

Name \_\_\_\_\_

Topic title	<b><u>Preparing for your mock exams - AQA P2</u></b>	Links	Before revision			After revised		
								
<b>1.1 Distance-Time Graphs</b>	Know that the gradient of an object's distance-time graph gives the speed of the object.	 						
	Be able to interpret an object's motion from its distance-time graph.							
	Be able to draw a distance-time graph for an object that's stationary or moving in a straight line at a steady speed.							
	<b>Higher tier:</b> Be able to calculate the speed of an object at a given point in time using the gradient of its distance-time graph.							
<b>1.2 Velocity and Acceleration</b>	Know that a speed in a given direction is called velocity.	   						
	Know that acceleration is how quickly the velocity is changing.							
	Be able to calculate the acceleration of an object over a given time from its initial and final velocity.							
	Be able to interpret an object's motion from its velocity-time graph.							
<b>1.3 More About Velocity-Time Graphs (Higher tier parts) 1.4 Using Graphs (Higher tier)</b>	Be able to interpret an object's motion from its velocity-time graph.	 						
	Know that the gradient of a velocity-time graph represents the acceleration of the object.							
	<b>Higher tier:</b> Be able to calculate the acceleration of an object from its velocity-time graph.							
	<b>Higher tier:</b> Be able to calculate the distance travelled by an object in a given time from its velocity-time graph.							
<b>2.1 Forces Between Objects</b>	Know that when two objects interact, they exert forces on each other that are equal but opposite.	 						
	Describe friction as a contact force between surfaces.							
	Recall the unit of a force as newton (N).							
<b>2.2 Resultant Forces</b>	Know that all the forces acting at a point can be replaced by a single force called the resultant force.							
	Know that the resultant force has the same effect as all of the individual forces it represents.							
	Understand that if a resultant force acts on an object, the object's velocity will change.							
	Be able to calculate the resultant of multiple forces acting in the same or opposite directions along a straight line.							
	Explain that a non-zero resultant force will cause acceleration.							



<b>2.6 Stretching and Squashing (Hookes Law)</b>	Describe how forces acting on an object may cause a change in its shape	   						
	Describe the energy changes when a force is used to change the shape of a spring							
	State and calculate the relationship between the force applied and the extension and its spring constant k.							
	Know that the extension of an elastic object is directly proportional to the force applied up to a point called the limit of proportionality.							
<b>3.1 Energy and Work</b>	Know that when a force moves an object through a distance, work is done.	 						
	Know that when work is done, energy is transferred from one form to another.							
<b>3.2 Gravitational Potential Energy</b>	Know what gravitational potential energy is and be able to use the formula $E_p = m \times g \times h$	 						
	Be able to use the formula $W = F \times d$ .							
	Recall that gravitational potential energy depends on both its weight and height above ground.							
<b>3.3 Kinetic Energy</b>	Know what kinetic energy is, and that it depends on an object's mass and speed.	   						
	Be able to use the formula: $E_k = \frac{1}{2} \times m \times v^2$							
	Know that when work is done against frictional forces kinetic energy is transferred into heat energy (and some sound).							
	Know that the work done by brakes to stop a moving object is equal to its original kinetic energy.							
	Be able to describe how kinetic energy is transferred in certain situations e.g. objects falling or objects entering the Earth's atmosphere.							

<b>3.4 Momentum</b>	Define the unit (kilogram metre per second (kg m/s)) and calculate momentum.	 						
	Explain and apply the law of conservation of momentum.							
	Be able to apply and rearrange the correct equations to two bodies that collide in a straight line. (momentum in kg = p (equation is $p = m \times v$ ))							
<b>3.5 Explosions &amp; more momentum</b>	Describe that momentum has size and direction of travel- important in collisions.	 						
	Be able to calculate the momentum of an object with a known mass and velocity.							
	There is no change in momentum in an explosion (momentum is conserved), unless external forces interact.							
<b>3.6 Impact Forces</b>	State that the resultant force will change the momentum of an object.	 						
	Describe the factors that affect the size and force of an impact.							
	Calculate the force produced in a collision using the formula $a = (v-u)/t$ and $F = ma$							
<b>3.7 Car Safety</b>	Be able to compare different braking systems, including regenerative brakes.	 						
	Understand the effects of crumple zones, side impact bars, seat belts and air bags on energy and momentum changes in cars.							
	Be able to analyse how the damage caused in a collision can be observed and used to determine an estimated speed of a collision.							

<b>4.1 Electrical Charges</b>	Know that some substances are conductors, which electrical charges can move easily through	 						
	Know that rubbing together certain insulating materials can cause negatively charged electrons to be transferred from one material to the other.							
	If material loses electrons it's positively charged. If the material gains electrons it will have a negative charge.							
	Know that two electrically charged materials will exert a force on each other when brought together.							
	Know that objects with opposite charges attract and objects with the same type of charge will repel each other.							
<b>4.2 Electrical Circuits</b>	Know the standard circuit symbols for the following components: cell, battery, switch (open and closed), lamp, ammeter, voltmeter, resistor, variable resistor, fuse, thermistor, diode, light-emitting diode (LED), light-dependant resistor (LDR).	 						
	Be able to draw the standard circuit symbols listed.							
	State the function of each component listed e.e.g cell and battery and the difference.							
	Be able to apply the equation to the flow of electric charge (current) using the keywords coulombs and amperes along with the formula $I=Q/t$ .							
<b>4.4 Current-Potential Difference Graphs- Thermister- LightDependent Resistor (LDR) (Higher tier parts)</b>	Know that potential difference (voltage) is the work done per coulomb of charge that passes between two points in an electric circuit.	 						
	Know how to calculate potential difference using $V = W \div Q$ .							
	Know that for a light-dependent resistor (LDR), the resistance decreases as the light intensity increases.							
	Know that for a thermistor, (e.g. in thermostats) the resistance decreases as the temperature increases.		     					

<b>4.3 Resistance</b>	Know that the current through a component depends on its resistance.	   						
	Understand and be able to use the equation: $V = I \times R$ .							
	Know that for a resistor at a constant temperature, the current through it is proportional to the p.d. across it and it produces a straight-line I-V graph.							
	Know that, and interpret graphs on: resistance of a filament lamp increases as the temperature of the filament increases. <b>Higher tier</b> Be able to explain the varying resistance of a filament lamp in terms of ions and electrons.							
<b>4.5 Series Circuits</b>	Know that the potential difference of multiple cells connected in series and in the same direction is the sum of the potential differences of each cell.	   						
	Know that the potential difference of a power supply is shared across all of the components connected in series with it.							
	Know that the same current flows through all components connected in series.							
	Know that the total resistance in a series circuit is the sum of the resistances of all the components in it.							
<b>4.6 Parallel Circuits</b>	Know that all components connected in parallel will have the same potential difference across them.	 						
	Know that the total current in a parallel circuit is the sum of the currents through each of the branches of the parallel circuit.							
<b>5.1 Alternating Current and Direct Current (Higher tier parts)</b>	Know that direct current (d.c.) is the current supplied by cells and batteries and that it always passes in the same direction.	   						
	Know that alternating current (a.c.) is current that constantly changes direction.							
	Know that mains electricity is a.c. with a frequency of 50 Hz and a voltage of around 230 V in the UK.							
	Be able to interpret and compare oscilloscope traces showing d.c. and a.c. <b>Higher tier</b> Be able to calculate the time period and frequency of an a.c. supply from an oscilloscope trace.							

<b>5.2 Cables and Plugs &amp; 5.3 Fuses</b>	Know the structure of a 2-3 core cables, three-pin plugs and how to wire one.	   						
	Understand and compare how a fuse or circuit breaker, together with an earth wire, breaks a circuit in the event of an electrical fault.							
	Know that the larger the current, the thicker a cable needs to be to carry it. This causes a link between cable thickness and fuse rating.							
	Know what Residual Current Circuit Breakers (RCCBs) are and how they protect circuits.							
<b>5.4 Electrical Power and Potential Difference</b>	Know how power, energy transferred and time are related and be able to use the formula: $p=E/t$	     						
	Know that power should be considered when choosing an appliance.							
	Know how power, potential difference and current are related and be able to use the formula: $p=I \times v$							
	Be able to calculate the fuse needed for an appliance from its power and the potential difference of the electricity supply.							

<b>5.5 Electrical Energy and Charge (Mainly Higher tier parts)</b>	RECAP- Be able to calculate and apply the equation to the flow of electric charge (current) using the keywords coulombs and amperes along with the formula $I=Q/t$ .	     						
	Higher tier. Be able to calculate how much energy something transfers using the formula $E = V \times Q$ .							
	Metal materials carry charges in electrons.							
	Know that resistors and other components such as lamps get hot when current flows through them.							
<b>5.6 Electrical Issues- LEDs etc.</b>	Know that current only flows in the forward direction through a diode.	   						
	Know that the resistance of a diode in the reverse direction is very high.							
	Know the shape of the I-V graph for a diode.							
	Understand the reasons behind LEDs being used increasingly as a form of lighting, including their energy and cost efficiency.							
<b>6.1 Observing Nuclear Radiation</b>	Unstable nuclei decay and emit invisible radiation, which then forms a more stable nucleus structure.	 						
	Define a radioactive substance and the types of radiation emitted from these substances.							
	Be able to explain how radioactive substances were discovered and that a Geiger counter is used to detect radioactivity.							
	Describe that background radiation is everywhere due to cosmic rays and radioactive decay of rocks.							
<b>6.2 The Discovery of the Nucleus</b>	Know what the plum pudding model of the atom is.	 						
	Know that according to the nuclear model, the atom is mostly empty space.							
	Know how the results of scattering experiments by Rutherford and Marsden resulted in the plum pudding model of the atom being replaced by the current nuclear model.							

<b>6.3 Nuclear Reactions-radioactive decay-isotopes (Higher tier parts)</b>	Know the basic structure of the atom, according to the nuclear model.	     						
	Know that if an atom loses or gains an electron, it becomes a charged particle called an ion.							
	Know what the atomic number and the mass number of an atom are.							
	Know that atoms of an element with different mass numbers, (different numbers of neutrons) are called isotopes. <b>Higher tier</b> write nuclear equations to represent alpha or beta decay.							
<b>6.4 Alpha-Beta-Gamma Radiation</b>	Be able to describe what alpha, beta and gamma radiation are.	   						
	Be able to compare the ionising powers and penetrations through air and materials of alpha, beta and gamma radiation.							
	Know that alpha and beta radiation are deflected by magnetic and electric fields (they are particles), but gamma isn't (gamma is an uncharged EM-wave).							
	Explain in detail why radiation is dangerous in terms of cell damage.							
<b>6.5 Half Life</b>	Know that radioactive half-life is the average time it takes for the number of nuclei in a sample of a radioactive isotope to halve.	 						
	Know that half-life of a radioactive sample can be found by measuring the time it takes for the count rate to reach half its initial level.							

<b>7.1 Nuclear Fission &amp; 7.2 Nuclear Fusion</b>	Describe the process of nuclear fission, which isotopes undergo fission and how chain reactions are controlled.	 						
	Describe a source of fusion e.g. the Sun, the process of nuclear fusion and how nuclei fuse together.							
	Compare the advantages and disadvantages of each method for producing energy.							
<b>7.3 Nuclear Issues &amp; 6.6 Radioactivity at Work-uses of radiation</b>	Discuss nuclear waste storage, radon gas hazards and the arguments for any nuclear issues.	 						
	Discuss how we can use radioactivity for monitoring and the use of radioactive tracers.							
	Describe how radioactive isotopes can be used to determine the age of rock or organic material (e.g. radioactive (carbon and uranium) dating).							
<b>7.4 The Early Universe &amp; 7.5 The Life History of a Star &amp; 7.6 How the Chemical Elements Formed</b>	Explain how stars are formed and the components of the universe e.g. galaxies, stars, planets etc.	 						
	Describe what happens when a star approaches the end of its life.							
	Describe the complete life cycle of a star.							
	Describe what chemical elements are formed inside stars and supernovas.							
	Describe why Earth contains heavy elements.							