expand

Knowledge
Options
your:
Thinking
Skills
Horizons

physics at A-level

the logical choice

why is physics important?

Unlike the other sciences, physics has no limits – everything in your life, on this planet, other planets, to the far reaches of universe and beyond is in physics' job description.

We'd be a bit lost without physics. All the gadgets that we take for granted like laptops and mobile phones wouldn't be here. Nor would the electricity supply that charges them and powers so many other things we use every day. Did you know that a physicist invented the World Wide Web? It's hard to imagine a world without the Internet, but when you were born almost no one had heard of it. Physicists are constantly finding new things. They have recently shown that teleportation is possible – who knows what that will lead to in a few years time?

Physics also deals with the big questions: How do we search for aliens? Are there parallel universes? Will we ever travel back in time? Why do we always find the smallest bits of cereal at the bottom of the packet?

"Physics is about how everything around you works."

Stuart, TV producer

what's physics like at A-level?

You will already have come across some of the concepts of physics at GCSE: forces, energy, waves, radioactivity, electricity and magnetism. At A-level you will start to see how these ideas work together, and begin to grasp the universal principles that apply to everything from the smallest atoms to the largest galaxies. You will also be able to impress your mates by knowing how things like MP3 players and plasma screen TVs work.

"It's a bit of a jump from GCSE to A-level physics. You study things in much more depth. But towards the end of my A-level physics I started understanding the links between different areas and it really changed my outlook on the world."

David, Renewable Energy Manager

why should I study physics?

Well, do you want to investigate the limits of space, the beginning of time and everything in between?

How about understanding how the technology around you works? Want to save the planet or maybe just help people get better when they are ill? Or maybe you don't care about any of this and just want to earn lots of money?

Well it doesn't really matter. Whatever you do the knowledge and skills you gain by studying physics will be useful. Physics is more than a subject – it trains your brain to think beyond boundaries.

"There are millions of students in the world, but to get a 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."

Steff, Weather Forecaster

which subjects should I choose?

There's no doubt that A-level physics can be a bit mathematical at times, and so it is best to take maths as well (at least to AS-level).

"For me maths is the language through which you do physics. It helps if you do maths A-level. Others in my class didn't do maths and they did okay, they just had to work a bit harder."

David

Many students choose to combine physics with one of the other sciences such as chemistry or biology, while others who are thinking of becoming an engineer or architect combine physics with design-technology or art.

"I knew I wanted to be an engineer, but I wasn't sure which type. That's why I chose physics at A-level; you pretty much need physics to do any engineering degree."

Naomi

But there is no need to follow the crowd. Physics and maths can be combined with just about anything.

"I chose physics and maths at A-level because I thought they would make a nice balance to my English and photography A-levels."

Abi

To find out more about these people and all the jobs an A-level in physics could lead to, visit:

physics.org/careers

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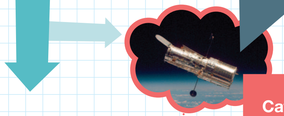
a world of possibilities

It all starts with physics A-level...



Catherine, Astrophysicist

Catherine was always fascinated by space when she was at school and so she studied astrophysics at university. She now investigates galaxies for a living and also gets to travel the world. "I've been to places like Australia and the Canary Islands. The skies there are much clearer and darker and so I get a much better view," she explains. Catherine has even used the Hubble Space Telescope, which is way above the Earth's atmosphere, in her search for dark matter. "Dark matter is a bit mysterious; we still haven't discovered what it is yet. We do know it's important though, it surrounds and holds our galaxy together."

Steff, Weather Forecaster

After completing her A-levels Steff decided to continue with physics, rather than take maths at university. "Obviously there's a lot of maths in physics, but I far preferred physics, there is much more of a link to the real world." Steff now works as a TV weather forecaster on the news network Al Jazeera. She's also clocked up appearances on the BBC, Sky and Channel five. "I even appeared on Richard and Judy once," she adds. "I certainly wouldn't be where I am today without physics, I use physics every day. It's the backbone of meteorology [the science of predicting the weather]." Steff is keen to point out that forecasting isn't just about working out whether or not it's going to rain tomorrow. "Forecasters also use computer models to predict what will happen to the Earth's climate in the long term. As the effects of global warming become worse in the coming years, the role of a meteorologist will become increasingly important."

David, Renewable Energy Manager

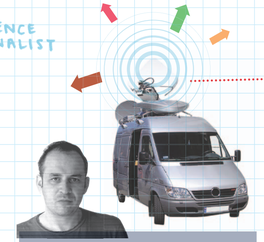
Of the many physics inventions, David thinks that wind-turbines or solar panels are probably his favourite. "In principle they're so simple; they take something that is just there [wind and sun] and turn it into something really useful [electricity]." David studied physics at university after his A-levels and feels that this really has helped him do his job. "I manage a number of projects to introduce renewable energies across the UK; my physics knowledge makes it so much easier to understand the technology. The skills you learn whilst studying physics also help you to approach projects in a much more logical way. That's an important part of most jobs and so studying physics really does keep your options open; you can pretty much go into whatever area you want."

Declan, Surgeon

Declan started a music degree before deciding to become a surgeon. However, as he often operates on patients with throat problems, neither Declan's music knowledge or what he learned during his physics A-Level goes to waste. "I found A-level physics quite hard, but with hindsight I'm glad I did it. During my music degree, my knowledge of acoustics – particularly how sound is produced – helped me understand how the human voice works. If you haven't got a background in physics it can be difficult to understand things like frequency, pitch and harmonics." Physics also comes in useful now that he is a surgeon. "I use lasers most weeks, and having knowledge of how they work helps," he says. "Lasers are a very powerful tool and have made a huge difference to how we treat cancers."

Emma, Clinical Scientist

Surgeons are not the only medical professionals who use physics. Radiographers, medical physicists, and clinical scientists like Emma use their physics knowledge every day when looking after patients. "I am constantly applying the physics I have learned to help diagnose medical problems," says Emma, who uses computers to model how patients regulate blood-pressure and heart-rate. "The ultimate aim is to diagnose and treat heart disease earlier," she explains. "I also work in surgical theatres, monitoring the status of patients' spinal cords during major operations. If there is a problem I alert the surgeon, so they can prevent paralysis of the patient."

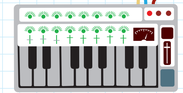


Stuart, TV Producer

"I could never understand why people don't find physics interesting; physics is about how everything around you works," says Stuart, who makes TV documentaries. Stuart studied electronics at university before moving into TV production. "At university I became editor of the student newspaper and just got into storytelling. It was quite a big moment for me to give up science, but I do use my science knowledge in my job a lot, so I feel okay with it. TV production is a very technical thing. Having a physics background means I can do a better job as I have a much better understanding of how cameras and lighting work."

Tony, Sound Engineer

"There's a lot of physics in sound engineering, from the acoustics to radio waves," says Tony, who works as a sound system engineer for music artists like Kylie, Il Divo and Bob Dylan. Tony got into sound engineering whilst at university. "A few friends formed a band. The drummer was doing physics with me, the singer was doing medicine, and the keyboard player was doing law. I started mixing the sound for them." Tony soon began working for bigger name bands, and now tours all over the world. His physics background helps him prepare for concerts. Before a gig starts "I get up on the front of the stage and use laser measuring tools to get the measurements of the room. I then use software to do a 3D model of the room, and put the speakers in that model. I'll adjust the angles and height and direction of the speaker system to try and get the most even [sound] coverage for all of the audience area," he explains.



Naomi, Mechanical Engineer

Naomi became interested in engineering during her GCSEs. "I did some work experience at British Aerospace. That's when I realised what it was all about; it's very hard to understand what an engineer does without seeing it for yourself. It's very hands on; you're always producing something or making something." After completing a degree in engineering Naomi now investigates how people are injured in accidents and terrorist attacks. "The best bit of my job is when I get to crash cars and blow up fake people - its great fun. But it is also good to know that you're preventing people from being injured or killed in the real world."

Abi Law student

Abi studied English at University. But now that she is training to become a lawyer, she's glad she took physics at A-level. "Law and physics are quite similar. 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," she explains.

Harjinder, Solicitor

With law covering so many areas including new inventions and technology, some lawyers benefit even more directly from a training in physics. "There are many people with a physics background in law," says Harjinder who studied physics at university. He now works as a solicitor for the Internet search engine Google. "The way of thinking that physics develops is very useful, as is the ability to understand technology when discussing the legal aspects of it."

METEOROLOGIST
CLIMATOLOGIST
ENVIRONMENTAL SCIENTIST
CYBERNETICIST
RADIOGRAPHER
AIR TRAFFIC CONTROLLER
ELECTRICAL ENGINEER
OPTOMETRIST
SCIENCE JOURNALIST
COMPUTER GAME DESIGNER
MEDICAL PHYSICIST
CIVIL ENGINEER
HEALTH AND SAFETY ADVISOR
VEHICLE DESIGNER
PATENT OFFICER
LAWYER
ASTRONAUT
ASTRONOMER
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GEOPHYSICIST
FINANCIAL ANALYST
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VENTURE CAPITALIST
CARTOGRAPHER
ARCHITECT
AERONAUTICAL ENGINEER
COMPUTER PROGRAMMER
MARINE ENGINEER