Physics

Welcome to A-Level Physics

Thank you for making a great choice to continue to study Physics to A-Level. We're going to explore the nature of physical reality, from quarks to infinite fields.

At Chew Valley we follow the AQA A-Level physics specification which can be found here: https://filestore.aqa.org.uk/resources/physics/specifications/AQA-7407-7408-SP-2015.PDF

There will be three written exams and no coursework. You will also be assessed on your practical skills throughout the two years. There are twelve 'required practical' tasks that need to be signed off by your teachers and you will also be asked questions about them on the third exam paper.

Preparation

You will need the following textbooks for the course:
Year 12: AQA Physics A Level Year 1 Oxford University Press (ISBN: 978-019-835186-3)
Year 13: AQA Physics A Level Year 2 Oxford University Press (ISBN: 978-019-835772-8)
(This book can be bought at the end of year 12.)
The two textbooks are available in a single volume (ISBN 978-019-835187-0)

Expectations

Students are expected to

- ensure their own notes are complete and comprehensive – if you have questions, clarify these with your teacher in the next lesson
- Keep notes and assignments organised in folders
- Re-do any homework/assessments which have been disappointing
- Use course textbook and additional resources to read around the subject
- Complete exam questions when they finish a topic
- Ensure their required practical book is complete and up to date

Essential skills

In order to do well at Physics you will need be confident in the following skills.
If you are struggling with these skills, seek support as early as you can when you start the course.

- Converting between different units of measurement
- Using standard form (for example 3×10^{8} and 1.6×10^{-19})
- Rearranging formulae
- Following a set of practical instructions
- Plotting an accurate line graph
- Drawing of equipment diagrams

Physics continued…

Essential content that is expected to be known from Day 1

Revision topics AQA GCSE Physics	**Specification Points**
The parts of an atom	Simple model of the atom, including the proton, neutron and electron. Charge and mass of the proton, neutron and electron in SI units and relative units. Proton number Z, nucleon number A, nuclide notation. Students should be familiar with the ${}^{A}_{Z}X$ notation (for example ${}^{14}_{6}C$) Meaning of isotopes and the use of isotopic data
Wave properties and reflection	Oscillation of the particles of the medium; amplitude, frequency, wavelength, speed, phase, phase difference, $c = f\lambda$, $f = 1 / T$
Calculating speed, velocity and acceleration	Displacement, speed, velocity, acceleration. Calculations may include average and instantaneous speeds and velocities.
Drawing distance-time and velocity-time graphs	Significance of the area under a velocity–time graph, and gradients of displacement–time and velocity–time graphs for uniform and non-uniform acceleration (e.g. graphs for the motion of a bouncing ball).
Drawing and interpreting circuit diagrams	Electric current as the rate of flow of charge; potential difference as work done per unit charge. Constructing circuits from a range of components.
Using Ohm's Law to calculate resistance	The relationships between currents, potential differences and resistances in series and parallel circuits, including cells in series and identical cells in parallel.
Trigonometry	Using trigonometry rules to find either a missing angle or length

Good news: You will be given a booklet with formulas and useful constants, which you are also given in the exams, so there's no requirement to memorise these.

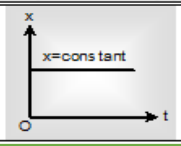
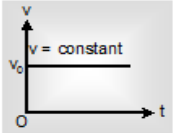
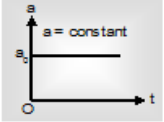
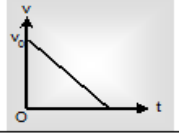
Physics continued…

Activities to be completed over the summer and brought along to your first lesson of A-level Physics

Task 1: Use the wave equation (speed = frequency x wavelength) to answer the following:

a) A wave with a frequency of 14 Hz has a wavelength of 3 metres. At what speed will this wave travel?
b) 2. The speed of a wave is 65 m/sec. If the wavelength of the wave is 0.8 metres, what is the frequency of the wave?
c) A wave has a frequency of 46 Hz and a wavelength of 1.7 metres. What is the speed of this wave?
d) A wave traveling at 230 m/sec has a wavelength of 2.1 metres. What is the frequency of this wave?
e) A wave with a frequency of 500 Hz is travelling at a speed of 200 m/s. What is the wavelength?
f) A wave has a frequency of 540 Hz and is travelling at 340 m/s. What is its wavelength?
g) A wave has a wavelength of 125 metres is moving at a speed of 20 m/s. What is its frequency?
h) A wave has a frequency of 900 Hz and a wavelength of 200 m. At what speed is this wave travelling?
i) A wave has a wavelength of 0.5 metres and a frequency of 120 Hz. What is the wave's speed?
j) Radio waves travel at a speed of 300,000,000 m/s. WFNX broadcasts radio waves at a frequency of 101,700,000 Hertz. What is the wavelength of WFNX's radio waves?

Task 2:
Complete the table below filling in each box with the correct graph, make sure to label the axes.

	Displacement(x)	Velocity(v)	Acceleration (a)
a. At v=0;			
b. Motion with constant velocity			
c. Motion with constant acceleration			
d. Motion with constant deceleration			

Task 3:

Use the acceleration equation (acceleration = change in velocity ÷ time taken) to work out the following:

a) A cyclist accelerates from 0 to 10 m/s in 5 seconds. What is her acceleration?
b) A ball is dropped and accelerates downwards at a rate of 10 m/s^2 for 12 seconds. How much will the ball's velocity increase by?
c) A car accelerates from 10 to 20 m/s with an acceleration of 2 m/s^2. How long did this take?
d) A rocket accelerates from 1,000 m/s to 5,000 m/s in 2 seconds. What is its acceleration?

Task 4:

Long answer task: Design a *single* circuit that could find the relationship of potential difference and current for a diode, lamp and resistor individually and complete a step by step method to complete this practical with the end result of a graph for each component.

Any queries to Mr Newton: jnewton@chewvalleyschool.co.uk