NONSUCH
HIGH SCHOOL FOR GIRLS

Building Work 2026

The aims of this building work are:

Objective 1: *To identify and review key areas of your Y12 exam to improve your A-level outcomes.*

Objective 2: *To review command words that will support you answering A-level Physics questions to the highest standard.*

Objective 3: *To continue wider reading and associated skills*

Task 1: Re-sit candidates

Re-sit preparations:

This is only applicable for those resitting their End Of Year paper in September. A reminder of the information sent about this paper:

You will sit the paper on either the 11th or 12th of September. The paper will be a "Depth in Physics" style paper, much like the second mock you did. It will be 90 min and 70 marks. You will need to have a good understanding of all the AS content which is modules 1 to 4. I highly recommend attending Physics support on Thursdays, review UpLearn content over the summer break and complete as many full past papers under timed conditions as you can.

I will review the papers with you at Physics support in the week after the paper (18th Sept).

The first thing that I will look through when in September is what you have completed on UpLearn. I will ask the UpLearn manager in school to take a snap shot of where you are at the moment (July) and compare the two.

UpLearn Review		
	Planned date of completion	Completed
Fundamentals of Successful Learning		
Nature of Physics		
Motion		
Forces		
Work, Energy and Power		
Behaviour of Materials		
Newton's Laws		
Charge and Current		
Energy, Power and Resistance		
Electrical Circuits		
Waves		
Quantum Physics		
Practical Skills		
Exam Techniques		

Task 2: Literacy Activity

Identifying command words will support you answering A-level Physics questions to the highest standard. OCR issues the following guidance on each Assessment Objective.

AO1: Demonstrating Knowledge & Understanding

- **Define / State** – Give precise meanings.
- **Name / Identify / List** – Provide facts or items.
- **Describe** – Set out characteristics/details.
- **Outline** – Summarise main points.
- **Give** – Provide a short answer without explanation.

AO2: Applying Knowledge & Understanding

- **Apply / Use** – Put knowledge into context.
- **Calculate** – Work out numerical answers, showing workings.
- **Determine / Find** – Obtain a result or answer.
- **Complete / Construct / Draw** – Add or build diagrams, tables, equations.
- **Convert** – Change items into another format (e.g., g → moles).

AO3: Analysis, Interpretation & Evaluation

- **Analyse** – Break down information, examine relationships, interpret.
- **Compare / Contrast** – Identify similarities and differences.
- **Explain** – Provide reasons or describe mechanisms.
- **Deduce** – Infer from given information or data.
- **Interpret** – Translate information into meaning.
- **Discuss** – Balanced account including different viewpoints.
- **Evaluate** – Make a judgement based on evidence and criteria.
- **Suggest** – Propose ideas, hypotheses, or methods.
- **Predict** – Forecast likely outcomes based on understanding.
- **Justify** – Provide reasons or evidence supporting a decision.

Why This Matters

1. **Decoding Questions**: You must grasp what each command word is asking—e.g., "Explain" vs. "Describe."
2. **Mark Scheme Alignment**: OCR's grading rubric is structured around these command words—responding accurately improves marks.
3. **Skill Development**: Understanding and practicing responses builds progression from recall (AO1), through application (AO2), to analysis and critical thinking (AO3).

Example questions:

Try to answer these on lined paper and compare your answers to the solutions on the back.

Questions

1. Describe how you would use a micrometer to measure the diameter of a wire accurately.

(2 marks)

2. Suggest one reason why repeating measurements and calculating a mean improves the reliability of results.

(1 mark)

3. Evaluate the suitability of using a stopwatch to time a pendulum for measuring the period accurately.

(4 marks)

4. Define the term scalar quantity and give two examples.

(2 marks)

5. A car travels 120 m in 6.0 s. Calculate its average speed.

(2 marks)

6. Explain the difference between precision and accuracy in the context of experimental measurements.

(3 marks)

7. A cyclist accelerates from rest with a constant acceleration of 1.5 m/s^2. Calculate the distance travelled in 8.0 s.

(3 marks)

8. A ball is thrown vertically upwards and returns to the thrower's hand. Deduce the shape of the velocity–time graph for the motion.

(3 marks)

9. A student claims that a heavier object falls faster than a lighter one in a vacuum. Justify whether this statement is correct.

(2 marks)

10. State the equation that relates energy of a photon to its frequency.

(1 mark)

11. Calculate the energy of a photon of red light with a wavelength of 6.50×10^{-7} m.

(3 marks)

12. Discuss how the photoelectric effect provides evidence for the particle nature of light.

(4 marks)

Model Answers

1. Use the ratchet to gently close the jaws on the wire. Take multiple readings at different points and average them.

2. It reduces the effect of random errors and increases reliability.

3. A stopwatch has human reaction time error. For short periods, this is significant. Using light gates or data loggers would be more accurate.

4. A scalar has magnitude only. Examples: speed, mass.

5. Speed = distance / time = 120 / 6.0 = 20 m/s.

6. Precision refers to the consistency of repeated measurements. Accuracy refers to how close a measurement is to the true value.

7. $s = 0.5 \times a \times t^2 = 0.5 \times 1.5 \times 8^2 = 48$ m.

8. A straight line with negative gradient, crossing the time axis at the peak, symmetric about the midpoint.

9. Incorrect. In a vacuum, all objects fall at the same rate regardless of mass due to no air resistance.

10. $E = hf$.

11. $E = hc / \lambda = (6.63\times10^{-34} \times 3.00\times10^{8}) / (6.50\times10^{-7}) \approx 3.06\times10^{-19}$ J.

12. The photoelectric effect shows electrons are emitted instantly when light of sufficient frequency hits a metal, which supports the idea that light behaves as particles (photons) transferring energy in discrete packets.

Wider reading for A-level Physics

Reading whole books about Physics is a bit of a marathon. You might find an academic article will widen your understanding and base knowledge of Physics as well as open your eyes to possible future career opportunities. That said those of you hoping to follow the **Oxbridge** route, in which case a book is obviously more impressive.

Below is a list of recommended and age appropriate books, as well as some suggested areas for further reading. You should document your experience as soon as you can so that it is useful come UCAS application time. There are templates you can use to help with this. Please don't feel limited to this list.

Title	Author	Description
Six Easy Pieces	Richard Feynman	A brilliant introduction to key physics concepts by one of the most famous physicists. Clear, engaging, and thought-provoking.
The Physics of the Impossible	Michio Kaku	Explores futuristic ideas like time travel and teleportation using real physics—great for sparking curiosity.
Thing Explainer	Randall Munroe	Uses only the 1,000 most common English words to explain complex scientific ideas with humor and clarity.
Human Universe	Brian Cox and Andrew Cohen	A beautifully illustrated book that explores our place in the universe, blending physics with philosophy.
The Particle at the End of the Universe	Sean Carroll	A fascinating look at the discovery of the Higgs boson and how modern physics works behind the scenes.
Why Does $E=mc^2$?	Brian Cox and Jeff Forshaw	Breaks down Einstein's famous equation in a way that's understandable and relevant to A-level students.
The Elegant Universe	Brian Greene	A deeper dive into string theory and modern physics—challenging but rewarding for motivated students.
Stuff Matters	Mark Miodownik	While not strictly physics, this book explores the science of everyday materials in a fun and accessible way.
The Manga Guide to Physics	Hideo Nitta	A visual and fun way to learn physics basics—great for visual learners or those who enjoy comics.
GCSE to A-Level Bridging Workbooks	Various publishers	These are practical resources that help students transition smoothly from GCSE to A-level Physics.

Book Title & Author	
Main Topic	
Key Takeaway	
Favourite Part	

Rating	

Alternative wider reading

Green Technologies & Innovations	
Green Technology & Innovation (GT&I)	Peer-reviewed journal covering renewable energy, hydrogen systems, carbon capture, and sustainable infrastructure.
Clean Technologies and Environmental Policy – Springer	Focuses on the intersection of sustainability and technological innovation.
Oxford Academic – Renewable Energy Innovations	Articles on how renewable technologies contribute to sustainable development goals.
Cutting-Edge Physics (e.g., Quantum, Fusion)	
Academia Quantum – Academia.edu	Open-access journal for interdisciplinary quantum science, including computing, cryptography, and materials.
National Quantum Information Science Research Centers	U.S. DOE-backed centers advancing quantum computing, sensing, and materials.
Top Universities for Quantum Research – The Quantum Insider	A guide to institutions leading in quantum research and innovation.
Historic Physics Breakthroughs	
Harvard Physics Library – Online Resources	Includes INSPEC, ADS, and arXiv for historical and modern physics literature.
Google Scholar	Use search terms like 'Michelson-Morley experiment' or 'history of quantum mechanics' for academic articles.
Mega Projects in Physics & Engineering	
Springer – International Mega-Science Projects	Covers global collaborations like ITER and SKA, emphasizing science diplomacy.
Academia.edu – The Story of NEOM City	Academic insights into NEOM's vision, challenges, and technological ambitions.
Formula 1 – Physics & Engineering	
Aerodynamics and Aerodynamic Research in Formula 1 – Cambridge University Press	A detailed academic article exploring how aerodynamics shapes F1 performance, including tools like wind tunnels and CFD.
Study on Aerodynamic Development in Formula One Racing – Theoretical and Natural Science	Traces the evolution of F1 aerodynamics from the 1950s to modern innovations like DRS and vortex generators.
Formula One Racing: Driver vs. Technology – Stanford University	Discusses the balance between driver skill and technological advancement, and how F1 innovations influence consumer vehicles.

Mini Scientific Article Review Template

Title & Author	
Main Idea	
Key Findings	
Cool or Confusing	
Your Thoughts	

Title & Author	
Main Idea	
Key Findings	
Cool or Confusing	
Your Thoughts	

Feedback from your teachers:

Teacher Checked	Purple	Blue	Green	Yellow	Orange

Purple:

- Your questions have been completed showing your working out
- Your analysis of the Y12 exam paper is complete and topics reviewed
- The review of the scientific article is fully completed with an exceptional level of detail
- The summary is clear and specific summarising the main points of the article
- The 3 facts and figures are clearly categorised (perhaps into more than one category)
- There is a clear and very detailed link back to the specification and what you are studying.
- All 5 definitions are of complex key terms and concepts from the article

Blue:

- Your questions have been completed showing your working out
- Your analysis of the Y12 exam paper is complete and topics reviewed
- The review of the scientific article is fully completed with a high level of detail.
- The summary is clear, summarising the main points of the article
- There is a clear link back to the specification and what you are studying.
- 1 or 2 of the definitions are of complex key terms and concepts from the article

Green:

- Your questions have been completed showing your working out
- Your analysis of the Y12 exam paper is complete and topics reviewed
- The review of the scientific article is fully completed and all areas filled in.
- But there is potential for more detail to be added such as the specification links.
- Key words are completed but could be more complex words/concepts from the article.

Yellow:

- Your questions are incomplete
- Your analysis of the Y12 exam paper is complete, however the review of topics is incomplete
- The review of the scientific article is incomplete
- The review of the scientific article but sections lack detail, such as definitions, or the written areas (Summary and links to study). Key words are likely to be more basic words/concepts from the article.
- OR Your Review is partially completed, eg 2 out 3 facts or 3 out of 5 definitions.

Orange:

- Your questions are incomplete
- Your analysis of the Y12 exam paper is incomplete
- The review of the scientific article is incomplete. Whole sections are not completed, eg definitions