Welcome to A Level Physics.
The transition from GCSE to A Level is a significant step up in both conceptual understanding and mathematical demand. This summer work has been designed to help you prepare for that transition, ensuring you begin Year 12 in September 2026 with confidence and readiness to succeed.

At A Level, Physics requires more than just remembering facts. You will be expected to:
- Apply knowledge to unfamiliar situations
- Use mathematical skills fluently in problem-solving
- Think critically about practical investigations and data
- Develop independence in your learning

The purpose of this summer work is therefore to:
- Consolidate key GCSE knowledge that forms the foundation of A Level topics
- Strengthen essential maths skills such as algebra, graphs, and standard form
- Introduce core scientific thinking skills, including analysis, evaluation, and research
- Encourage curiosity and engagement with Physics beyond the classroom

We strongly encourage you to take pride in your work, present it clearly, and show all working where appropriate.
We look forward to supporting you as you begin your journey into A Level Physics.

Section 1; GCSE Physics Recap

Task 1: Key Concepts Summary
Create concise revision notes (1–2 pages each) for:
- Forces & Motion (Newton's laws, SUVAT basics)
- Energy (stores, conservation, calculations)
- Waves (properties, wave speed equation)
- Electricity (current, voltage, resistance, power)
- Particle model (density, pressure)

You must Include:
- Definitions
- Key equations
- Worked examples

Task 2: Required Practical Review
Write a summary of at least **3 GCSE required practicals**, including:
- Method
- Variables
- Sources of error
- Improvements

Section 2: Maths Skills for Physics

A Level Physics is maths-heavy—this is your most important preparation.

Task 3: Algebra & Rearranging

Solve and rearrange equations such as:

1. Rearrange $v = u + at$ for t
2. Rearrange $E = \frac{1}{2}mv^2$ for v
3. Solve: $3x + 5 = 20$
4. Solve: $y = 2x^2$ when $y = 18$

Task 4: Standard Form & Calculator Skills

1. Write in standard form:
   - 0.00045
   - 3,200,000
2. Calculate:
   - $(3 \times 10^5)(2 \times 10^3)$
   - $\frac{6\times10^6}{2\times10^2}$

TASK 5: Graph Skills

Time (s)	*Distance (m)*
0	*0.0*
1	*0.5*
2	*2.0*
3	*4.5*
4	*8.0*
5	*12.5*
6	*18.0*
7	*24.5*

1. Plot the Graph

- Plot **distance (y-axis)** against **time (x-axis)**
- Use a sensible scale
- Draw a **best-fit straight line**

2. Calculate the Gradient

- Choose two points on your line
- Use:

$$\text{gradient} = \frac{\Delta\text{distance}}{\Delta\text{time}}$$

What does the gradient represent?

3. Interpretation Questions

Answer the following:

1. Is the graph linear or curved?
2. What does this tell you about the motion?
3. Estimate the speed of the car using your gradient
4. Suggest one reason the data isn't perfectly straight

Section 3: Practical & Investigation Skills

Task 6: Mini Investigation

Choose ONE experiment:

- Measuring reaction time
- Speed of a moving object
- Cooling of water over time

Write a short report including:

- Aim
- Method
- Results (table + graph)
- Conclusion
- Evaluation

Section 4: Research Task (Independent Learning)

Task 7: Physics in the Real World

Write a 1–2-page report or presentation on one of the following topics explaining why it matters:

- Quantum physics
- Medical imaging (MRI, X-rays)
- Space exploration
- Renewable energy

Section 5: Watch & Reflect

Watch ONE of the following:

- Brian Cox documentaries
- "The Secrets of Quantum Physics"
- NASA or CERN videos

Write a **300-word reflection**:

- What did you learn?
- What surprised you?
- What would you like to explore further?

Section 6: Stretch & Challenge

Task 8: Intro to A Level Concepts

Research and explain:

- Scalars vs vectors
- Power vs energy
- Difference between accuracy & precision

Submission Expectations

- Neatly presented (handwritten or typed)
- Clear working shown in calculations
- Attempts made on all sections
- Quality > quantity