

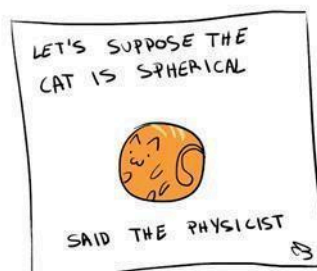
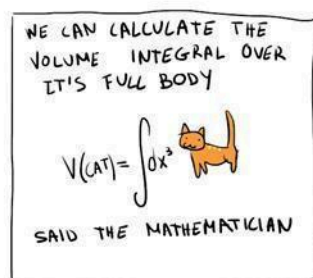
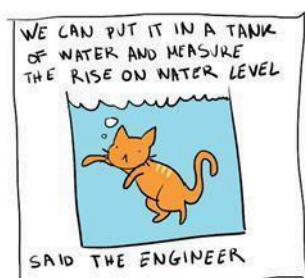
Nonsuch High School for Girls



Sixth Form

Physics Handbook 2026 – 2028

HOW TO CALCULATE THE VOLUME OF A CAT ?



Name: _____

"Physics teaches people to accept the reality with awe and admiration not to mention the amazement and joy that comes with it." – Lise Meitner

Welcome to A-Level Physics!

Overview

A level Physics gives you the opportunity to explore the phenomena of the universe and to look at theories that explain what is observed. This subject combines practical skills with theoretical ideas to develop descriptions of the physical universe. Physics is more than a subject – it trains your brain to think beyond boundaries.

You will already be familiar with many of the topics that you will study, including forces, waves, radioactivity, electricity and magnetism. At A-level, you'll look at these areas in more detail and find out how they are interconnected. You will also learn how to apply maths to real-world problems and explore new areas such as particle physics, cosmology and medical physics.

But the main thing is that there is a big jump between GCSE and A level – no doubt about it. A level Physics yearns for deep understanding of topics and relies less on memorisation and more on how you express your understanding of a topic. You can't take it easy and you have got to dive right in.

Some of the pioneering women in Physics, perhaps your picture will be there one day?



Enheduanna



Sophia Brahe



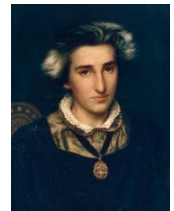
Maria Cunitz



Caroline
Herschel



Mary
Somerville



Margaret
Huggins



Marie Curie



Lisa Meitner



Ching Shiung Wu



Vera Rubin



Valentina
Tereshkova



Jocelyn
Burner



Kalpana Chawla



Shirley Jackson



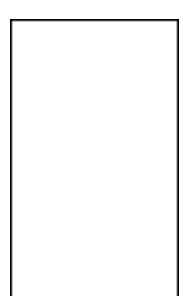
Fabiola Gianotti



Donna
Strickland



Christina
Koch



Your
Face?

Your teachers

Teacher	Email
Mr Stobie-Jones – Head of Physics	Stobie-Jones-r@nonsuchschool.org
Dr Kearnes	Kearnes-a@nonsuchschool.org
Mrs Velzeboer	Velzeboer-k@nonsuchschool.org
Mrs Jayaraj	Jayaraj-n@nonsuchschool.org
Mrs Jenkins	NJenkins@nonsuchschool.org

What will I be learning?

You are doing **OCR A level Physics**. The course is divided into six modules. The first two modules (Development of practical skills in physics and Foundations of physics) are taught alongside the last four.

Module 1 – Development of practical skills in physics

- 1.1 Practical skills assessed in a written examination
- 1.2 Practical skills assessed in the practical endorsement

Module 2 – Foundations of physics

- 2.1 Physical quantities and units
- 2.2 Making measurements and analysing data
- 2.3 Nature of quantities

Module 3 – Forces and motion

- 3.1 Motion
- 3.2 Forces in action
- 3.3 Work, energy and power
- 3.4 Materials
- 3.5 Momentum

Module 4 – Electrons, waves and photons

- 4.1 Charge and current
- 4.2 Energy, power and resistance
- 4.3 Electrical circuits
- 4.4 Waves
- 4.5 Quantum physics

Module 5 – Newtonian world and astrophysics

- 5.1 Thermal physics
- 5.2 Circular motion
- 5.3 Oscillations
- 5.4 Gravitational fields
- 5.5 Astrophysics and cosmology

Module 6 – Particles and medical physics

- 6.1 Capacitors
- 6.2 Electric fields
- 6.3 Electromagnetism
- 6.4 Nuclear and particle physics
- 6.5 Medical imaging

When will I be learning what?

You will have two teachers who will teach you different sections of the course. As this is a linear course, we have taken to opportunity to reorder the teaching of the content course to suit the learning environment at Nonsuch.

Year 12				
	Teacher 1		Teacher 2	
September 2025 - July 2026	2.1	Physical quantities and units	4.1	Charge and current
	2.2	Making measurements and	4.2	Energy, power and resistance
		analysing data	4.3	Electrical circuits
	2.3	Nature of quantities	4.4	Waves
	3.1	Motion	3.4	Material Physics
	3.2	Forces in action	5.2	Circular motion
	3.3	Work, energy and power	5.3	Oscillations/SHM
	3.5	Momentum	5.4	Gravitational fields
	4.5	Quantum Physics		

* Further information on the content of each module and unit can be found at <http://www.ocr.org.uk/qualifications/as-a-level-gce-physics-a-h156-h556-from-2015/>

How is it assessed?

1. Class assessments

- At the end of each topic there will be an end of unit progress test.
- Surprise 10 min tests on previous topics.
- 6 marks assessments embedded into the topic.
- End of year exams for Y12 and mock exams for Y13

2. Exam board assessments

There are four assessment components detailed in the table below.

Assessment Title and Number	Type of Assessment	Percentage of total A Level	Modules Assessed.
Modelling Physics (01)	2 hours 15 minutes written paper (100 marks)	37%	Modules 1, 2, 3, and 5.
Exploring Physics (02)	2 hours 15 minutes written paper (100 marks)	37%	Modules 1, 2, 4, and 6.
Unified Physics (03)	1 hour 30 minutes written paper (70 marks)	26%	Modules 1 to 6.
Practical endorsement (04)	Assessed throughout the course (with no exam)	Reported Separately	Application of module 1 to modules 2 to 6.

There are three assessment objectives, with the papers more heavily weighted on the first two.

	Assessment Objective
A01	Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures.
A02	Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: - in a theoretical context - in a practical context - when handling qualitative data - when handling quantitative data.
A03	Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: - make judgements and reach conclusions - develop and refine practical design and procedures.

What makes a successful physics student?

Be curious, ask as many questions as you can, both of your teacher and your peers; physics is easier to understand if you question it. Your lessons will include lots of opportunities for discussion and you are encouraged to take every opportunity. Finding the solution to a tricky proof is one of the most rewarding moments when studying physics.

Practise, practise, practise! Physics requires you to be able to solve complex problems, each one requiring you to draw on the full a wide spectrum of knowledge. While we will be teaching you the skills you need to achieve this in lessons, there is no substitute for simply practising past paper questions. For every hour spent in class, you must spend an hour outside the class. This can be either at home or during your study periods.

What should I do if I get stuck?

KS5 Physics Club is held every week. This is an informal time to bring homework, revision questions, or the latest proof you have been working on to get help from a physics teacher or from one of your peers. Additional support and extension programs will be run depending on demand and necessity.

Physics teachers are a friendly bunch so you don't need to wait till the Physics club; if one of us (even if we don't teach you) has five minutes when you happen to catch us we'll be happy to help there and then, or book you in when we do have time.

Don't forget your classmates. You'll probably find that if you are finding it challenging, they are too; working through problems together can help you find solutions that you might have missed on your own.

Department resources

1. Text Books

- a. Online textbook – Kerboodle gives you access to the digital version of the textbook A level Physics by Gurinder Chadha, Oxford publication.
- b. Hard copy - You will be issued with a copy of Advanced Physics for You by Keith Johnson which should be returned at the end of the course.
- c. Practise question books (Calculations for A-level Physics) and OCR Physics Books 1 and 2 published by Pearson are available to sign out for 1 day at a time from Science office.

2. **Work packs** - Every topic will be supplemented by a work pack which contains past exam questions.

3. **Resource Booklets** – Recall and retrieve questions in the form of a booklets.

4. **PAG booklets** – A booklet comprising of the worksheets of all required practicals will be provided.

3. **Past paper packs** – Towards the end of the year, past paper packs compiling all previous year's paper will be provided as hard copy to the students

4. **Support Centre** – A document which has work pack and resource booklet questions divided to subtopics to aid independent learning and links to videos to enhance learning.

5. **Easy marks** – All the previous recall collated into a booklet.

6. **SharePoint** – A fully populated SharePoint area with soft copies of work packs, resource booklets, answers to work pack and resource booklets, revision resources and links to various useful websites.

7. **UpLearn** – This is a bespoke online support platform that monitors your efforts and reports this to your teachers.

Practical Endorsement

A range of practical experiences is a vital part of a learner's development as part of this course. Learners should develop and practise a wide range of practical skills throughout the course as preparation for the Practical Endorsement, as well as for the written examinations. The experiments and skills required for the Practical Endorsement will allow learners to develop and practise their practical skills, preparing learners for the written examinations. In order to assess practical skills, you will cover a variety of practical activity groups (PAGS) throughout the year. You will record when you completed each practical and what skills you developed in your PAG booklet which contains instructions for each practical you will cover.

Our expectations of you

Independent study

Students are expected to complete revision and further reading in addition to their homework. The subject is challenging and the more you know the easier you will find it! You will be provided with workbooks that include practice questions and as mentioned before you should expect to spend at least an hour outside the lesson for every one hour you spent in the lesson. Physics club is another great place to find this time.

Deadlines and homework

The deadlines we set are fair and will give you plenty of time to complete the work. As a

result, we expect all homework to be completed and handed in on time. This will allow your teachers to give you feedback quickly and effectively. We do recognise that some circumstances can arise where you are not able to complete the work, if this happens, you must ensure you see your teacher as soon as possible (preferably before the deadline) so they can agree an extension.

Punctuality

Students are expected to be on time to the lessons. Repeated lateness would have to be compensated by extra time during lunch or afterschool.

Missed lessons

If you miss a lesson it is your responsibility to ensure you catch up the missed work. Ask a classmate or email your teacher so you know what you need to do.

Equipment

You are expected to maintain a proper organised folder and bring it with you to every lesson. On your first lesson you will be given a list of items that we expect to find in your folder every lesson. Together with that you will be expected to bring your scientific calculator to every lesson along with the usual paper, whiteboard pen and pens/pencils.

Health and safety

Majority of your lessons are conducted in labs. Students are expected to follow all the health and safety rules displayed in the lab.

We support you!

How?	When	Where
A level Physics Club (inc university selection test preparation)	TBC based on teacher timetable	S4

What next?

University:

A Level Physics is **essential** for:

- Engineering (all disciplines including some Chemical Engineering courses) Physics

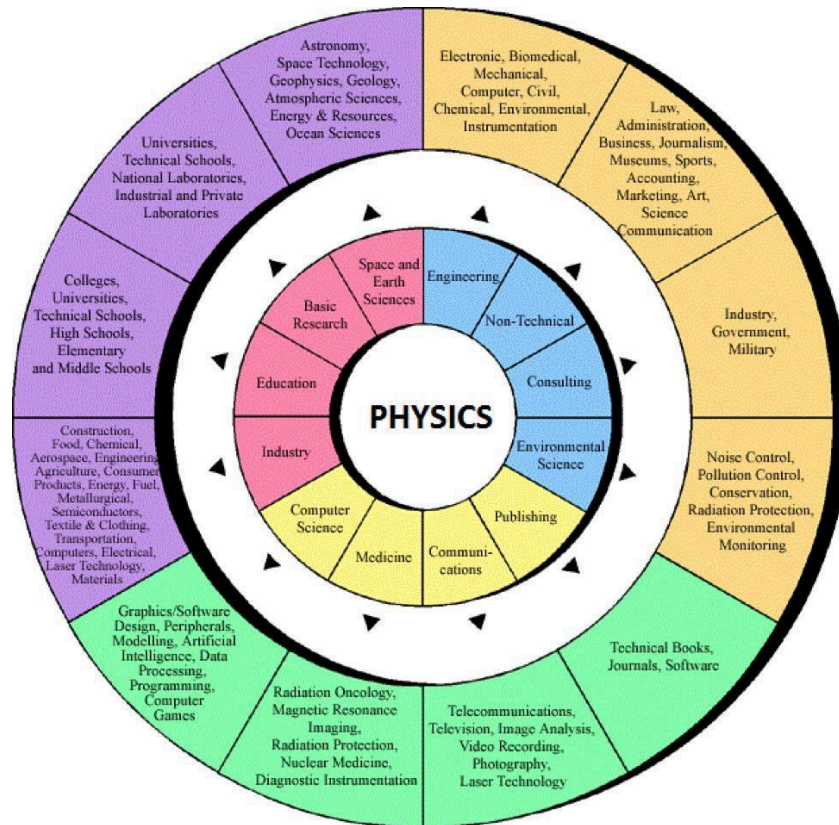
A Level Physics is **strongly** recommended for:

Engineering (All Disciplines)	Astronomy and Astrophysics
Pure Physics	Geophysics and Earth Sciences
Architecture	Mathematics
Computer Science	Aerospace and Aeronautical Engineering
Medicine	Optometry
Pharmacy	Sports Science
Veterinary Science	Orthoptics

Careers

By the end of the course, you will develop skills that can be transferred to just about any other area of work, from setting up a business to saving the planet. Even if you don't go on to become a physicist, learning to think like one will help you get to the root of any problem and draw connections that aren't obvious to others.

Physics won't give you all the answers, but it will teach you how to ask the right questions.



Good Luck

[Turn over for enrichment and super curricular activities]

Enrichment and super curricular opportunities

In order to support your learning we recommend that you engage in activities from the sections below to help widen your interest in the subject as well as begin to introduce you to the kind of independent learning activities we encourage you to engage with during A level study.

Practise Questions

1. **‘Head start to A level Physics’** has lots of practise questions to refresh your GCSE knowledge and to start the transition to A levels. Link given below:
<https://www.cgpbooks.co.uk/secondary-books/as-and-a-level/science/physics/pbr71-head-start-to-a-level-physics>
Also available in amazon
https://www.amazon.co.uk/Head-Start-level-Physics-%20%20Level/dp/1782942815/ref=sr_1_1?crid=1TS1MFUX8M31S&dchild=1&keywords=headstart+to+a+level+physics&qid=1588544572&srefix=Headstar%2Caps%2C190&sr=8-1
2. **‘Essential Maths skills for A Level Physics’** - the questions provide you a good base to get you ready for A level Physics. Link given below:
<https://www.cgpbooks.co.uk/secondary-books/as-and-a-level/science/physics/pmr71-a-level-physics-essential-maths-skills>
Also available in Amazon
https://www.amazon.co.uk/Level-Physics-Essential-Maths-Skills/dp/1782944710/ref=sr_1_1?crid=284H50UBRHEUT&dchild=1&keywords=essential+maths+skills+for+a+level+physics&qid=1588578017&srefix=Essential+maths+skills+%2Caps%2C179&sr=8-1

Subject Reading List

We recommend that you read at least one book from the list below. The list is diverse and engaging as wider reading at this stage is not about developing your subject knowledge but cultivating a deeper interest in the subject. We look forward to hearing about what you have read in September.

1. **Moondust - In search of men who fell to Earth, Andrew Smith**
This book uses personal account of 9 astronauts and many others involved in the space program, looking at the whole new space era
2. **From X-rays to Quarks: Modern Physicists and their Discoveries, by Emilio Segre**
Beautiful and easy to read with some brilliant photos of some of the most brilliant physicists.
3. **Quantum - Einstein, Bohr and the Great Debate About the Nature of Reality, Manjit Kumar**
A chronological account of the development of quantum mechanics. Told like a story with background info about different physicists, but it also gives a good intro to the science
4. **Six Easy Pieces, Richard Feynman**
Six short lectures by Richard Feynman where he introduces basic concepts in simple language
5. **Storm in a teacup, Helen Czerski**
Talks about the Physics behind everyday phenomena, more of a light read than others
6. **Why does $E = mc^2$, Brian Cox and Jeff Forshaw**
Introduces special relativity without assuming much beyond basic Physics
7. **A Short History of Nearly Everything, Bill Bryson**

A whistle-stop tour through many aspects of history from the Big Bang to now. This is an accessible read that will re-familiarise you with common concepts and introduce you to some of the more colourful characters from the history of science.

8. The Physics of Super Heros, James Kakalios

If superheroes stepped off the comic book page, could they actually work their wonders in a world constrained by the laws of physics? How strong would Superman have to be to 'leap tall buildings in a single bound'?

9. How to teach Quantum Physics to your dog, Chad Orzel

From quarks to gluons to Heisenberg's uncertainty principle, it is an entertaining way to grasp basic Quantum Physics

10. What if? Serious Scientific Answers to Absurd Hypothetical Questions, Randall Munroe

From the creator of the wildly popular xkcd.com, hilarious and informative answers to important questions you probably never thought to ask

Movie Recommendations

- 1. The Abyss (1989)** - James Cameron has done a great job in directing this film, by keeping it sci-fi, yet scientifically accurate. This one goes way too deep into the sea.
- 2. Apollo 13 (1995)** - Based on a true story. NASA must devise a strategy to return Apollo 13 to Earth safely after the spacecraft undergoes massive internal damage putting the lives of the three astronauts on board in jeopardy
- 3. Moon (2009)** - With only three weeks left in his three year contract, Sam Bell is getting anxious to finally return to Earth. He is the only occupant of Moon-based manufacturing facility along with his computer and assistant, GERTY. When he has an accident however, he awakens to find that he is not alone.
- 4. Gravity (2013)** - Two astronauts work together to survive after an accident which leaves them stranded in space
- 5. Interstellar (2014)** - A team of explorers travel through a wormhole in space in an attempt to ensure humanity's survival
- 6. The imitation Game (2014)** - Based on a true story. During World War II, the English mathematical genius Alan Turing tries to crack the German Enigma code with help from fellow mathematicians
- 7. The theory of Everything (2014)** - Starring Eddie Redmayne, this film is based on the life of one of the greatest physicians of all time – Stephen Hawking
- 8. The Martian (2015)** - When astronauts blast off from the planet Mars, they leave behind Mark Watney (Matt Damon), presumed dead after a fierce storm. With only a meager amount of supplies, the stranded visitor must utilize his wits and spirit to find a way to survive on the hostile planet.
- 9. Radioactivity (2019)** - The incredible true story of Marie Skłodowska-Curie and her Nobel Prize-winning work that changed the world. Constantly side-lined because of her gender, physicist Marie Curie discovers radium and polonium and soon discovers radioactivity, which brings a revolutionary change in chemistry and physics studies.

MOOC

MOOCs (Massive Open Online Courses) are online courses run by nearly all universities. They are short Free courses that you take part in. There are lots of websites that help you find a course, such as edX and Future learn. You can take part in any course, but there are usually start and finish dates. They mostly involve taking part in web chats, watching videos and interactives. It will really help you to add to your personal statement for UCAS.

Presentation Links

With a maximum of 30 minutes, here are some great presentations (and free!) from world leading scientists and researchers on a variety of topics. They provide some interesting answers and ask some thought-provoking questions. Use the links given below:

1. The fascinating Physics of everyday life

https://www.ted.com/talks/helen_czerski_the_fascinating_physics_of_everyday_life?language=en

Physicist Helen Czerki presents various concepts in Physics you can become familiar with using everyday things found in your kitchen

2. We need nuclear power to solve climate change

https://www.ted.com/talks/joe_lassiter_we_need_nuclear_power_to_solve_climate_change?language=en

Joe Lassiter is focused on developing clean, secure and carbon-neutral supplies of reliable, low-cost energy. His analysis of the world's energy realities puts a powerful lens on the touchy issue of nuclear power

Experiment to try at home

Crushing sugar cubes!

You would not believe it unless you did it and saw it. Ordinary white sugar cube, sit in a very dark room, let your eyes dark adapt (fully), crush the cube (nut crackers, pliers, hammer!) as it shatters you get a tiny flash of blue/green light.

Past experiences show that students get through a whole box of sugar cubes!

Other Opportunities

- **Isaac Physics** - Mastering Physics by solving problems: from schools to university. The best thing is that it lets you track your progress so it's easy to write about it in a personal statement.
<https://isaacphysics.org/>
- **I want to study engineering** – A website with Maths and Physics problems designed to help you compete for engineering places at top universities
<https://i-want-to-study-engineering.org/>

END OF HANDBOOK