



huish **HEADSTART**

Huish Headstart 2020

Preparing for A level Physics

Why Physics?



Physics is the science which helps us to understand everything around us, from the tiniest particles through to the infinite (or not) universe.

Fundamentally physicists are problem solvers who, when presented with a puzzle, use the skills that they have practised to solve a huge variety of problems, from building more efficient solar panels to solve the world's energy crisis, to the latest mobile devices that use up some of that energy.

Physicists cross all the boundaries of science from medical physics and biophysics to materials science and product and technology engineering. Furthermore, understanding problem solving and physics also provides training for many other professions such as law, accountancy, banking, management consultancy, software development, science journalism....

Physics and physicists will help us to solve many of the big questions we face in the modern world (energy production, food in a rapidly growing population) while also making our lives more entertaining (3D TVs and games consoles!).

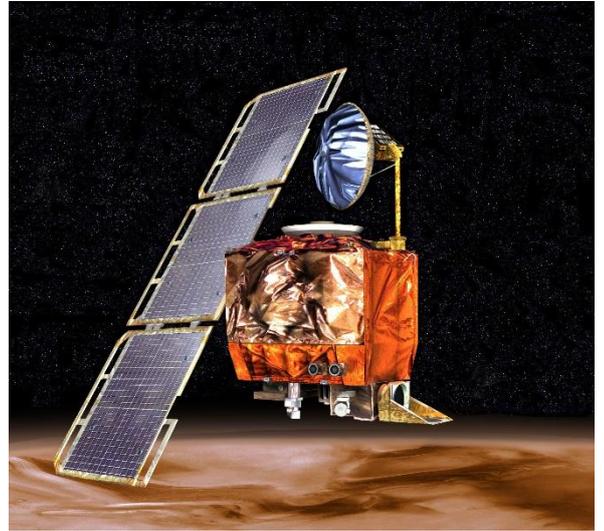
We follow the AQA Physics specification

If you have any questions over the summer, email: barrieh@richuish.ac.uk

Why getting your units right matters in physics

In December 1998, NASA launched the Mars Climate Orbiter. Its mission was to report data on the Martian atmosphere and climate. The probe was intended to function until 2004 and the construction of the orbiter and its lander were reported to have cost \$330 million.

In September 1999, as the spacecraft was about to enter Martian orbit, communication was lost. A subsequent report determined that the Orbiter had most likely been destroyed because it had entered Mars' atmosphere at the wrong angle.



The loss of the Orbiter has been attributed to a mismatch of units. The software that sent commands to the spacecraft from Earth used imperial units whilst the software on the Orbiter worked in metric units. The Mars Climate Orbiter Mishap Investigation Board reported that the spacecraft was inserted into orbit at the dangerously low altitude of 35 miles above Mars, rather than 140 miles. This was because the imperial unit of force, the pound-force, is equal to 4.45 Newtons so the thrust produced by the orbiter to begin its orbit was incorrect by a factor of 4.45. Oops!

From Weird Units and Wonderful Measures by Richard Brock

TASK

What is the average loss in life expectancy due to the ionising radiation exposure from a flight from London to New York?

Which is longer: a Hubble or a shake?

Use the link below to find answers to the above questions and more:

https://spark.iop.org/sites/default/files/media/documents/IOP%20Stories%20from%20Physics%20Units%20single%5Bweb%5D%20%281%29_0.pdf

Physics Summer Holiday Task

As part of your preparation we would like you to complete some questions that will brush up your skills before starting your Physics A-Level course. We are using a website called Isaac Physics, which contains resources including physics problems which you can attempt online. Please follow the instructions below:

1. Go to <https://isaacphysics.org/login>
2. Click 'sign up' and follow the instructions. You will need a valid email address and will be asked to set up a password. Please make sure that you remember these as you will need them throughout your time at Huish.

Please enter the following code into the 'Teacher Connections' tab at the top of the 'My Account Settings' page.

47689B

This will enrol you in the group Huish Headstart Physics Preparation 2020

3. We would like you to complete the following assignments:
 - Nuclear: 51 Atomic number and nomenclature
 - Mechanics: 8A Additional speed, distance and time questions
 - Electricity: 23 Current and voltage – circuit rules
 - Waves: 38A Additional Wave properties and basic equations questions

These 4 sections are listed in your assignments (click on 'Menu')

Before you answer the problems read:

https://isaacphysics.org/solving_problems

This page gives a guide to solving the problems on the site. It also gives information about the notation and conventions used by the makers of the site, and those that you should use when giving answers.

If you like you can do other questions as well, using your GCSE knowledge.

Any problems please email barrieh@richuish.ac.uk

Sign up to Qubit, the Institute of Physics' free e-newsletter for A Level physics students.

As a subscriber you will receive regular updates on:

- What's new in physics
- Exam and university guidance
- Information about careers from physics
- Upcoming events and competitions

Click http://www.iop.org/education/student/youth_membership/page_41684.html

Pre course reading

You will be given a course text book on loan for use during the course, but if you want to buy an additional textbook, we recommend the CGP A Level Physics student book ISBN 9781789080483. It covers both years of the course. There is a separate Year 1 version as an alternative.

3 great recent physics books - you could read one over the summer...

The World According to Physics – Jim Al Khalili

Universal: A Guide to the Cosmos – Brian Cox and Jeff Forshaw

Brief Answers to the Big questions – Stephen Hawking

Podcasts/Videos?...

Finally, which elementary particle best fits your personality? We'll be learning all about these wonderful particles at the start of the course.

Click <https://scoollab.web.cern.ch/sites/scoollab.web.cern.ch/files/ParticleGame/>

