



A LEVEL PHYSICS

Summer Transition Booklet 2026

Year 11 into Year 12 | Pearson Edexcel

Welcome to Slough & Eton Physics

This booklet prepares you for the mathematical, practical and conceptual demands of A Level Physics. It should be completed carefully over the summer and brought to your first Physics lesson in September.

Student name	
GCSE Physics grade / Combined Science grade	
GCSE Maths grade	
Target for September	

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Why choose A Level Physics?

The big idea

Physics is not only a subject about equations. It is the language used to understand motion, energy, electricity, waves, matter, space and technology. Students who succeed in A Level Physics develop the habits universities and employers value most: accuracy, resilience, mathematical confidence and evidence-based thinking.

Physics gives you academic power

- It trains you to solve unfamiliar problems rather than memorise answers.
- It strengthens the mathematics needed for engineering, computer science, data science, medicine-related technology and finance.
- It teaches you how to use evidence, uncertainty, graphs and models to make reliable decisions.
- It shows universities that you can handle a demanding, high-value subject.

The mindset for Year 12

Your aim should be excellence, not survival

A Level Physics is challenging, but that is exactly why it is valuable. From the start of Year 12, aim for an A or A*. High grades do not guarantee a scholarship, but they make strong university applications and scholarship applications much more realistic. The students who win competitive opportunities usually combine excellent grades with curiosity, independent reading, problem-solving practice and evidence of commitment beyond lessons.

Student challenge: write a paragraph explaining why you personally want to study Physics, then turn that reason into a target for September.

Where can Physics take you?

A flexible A Level

Physics keeps many doors open because it is both a science and a mathematical training course. It is especially useful for students who want degrees or careers where clear thinking, numerical skill and problem-solving matter.

Future field	What Physics helps you do	Example pathways
Physics, Astrophysics and Space Science	Understand matter, fields, particles, stars, planets and the universe.	Physics, Astrophysics, Astronomy, Cosmology, Space Science
Engineering	Apply forces, energy, materials, electricity and modelling to real systems.	Aerospace, Mechanical, Electrical, Civil, Automotive, Chemical Engineering
Computer Science, AI and Data	Use mathematical modelling, logic and problem-solving to analyse complex data.	Data Science, AI, Robotics, Software Engineering, Quantum Computing
Medicine and Healthcare Technology	Understand imaging, radiation, instrumentation and medical devices.	Medical Physics, Radiography, Biomedical Engineering, Nuclear Medicine
Energy and Climate	Work with electricity generation, renewables, nuclear energy and climate-related technology.	Renewable Energy, Nuclear Engineering, Environmental Physics, Sustainability
Finance and Quantitative Careers	Use mathematical modelling, risk analysis and logical reasoning.	Quantitative Finance, Actuarial Science, Consultancy, Economics-related analysis
Research, Education and Innovation	Ask original questions, test ideas and communicate scientific explanations.	University research, teaching, science communication, policy, industry R&D

Important message

You do not need to know your final career now. Choosing Physics means you are building a strong set of options for university, apprenticeships and future work.

Physics, scholarships and saving money

Why scholarships should be part of your target

A scholarship can reduce or remove tuition fees, contribute to living costs, fund postgraduate research, or support international study. Strong Physics grades are not the only requirement, but they are often one of the clearest pieces of evidence that you can succeed on a demanding degree.

How much could a scholarship save?

Opportunity to research	Typical value / saving	Why Physics helps
UK undergraduate tuition support	In England, standard full-time undergraduate tuition fees at many approved providers can be up to £9,535 per year. A full tuition award over a 3-year course could save up to £28,605.	A strong A Level profile, especially in Physics and Maths, supports applications to competitive STEM degrees.
UCL Global Undergraduate Scholarship	Examples include awards covering full tuition fees; some awards also include maintenance support for overseas students.	Physics can support entry to a wide range of science, engineering and technology degrees.
Chevening Scholarship	A fully funded UK master's scholarship can cover tuition, living expenses and return flights.	A Physics pathway can lead to high-impact postgraduate study in energy, climate, engineering, data and research.
DAAD Germany master's scholarships	Example support includes €992 per month, insurance payments, travel allowance and an annual study allowance. Over 24 months, the stipend alone is €23,808.	Physics graduates can apply for international STEM master's routes where quantitative skill is valued.
UKRI-funded PhD studentships	From October 2026, the minimum stipend is £21,805 and the fee level is £5,238. Over 3.5 years, minimum stipend plus fee support is roughly £94,651.	Physics is one of the core routes into funded doctoral research in science and engineering.
Imperial President's PhD Scholarships	Example support includes full tuition fees, a £26,500 annual stipend and a consumables fund. The stipend alone is £92,750 over 3.5 years.	High academic achievement and research potential are central to competitive doctoral funding.

Note: scholarship values, deadlines and eligibility rules change every year. Always check the official university or scholarship website before applying.

The A* and scholarship action plan

Grades open doors, evidence keeps them open

Aiming for an A* in Physics is not about perfection. It is about building habits early: correct units, clear working, careful diagrams, strong maths, independent reading and the confidence to attempt difficult problems. Scholarships and top universities usually look for evidence that you have stretched yourself beyond the minimum.

What you should build during Year 12

Evidence to build	What it could look like
Academic excellence	Consistent A/A* standard work in Physics and Maths; strong predicted grades; excellent end-of-topic test corrections.
Problem-solving record	Isaac Physics practice, Physics Olympiad-style questions, extra exam questions, clear correction logs.
Super-curricular Physics	Reading one serious Physics book, watching lectures, attending talks, visiting labs or completing an independent project.
Practical confidence	Accurate graphs, sensible uncertainty work, careful evaluation and strong laboratory habits.
Communication	Being able to explain Physics clearly in writing, interviews, presentations and personal statements.
Scholarship preparation	A shortlist of scholarships, deadlines, eligibility rules and evidence needed for each application.

Your personal scholarship target

My target Physics grade	
Degree or career area I may want	
One scholarship I will research	
Evidence I need to build this year	
First action I will complete this month	



How to use this booklet

Purpose

A Level Physics rewards precision, resilience and clear mathematical communication. The focus is on the skills that make the biggest difference at the start of Year 12: units, standard form, significant figures, algebra, trigonometry, vectors and secure GCSE knowledge in mechanics, electricity, waves and materials.

Assessment and completion requirements

Done	Task	Evidence / page
☐	Complete every task in black or blue pen, setting calculations out using C-E-R-N-A-U-S.	
☐	Use a scientific calculator and practise the $\times 10^x$ / EXP button.	
☐	Make Cornell notes for any GCSE topic you cannot explain confidently.	
☐	Bring this completed booklet, your folder, calculator, ruler and textbook to your first Physics lesson.	
☐	Prepare for a transition assessment in the second week of term.	

1. Course overview

Edexcel Year 12 area	What you must be ready to do
Working as a Physicist	Use SI units, uncertainties, graphs, practical methods and clear scientific reasoning.
Mechanics	Describe motion, resolve forces, apply Newton's laws, calculate work, energy and power.
Electric Circuits	Use current, potential difference, resistance, charge and circuit characteristics precisely.
Materials	Use Hooke's law, stress, strain and energy stored in stretched materials.
Waves and Particle Nature of Light	Use wave equations, diffraction, refraction, superposition and photon ideas.

Success standard

By September, you should be able to show every calculation clearly, convert units without guessing, identify a sensible equation, rearrange before substituting and round answers appropriately.



2. Weekly summer routine

Week	Focus	Evidence to produce
1	Units, prefixes and standard form	One corrected page of prefix conversions.
2	Significant figures and calculator fluency	One page of calculations with final answers rounded correctly.
3	Rearranging equations	Ten equations rearranged and checked by substitution.
4	Trigonometry and vectors	Resolved components with diagrams.
5	Energy, power and mechanics	GCSE revision notes and exam-style answers.
6	Electricity, waves and materials	Cornell notes for your weakest topics.

3. Required equipment and preparation

- A4 lined paper, an A4 folder with dividers, plastic wallets and a green pen for corrections.
- Pens, pencil, highlighters, ruler, protractor and a scientific calculator.
- Textbook: Edexcel AS/A level Physics Student Book 1, Mike Benn and George Graham, ISBN 9781471807527. Try to buy a second-hand copy where possible.
- Pre-read the first few pages of Topic 1 and Topic 2 from Book 1 before September.

4. Recommended support

Resource	Use it for	Link / search term
Pearson Edexcel A Level Physics specification	Understanding course content and practical expectations	Pearson Edexcel A Level Physics specification
Science Shorts	Video tutorials and worked examples	youtube.com/user/ScienceShorts
Gorilla Physics	Clear GCSE-to-A Level explanations	youtube.com/channel/UCDWYbhR94ZYFUXd4NJvAHYQ
Isaac Physics	Challenging calculation practice	isaacphysics.org
Physics & Maths Tutor	Exam questions by topic	PMT Edexcel A Level Physics
Seneca Learning	GCSE knowledge refresh	senecalearning.com
Cyber Physics	Reference notes and topic explanations	cyberphysics.co.uk



Further reading and viewing

Student instruction

Choose at least one book, one film/documentary and one talk/video. Write a short reflection explaining one physics idea, one question it raised and how it connects to A Level Physics.

5. Further reading

Choice	Why it is useful	Reflection
Moondust: In Search of the Men Who Fell to Earth	Uses astronauts' accounts to explore the human and scientific context of the Apollo era.	
Surely You're Joking, Mr Feynman!	Shows curiosity, problem-solving and the habits of a physicist.	
Quantum Theory Cannot Hurt You	Accessible introduction to the more unusual ideas in modern physics.	
A Short History of Nearly Everything	Builds scientific background knowledge beyond the specification.	
Thing Explainer	Practises explaining complex ideas simply and clearly.	
Why the Universe Exists	Introduces particle physics and how matter behaves at the smallest scales.	

6. Films and talks

Choice	Physics link	Reflection
Moon (2009)	Space industry, isolation, artificial intelligence and ethics.	
Gravity (2013)	Orbital motion, momentum, forces and survival in space.	
Interstellar (2014)	Gravity, relativity, modelling and space travel.	
The Imitation Game (2014)	Mathematics, computation and problem-solving under pressure.	
Apollo 13 (1995)	Engineering, energy, forces and problem-solving with constraints.	
Regina Dugan: From mach-20 glider to hummingbird drone	Engineering design, risk and innovation.	
Brian Greene: Is our universe the only universe?	Big Bang questions, cosmology and models.	
Helen Czerski: The fascinating physics of everyday life	Everyday physical phenomena explained scientifically.	
Joe Lassiter: We need nuclear power to solve climate change	Energy generation, sustainability and nuclear physics debates.	



7. Unit prefixes

Core skill

Prefixes are written before units to show multiplication or division by powers of ten. In A Level Physics, most equations require SI units before substitution. You must learn these prefixes by heart and become fluent with them.

Symbol	Prefix	Multiplier	Meaning
T	tera	$\times 10^{12}$	1,000,000,000,000
G	giga	$\times 10^9$	1,000,000,000
M	mega	$\times 10^6$	1,000,000
k	kilo	$\times 10^3$	1,000
unit	—	$\times 10^0$	1
m	milli	$\times 10^{-3}$	1/1,000
μ	micro	$\times 10^{-6}$	1/1,000,000
n	nano	$\times 10^{-9}$	1/1,000,000,000
p	pico	$\times 10^{-12}$	1/1,000,000,000,000
f	femto	$\times 10^{-15}$	1/1,000,000,000,000,000

7A. Practice: expand into SI units

Question	Answer	Question	Answer
900 mV		3.456 kg	
12 MJ		700 nm	
1.67 mm		0.72 pA	
4.8 kN		53 μ C	
0.035 GW		2.4 cm	

7B. Practice: choose an appropriate prefix

Question	Answer	Question	Answer
0.005 A		1001 m	
30000 s		0.006 V	
5×10^{-5} m		2,100,000 N	
0.00000047 F		8500 W	



8. SI system of units

Term	Your definition	Example
Physical quantity		mass, time, force, energy
SI unit		metre, kilogram, second, ampere
Base unit		m, kg, s, A, K, mol, cd
Derived unit		newton, joule, watt, volt, ohm

9. Standard form and powers of ten

Exam habit

Write numbers in the form $a \times 10^n$ where $1 \leq a < 10$. Use the $\times 10^x$ or EXP button on your calculator for powers of ten, not repeated multiplication by 10.

Value	Standard form / SI value	Value	Standard form / SI value	Value	Standard form / SI value
3141		0.00055		2.0002	
120000 (2 s.f.)		120000 (6 s.f.)		843×10^4	
1.5 μm		$12.0 \times 10^{-2} \text{ nm}$		999 MJ	
245 mg		16 pF		97.237 GN	

9A. Mixed standard form calculations

Calculate the area in m^2 : $120 \text{ mm} \times 250 \text{ mm}$. [2 marks]

Calculate the area in m^2 : $2.4 \text{ m} \times 60 \text{ cm}$. [2 marks]

Calculate density in kg m^{-3} : mass = 48 g, volume = 12 cm^3 . [3 marks]

Calculate charge: $Q = It$, where $I = 3.0 \text{ kA}$ and $t = 20 \mu\text{s}$. [3 marks]

Calculate speed squared: $v^2 = (16 \text{ m s}^{-1})^2$. [2 marks]

Calculate force: $F = ma$ where $m = 923000 \text{ g}$ and $a = 9.8 \text{ m s}^{-2}$. [3 marks]



10. Significant figures

Rules

Start counting from the first non-zero digit. Zeros between non-zero digits count. Leading zeros do not count. Trailing zeros count only when the decimal place makes the precision clear.

Value	s.f.	Value	s.f.	Value	s.f.	Value	s.f.
2		1066		1800.45		0.070	
2.0		82.42		2.483×10^4		69324.8	
500		750000		0.0006		0.0063	
0.136		310		5906.4291		9.81×10^4	
0.0300		3.10×10^4		200000		40000.00	
54.1		3.1×10^2		12.711		0.0004×10^4	

10A. Rounding in calculations

Adding/subtracting

Round the final answer to the least precise number of decimal places used in the original values. Example: $0.88 + 10.2 - 5.776 = 5.304 = 5.3$ to 1 decimal place.

Value 1	Value 2	Value 3	Total	Correct rounding
51.4	1.67	3.23		
7146	-32.54	12.8		
20.8	18.72	0.851		
1.4693	10.18	-1.062		
9.07	0.56	3.14		
739762	26017	2.058		
8.15	0.002	106		
152	0.8	0.55		



Rounding, means and anomalies

Multiplying/dividing

Round the final answer to the least number of significant figures in the original values. Example: $4.02 \times 3.1 \div 0.114 = 109.315\dots = 110$ to 2 significant figures.

Value 1	Value 2	Total	Correct rounding
0.91	1.23		
8.764	7.63		
2.6	31.7		
937	40.01		
0.722	634.23		

10B. Calculating a mean

- Remove any obvious anomalies first. Circle them in the table.
- Calculate the mean using the remaining values.
- Record the mean to the least number of decimal places in the included values.
- Example: for 8.0, 10.00 and 145.60, remove 145.60. The mean of 8.0 and 10.00 is 9.0 to 1 decimal place.

Value 1	Value 2	Value 3	Mean value	Mean to correct rounding
1	1	2		
435	299	437		
5.00	6.0	29.50		
5.038	4.925	4.900		
720.00	728.0	725		
0.00040	0.00039	0.000380		
31	30.314	29.7		



11. Rearranging equations

Method

Rearrange using inverse operations before inserting numbers. Keep the subject on its own and check the rearrangement by substituting a simple value.

Equation	Make this the subject	Answer
$v = x / t$	x	
$v = x / t$	t	
$F = ma$	m	
$F = ma$	a	
$a = (v - u) / t$	t	
$a = (v - u) / t$	v	
$a = (v - u) / t$	u	
$v^2 = u^2 + 2as$	v	
$v^2 = u^2 + 2as$	a	
$v^2 = u^2 + 2as$	u	

11A. Exam habit: substitution check

Choose two of your rearrangements above. Substitute simple numbers into the original equation and your rearranged equation to prove they match.

Equation checked	Numbers substituted	Does it match?



Algebra: rearranging equations continued

Equation	Make this the subject	Answer
$s = ut + \frac{1}{2}at^2$	u	
$s = ut + \frac{1}{2}at^2$	a	
$s = ut + \frac{1}{2}at^2$	t	
$1/R_{tot} = 1/R_1 + 1/R_2$	R_{tot}	
$1/R_{tot} = 1/R_1 + 1/R_2$	R_1	
$V = IR$	I	
$P = IV$	V	
$E_k = \frac{1}{2}mv^2$	v	
$\rho = m / V$	V	
$F = ke$	e	

11B. Rearrangement challenge

Rearrange $E_p = mgh$ to make h the subject.

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Rearrange $Q = It$ to make t the subject.

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Rearrange $P = E/t$ to make E the subject.

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Rearrange $v^2 = u^2 + 2as$ to make s the subject.

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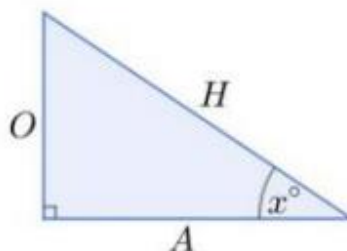
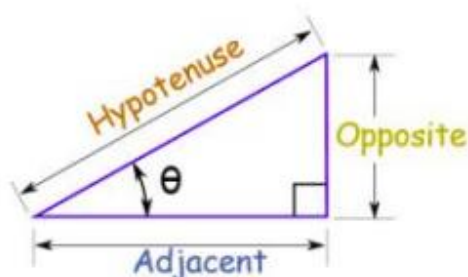
12. Trigonometry basics

Why it matters

Trigonometry is a major part of A Level Physics. It is used to resolve forces, analyse projectiles, calculate components of velocity and work with waves and fields. It becomes easy after plenty of practice.

Watch and practise

Focus	Link
Right-angled triangle trigonometry	https://www.youtube.com/watch?v=q9ILOlyPmC8
SOH CAH TOA practice	https://www.youtube.com/watch?v=z925v3v9Va4
Finding angles using inverse sine and inverse cosine	https://www.youtube.com/watch?v=RWyY3n9nTf8



12A. Inverse trigonometry practice

A right-angled triangle has hypotenuse 5.2 cm and adjacent side 3.4 cm. Calculate the angle to the horizontal. [3 marks]

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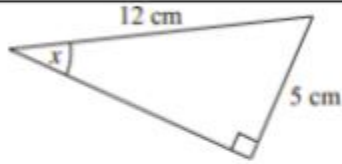
A right-angled triangle has hypotenuse 52 cm and opposite side 40 cm. Calculate the angle. [3 marks]

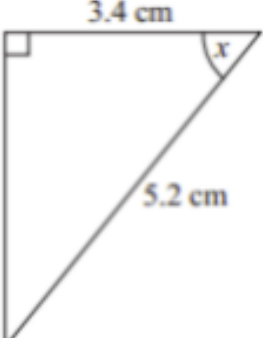
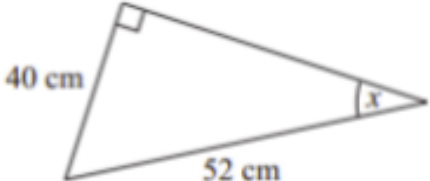
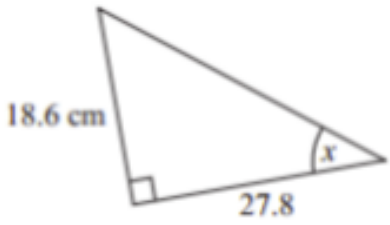
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Calculating angles:

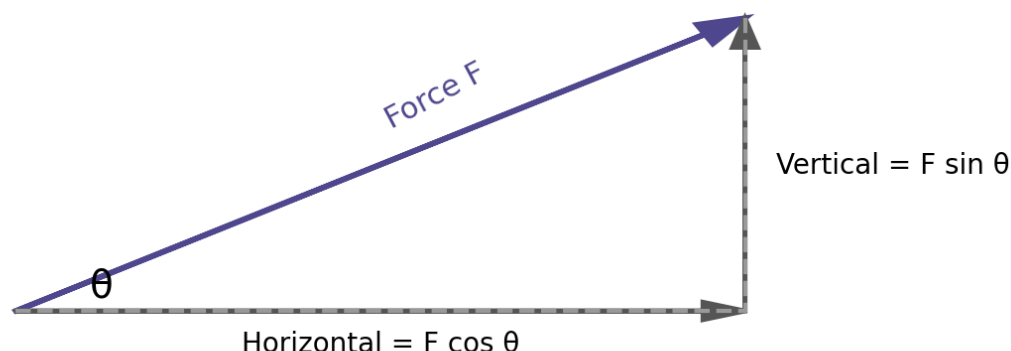
Example:

	1) Identify the sides you have – Opposite and Hypotenuse 2) Select the function that has both of these – Sine 3) $\sin(\theta) = \text{Opp} / \text{Hyp}$ 4) However you're looking for the angle so it becomes: $\sin^{-1}(\text{opp/hyp})$ $\sin^{-1}(5 / 12)$ $= 24.6^\circ$
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Trigonometry and resolving vectors



Key rule

For a vector at angle θ to the horizontal: horizontal component = $F \cos \theta$ and vertical component = $F \sin \theta$. Always draw a diagram before calculating.

Worked example

A force of 20 N acts at 30° to the horizontal. Resolve the force into horizontal and vertical components.

Step	Working
Horizontal	$F_x = F \cos \theta = 20 \times \cos 30^\circ = 17.3 \text{ N} \approx 17 \text{ N}$
Vertical	$F_y = F \sin \theta = 20 \times \sin 30^\circ = 10.0 \text{ N} \approx 10 \text{ N}$
Check	The horizontal component is larger because the angle is closer to the horizontal than the vertical.

12B. Resolve these vectors

Vector	Horizontal component	Vertical component
40 N at 35° to the horizontal		
80 N at 75° to the horizontal		
30 m s ⁻¹ at 25° to the horizontal		
12 N at 60° to the horizontal		
50 N at 40° to the horizontal		



13. C-E-R-N-A-U-S calculation method

Step	What it means	What strong work looks like
C	Convert units	g to kg, cm to m, ms to s, kN to N before using the equation.
E	Equation	Write the correct equation exactly, using standard symbols.
R	Rearrange	Make the required quantity the subject before substitution.
N	Numbers	Substitute values with units where possible.
A	Answer	Calculate clearly and avoid hidden calculator jumps.
U	Units	State the correct SI unit.
S	Significant figures	Round to a sensible number of significant figures.

Worked example

A red ball of mass 120 g receives 15 J of kinetic energy. Calculate its speed immediately after the collision. [5 marks]

C	120 g = 0.120 kg
E	$E_k = \frac{1}{2}mv^2$
R	$v = \sqrt{(2E_k / m)}$
N	$v = \sqrt{(2 \times 15 / 0.120)}$
A	$v = 15.8 \text{ m s}^{-1}$
U	Unit = m s^{-1}
S	$v = 16 \text{ m s}^{-1}$ to 2 s.f.

Success criteria for extended answers

Use correct physics vocabulary; link each point to the question; include equations where relevant; compare quantities using numbers; avoid vague phrases such as "it goes up" without saying what increases and why.

Explain why a student must convert mass from grams to kilograms before using $E_k = \frac{1}{2}mv^2$ in an A Level calculation. [3 marks]

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14. Energy and work

Quantity	Definition / meaning	Equation(s)	Unit
Work done	Energy transferred by a force moving an object through a distance	$W = Fs$, $W = \Delta E$	J
Kinetic energy	Energy due to motion	$E_k = \frac{1}{2}mv^2$	J
Gravitational potential energy	Energy due to height in a gravitational field	$E_p = mgh$	J
Elastic potential energy	Energy stored in a stretched/compressed object	$E_e = \frac{1}{2}ke^2$	J
Efficiency	useful output $\div$ total input	efficiency = useful / total	no unit / %
Power	Rate of energy transfer or rate of doing work	$P = E/t$, $P = W/t$, $P = Fv$, $P = IV$	W

Define work done. [2 marks]

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A box is pushed 3.0 m along the floor by a horizontal force of 500 N. Calculate the work done and state the main energy transfer. [3 marks]

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An electric lift raises a 540 kg load through a height of 18.3 m. Use $g = 9.8 \text{ N kg}^{-1}$. Calculate the work done. [3 marks]

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A man pulls a box 3.0 km with a force of 450 N at 38° above the horizontal. Calculate the work done in the direction of motion. [4 marks]

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15. Power questions

Define power. [2 marks]

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Explain why power can be written as $P = Fv$. [2 marks]

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Explain why electrical power can be written as $P = IV$. [2 marks]

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In two minutes a rocket gains 370 MJ of kinetic energy and 1300 MJ of gravitational potential energy. Calculate the average power output. [3 marks]

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In 30 s the rocket travels at a steady speed of 320 m s^{-1} . Assuming constant power, calculate the thrust force produced by the engines. [3 marks]

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Physics Online revision

Watch the Physics Online revision video and summarise three ideas you need to revise:

<https://www.youtube.com/watch?v=tr2wxyJhBv0>

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3	



16. Speed and acceleration questions

Key GCSE-to-A Level link

At A Level, motion questions often combine unit conversion, rearranging equations and clear reasoning. Always convert cm to m, minutes to seconds and km h^{-1} to m s^{-1} before substituting.

A bullet travels 300 m in 2.60 s. Calculate its velocity in m s^{-1} and km h^{-1} . [3 marks]

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An alpha particle covers 2.0 cm travelling at 5% of the speed of light. Calculate the time taken. Use $c = 3.0 \times 10^8 \text{ m s}^{-1}$. [3 marks]

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A cyclist completes three laps of a circular track in 2 min 24.36 s at 8.35 m s^{-1} . Calculate the radius of the track. [4 marks]

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A car travelling at 16.0 m s^{-1} brakes for 3.20 s with acceleration -3.125 m s^{-2} . Calculate its final speed. [3 marks]

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17. Electric circuits

Concept	Definition / rule	Equation
Current	Rate of flow of charge	$I = Q/t$
Potential difference	Energy transferred per unit charge	$V = W/Q$
Resistance	Opposition to current	$R = V/I$
Electrical power	Rate of electrical energy transfer	$P = IV = I^2R = V^2/R$
Series circuits	Current is the same; p.d. is shared	—
Parallel circuits	P.d. is the same; current is shared	—

A charge of 18 C passes through a component in 45 s. Calculate the current. [2 marks]

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A 12 V lamp transfers 360 J of energy. Calculate the charge that passed through the lamp. [2 marks]

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Explain the difference between current and potential difference. [4 marks]

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A 6.0 Ω resistor has a current of 2.5 A through it. Calculate the potential difference across it. [2 marks]

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Explain one advantage of connecting lamps in parallel rather than series in a home lighting circuit. [3 marks]

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18. Waves and materials

Topic	Key ideas to revise	Self-rating 1–5
Wave equation	$v = f\lambda$; frequency, wavelength and wave speed	
Wave behaviour	reflection, refraction, diffraction and superposition	
Electromagnetic spectrum	order, uses and hazards	
Hooke's law	$F = ke$; limit of proportionality	
Stress and strain	force per area; extension per original length	

A wave has frequency 250 Hz and wavelength 1.6 m. Calculate its wave speed. [2 marks]

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A sound wave travels at 340 m s^{-1} and has frequency 680 Hz. Calculate its wavelength. [2 marks]

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Explain why a spring may stop obeying Hooke's law beyond the limit of proportionality. [3 marks]

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A spring has force constant 25 N m^{-1} and extension 0.12 m. Calculate the elastic energy stored. [3 marks]

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19. Practical skills and graphs

Skill	What strong A Level work includes	Your notes
Variables	Clearly identify independent, dependent and control variables.	
Uncertainty	Record instrument resolution and calculate percentage uncertainty where appropriate.	
Repeats	Repeat readings to identify anomalies and improve reliability.	
Graphs	Choose sensible scales, label axes with units and draw a best-fit line.	
Gradient	Use a large triangle and include units for the gradient.	
Evaluation	Explain the effect of limitations and suggest realistic improvements.	

19A. Graphing mini-task

A student investigates how the extension of a spring changes with force. The results are shown below.

Force / N	0	1	2	3	4	5
Extension / cm	0.0	1.8	3.9	5.7	7.9	10.1

- Plot a graph of force against extension on graph paper.
- Calculate the gradient and explain what the gradient represents.
- Identify whether the relationship is proportional and justify your answer.

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20. Mixed practice questions

Convert 0.075 km into metres. [1 marks]

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Write 0.0000042 in standard form. [1 marks]

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Calculate the force needed to accelerate 3.5 kg at 2.8 m s^{-2} . [2 marks]

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Rearrange $V = IR$ to make I the subject. [1 marks]

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A 0.25 kg ball moves at 12 m s^{-1} . Calculate its kinetic energy. [3 marks]

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Resolve a 50 N force at 40° to the horizontal into horizontal and vertical components. [4 marks]

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State one reason why repeated measurements are taken in practical work. [2 marks]

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Explain the difference between a scalar and a vector, giving one example of each. [3 marks]

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21. Writing like an A Level physicist

Planning structure

1. Define the key physical quantity. 2. State the relevant law or equation. 3. Apply it to the situation in the question. 4. Use numbers if given. 5. Finish with a clear conclusion.

A student says: “A heavier object always falls faster than a lighter object.” Explain why this statement is not correct in ideal conditions, and explain why it may appear correct in everyday situations. [6 marks]

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Explain why a larger force does not always produce a larger acceleration in real-world motion. [4 marks]

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A student connects two identical lamps in series and then in parallel. Compare the brightness of the lamps and explain the reason using current and potential difference. [6 marks]

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22. Turn mistakes into marks

Use this log after completing the booklet. Correcting mistakes is more valuable than simply filling the pages.

Question / page	What I got wrong	Correct physics / maths	What I will do next time



23. Student reflection

Question	Response
Which three skills have improved most while completing this booklet?	
Which topic still feels weakest?	
What specific action will you take before September?	
Which enrichment reading/video did you choose and what did it teach you?	
What question about A Level Physics do you want to ask in your first lesson?	

24. Teacher feedback

Area	Teacher comment
Completion	
Calculation layout	
Accuracy and corrections	
Readiness for A Level Physics	

Final message

A Level Physics is demanding, but it is also one of the most rewarding subjects you can study. The students who make the strongest start are not always those who find GCSE easiest; they are the students who practise carefully, correct mistakes honestly and explain their thinking clearly.