PiXL Pers	onalised Learı	ning Checkli	st	Date	Revie	wed	and	RAG	Ratir	ng
AQA A Level Physics		No Knowledge								
P1 Measurements and their Errors		Insecure								
-P1.1 Use of SI units and their prefixes		Secure								
Know the fundamental base and standard in	ndex units									
Be able to derive standard index units										
Be able to use standard index prefixes and s	standard form									
Be able to convert between different units	of the same quantity, i.e. J and eV, J	and KWh								
-P1.2 Limitation of physics measurements										
Be aware of the difference between randor	n and systematic errors and be able	to give examples								
Know the definitions for precision, repeatal	bility, reproducibility, resolution and	accuracy								
Know the difference between absolute, frac	ctional and percentage uncertainties									
Be able to combine absolute and percentag	ge uncertainties									
Be able to represent uncertainty in a data p	point on a graph using error bars									
Be able to determine uncertainties in the gr	radient and intercept of a straight-lin	ne graph								

PixL Personalised Learning	Checklist	Da	ite R	evie	wed	and	RAG	Rati	ng
AQA A Level Physics	No Knowledge								
P2 Particles and Radiation	Insecure								
-P2.1 Constituents of the atom	Secure								
Know the simple model of the atom, including proton, neutron and electron									
Know the charge and mass of the proton, neutron and electron in SI units and relative unit	S								
Know the specific charge of the proton and the electron and of nuclei and ions									
Know the nuclide notation of Proton Number Z, and Nucleon Number A									
Know the meaning of isotopes and the use of isotopic data									
-P2.2 Stable and unstable nuclei							-		•
Know the role of the strong nuclear force including distances of short range attraction and	very-short range repulsion								
Know the equations for Alpha and Beta minus decay including the need for the neutrino									
Describe why the neutrino was hypothesised to account for the conservation of energy in b	peta decay								
-P2.3 Particles, anti-particles and photons									
Show awareness that for every type of particle there is a corresponding anti-particle									
Be able to compare particle and anti-particle masses, charge and rest energy in MeV									

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Know the anti-particles for electron, proton, neutron and neutrino							
Describe the photon model of electromagnetic radiation							
Know and use E=hf=hc/λ							
Knowledge of annihilation and pair production and the energies involved							
-P2.4 Particle interactions							
Know the four fundamental interactions							
Allow the four fundamental interactions							
Describe the concept of exchange particles to explain forces between elementary particles							
Describe the weak interaction limited to Beta- and Beta+ decay, electron capture and electron-proton collisions; W+ and							
W- as the exchange particles							
Be able to draw and interpret simple diagrams to represent the above reactions in terms of incoming and outgoing							
particles and exchange particles							
-P2.5 Classification of particles							
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Know that hadrons are subject to the atrona interestions							
Know that hadrons are subject to the strong interactions							
Know the two classes of hadrons, baryons and mesons							
Know the proton is the only stable baryon into which other baryons eventually decay							
Know the pion is the exchange particle of the strong nuclear force							
Know the plot is the exchange particle of the strong nuclear force							\dashv
Know that the kaon is a particle that can decay into pions							

Know that leptons are subject to the weak interaction						_
Be able to list leptons: electron, muon, neutrino (electron and muon types only) and their anti-particles						
Know the muon is a particle that decays into an electron						
Know that strange particles are particles produced through the strong interaction and decay through the weak interaction	1					
Know that strangeness can change by 0, +1 or -1 in weak interactions						
Appreciate that particle physics relies on the collaborative efforts of large teams of scientists and engineers to validate new knowledge						
-P2.6 Quarks and anti-quarks						
Know that quarks possess charge, baryon number and strangeness						
Know the combinations of quarks and anti-quarks required for; baryons (protons and neutrons only), antibaryons (antiproton and antineutron only) and mesons (pion and kaon only)						
Knowledge of properties of up, down, and strange quarks and their anti-quarks						
Knowledge of neutron decay						
-P2.7 Applications of conservation laws						
Know the change in quark structure in B- and B+ decay						
Apply the conservation laws for charge, baryon number, lepton number and strangeness to particle interactions						
Recognise that energy and momentum are conserved in interactions						
-P2.8 The photoelectric effect						

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Explain what threshold frequency, work function and stopping potential are.						
Know and use hf=φ=Ek(max)						
Know that Ek(max) is the maximum kinetic energy of the photoelectrons						
-P2.9 Collisions of electrons with atoms	T	ī			-	
Show understanding of ionisation and excitation in florescent tubes						
Show understanding of what the electron volt represents						
Convert eV into J and vice versa						
-P2.10 Energy levels and photon emission	1					
Describe how line spectra give evidence for transitions between discrete energy levels in atoms						
Know and use hf=E1-E2						
-P2.11 Wave-particle duality						
Describe how electron diffraction suggests particles possess wave properties and the photoelectric effect suggests that						
electromagnetic waves have a particle nature						
Know and use λ=h/mv						
Explain how and why the amount of diffraction changes when the momentum of the particle is changed						
Appreciate how knowledge and understanding of the nature of matter changes over time						
Appreciate that changes need to be evaluated through peer review and validated by the scientific community						
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PiXL Partners in excellence	ersonalised Learning Che	ecklist	Date	Revie	wed a	nd RAG	i Ratiı	ng
AQA A Level Physics		wledge						
P3 Waves -P3.1 Progressive waves	Insecur Secure	e						
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Define amplitude, frequency, wave	elength, speed, phase, phase difference							
Know and use c=fλ, f=1/t								
Appreciate phase difference can b	e measured as an angle (radians and degrees) or as fractions of a ${\sf c}_{\sf i}$	ycle						
-P3.2 Longitudinal and transverse								
Appreciate the nature of longitudi	nal and transverse waves							
Know the direction of displacemen	nt of particles/fields relative to the direction of energy propagation	and that all						
electromagnetic waves travel at the	ne same speed in a vacuum							
Describe how polarisation is evide	nce for the nature of transverse waves							
Describe some applications of polareception	arisation to include polaroid material and the alignment of aerials fo	or transmission and						
-P3.3 Principle of superposition of	f waves and formation of stationary waves							
Define a stationary wave								
Identify nodes and antinodes on st	rings							
identity flodes and artiflodes off st	65							
Know and use f=1/2lV(t/μ)								

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Describe how a stationary wave can be formed by two stationary waves of the same frequency travelling in opposite						
directions						
Described to the state of the s						
Describe how stationary waves can be formed on string and with microwaves and sound waves						
-P3.4 Interference	,			 		
Define path difference						
Define coherence						
Explain how interference and diffraction can be achieved using a laser as a source of monochromatic light						
Describe Versials de la la literatura de la companya de la company						
Describe Young's double-slit experiment as a method to produce an interference pattern						
Know and use w=λD/s						
Describes and sometime interference and describes according to a describe according to						
Describe and explain interference produced with sound and electromagnetic waves						
Appreciate how knowledge and understanding of the nature of electromagnetic radiation has changed over time						
-P3.5 Diffraction						
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Draw the appearance of the diffraction pattern from a single slit using monochromatic and white light						
Be able to derive dsinθ=nλ						
-P3.6 Reflection at a plane surface						
Know and use the equation to define refractive index of a substance, n=C/Cs						
Know that the refractive index of air is approximately 1						
and the approximation, and						

Know and use Snells law, n1Sin θ 1=n2sin θ 2					
Know and use Sinθc=n2/n1					
State the function of fibre optic cladding					
Understand the principles and consequences of pulse broadening and absorption					

PixL Personalised Learning	Checklist	Da	ite Re	eviev	wed	and	RAG	Rati	ng
AQA A Level Physics	No Knowledge								
P4 Mechanics and Materials -P4.1 Scalars and vectors	Insecure Secure								
State the difference between scalars and vectors									
Add vectors by calculation or scale drawing									
Be able to resolve vectors into two components at right angles to one another									
Appreciate the meaning of equilibrium in the context of an object at rest or moving with co	nstant velocity								
-P4.2 Moments	·								
Calculate the moment of a force about a point									
Define a moment as the force x perpendicular distance from the point to the line of action of	of the force								
Define a couple as a pair of equal and opposite coplanar forces									
Define a moment of couple as the force x perpendicular distance between the lines of actio	n of the force								
Define centre of mass									
Know that the position of centre of mass of an uniform regular solid is at its centre									
-P4.3 Motion along a straight line									
. He motion diving a straight line									

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Define displacement speed velocity assolutation						
Define displacement, speed, velocity, acceleration						
Know and use v=Δs/Δt						
Know and use a=Δv/Δt						
Represent uniform and non-uniform acceleration via graphical methods						
Recognise the significance of areas of velocity-time graphs and acceleration time graphs and gradients of displacement-time and velocity time graphs for uniform and non-uniform acceleration						
Know and use v=u+at						
Know and use s=((u+v)/2)t						
Know and use s=ut=at ²						
-P4.4 Projectile motion	<u> </u>				•	
Show awareness of the independent effect of motion in horizontal and vertical directions of a uniform gravitational field						
Describe friction, lift, drag and terminal speed qualitatively						
Know that air resistance increases with speed						
Show qualitative understanding of the effect of air resistance on the trajectory of a projectile and on the factors that affect the maximum speed of a vehicle						
-P4.5 Newton's laws of motion						
Know and apply the three laws of motion to appropriate situations						

Know and use f=ma for situations where the mass is constant					
-P4.6 Momentum					
Know and use p=mv					
Appreciate that linear momentum is conserved					
Appreciate that inical momentum is conscived					
Calculate situations involving conservation of linear momentum in one dimension					
Know and use f=Δ(mv)/t					
Appreciate that impulse=change in momentum					
Know and use $f\Delta t = \Delta(mv)$ where f is constant					
Know the significance of the area under a force time graph					
Know the significance of the area under a force-time graph					
Show a quantitative understanding of how forces vary with impact time					
State the difference between elastic and inelastic collisions					
Appreciate how safety features are designed with momentum conservation in mind					
-P4.7 Work, energy and power					
Know and use W=FSCosθ					
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Appreciate that the rate of doing work=rate of energy transfer, $P=\Delta w/\Delta t=Fv$					

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Know the significance of the area under a force-displacement graph							
Calculate efficiency							
-P4.8 Conservation of energy							
State the principle of the conservation of energy							
State the principle of the conservation of chergy							
Know and use ΔEp=mgΔh, Ek=1/2MV ²							
Calculate energy transfers involving G.P.E, K.E and work done against resistive forces							
-P4.9 Bulk properties of solids							
Know and use density, ρ=m/v							
know and use density, p-m/v							
Define Hooke's Law							
Define elastic limit							
Know and use F=kΔl							
KHOW drid dise 1 - KDI							
Define tensile strain and tensile stress							
Define elastic strain energy, breaking stress							
Know and use energy stored=1/2f∆l=area under a force-extension graph							
Thow and use energy stored—1/2141—area ander a force extension graph							
Describe plastic behaviour, fracture and brittle behaviour linked to force-extension graphs							

Be able to quantitatively and qualitatively apply the conservation of energy to examples involving elastic strain energy							
Describe how springs transform energy from kinetic to gravitational potential energy							
Interpret simple stress-strain curves							
Appreciate how safety features are designed with energy conservation issues in mind							
-P4.10 Young modulus							
Know and use the Young modulus=tensile stress/tensile strain=fl/a∆l							
Use stress-strain graphs to find the Young modulus							

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AQA A Level PhysicsP5 Electricity -P5.1 Basics of Electricity	No Knowledge Insecure Secure														
Know that electric current is the	rate of flow of charge, potential difference is the work done per unit charge														
Know and use $I = \Delta Q/\Delta t$, $V=w/q$															
Define resistance as R=V/I															
-P5.2 Current-voltage character	istics														
Recognise the current voltage cl	naracteristics for: ohmic conductors, semiconductor diodes and a filament lamp														
Recognise Ohm's law as a specia	I case where I is proportional to V under constant physical conditions														
-P5.3 Resistivity															
Know and use ρ=RA/L															
Describe qualitatively the effect	of temperature on the resistance of metal conductors and thermistors (NTC)														
Describe resistance-temperature	e graphs for NTCs														
State applications of NTCs															
Describe superconductivity and	the conditions required for it to occur														

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Describe applications of superconductors including production of magnetic fields and reduction of energy loss in the					
transmission of electric power					
-P5.4 Circuits					
Know and use Rt=R1+R2+Rn and 1/Rt=1/R1+1/R2+1/Rn to calculate resistance in series and parallel					
Know and use E=Ivt, P=IV, P=IR ² , P=V ² /R					
Describe the relationship between current, voltage and resistance in series and parallel circuits, including cells in series and					
parallel					
Be aware of the conservation of charge and conservation of energy in DC circuits					
-P5.5 Potential divider					
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Identify the use of a potential divider to supply constant or variable potential difference from a power supply					
Give examples of how the potential divider can be used, including the use of thermistors and light dependent resistors in a potential divider					
-P5.6 Electromotive force and internal resistance					
-P5.6 Electromotive force and internal resistance	т		П		
Know and use ε=E/Q and ε=I(R=r)					
State the definitions of Terminal PD					
State the definitions of EMF					
Perform calculations for circuits in which the internal resistance is not negligible					