an atom.	☐	I can describe the properties of protons, neutrons, and electrons.	☐	I can describe how the initial evidence for the nuclear model was processed and how the model came to be	☐
P7.3 Changes in the nucleus	I can identify the mass and atomic number by using nuclear notation.	☐	I can calculate the number of neutrons in an isotope by using nuclear notation.	☐	I can explain why particles are ejected from the nucleus during nuclear decay.	☐
	I can identify the type of decay taking place from a nuclear equation.	☐	I can describe the differences between isotopes.	☐	I can describe the changes in the nucleus that occur during nuclear decay.	☐
	I can describe how isotopes are atoms of the same element with different mass numbers.	☐	I can complete decay equations for alpha and beta decay.	☐	I can write full decay equations for example nuclear decays.	☐

AQA GCSE Physics Student Checklist

P7 Radioactivity

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P7.4 More about alpha, beta, and gamma radiation	I can rank the three types of nuclear radiation in order of their penetrating power.	☐	I can describe how the penetrating powers of radiation can be measured.	☐	I can describe in detail how the thickness of a material being manufactured can be monitored by	☐
	I can rank the three types of nuclear radiation in order of their range through air.	☐	I can describe the path of radiation types through a magnetic field.	☐	I can compare the ionisation caused by different types of nuclear radiation.	☐
	I can state that all three types of nuclear radiation are ionising.	☐	I can describe the process of ionisation.	☐	I can evaluate in some detail the risks caused by alpha radiation inside and outside the human body.	☐
P7.5 Activity and half-life	I can state that the activity of a radioactive sample will fall over time.	☐	I can find the ratio of a sample remaining after a given number of half-lives.	☐	I can compare a physical model of decay with the decay of nuclei, noting the limitations of the model.	☐
	I can define half-life in simple terms such as 'the time it takes for half of the material to decay'.	☐	I can state that all atoms of a particular isotope have an identical chance to decay in a fixed time.	☐	I can outline how the age of organic material can be determined by using radioactive dating.	☐
	I can find the half-life of a substance from a graph of count rate (or nuclei remaining) against time with support.	☐	I can plot a graph showing the decay of a sample and use it to determine half-life.	☐	I can calculate the changes in count rate or nuclei remaining by using an exponential decay function.	☐

AQA GCSE Physics
Student Checklist

P8 Forces in balance

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P8.1 Vectors and Scalars	I can state that scalars have size (magnitude) without direction.	☐	I can draw a scale diagram to represent a single vector.	☐	I can interpret a scale diagram to determine the magnitude and direction of a vector.	☐
	I can state that vectors have both size (magnitude) and direction.	☐	I can categorise a wide range of quantities as either a vector or a scalar.	☐	I can translate between vector descriptions and vector diagrams and vice versa using a range of appropriate scales.	☐
	I can list some common scalars and vectors.	☐	I can compare a scalar and a similar vector and explain how these quantities are different.	☐	I can use a scale diagram to add two or more vectors.	☐
P8.2 Forces between objects	I can use arrows to represent the directions of forces.	☐	I can use scale diagrams to represent the sizes of forces acting on an object.	☐	I can use appropriate SI prefixes and standard form to describe a wide range of forces.	☐
	I can give examples of contact and non-contact forces.	☐	I can describe the action of pairs of forces in a limited range of scenarios.	☐	I can explain the pairs of forces acting in a wide range of unfamiliar scenarios, including the nature (contact or non-contact), direction, and magnitude of the forces.	☐
	I can compare the sizes of forces using the unit newton (N).	☐	I can investigate the effect of different lubricants on the size of frictional forces.	☐	I can evaluate force measurement techniques in terms of precision and accuracy.	☐
P8.3 Resultant forces	I can label a diagram showing several forces acting on an object.	☐	I can draw a scaled diagram of the forces acting in a range of situations using arrows to represent the forces.	☐	I can draw a scaled free-body force diagram showing forces as vectors and find the resultant force vector.	☐
	I can calculate a resultant force from two parallel forces acting in opposite directions.	☐	I can calculate resultant force produced by several forces acting on an object in coplanar directions.	☐	I can calculate resultant forces from several forces acting in coplanar directions using a range of SI prefixes.	☐
	I can state that a non-zero resultant force will cause a change in motion and a zero resultant force will not.	☐	I can describe the effect of zero and non-zero resultant forces on the motion of moving and stationary objects.	☐	I can create a detailed plan to investigate the factors that affect the acceleration of objects acted on by non-zero resultant force.	☐

AQA GCSE Physics
Student Checklist

P8 Forces in balance

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P8.4 Centre of mass	I can identify the approximate centre of mass of a range of simple shapes.	☐	I can describe an experimental technique to determine the centre of mass of an object.	☐	I can evaluate an experimental technique to determine the centre of mass of an object, identifying the likely	☐
	I can state that a suspended object will come to rest so that the centre of mass lies below the point of suspension.	☐	I can explain why a suspended object comes to rest with the centre of mass directly below the point of suspension in terms of balanced forces.	☐	I can apply understanding of the particle model and moments to explain why objects have a point at which the mass seems to act.	☐
	I can use lines of symmetry to identify the location of the centre of mass.	☐	I can compare the stability of objects to the position of their centre of mass of an object, identifying the likely sources of error leading to inaccuracy.	☐	I can plan a detailed investigation into the stability of three-dimensional objects.	☐
P8.5 The parallelogram of forces			I can find the resultant of two forces at an acute angle by drawing a scale diagram.	☐	I can find the resultant of two forces at an obtuse angle by drawing a scale diagram.	☐
			I can describe a system in equilibrium in which non-parallel forces are acting.	☐	I can investigate non-parallel forces acting on a system in equilibrium to verify the parallelogram of forces.	☐
			I can calculate the component of a force using scale diagrams and ratios.	☐	I can analyse a wide range of systems of non-parallel forces using a parallelogram technique.	☐
P8.6 Resolution of forces			I can resolve a single force into wo perpendicular components.	☐	I can resolve a pair of forces into the overall perpendicular components.	☐
			I can determine if an object is in equilibrium by considering the horizontal and vertical forces.	☐	I can determine if an object is in equilibrium by considering the horizontal and vertical components of	☐
			I can investigate the effect of increasing the weight of an object on a slope on the component of the weight acting along the	☐	I can plan a detailed investigation into the effect of increasing the gradient of a slope on the component of the	☐

AQA GCSE Physics
Student Checklist

P9 Motion

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P9.1 Speed and distance-time graphs	I can state that the gradient of a distance-time graph represents the speed.	☐	I can use the gradients of distance-time graphs to compare the speeds of objects.	☐	I can calculate the speed of an object by extracting data from a distance-time graph.	☐
	I can estimate typical speeds for walking, running, and cycling.	☐	I can describe the motion of an object by interpreting distance-time graphs.	☐	I can extract data from a distance-time graph to calculate the speed of an object at various points in its motion.	☐
	I can calculate the distance an object at constant speed will travel in a given time.	☐	I can calculate the speed of an object and the time taken to travel a given distance,	☐	I can perform calculations of speed, distance, and time which involve conversion to and from SI base units.	☐
P9.2 Velocity and acceleration	I can describe the difference between speed and velocity using an appropriate example.	☐	I can identify the features of a velocity-time graph.	☐	I can compare and contrast the features of a distance-time, displacement-time, and velocity-time graph.	☐
	I can recall he equation relating velocity, acceleration, and time.	☐	I can rearrange the acceleration equations in calculations.	☐	I can combine equations relating to velocity and acceleration in multi-step calculations.	☐
	I can calculate the acceleration of an object using the change in velocity and time.	☐	I can calculate the change in velocity for an object under constant acceleration for a given period of time.	☐	I can calculate a new velocity for a moving object that has accelerated for a given period of time.	☐
P9.3 More about velocity-time graphs	I can identify the feature of a velocity-time graph which represents the acceleration (the gradient), and compare these values.	☐	I can describe sections of velocity-time graphs, and compare the acceleration in these sections.	☐	I can calculate the acceleration of an object from values taken from a velocity-time graph.	☐
	I can identify the feature of a velocity-time graph which represents the distance travelled (the area beneath the line), and compare these values.	☐	I can calculate the distance travelled using information taken from a velocity-time graph for one section of motion.	☐	I can calculate the total distance travelled from a multi-phase velocity-time graph.	☐
	I can measure the acceleration of an object as it moves down a ramp.	☐	I can use a series of repeat measurements to find an accurate measurement of the acceleration of a moving object.	☐	I can evaluate an experiment into the acceleration of an object in term of precision based on the spread of repeat measurements.	☐

AQA GCSE Physics
Student Checklist

P9 Motion

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P9.4 Analysing motion graphs	I can identify speed on a distance-time graph using change in gradient.	☐	I can calculate the speed of an object by extracting data from a distance-time graph.	☐	I can calculate the acceleration of an object by extracting data from a velocity-time graph.	☐
	I can identify acceleration on a velocity-time graph using change in gradient.	☐	I can use a tangent to determine the speed of an object from a distance-time graph.	☐	I can use the gradient of a velocity-time graph to determine the acceleration of an object.	☐
	I can calculate the distance travelled by an object at constant velocity using data extracted from a graph.	☐	I can use the equation $v^2 - u^2 = 2as$ in calculations where the initial or final velocity is zero.	☐	I can apply transformations of the equation $v^2 - u^2 = 2as$ in calculations involving change in velocity and acceleration where both velocities are	☐

AQA GCSE Physics
Student Checklist

P10 Forces and motion

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P10.1 Force and acceleration	I can state the factors that will affect the acceleration of an object acted on by a resultant force.	☐	I can describe the effect of changing the mass or the force acting on an object on the acceleration of that object.	☐	I can define the inertial mass of an object in terms of force and acceleration.	☐
	I can calculate the force required to cause a specified acceleration on a given mass.	☐	I can perform calculations involving the rearrangement of the $F = ma$ equation.	☐	I can calculate the acceleration of an object acted on by several forces.	☐
	I can investigate a factor that affects the acceleration of a mass.	☐	I can combine separate experimental conclusions to form an overall conclusion.	☐	I can evaluate an experiment by identifying sources of error and determining uncertainty in the resulting data.	☐
P10.2 Weight and terminal velocity	I can state the difference between the mass of an object and its weight.	☐	I can calculate the weight of objects using their mass and the gravitational field strength.	☐	I can apply the mathematical relationship between mass, weight, and gravitational field strength in a range of situations.	☐
	I can describe the forces acting on an object falling through a fluid.	☐	I can apply the concept of balanced forces to explain why an object falling through a fluid will reach a terminal velocity.	☐	I can explain the motion of an object falling through a fluid by considering the forces acting through all phases of motions.	☐
	I can investigate the motion of an object when it falls.	☐	I can investigate the relationship between the mass of an object and the terminal velocity.	☐	I can evaluate the repeatability of an experiment by considering the spread of the results.	☐
P10.3 Forces and braking	I can state factors which affect the stopping distance of a car.	☐	I can categorise factors which affect thinking distance, braking distance and both.	☐	I can calculate acceleration, mass, and braking force of vehicles.	☐
	I can calculate the thinking distance for a car from the initial speed and reaction time.	☐	I can calculate the braking distance of a car.	☐	I can calculate total stopping distance, initial speed, reaction time, and acceleration.	☐
	I can estimate the relative effects of changing factors which affect the stopping distance of cars.	☐	I can describe the relationship between speed and both thinking and braking distance.	☐	I can explain the relative effects of changes of speed on thinking and stopping distance.	☐

AQA GCSE Physics
Student Checklist

P10 Forces and motion

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P10.4 Momentum			I can apply the equation p = *mv* to find the momentum, velocity or mass of an object.	☐	I can fully describe the motion of objects after an explosion accounting for any frictional effects.	☐
			I can describe how the principle of conservation of momentum can be used to find the velocities of objects.	☐	I can apply principle of conservation of momentum to a range of calculations involving the velocities of objects.	☐
			I can investigate the behaviour of objects during explosions to verify the conservation of momentum.	☐	I can evaluate the data produced from an investigation and compare this to a theoretical framework.	☐
P10.5 Forces and elasticity	I can state Hooke's law.	☐	I can explain the limitations of Hooke's law including the limit of proportionally.	☐	I can find the spring constant of a spring using a graphical technique.	☐
	I can calculate the extension of a material using its length and original length.	☐	I can calculate the force required to cause a given extension in a spring using the spring constant.	☐	I can Hooke's law equation in a wide of situations.	☐
	I can compare materials in terms of elastic and non-elastic behaviour.	☐	I can compare the behaviour of different materials under loads in terms of proportional and non-proportional behaviour.	☐	I can evaluate an investigation into the extension of materials in terms of the precision of the data.	☐

AQA GCSE Physics Student Checklist

P11 Wave properties

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P11.1 The nature of waves	I can state that waves can transfer energy and information without the transfer of matter.	☐	I can investigate wave motion through a spring model.	☐	I can explain the features of a longitudinal wave in terms of compressions and rarefactions by using a particle model.	☐
	I can identify waves as either transverse or longitudinal.	☐	I can compare transverse and longitudinal waves in terms of direction of vibration and propagation.	☐	I can discuss the features of a transverse wave in terms of particle or field behaviour.	☐
	I can identify waves as either mechanical or electromagnetic.	☐	I can compare electromagnetic and mechanical waves in terms of the need for a medium.	☐	I can compare mechanical waves and their particulate nature with electromagnetic waves and their field	☐
P11.2 The properties of waves	I can outline the derivation of the wave speed equation.	☐	I can outline the derivation of the wave speed equation.	☐	I can explain how the wave speed equation can be derived from fundamental principles.	☐
	I can calculate the period of a wave from its frequency.	☐	I can calculate the period of a wave from its frequency.	☐	I can perform calculations involving rearrangements of the period equation and the wave speed equation.	☐
	I can measure the speed of a water wave.	☐	I can calculate the wave speed from the frequency and wavelength.	☐	I can perform multi-stage calculations linking period, frequency, wave speed, and wavelength.	☐
P11.3 Reflection and refraction			I can describe refraction at a boundary in terms of wavefronts.	☐	I can use a wavefront model to explain refraction and reflection.	☐
			I can describe refraction including the reflected rays.	☐	I can describe the relationship between the angle of incidence and angle of refraction.	☐
			I can explain partial absorption as a decrease in the amplitude of a wave and therefore the energy carried.	☐	I can explain refraction in terms of changes in the speed of waves when they move between one medium and another.	☐

AQA GCSE Physics
Student Checklist

P11 Wave properties

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P11.4 More about waves	I can measure the speed of a wave in water.	☐	I can measure the speed of a wave in a solid (string)..	☐	I can evaluate the sustainability of apparatus for measuring the frequency, wavelength and speed of waves.	☐
	I can describe how sound waves travel more quickly in solids than they do in gases.	☐	I can describe the effect that changing the frequency of a wave has on its wavelength in a medium.	☐	I can explain why the wavelength of a wave in a particular medium changes as the frequency changes with reference to the wave equation.	☐
	I can describe how the sound waves require a medium to travel in.	☐	I can calculate the speed of waves using the wave speed equation.	☐	I can evaluate data from speed of sound experiments to discuss the range of uncertainty.	☐

AQA GCSE Physics Student Checklist

P12 Electromagnetic waves

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P12.1 The electromagnetic spectrum	I can state that electromagnetic waves transfer energy without transferring matter.	☐	I can describe the relationship between the energy being transferred by an electromagnetic wave and the frequency of the wave.	☐	I can apply the wave model of electromagnetic radiation as a pair of electric and magnetic disturbances that do not require a medium for travel.	☐
	I can identify the position of EM waves in the spectrum in order of wavelength and frequency.	☐	I can calculate the frequency and the wavelength of an electromagnetic wave.	☐	I can use standard form in calculations of wavelength, frequency, and wave speed.	☐
	I can state that all EM waves travel at the same speed in a vacuum.	☐	I can explain why the range of wavelengths detected by the human eye is limited.	☐	I can explain the interactions between an electromagnetic wave and matter.	☐
P12.2 Light, infrared, microwaves, and radio waves	I can state that white light is a part of the EM spectrum and composed of a range of frequencies.	☐	I can describe how a range of electromagnetic waves are used in a variety of scenarios.	☐	I can determine the wavelength of radio waves in air.	☐
	I can list some simple examples of the uses of light, microwaves, and radio waves.	☐	I can explain why a particular wave is suited to its application.	☐	I can describe the interactions between a range of waves and matter, including the effect of absorption.	☐
	I can carry out a practical task to determine the penetrating power of an electromagnetic signal.	☐	I can determine whether the law of reflection applies to a microwave signal.	☐	I can plan, carry out, and evaluate in detail an investigation into the penetrating power of microwaves.	☐

AQA GCSE Physics Student Checklist

P12 Electromagnetic waves

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P12.3 Communications	I can state that radio waves and microwaves are used in communications through the atmosphere.	☐	I can compare the rate of information transfer through optical fibres and radio signals.	☐	I can describe in detail how carrier waves are used in the transfer of information.	☐
	I can state that the higher the frequency of a wave, the greater the rate of data transfer possible.	☐	I can outline the operation of a mobile phone network and the waves used.	☐	I can describe the structure of a radio communication system, including the effect of a radio wave on the current in the receiver.	☐
	I can describe the sub-regions of the radio spectrum.	☐	I can discuss the evidence for mobile phone signals causing damage to humans.	☐	I can discuss the relationship between wavelength data transmission and range to explain to explain why particular frequencies are chosen for particular transmissions.	☐
P12.4 Ultraviolet waves, X-rays, and gamma rays	I can state that high-frequency EM radiation is ionising.	☐	I can describe the penetrating powers of gamma rays, X-rays, and ultraviolet rays.	☐	I can describe in detail the interaction between ionising radiation and inorganic materials.	☐
	I can describe the uses and dangers of UV radiation.	☐	I can compare X-rays and gamma radiation in terms of their origin.	☐	I can compare different regions of the electromagnetic spectrum in terms of their potential harmfulness.	☐
	I can describe the uses and dangers of X-rays and gamma radiation.	☐	I can describe the ionisation of atoms in simple terms.	☐	I can explain how the process of ionisation can lead to cell death or cancer through damage to DNA.	☐
P12.5 X-rays in medicine	I can state some safety procedures that take place during the operation of devices that produce ionising radiation.	☐	I can describe the operation of an X-ray machine.	☐	I can compare the operation of a CT-scanner and that of a simple X-ray device.	☐
	I can describe the formation of an X-ray photograph in terms of absorption or transmission.	☐	I can explain why contrast media can be used during X-rays.	☐	I can evaluate the doses of ionising radiation received in a variety of occupations or medical treatments.	☐
	I can state that X-ray therapy can be used to kill cancerous cells in the body.	☐	I can describe the factors that affect the radiation doses received by people.	☐	I can explain in detail how various safety features reduce exposure to ionising radiation.	☐

AQA GCSE Physics
Student Checklist

P15 Electromagnetism

Name ..... Class ..... Date .....

Lesson	Aiming for 4		Aiming for 6		Aiming for 8	
P13.1 Magnetic fields	I can state the names of the poles of a magnet.	☐	I can sketch the shape of a magnetic field around a bar magnet.	☐	I can describe the regions in a magnetic field where magnetic forces are greatest using the idea of field lines.	☐
	I can describe the interaction of magnetic poles (attraction and repulsion).	☐	I can describe how the shape of a magnetic field can be investigated.	☐	I can explain in detail how a magnetism can be induced in some materials.	☐
	I can list some magnetic and non-magnetic metals.	☐	I can compare the Earth's magnetic field to that of a bar magnet.	☐	I can plan in detail how the strength of a magnetic field can be investigated.	☐
P13.2 Magnetic fields of electric current	I can state that the magnetic field produced by a current carrying wire is circular.	☐	I can use the corkscrew rule to determine the direction of the field around a current carrying wire.	☐	I can determine the polarity of the ends of a solenoid from the direction of the current.	☐
	I can describe the effect of increasing the current on the magnetic field around a wire.	☐	I can describe the shape of the field produced by a solenoid.	☐	I can sketch the shape of the field surrounding a solenoid relating this to the direction of the current through the coil.	☐
	I can describe the effect of reversing the direction of the current in the wire.	☐			I can plan a detailed investigation into the factors that affect the strength of the magnetic field around a solenoid.	☐
P13.3 The motor effect			I can describe the operation of a moving-coil loudspeaker.	☐	I can describe and explain in detail the operation of a d.c. motor.	☐
			I can apply Fleming's left-hand rule to determine the direction of the force acting on a conductor.	☐	I can perform calculations involving rearrangements of the equation $F = BIl$.	☐
			I can calculate the force acting on a conductor when it is placed in a magnetic field.	☐	I can investigate the factors that affect the rotation of an electric motor.	☐