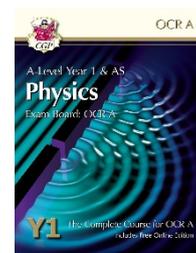


Physics transition project

At A-Level we follow the **OCR A Specification** and will study the following topics:

Forces and motion	Electricity	Waves	Quantum physics
Thermal physics	Circular motion	Oscillations	Gravitational fields
Astrophysics & cosmology	Capacitors	Electric fields	
Electromagnetism	Nuclear & particle physics	Medical imaging	



Practical skills (these are used and developed throughout the course).

<https://www.ocr.org.uk/qualifications/as-and-a-level/physics-a-h156-h556-from-2015>

To help prepare you for the step up and keep you engaged with Physics over the summer, choose one or more of the investigations outlined below.

The number of light bulbs indicates the level of difficulty of each task. These mirror the progression which you will experience over the course.



Small step-up from GCSE – builds on knowledge & skills you already have



Larger step-up from GCSE – builds new knowledge & skills



Complex ideas & concepts

We'd like you to bring details of your investigation(s) to enrolment in August, but if you'd like to get in touch about the project, get some feedback or find out more about the course, please email Hazel Abbotts (at hab@woking.ac.uk) or Matt Klein (at mpk@woking.ac.uk).

Happy investigating!

Use a study guide to practice Maths skills or key Physics ideas

This involves buying a book but there are free options further on. This is purely optional; you don't need to do this before starting the course.

“A level Physics: essential Maths skills” (CGP) £7.50

It explains the areas of your Maths GCSE that are important in our course: calculations, geometry, trigonometry, graph skills and handling data.

There are clear study notes, examples and practice questions (with answers).

It is important that you are confident in mathematical topics in order to thrive in A level Physics.

“Head Start to A level Physics” (CGP) £4.95

This is one way to revise all the key topics from GCSE, with notes, examples and practice questions. It also includes introductions to some of the topics we study at A level.

<https://www.cgpbooks.co.uk/secondary-books/as-and-a-level/science>

Other publishers will have similar books.



Silver CREST award

This is a nationally recognised scheme for student-led projects in the STEM subjects. Its aim is to enable young people to think like scientists and engineers, and is run by the British Science Association. It costs £10 to enter for a CREST award, but you are very welcome to complete a project and bring it along to enrolment without entering for the actual award.

One member of the Science department is an examiner for Silver and Gold awards, and we can seek her expert advice to check the final format of your project if you wish to submit it for an award.

Undertake a Silver CREST award (for 14-16 year-olds) (£10 fee)



1. Go onto the CREST website at <https://www.crestawards.org/crest-silver>
2. Look at the “Silver student guides” and the “guidance of what’s expected at Silver level, with examples”. When our colleague marks projects, it is not uncommon for her to have to send them for resubmission because students have not followed the guidance.
3. Go to the “resource library” (under “Available resources”) and look at the projects. Many of them require a school lab and equipment, but they will give you an idea of what sort of thing you could do. These two could work at home:
 - **“How strong are climbing ropes?”** This is actually in the Engineering and Chemistry sections of the resources but it links to our study of materials in the Forces and motion topic. “Breaking strength” means the force per unit area required to break a material; it’s the same equation as that for pressure, but this is for a material which is under tension (being stretched). You could try using different types of string or thread you have at home, or you could buy nylon fishing line online. You could use objects you have at home to hang on the strings; you will need kitchen scales to measure the masses. You will also need a way of measuring the diameter of the string as precisely as you can, so that you can work out the cross-sectional area (it’s a circle). Think about safety when you are hanging heavy objects on the string, especially when it breaks. <https://secondarylibrary.crestawards.org/how-strong-are-climbing-ropes/62137420>
 - **“Build a model pirate ship.”** This links to the Oscillations topic. If you have an electrical circuit kit you could do everything on this task, but there is lot of scope even in investigating the swinging motion. As with the previous one, you could use kitchen scales to measure masses that you use (but you could still get a rough idea of the effect of mass without measuring). <https://secondarylibrary.crestawards.org/build-a-model-pirate-ship-ride/62214108>

For any project you need to do research on your topic, take lots of photos of your work and explain what problems you had and how you overcame them.

Institute of Physics (IOP) videos

They have lots of videos available for students.



1. Physics tricks

These include:

- The Alka-Seltzer rocket
- Balloon kebabs
- Amazing marshmallows

You might be able to try some of them at home!

<https://www.iop.org/resources/videos/physics-tricks/index.html>



2. Schools lectures

These are in the “Education, Schools lectures” section. They vary in length.

- “The Science of seeing inside the human body” is one that we use in class for Medical imaging.
- “Physics and the Games” is about the physics of sport.

Make a few notes while you are watching and then try to summarise the key ideas in a few bullet points.

https://www.iop.org/resources/videos/education/schools-and-colleges-lecture/page_50044.html



3. Advanced lectures

These are in the “Lectures, Open access” section, and are about 50 minutes long.

Topics include:

- Graphene: materials in the flat land
- String theory
- Inflationary Cosmology
- Quantum information
- The Human Body (related physics).

Make a few notes while you are watching and then try to summarise the topic in 1-2 pages.

Highlight anything that particularly interested you. Also note any questions you still have.

You could try searching online for answers, or talk to us about them when you come to college!