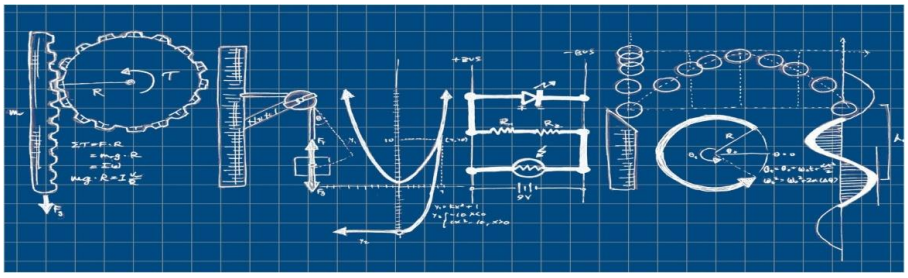


By studying physics at school or college you're opening the door to a wide variety of rewarding careers. As well as learning about how the universe works, you'll gain a broad training in skills that all employers value: an ability to grasp concepts quickly and a determination to find coherent answers; problem-solving, analytical, mathematical and IT skills. Even if you don't end up working in a physics-related industry, these skills are still highly regarded. Studying Physics is a good way of keeping your options open and earning a good salary.

In order to succeed at anything, it is imperative you commit your time. Physics A-level is no different. Attendance and attainment are closely linked, so turning up to class is important. Physics is a huge subject and we'll only be covering a tiny aspect of it in class. To help with your understanding you must also read around the subject. The reading you do doesn't have to be purely about what we're studying at the time. Physics is incredible, as are all the sciences. If you don't read or find out about what is happening in the world of science, you'll miss the fantastic and sometimes mind blowing things that are happening or have happened in our world. Fact is definitely stranger than fiction!

In summary, do your best, work hard and enjoy it – it's as simple as that.

Below are a few careers that studying physics can lead to:

Architecture

Astronomy

Engineering

Education

Finance

Further Education

Material development

Medicine

Meteorology and climate change

Nanotechnology

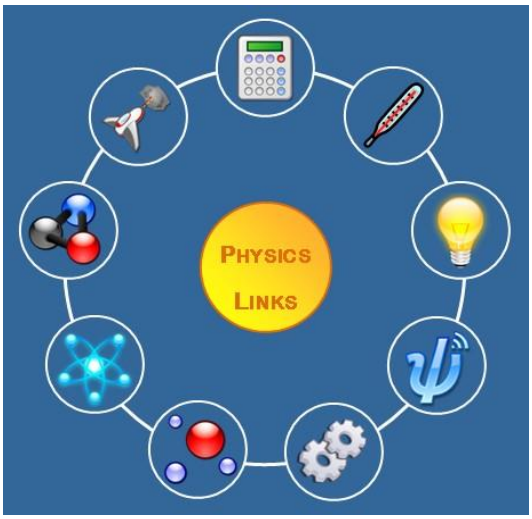
Oil and gas

Renewable energy

Scientific research

Space exploration industries

Telecommunications



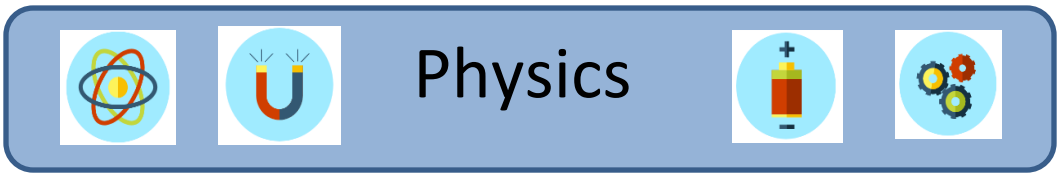
Please find all AQA specification and course content by following:

http://www.aqa.org.uk/subjects/science/as-and-a-level/physics-7407-7408

There is no course work. Your practical skills are monitored and assessed throughout the year and questions in the exams are based on set practicals you would have completed.

Students are expected to buy course books and required practical lab books which we will be selling, through the school, at a considerable discount.

What independent learning looks like in…



1. Before each lesson

- see your teacher in advance to get any work you may be missing
- ensure you have completed preparation work / homework
- read ahead in the book or on kerboodle
- have a knowledge or understanding / definition of key words, terms and equations

2. After each lesson

- review your lesson notes and highlight any aspects you don't understand so you can ask about them next lesson
- locate relevant material in your book, online or in the library in order to help you with anything you're not sure about
- ensure you have noted down any deadlines in your diary
- use the module check sheet on kerboodle to tick off what has been covered so you know where you are in terms of the syllabus

3. Regularly

- use recommended books and websites to read around the subject and further your understanding
- practice exam questions from past papers, these are all available at http://www.physicsandmathstutor.com/
- use YouTube to help with any difficult concepts or equations
- read around the subject; watch the news, read articles, to see where Physics is relevant in the real world
- use the library resources, especially Physics Review

4. Before tasks / homework

- ensure you understand the work set – ask you teacher if you are unsure
- read about the topic, start form the ground up before if you find the subject tricky
- meet with other students and work together
- find examples and model answers

5. Before tests

- use your check sheet to break the topic down into manageable revision sections
- practice past exam questions
- use the online activities on kerboodle to show you how to break down questions with many stages to them and how to interpret command words
- use the AQA website to see what you are expected to know

Before starting A-level physics, you need to do a bit of revision, a little work, some research and a web quest. Please complete the list of tasks below and bring to your first lesson in September.

1. Find the SI measurements; state the base quantities and their units
2. State what is meant by derived units and give three examples along with their physical quantity, e.g. density.
3. What does each of the letters in these equations of motion represent?

   $v = u + at$

   $s = \frac{1}{2}(u + v)t$

   $s = ut + \frac{1}{2}at^2$

   $v^2 = u^2 + 2as$

   Rearrange $v = u + at$ to make 't' the subject

   Rearrange $s = \frac{1}{2}(u + v)t$ to make 'u' the subject

   Rearrange $v^2 = u^2 + 2as$ to make 's' the subject

4. Research the importance of the work of Rutherford's alpha particle scattering experiment and how it changed our ideas of the atom.

5. For each of these famous physicists, write a short paragraph about their contribution to science and how it is still relative today.

   Niels Bohr

   Louis de Broglie

   Albert Einstein

   Michael Faraday

   Max Planck

   Wolfgang Ernst Pauli

   Richard Phillips Feynman

Web Quest

Follow the instructions below and use the web sources provided to complete this task. It is essential you do so as this work is part of, and will contribute towards, your A level course.

Introduction to superconductors

Superconductivity is an astonishing property of certain materials for which, below a critical temperature, the electrical resistance suddenly drops to zero. It was discovered in 1911 by Heike Kamerlingh Omes but, until 1986, it was essentially inaccessible due to the very low temperatures required.

Superconductivity can produce incredibly strong magnetic fields and has significant potential to advance technology and improve quality of life in areas such as communication, transport and medicine.

In this Web Quest, you will research superconductivity and its applications. You'll come to understand how it works, the history of its development, its modern uses (such as in magnetic resonance image (MRI) scanning), and the risks associated with it.

Task

Your task is to create a research report about superconductivity and the MRI (Magnetic Resonance Imaging) scanner. For each section of your report you should provide a summary of the most significant and relevant pieces of information contained within the main body of your text. Your report should cover the following points:

- the history of superconductivity's discovery
- the challenges facing superconductivity before 1986 and how they were overcome
- some of the applications of superconductivity
- what a MRI scanner is and its benefits
- the risks associated with MRI scanners

Process

Step 1 research: what is superconductivity?
- find out what superconductivity is and how it was discovered.

Step 2 research: what happened in 1986?
- summarise the main events of the 1986 discovery and their implications for society.

Step 3 research: applications of superconductivity
- compile a list of the current applications of superconductivity. For each one briefly summarise the application and its implications on society. Look out for the 'squids'!
- focus on the MRI scanner. Find out how it works and the risks associated with it.

Step 4 prepare your report
- gather all the information you have found and prepare your report on superconductivity
- give your report the following sections for its structure:
  1. What is superconductivity?
  2. What happened in 1986?
  3. Applications of superconductivity
  4. The MRI scanner

Step 5 Create section summaries
- summarise the most important information from each section of your report. Include these at the beginning of each section.

Possible Sources

What is superconductivity?

http://teachers.web.cern.ch/teachers/archiv/HST2001/accelerators/superconductivity/superconductivity.htm

http://www.physicscentral.com/explore/action/super.cfm

http://www.coolmagnetman.com/magsuper.htm

http://web.archive.org/web/20080619044025/http://www.eapen.com/jacob/superconductors/chapter1.html

What happened in 1986? History of superconductors

http://www.thenakedscientists.com/HTML/articles/article/ahistoryofsuperconductivity1160050756/

http://hyperphysics.phy-astr.gsu.edu/hbase/solids/hitc.html

http://www.superconductors.org/history.htm

Applications of superconductivity

http://www.superconductors.org/Uses.htm

http://www.physicsplanet.com/articles/superconductors

The MRI scanner

http://www.physicscentral.com/explore/action/mri.cfm

http://science.howstuffworks.com/mri.htm

Conclusion

In this Web Quest you will have learned:

- how superconductivity works
- what happened in 1986 that made superconductivity more useful
- some of the applications of superconductivity
- what an MRI scanner is
- the risks and benefits of superconductivity

The future of superconductivity depends mostly on the ability to develop superconductors that can operate at higher temperatures.

Currently cost is the primary factor limiting their advancement, rather than the risks associated with them. However, as the technology improves and the costs come down, society will have to weigh the benefits and risks of using such strong magnetic fields.