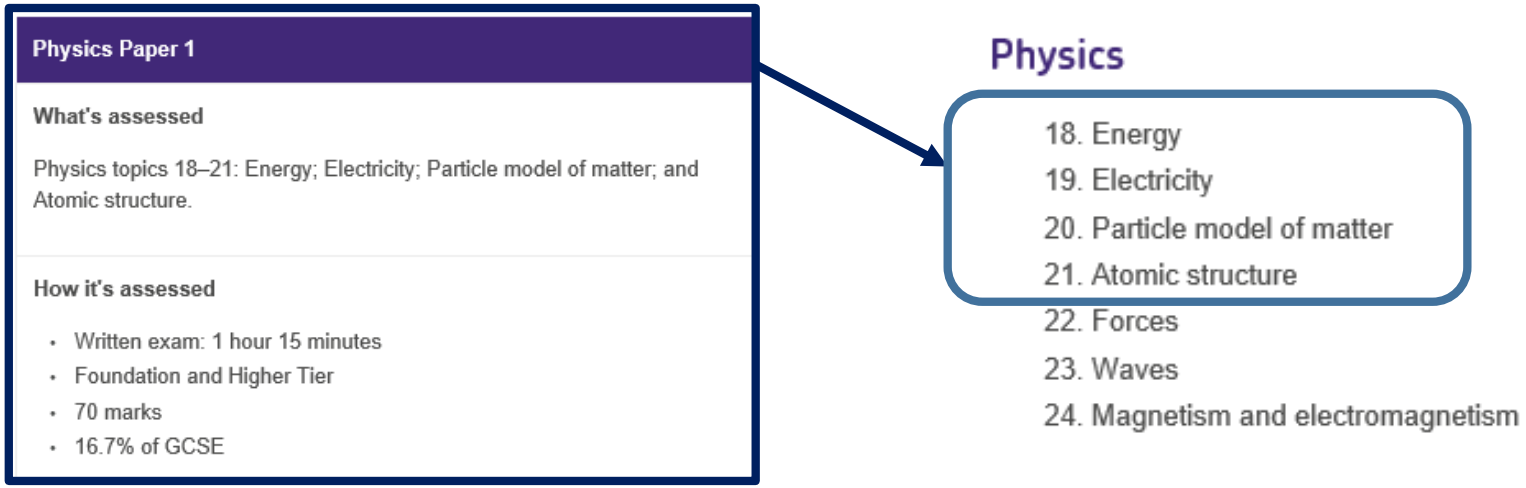
Physics 1 Revision Support Booklet



<u>Next Mock for Physics paper 1 is November 2019</u>

Use the Test-Read-Cover-Remember-Test method to learn the facts
Get a family member to ask the questions and check the answers
Use the question sheet to practice and check the answers against the answer page

Support your learning by practicing further using your revision guides and Educake

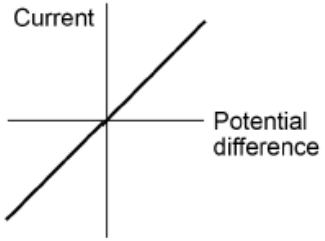
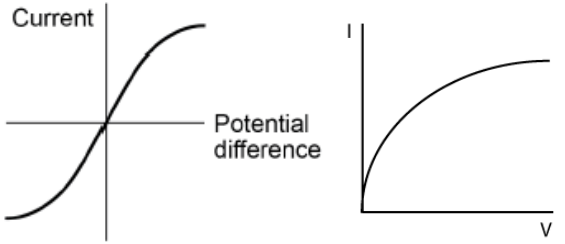
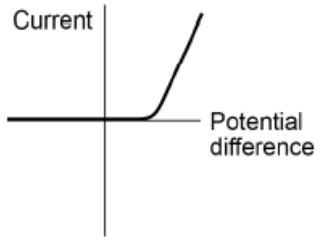
Key Facts Memory Task: Energy

When an object is throw (or just moves) upwards, what type of energy does it gain?	Gravitational energy
State the equation for kinetic energy	Kinetic energy = ½ x mass x velocity squared ($E_k = ½ m v^2$)
State the equation for gravitational energy	Gravitational energy = mass x gravitational field strength x height ($E_g = mgh$)
Define specific heat capacity	The energy needed to raise the temperature of 1kg of a substance by 1°C
Define power	Power is defined as the rate at which energy is transferred
State the equation for power	Power = energy ÷ time
What type of energy is wasted from most electrical and mechanical appliances?	Thermal energy (heat)
State 2 ways to reduce unwanted energy transfers	Lubrication and thermal insulation
State the equation for efficiency	Efficiency = useful energy out ÷ total energy in Efficiency = useful power out ÷ total power in
State the 3 fossil fuels	Coal, oil and natural gas
Describe geothermal power	Heat from inside the Earth is used to heat water which then turns a turbine which turns a generator
Describe hydroelectric power	Water flowing through a dam turns a turbine which turns a generator

Key Facts Memory Task: Energy

1.	When an object is throw (or just moves) upwards, what type of energy does it gain?
2.	State the equation for kinetic energy
3.	State the equation for gravitational energy
4.	Define specific heat capacity
5.	Define power
6.	State the equation for power
7.	What type of energy is wasted from most electrical and mechanical appliances?
8.	State 2 ways to reduce unwanted energy transfers
9.	State the equation for efficiency
10.	State the 3 fossil fuels
11.	Describe geothermal power
12.	Describe hydroelectric power

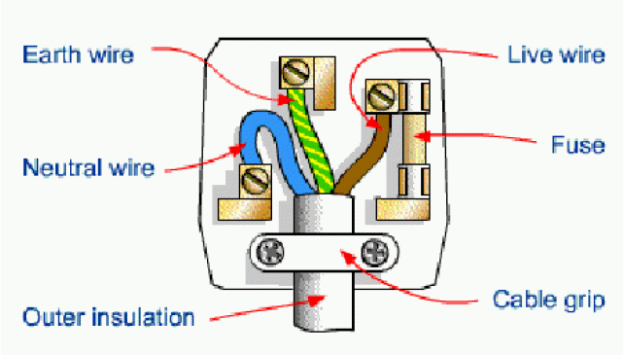
Key Facts Memory Task: Electric Circuits

Draw the circuit symbols for a variable resistor, a diode, a thermistor and an LDR		
Define electric current	Electric current is a flow of electrical charge	
State the equation for charge flow	Charge = current x time	
How is current affected by resistance?	If resistance increases, current decreases or if resistance decreases, current increases	
State the equation that links current, potential difference and resistance	Potential difference = current x resistance	
State Ohm's Law	The current through an ohmic conductor (at a constant temperature) is directly proportional to the potential difference across the resistor.	
Sketch the V-I graph for a fixed resistor 	Sketch the V-I graph for a filament bulb 	Sketch the V-I graph for a diode 
Describe how temperature affects the resistance of a thermistor	As temperature increases, the resistance of a thermistor decreases	
Describe how light intensity affects the resistance of n LDR	As light intensity increases, the resistance of an LDR decreases	
If you increase the number of resistors in parallel, what can be said about the resistance of the whole circuit?	If resistors are added in parallel. The resistance of the whole circuit will be less that the resistance of the smallest resistor	

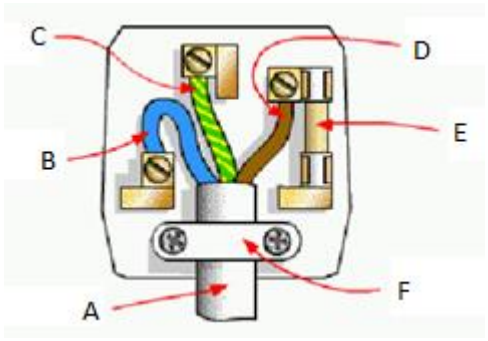
Key Facts Memory Task: Electric Circuits

1.	Draw the circuit symbols for a variable resistor, a diode, a thermistor and an LDR		
2.	Define electric current		
3.	State the equation for charge flow		
4.	How is current affected by resistance?		
5.	State the equation that links current, potential difference and resistance		
6.	State Ohm's Law		
7. **8.** **9.**	Sketch the V-I graph for a fixed resistor	Sketch the V-I graph for a filament bulb	Sketch the V-I graph for a diode
10.	Describe how temperature affects the resistance of a thermistor		
11.	Describe how light intensity affects the resistance of n LDR		
12.	If you increase the number of resistors in parallel, what can be said about the resistance of the whole circuit?		

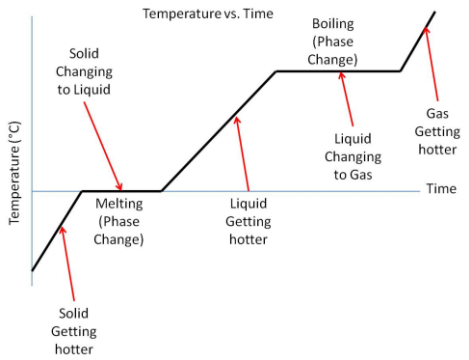
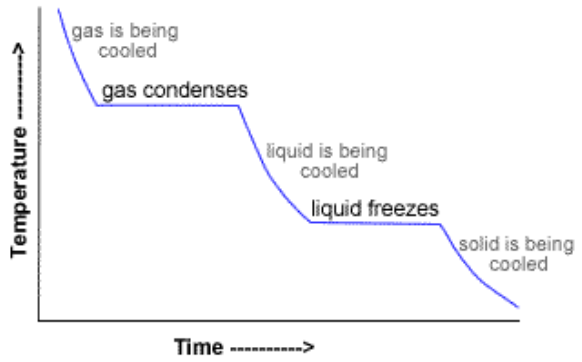
Key Facts Memory Task: Main Electricity

State the voltage and frequency of the UK mains supply	Voltage = 230V Frequency = 50Hz
What is the difference between alternating and direct current?	In direct current the electrons flow one way around the circuit. In alternating current the electrons constantly change direction
State the purpose of the live wire	The live wire carries the alternating potential difference from the supply
State the purpose of the neutral wire	The neutral wire completes the circuit
State the purpose of the earth wire	The earth wire is a safety wire to stop the appliance casing becoming live. Only needed for appliances with metal cases.
Label the key parts of the plug	
State the colour and potential difference of each wire in the plug	Live – Brown 230V Neutral – Blue 0V Earth – Yellow and Green 0V
State the two equations for electrical power	Power = voltage x current $P = V \times I$ Power = current squared x resistance $P = I^2R$
State the equation that links potential difference, energy transferred and charge	Energy transferred = charge x potential different $E = QV$
Describe and explain the use of step up transformers in the national grid	Step-up transformers are used to increase the potential difference so less energy is wasted as heat on the cables

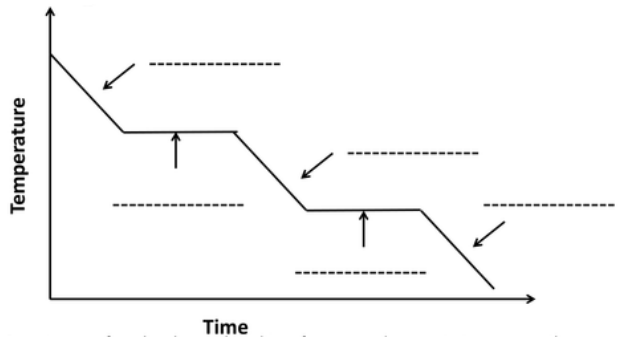
Key Facts Memory Task: Main Electricity

1.	State the voltage and frequency of the UK mains supply
2.	What is the difference between alternating and direct current?
3.	State the purpose of the live wire
4.	State the purpose of the neutral wire
5.	State the purpose of the earth wire
6.	Label the key parts of the plug 
7.	State the colour and potential difference of each wire in the plug
8.	State the two equations for electrical power
9.	State the equation that links potential difference, energy transferred and charge
10.	Describe and explain the use of step up transformers in the national grid

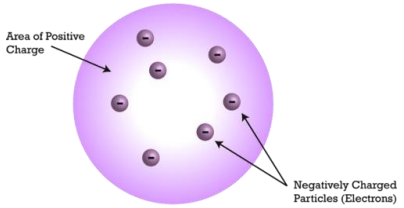
Key Facts Memory Task: The Particle Model of Matter

State the equation for density	Density = Mass ÷ Volume
Describe how to find the volume of an irregular solid	Submerge the object in water in a displacement can. Collect the overflow of water in a measuring cylinder. The volume of the water is the volume of the object.
State the scientific keyword to describe each state change	Solid → Liquid = Melting Liquid → Gas = Evaporation Solid → Gas = Sublimation Liquid → Solid = Freezing Gas → Liquid = Condensation
Define internal energy	Internal energy is the total kinetic energy and potential energy of all the particles (atoms and molecules) that make up a system.
Define specific heat capacity	The energy needed to raise the temperature of 1kg of a substance by 1°C
State the units of specific heat capacity	J / kg °C
Define latent heat of fusion	The energy needed to change the state of 1kg of a substance from solid to liquid
Define latent heat of vaporisation	The energy needed to change the state of 1kg of a substance from liquid to gas
Label the parts of a heating curve and a cooling curve graph	 
Why does pressure increase when you heat a gas?	The kinetic energy of the particles increases so they hit the sides of the container with more force and more frequently

Key Facts Memory Task: The Particle Model of Matter

1.	State the equation for density
2.	Describe how to find the volume of an irregular solid
3.	State the scientific keyword to describe each state change
4.	Define internal energy
5.	Define specific heat capacity
6.	State the units of specific heat capacity
7.	Define latent heat of fusion
8.	Define latent heat of vaporisation
9.	Label the parts of a cooling curve graph 
10.	Why does pressure increase when you heat a gas?

Key Facts Memory Task: Atomic Structure

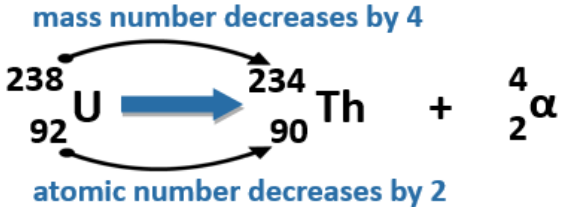
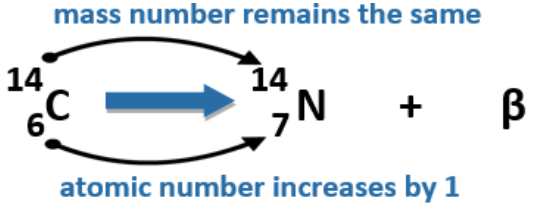
State the approximate radius of an atom	$1x10^{-10}$ metres
Describe the current model of the atom	A positively charged nucleus composed of both protons and neutrons surrounded by negatively charged electrons
How to move an electron towards or away from the nucleus	Move away – electron absorbs electromagnetic radiation Move towards – electron emits electromagnetic radiation
What is an isotope?	An atom with the same number of protons but a different number of neutrons
What does the atomic number of an atom represent?	The number of protons
What does the mass number of an atom represent?	The number of protons and neutrons
What can lead to a scientific model being changed or replaced?	New experimental evidence
Describe the plum pudding model of the atom	The plum pudding model of the atom is a ball of positive charge with negative electrons embedded in it 
State the conclusions of the alpha scattering experiment	Most of the atom is empty space and there is a positive nucleus in the centre
How did Niels Bohr adapt the model of the atom?	He suggested that electrons orbit at specific distances
What did James Chadwick do to change the model of the atom?	His experiments provided evidence for the existence of the neutrons

Key Facts Memory Task: Atomic Structure

1.	State the approximate radius of an atom
2.	Describe the current model of the atom
3.	How to move an electron towards or away from the nucleus
4.	What is an isotope?
5.	What does the atomic number of an atom represent?
6.	What does the mass number of an atom represent?
7.	What can lead to a scientific model being changed or replaced?
8.	Describe the plum pudding model of the atom
9.	State the conclusions of the alpha scattering experiment
10.	How did Niels Bohr adapt the model of the atom?
11.	What did James Chadwick do to change the model of the atom?

Key Facts Memory Task: Radioactivity

Describe the nature of radioactive decay	It is a random process. You can never predict when a nucleus will decay
Define activity and state its unit	Activity is the rate at which a source of unstable nuclei decays. It's unit is Becquerels (Bq)
What is an alpha particle?	2 neutrons and 2 protons emitted from the nucleus
What is a beta particle?	A fast moving electron emitted from the nucleus
What is a gamma ray?	Electromagnetic radiation from the nucleus
State the 4 types of nuclear radiation	Alpha, beta, gamma and a neutron

How do the mass and atomic numbers change in alpha decay?		How do the mass and atomic numbers change in beta decay?	

Nuclear radiation is ionising. What does this mean?	When the radiation hits an atom it could cause it to lose electrons and become charged
Define half life	The half-life of a radioactive isotope is the time it takes for the number of nuclei of the isotope in a sample to halve
Define contamination	Radioactive contamination is the unwanted presence of materials containing radioactive atoms on other materials
Define irradiation	Irradiation is the process of exposing an object to nuclear radiation. The irradiated object does not become radioactive.

Key Facts Memory Task: Radioactivity

1.	Describe the nature of radioactive decay
2.	Define activity and state its unit
3.	What is an alpha particle?
4.	What is a beta particle?
5.	What is a gamma ray?
6.	State the 4 types of nuclear radiation
7.	How do the mass and atomic numbers change in alpha decay?
8.	How do the mass and atomic numbers change in beta decay?
9.	Nuclear radiation is ionising. What does this mean?
10.	Define half life
11.	Define contamination
12.	Define irradiation

Give the equation for:	The equation is:
Kinetic Energy	Kinetic Energy = ½ x mass x velocity^2
Gravitational potential energy	G.P.E = mass x gravitational field strength x height
Power 1	Power = Energy ÷ time
Power 2	Power = Work done ÷ time
Efficiency 1	Efficiency = useful power output ÷ total power in
Efficiency 2	Efficiency = useful energy output ÷ total energy in
Charge	Charge = Current x time
Voltage	Voltage = Current x Resistance
Power 3	Electrical Power = Voltage x Current
Power 4	Electrical Power = Current^2 x Resistance
Energy	Electrical Energy = Charge x Voltage
Density	Density = mass ÷ volume
Weight	Weight = mass x gravitational field strength
Work done	Work Done = Force x displacement
Force from a spring	Spring Force = Spring constant x extension
Force (Newton's 2nd Law)	Force = mass x acceleration
Momentum	Momentum = mass x velocity
Average Velocity (Speed)	Av. Velocity = displacement ÷ time
Wave Speed	Wave speed = frequency x wavelength
Acceleration	Acceleration = change in velocity ÷ time
Moment	Moment = force x perpendicular distance from pivot

Physics 1 Revision Support Tracker

Question Set	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5
1 - Energy	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
2 – Electrical Circuits	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
3 – Mains Electricity	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10
4 – Particle Model of Matter	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10
5 – Atomic Structure	1 2 3 4 5 6 7 8 9 10 11	1 2 3 4 5 6 7 8 9 10 11	1 2 3 4 5 6 7 8 9 10 11	1 2 3 4 5 6 7 8 9 10 11	1 2 3 4 5 6 7 8 9 10 11
6 - Radioactivity	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12