

JOHN F KENNEDY SCHOOL: A-level PHYSICS – BRIDGING PROJECT

The first two sides of this document set out the compulsory tasks, a basic minimum expectation for everyone joining the course. The rest is optional, and you can be selective.

COMPULSORY SECTION

OVERVIEW:

IF you studied GCSE Physics as a SEPARATE subject (e.g. as part of “triple” science alongside GCSEs in Biology & Chemistry), then complete ONE of the Tasks on List A.

IF you studied physics within a DOUBLE AWARD GCSE (such as AQA Combined Science Trilogy) then you complete ONE of the Tasks on List A, AND ALL of the tasks on List B.

IF you are NOT intending to take Mathematics at A Level alongside physics, then it is recommended that you also obtain one of the resources from List C.

LIST A For ALL students

Choose any ONE of the following topics. Create a single-sheet (one or two-side) “abstract” (500-800 words plus any diagrams or photographs). Use Arial 10pt font, and include a reference list of your principal sources. Copy-and-pasting of large sections of text is not acceptable. The three marked with an asterisk (*) are best for any students who took Double Award Combined Science GCSE rather than “triple” science.

- THE ATOM. Show how the human understanding of the structure of the atom has developed over time, from 1800 to the present day. *(This option is a good choice for any student intending to take chemistry alongside physics.)*
- *THE BIG BANG. Summarise the evidence for The Big Bang as the best current theory to explain how the universe began.
- ROCKET SCIENCE. Choose either the Saturn V or Falcon Heavy rocket, and summarise the physics (and chemistry) that makes it work.
- MEDICAL IMAGING. Explain the theory and applications of a technique from the world of medical science. Choose from ultrasound*, MRI scans, X rays/CT scans.
- *NUCLEAR FUSION. Summarise the theory of nuclear fusion and assess the prospects for its arrival as the answer to the world’s growing demand for electricity.
- SPECIAL RELATIVITY. Summarise the key points of Einstein’s Theory of Special Relativity as they affect our understanding of space and time.
- THE LARGE HADRON COLLIDER. What has it achieved, and what might happen next?
- ASTRONOMY. What has been achieved by the Hubble Space Telescope?
- ROLLER-COASTERS. Choose a famous example and show how physics principles affect the design of the ride and the experience of the riders.

List B continues on the next page ...

LIST B For students who took Double Award Science GCSE rather than “Triple” Science

These are three selected topics that you will not have covered within Double Award Combined Science. Produce one sheet of revision notes for each one, using any of the standard GCSE support books or websites. For example, the websites given in optional activity 2 (see below) would be helpful.

- 1 NUCLEAR FISSION: Explain how electricity is generated in a nuclear power station using uranium as the fuel. What are the major advantages and disadvantages of nuclear power?
- 2 REFRACTION OF LIGHT: Find out about an experiment that allows the verification of Snell’s Law of Refraction, and demonstrates the phenomenon of Total Internal Reflection.
- 3 THE SUN: Our Sun is classified by astronomers as a “main sequence” star. Summarise how it was formed, why it is stable now, and what will happen to it eventually.

LIST C For students who are NOT intending to take A Level mathematics alongside physics

There are a number of published products and sources that could be helpful. It is recommended that you obtain one and at least make a start on it before September. The books vary in depth and price and you should take into account your confidence in mathematics before choosing one. Some of the optional activities (see below) would also give extra practice.

Publisher	Title	Author	ISBN
CGP	A-Level Physics: Essential Maths Skills PMR71		9781782944713
Illuminate	Maths for A Level Physics - updated edition	Kelly & Wood	9781908682918
OUP	Maths Skills for A Level Physics	Tear	9781408521205

The lower cost alternative is to use other available online sources to cover the following topics:

- Significant figures and rounding
- Percentages
- Standard form and handling powers of 10 – very large and small numbers
- Ratio
- Graphs and charts – scales, plotting, gradients, intercepts
- Trigonometry – sine, cosine, tangent
- Using your scientific calculator

Contact in case of questions or queries:

Mr G Yapp, gyapp@jfk.herts.sch.uk

The rest of this document contains **OPTIONAL** activities which might be useful depending on your particular circumstances or interests.

JOHN F KENNEDY SCHOOL: A-level PHYSICS

OPTIONAL BRIDGING ACTIVITIES

You are free to pick and choose the more interesting or useful of these.

OPTIONAL ACTIVITY 1 – KEEPING YOUR GCSE STANDARDS HIGH

Target Group : Everyone. Dip into these sources. The priority at this point is to be completely secure in the GCSE material rather than to start watching the A level material.

Transition Website : <https://www.gcsephysicsonline.com/pre-a-level>

YouTube Channel : https://www.youtube.com/channel/UCZzatyx-xC-DI_VVUVHYDYw

GCSE Videos and Daily Lessons : <https://www.gcsephysicsonline.com/covid-19>

OPTIONAL ACTIVITY 2 – CGP HEAD START TO PHYSICS

Target Group : Everyone, but especially those who are starting from below Grade 7 at GCSE.

<https://www.amazon.co.uk/Head-Start-level-Physics-Level/dp/1782942815>

OPTIONAL ACTIVITY 3 - WARWICK PHYSICS JOURNAL CLUB 2020

Target Group: anyone with a high GCSE grade interested in taking physics BEYOND A level. This might be a challenging activity so don't let it put you off the subject! This website is from a programme which ran last year, and was actually targeted at sixth-formers with more experience in the subject. The club ran for twelve weeks and, alongside the research journal paper itself, offered advice on note-taking techniques. You are certainly not expected to do all of these, but you are free to be selective.

<https://warwick.ac.uk/fac/sci/physics/outreach/journalclub>

Contact in case of questions or queries:

Mr G Yapp, gyapp@ifk.herts.sch.uk

Updated June 2021