Cornwallis Academy
Ambitions for All

SMILE
SUCCESSFUL | MOTIVATED | INSPIRED | LEARNING | EXCITED & ENGAGED

A-level Physics

Curriculum Intent

To equip our young people with the knowledge needed to understand the world and technology around them. To encourage a curiosity in the natural, physical and chemical world around them. To foster critical thinking and a provide our young people with a chance to broaden their horizons and provide multiple routes into STEM careers.

Assessment, Marking and Feedback

Paper 1
What's assessed Sections 1 - 5 and 6.1 (Periodic motion)
How is it Assessed
• written exam: 2 hours
• 85 marks
• 34% of A-level Questions
60 marks of short and long answer questions and 25 multiple choice questions on content.

Paper 2
What's assessed Sections 6.2 (Thermal Physics), 7 and 8 Assumed knowledge from sections 1 to 6.1
How is it Assessed
• written exam: 2 hours
• 85 marks
• 34% of A-level Questions 60 marks of short and long answer questions and 25 multiple choice questions on content.

Paper 3
What's assessed Section A: Compulsory section: Practical skills and data analysis Section B: Students enter for one of sections 9, 10, 11, 12 or 13
How is it Assessed
• written exam: 2 hours
• 80 marks
• 32% of A-level Questions 45 marks of short and long answer questions on practical experiments and data analysis. 35 marks of short and long answer questions on optional topic

Homework

Online platform: www.kerboodle.com

Kerboodle is an online learning platform designed to support A-level Chemistry students with everything from day-to-day classwork to final exam revision. It gives students access to digital textbooks, revision resources, exam-style questions, quizzes, required practical support, maths-skills practice and interactive activities — all matched closely to their exam board specification.

Students can use Kerboodle to revise independently, complete teacher-set assignments, track their progress and strengthen weaker topics using self-assessment checklists, podcasts, worked examples and practice questions. The platform is especially useful for consolidating difficult concepts, practising exam technique and preparing for practical endorsement skills throughout the course.

Links to National Curriculum / Syllabus Specifications

AQA A Level Physics
AS and A-level Physics Specification Specifications for first teaching in 2015

Interested to know more?

To read:

- **"Six Easy Pieces" by Richard Feynman**
  - **Why read it:** Culled from Feynman's legendary lectures, this book covers the absolute essentials of physics (atoms, energy, gravitation, quantum mechanics) with unparalleled clarity and wit.
- **"Reality Is Not What It Seems: The Journey to Quantum Gravity" by Carlo Rovelli**
  - **Why read it:** A beautifully written exploration of how our understanding of reality has changed from ancient Democritus to modern loop quantum gravity. It breathes life into the fields and particles students learn about in Year 12.
- **"Seven Brief Lessons on Physics" by Carlo Rovelli**
  - **Why read it:** At under 100 pages, this is the perfect, accessible entry point for students who might be intimidated by massive text volumes. It covers relativity, quantum mechanics, and thermodynamics elegantly.
- **"A Brief History of Time" by Stephen Hawking**
  - **Why read it:** A classic for a reason. It bridges the gap perfectly for students taking the **AQA Astrophysics option module**, explaining black holes, the big bang, and the nature of spacetime.

To watch:

- **Interstellar (2014)**
  - **The Physics Connection: Astrophysics option & Gravitational Fields.**
  - **Why watch:** Directed by Christopher Nolan with Nobel laureate Kip Thorne as the scientific advisor. The film's depiction of time dilation near a black hole is mathematically accurate and perfectly illustrates how gravity warps spacetime.
- **Oppenheimer (2023)**
  - **The Physics Connection: Nuclear Physics & Particles.**
  - **Why watch:** This biographical masterpiece offers immense historical and scientific context to the discovery of nuclear fission, isotopic enrichment, and the creation of the atomic bomb—all core components of the AQA Year 13 syllabus.
- **Hidden Figures (2016)**
  - **The Physics Connection: Mechanics (Projectiles and Orbits).**
  - **Why watch:** The heartwarming, true story of the female African-American mathematicians at NASA who calculated the launch windows and trajectories for the Mercury and Apollo missions. It is a fantastic look at classical mechanics and orbital paths in action.
- **The Boy Who Harnessed the Wind (2019)**
  - **The Physics Connection: Electricity, Magnetic Fields & Energy Transfers.**
  - **Why watch:** Based on a true story, a young Malawian boy saves his village from famine by building a wind turbine from scrap parts. It perfectly illustrates electromagnetic induction (generators) and the conversion of kinetic energy to electrical energy.
- **Chernobyl (HBO/Sky Miniseries, 2019)**
  - **The Physics Connection: Nuclear Physics (Binding energy, fission, half-life, and control rods).**
  - **Why watch:** Widely considered one of the best miniseries ever made, it explains the mechanics of a nuclear reactor disaster with surprising technical accuracy (especially the role of graphite moderators and boron control rods).
- **The Expanse (Amazon Prime)**
  - **The Physics Connection: Mechanics (Newton's Laws, G-force, momentum).**
  - **Why watch:** Often praised as the most scientifically accurate sci-fi series on television. Ships don't move like airplanes in space; they obey Newton's laws of motion. It brilliantly showcases the reality of inertia, artificial gravity via constant acceleration, and the physical toll of high-G maneuvers on the human body.

To listen:

- **The Infinite Monkey Cage (BBC Radio 4)**
    - **Hosts:** Professor Brian Cox and comedian Robin Ince.
    - **Why listen:** This is a perfect mix of serious science and witty banter. They bring on world-class physicists to debate big questions—ranging from "What is nothing?" to the mechanics of black holes. It directly feeds into **AQA Astrophysics** and **Particles**, making complex quantum theory incredibly digestible.
- **Physics World Weekly Podcast**
    - **Host:** The Institute of Physics (IOP) editorial team.
    - **Why listen:** This keeps students up to date with the latest breakthrough research and real-world applications. Listening to this is one of the easiest ways for students to find unique topics for university personal statements or interviews.
- **Sean Carroll's Mindscape**
    - **Host:** Sean Carroll (Theoretical Physicist).
    - **Why listen:** For your Year 13 students tackling fields and quantum mechanics, this is pure gold. Carroll hosts deep, unfiltered conversations with experts on thermodynamics, quantum foundations, and cosmology. It provides the deeper *why* behind the equations they learn in class.
- **Daniel and Jorge Explain the Universe (iHeartPodcasts)**
    - **Hosts:** Daniel Whiteson (CERN Particle Physicist) and Jorge Cham (Creator of *PhD Comics*).
    - **Why listen:** This podcast is fantastic for Year 12s just starting out. They tackle massive, mind-boggling questions about the universe (e.g., "What happens inside a particle accelerator?") using zero jargon and tons of creative analogies. It maps beautifully onto the **AQA Particles and Radiation** module.

To visit:

- The Historic Dockyard Click to open side panel for more information is an exceptional site for exploring mechanical engineering and materials science. Located in Chatham, this historic maritime facility allows students to see classical mechanics on a massive scale.
    - **The Physics Connection: Mechanics, Materials, and Waves.**
    - **Key Highlights:** The Ropery features an incredibly long building illustrating tension, strain, and material strength. Exploring HMS Ocelot (a Cold War submarine) provides a direct look at buoyancy, fluid dynamics, and underwater acoustic wave technologies (sonar).
- Sound Mirrors Click to open side panel for more information offers a unique look at pre-radar acoustic technology on the Dungeness peninsula. These massive, concrete curved structures were built between the world wars to detect the sound of approaching enemy aircraft engines.
    - **The Physics Connection: Waves (Reflection, Refraction, and Diffraction).**
    - **Key Highlights:** The structures function exactly like concrete satellite dishes, reflecting and focusing sound waves into a central point where a listener would stand. It is a stunning visual and physical demonstration of wave properties and curved reflectors.
- Secret Wartime Tunnels Click to open side panel for more information at Dover Castle provide a fascinating look into the practical applications of early radio communication and underground engineering.
    - **The Physics Connection: Electricity and Magnetic Fields (Radio waves).**
    - **Key Highlights:** These tunnels housed the underground command centre for the Dunkirk evacuation and a massive underground communication network. It is a brilliant case study in how electromagnetic waves were harnessed for vital wartime telecommunications and radar coordination.
- Royal Observatory Greenwich Click to open side panel for more information sits right on the historic border of Kent and London and is an essential visit for anyone taking the astrophysics path. It is the historic home of British astronomy and the source of the Prime Meridian line.
    - **The Physics Connection: Astrophysics option module.**
    - **Key Highlights:** Students can stand directly on the Prime Meridian line (0° longitude) and explore John Harrison's pioneering marine chronometers, which solved the longitude problem. The site

also features London's only planetarium, providing excellent visualization of stellar evolution and cosmology.