

# EXPAND

Your:

Knowledge

Options

Skills

Horizons

## physics at A-level

# WHAT WILL I STUDY?

**Which subjects should I choose?**

If you don't know what you want to do, think about the A-levels that will keep the most options open. Top universities recommend that you take at least two of the subjects shown on the opposite page. For most science and engineering courses both A-level physics and maths are required.

It is important to remember that although many jobs outside science do not require you to have studied a specific subject, studying a recommended A-level (such as physics) can give you an advantage.



**STEPH  
TV WEATHER FORECASTER**



**"To get any job you have to stand out from the crowd. Physics will help to give you that edge; people are always impressed by a qualification in physics."**



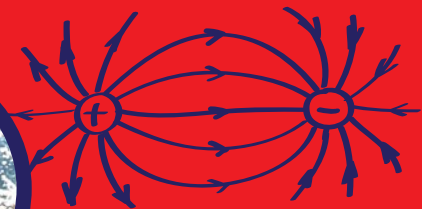
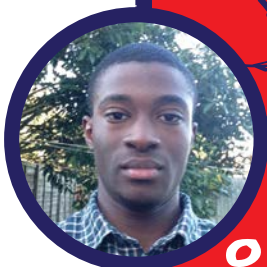
**A**

### Recommended A-levels

Top universities\* recommend that you study at least two from:

**Physics**  
**Mathematics**  
**English literature**  
**Chemistry**  
**Biology**  
**Geography**  
**History**  
**A language**

\*[russellgroup.ac.uk/informed-choices](http://russellgroup.ac.uk/informed-choices)



"It's a bit of a jump from GCSE to A-level. You study things in much more depth. But now that I'm getting to the end of my course I've really started to understand the links between different areas. It's really changed my outlook on the world."

RENATO  
A-LEVEL PHYSICS STUDENT

## What will I learn in A-level physics?

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.\*

Perhaps more importantly, 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.

\* The specific topics you will study in an A-level depend on your exam board. Details can be found in the "A-level physics specification" available from exam board websites. If you are unsure which exam board you will be studying, ask your physics teacher.

# What can I do with an A-level in physics?

Although only a lucky few get the chance to become an astronaut, studying physics can help you land a job in space.

You could become a cosmologist and investigate the evolution of the universe, a planet-hunter who searches for habitable planets around other stars or an astrophysicist who searches for dark matter and black holes.

If you prefer something more hands-on, there are also lots of UK jobs in space engineering.

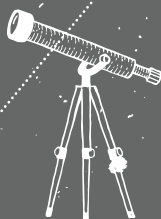


## INVESTIGATE SPACE



CHARLOTTE, ASTROPHYSICIST

"I use NASA's famous Hubble Telescope as well as several ground-based telescopes in Chile and La Palma to study the most extreme explosions in the universe. These are created when stars much bigger than our sun die. By studying them we can learn more about the massive blue stars that create them."



RAMY, SPACECRAFT ENGINEER



"The UK space industry is one of the fastest growing sectors in the UK. There are lots of opportunities for young people who want to design satellites or space telescopes, or build and operate spacecraft to investigate our solar system."



Find out more about how physics is used  
in medicine at [www.ipem.ac.uk](http://www.ipem.ac.uk)

# Work in medicine

Whether you want to be a surgeon or a clinical scientist, understanding physics is important if you want to work in modern medicine. Physics has revolutionised the diagnosis and treatment of illness. Surgery is now routinely carried out using lasers; cancer is treated using radiation, and new ways of using physics to see inside our bodies are being developed every year.

## DECLAN, SURGEON

"I'm glad I took A-level physics before studying medicine at university. Now that I am a surgeon, understanding how sound is produced has helped me understand how the human voice works. I also use lasers most weeks and having knowledge of how they work helps."



"After studying physics at university I decided to specialise in radiotherapy. I now work on delivering the best possible treatment for cancer patients using advanced computer systems and sophisticated particle accelerators. I love the mixture of working with different people and using cutting edge physics in my job."



LEILA  
MEDICAL PHYSICIST

*"Engineering is a great way to use maths and physics to do something practical. My favourite part is being able to point at a cool building like the Shard and say, 'I designed that!'"*

**ROMA  
STRUCTURAL ENGINEER**



**Architects and civil engineers design all sorts of buildings, from schools to skyscrapers, as well as other vital structures like bridges, dams and tunnels. A-level physics could be your first step towards a career in building a better world.**



**"Although physics was my weakest science at GCSE, I'm glad I took it at A-level and in the end I got really good grades. I now realise just how important physics is to designing buildings; for example you need to understand materials, and how they are affected by heat and light, and also how vibrations affect buildings, if there is a natural disaster such as an earthquake. If you want your building to stay up, you just can't ignore physics."**

**HAYDEN  
ARCHITECT**

**Build  
a Better  
World**

**Find out more about engineering at [www.tomorrowsengineers.org.uk](http://www.tomorrowsengineers.org.uk)**

"In visual effects you need to understand the laws of physics so that you can replicate them. We work in a computer-generated, virtual world, where buildings topple, tidal waves crash and things explode, and we can make this happen by understanding the underlying physics and using it in our animation. If we don't get it right, the audience would never believe it."

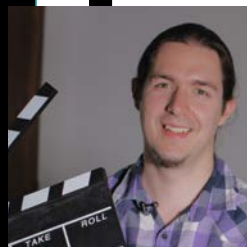


EUGENIE, VISUAL EFFECTS  
ARTIST

To make realistic visual effects for films and TV, or design computer games you'll need physics, maths and computing.



"All modern games need the physics to be programmed in to them. Without it you just can't create games like Grand Theft Auto or Star Wars. If you are interested in becoming a computer games designer, one of the most important pieces of advice I could give you is to take A-level physics and maths."



CHRIS,  
CHARACTER PROGRAMMER

People with a background in physics are needed more than ever to monitor climate change and find sustainable ways of generating electricity. We also need more engineers to work out how to save water, improve the world's food supply, make travel more environmentally friendly and recycle waste on a large scale.

## What can I do with an A-level in physics?

# SAVE THE PLANET



"When I was deciding on what to do after my degree green energy really appealed to me. Saving the world was something I definitely had in mind. I now work on improving the efficiency of solar cells so that they can be used on a bigger scale so that we reduce our reliance on fossil fuels."

JESS  
SOLAR ENERGY PHYSICIST

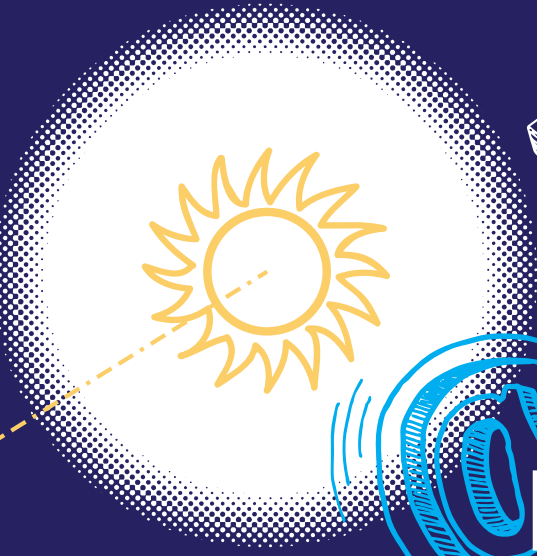


"I create better places for people and wildlife, and support sustainable development. For me and my colleagues our physics training is an intrinsic

part of what we do. We need it to develop our monitoring equipment for wildlife, predict the flow conditions in rivers in order to manage flooding and also to protect ecosystems by understanding the basic principles that govern the environment we live in."

MATT, ENVIRONMENTAL TECHNICAL ADVISOR





# 1

Whether you want to set up your own business or help run a large multinational company, studying physics can offer you a great return.



# Set up a business

# 2

**LEON, RESTAURANT FRANCHISE OWNER**

"After university I decided to set up a restaurant business. Working for yourself can be hard, and this is where my physics helps. As well as a good understanding of numbers, physics gives you a robust, logical, sceptical mind, which is ideal for any business pursuit."

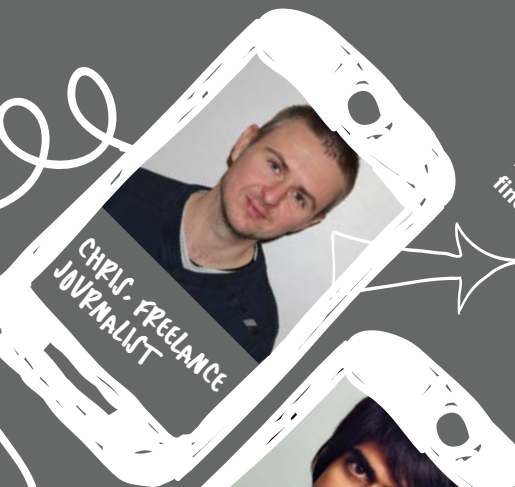


# 3

**GEMMA, INVESTMENT EXPERT**

"I help businesses invest billions of pounds. A background in physics has got me to where I am today. The ability to solve problems and the confidence to deal with complicated issues has proved invaluable. Moreover, a questioning scientific mind gives you a fresh perspective and allows you to think outside the box – perfect if you want to stay ahead of the game."





"Writing for magazines and newspapers comes down to finding things out and then telling people about them – much like physics. And the comfort with numbers and logical thinking developed by studying physics have been a great help to me when planning, researching, and, finally, writing stories on topics ranging from traditions in naming football stadiums, through RAF Bomber Command during WW2, to the finer points of environmental law."



"Reporting on new areas of science can be daunting if you have no foothold whatsoever. Even knowing a completely different bit of science increases your confidence when tackling a new bit."



To report on news, politics and the latest scientific discoveries you need to know a little bit of everything. If you are thinking of specialising in reporting science, then an A-level in physics becomes even more important.

"I develop technology to help high-level athletes and non-athletes alike. Recently I've worked on goal-line technology for the Premier League and also an app that allows you to measure how fast you can kick a football and share it with your mates. Being a sports fan, its great being able to use my engineering skills for something I love."

HEATHER, SPORTS ENGINEER



"I work with graphene, a new form of carbon that is only one atom thick! This substance is very light, yet incredibly strong and could soon be used to develop lots of new devices, such as a flexible smartphone that you can wrap around your wrist."

REBECCA, GRAPHENE RESEARCHER



Design  
new  
gadgets

Our world is full of gadgets.  
The number is only going to grow.  
So if you love gadgets and apps  
then why not get a job  
developing them?



# BECOME A LAWYER

Although the link between law and physics may not be obvious, the skills you need for both have a lot of overlap. Both require you to identify the key principles that apply from a wide range of possibilities, and use your skills to solve a specific problem.



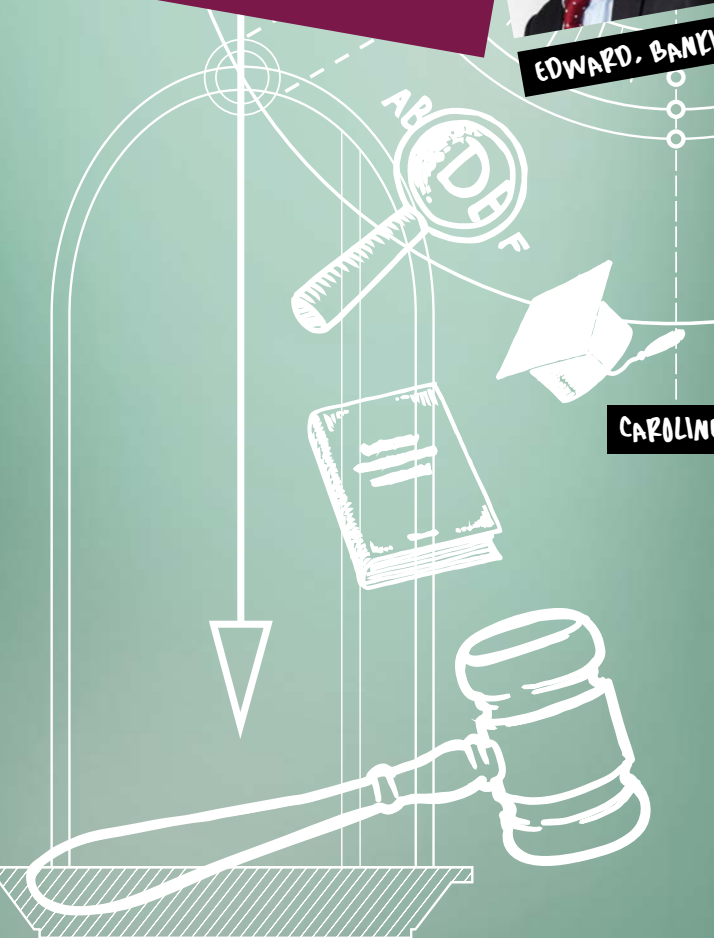
**EDWARD, BANKING LAW SOLICITOR**

"The skills that I developed by studying physics have provided a perfect grounding for a career in law. It has helped me to think critically and creatively. Drafting contracts and negotiating with other lawyers really isn't so different to writing physics reports and debating theories."



**CAROLINE, PATENT ATTORNEY**

"If you want to specialise in protecting new inventions you definitely need to study science or engineering at university. Intellectual property law requires a detailed understanding of the underlying science so you can argue your case from a strong knowledge base."





# DISCOVER

the nature of reality

If you want to know answers to questions like how big the universe is, what everything is made of and whether time-travel is possible, then perhaps a career in physics research is for you. Although physicists have made huge progress in answering many questions, there still plenty to find out.

Martyna, Theoretical physicist



"I'm developing new mathematical methods to test theories that try to combine gravity with quantum mechanics. If some of these theories prove to be correct, we may actually live in a universe with at least 10 dimensions. Many more than the three we normally experience."



Andreas, Experimental physicist



"I'm trying to build a laser system to measure ripples in space-time. These gravitational waves are predicted by Einstein's theory of relativity, but no-one has detected one yet."



Studying A-level physics doesn't restrict your options, it expands them. As well as being needed for many careers in science and engineering the skills and knowledge that you can develop by studying physics keeps the door open to doing just about everything else.

# DO SOMETHING COMPLETELY DIFFERENT



**"Poker is all about making complex decisions and understanding variables – skills that I learned studying physics. That's the beauty of the subject – you can apply the skills you learn to so many areas. Many of them, like poker, are not so obvious until you try them."**

**LIV, PROFESSIONAL POKER PLAYER**

**"You'd be surprised how useful physics can be. In fact, it got me my first job at a major UK music retailer. They needed someone with computing and radio experience to help start a radio station. Since I used to DJ on student radio and had done lots of programming as part of my degree, I really fitted the bill."**

**MARTIN, RADIO AND CLUB DJ**



## FIND OUT MORE

### Research different types of careers

Graduate jobs: [prospects.ac.uk](https://prospects.ac.uk)

Apprenticeships: [apprenticeships.org.uk](https://apprenticeships.org.uk)

England: [nationalcareersservice.direct.gov.uk](https://nationalcareersservice.direct.gov.uk)

Scotland: [myworldofwork.co.uk](https://myworldofwork.co.uk)

Wales: [careerswales.com](https://careerswales.com)

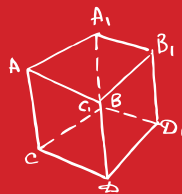
Jobs from physics: [physics.org/careers](https://physics.org/careers)

### Research requirements for university

All degrees: [search.ucas.com](https://search.ucas.com)

Russell Group universities: [russellgroup.ac.uk/informed-choices](https://russellgroup.ac.uk/informed-choices)

Physics degrees: [myPhysicscourse.org](https://myPhysicscourse.org)





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