

Dear Year 11 Student,

Below are some suggestions of things you could do to keep your Physics ticking over and prepare for A-level Physics.

1. If you are interested in studying A-level Physics next year and want to look ahead and keep busy, try the Seneca A-level Physics learning site. If you click on this link:
<https://app.senecalearning.com/sign-up>

use this class code: ptts4gm1z

2. A Level Physics Suggested Reading list (try one and if you like it try another...)

<i>Title</i>	<i>Author</i>
A short History of Nearly Everything	Bill Bryson
In Search of Schrödinger's Cat	John Gribbon
Why Does $E=mc^2$?	Brian Cox , Jeff Forshaw
The First 3 Minutes	Steven Weinberg
Six easy pieces: fundamentals of Physics explained	Richard Feynman
Bad Science	Ben Goldacre
Black Holes, Wormholes and Time Machines	Jim Al-Khalili
Particle Physics – a very short introduction	Frank Close
The Elegant Universe	Brian Greene
50 Physics ideas that you really need to know	Joanne Baker
The new science of strong materials or why your feet don't fall through the floor	J E Gordon

3. Interesting and helpful websites:

a) Isaac Physics https://isaacphysics.org/solving_problems



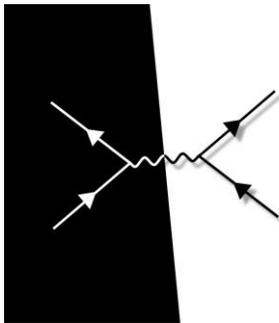
Isaac Physics

Isaac Physics a project designed to offer support and activities in physics problem solving to teachers and students from GCSE level through to university.

isaacphysics.org

b) Physics Online

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



Physics Online - YouTube

This channel is for all students who are studying Physics at GCSE and A Level. Short online tutorials cover the basic concepts while the experiments you need...

www.youtube.com

c) Why not watch an historical drama about relativity?

"Einstein's Big Idea" covers the history behind the equation $E=mc^2$ and links in to some of the A-level topics. A full length version can be found on YouTube

<https://www.youtube.com/watch?v=fyn1l-viYPw>

d) The website

<https://www.iop.org/explore-physics>

is a great site to visit to browse physics news articles, careers information and links to other recommended physics websites.

e) And don't forget VSauce, which is full of interest..

<https://www.youtube.com/playlist?list=PLZRRxQcaEjA5tpoxlKeVnPKlvfD1lavPq>

4. If you want a project try these two ideas. Both will help you prepare for some A-level Physics.

a) Particle Physics

We suggest that you read a book about Particle Physics (for example Frank Close (2004) Particle Physics: A Very Short Introduction. Oxford University Press.

ISBN 0-19-280434-0) These are also excellent resources:

http://en.wikipedia.org/wiki/Particle_physics

<http://www.particleadventure.org/>

These will help you to answer the following questions in your own words:

1. What is meant by the "Standard Model of Physics?"
2. What are the fundamental forces of nature?
3. What is antimatter?

Please write about a page of A4 explaining what you understand about the three questions above and bring them to your first Physics lesson.

b) The second topic is Dimensional Analysis There is a good explanation of dimensional analysis at:

http://en.wikipedia.org/wiki/Dimensional_analysis

Having looked through this webpage, have a go at the questions on page two of the letter which is attached to this email and bring your answers to your first Physics lesson.

Best wishes,

Mr Bell

Dear Physics A level Student,

Congratulations on choosing to study A level Physics at LRGS. A level Physics is a big step up from GCSE and so in order to make your transition from one to the other easier we are sending out some work for you to do before you come into the sixth form in September.

We suggest that you buy a copy of the text book "AQA Physics A Level Second Edition Student Book Paperback" (ISBN-13: 978-0198351870) which costs around £36. We cannot afford to provide a text book for students but will buy them back from students at the end of the course in order to sell them on to the next year group. If you think you might be eligible for a bursary to help you with the cost of the text book please look at the school website: <https://www.lrgs.org.uk/sixth-form/bursaries>

There are two sections of Physics that we would like you to prepare yourself for. This will help you to see what A level Physics is like and as there will be a test on these topics a couple of weeks into next term it will give your teacher an idea of your application and potential.

The two topics are:

A Particle Physics

B Dimensional Analysis

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The second topic is Dimensional Analysis There is a good explanation of dimensional analysis at:

http://en.wikipedia.org/wiki/Dimensional_analysis

Having looked through this webpage, have a go at the questions on page two of this letter and bring your answers to your first Physics lesson.

I hope that you have a relaxing summer holiday but that you also give yourself about four hours to think through and answer the questions we have set - you will find that it sets you up well for the start of an exciting course.

Best wishes,

Mr. S.G. Bell
Head of Physics
LRGS

Look at the quantities and basic units below:

Quantity		Basic unit	
Name	Symbol	Name	Symbol
mass	m	kilogram	kg
length	l	metre	m
time	t	second	s
temperature	T	kelvin	K
electric current	I	ampere	A
amount of substance	n	mole	mol

Now look at the Quantities and derived units.

Quantity		Derived unit	
Name	Symbol	Name	Symbol
area	A	square metre	m ²
volume	V	cubic metre	m ³
density	d	kilogram per cubic metre	kgm ⁻³
velocity	v	metre per second	ms ⁻¹
acceleration	a	metre per second squared	ms ⁻²
momentum	p	kilogram metre per second	kgms ⁻¹

These quantities and derived units have their own names and symbols but they are not basic units.

Quantity		Derived unit	
Name	Symbol	Name	Symbol
force	F	newton	N
pressure	P	pascal	Pa
energy	E	joules	J
work	W	joules	J
power	P	watts	W
frequency	f	hertz	Hz
electric charge	Q	coulomb	C
resistance	R	ohm	Ω
potential difference	V	volt	V
electromotive force	E	volt	V

4. Work out the derived unit for each of the quantities in the table above in terms of the basic units.

For example: Force = (mass x acceleration)

where acceleration = (change in velocity/ time taken)

So, [N] = [kg] x [m] [s]⁻²

So the unit of force, (Newton) can be written in terms of basic units as kgms⁻²;

Dear Year 11 Student,

Below are 4 more suggestions of things you could do to keep your Physics ticking over and prepare for A-level Physics if you have chosen Physics as one of your options at A-level.

1. Who have been the most influential Physicists over the centuries? If you had to choose a top 10, who would feature? Here is one Top 10: <https://www.theguardian.com/culture/gallery/2013/may/12/the-10-best-physicists>
Do you agree with it? Who do you think should be on it?
2. Is it possible to understand what the Nobel Prize for Physics is about? Here is some information about last year's prize to do with the Big Bang and Exoplanets. If you find it interesting, why not look back to previous years' prize winners and what they discovered?
<https://www.nobelprize.org/prizes/physics/2019/summary/>
This is a well explained 3 minute video about what Jim Peebles helped to discover: <https://www.youtube.com/watch?v=XSxtyGe06mg>
3. The NPL website has some interesting practical tasks you can try at home including finding the speed of sound using 3 toilet rolls and finding out about the breaking strength of breakfast cereals: <https://www.npl.co.uk/measurement-at-home>
4. There is an excellent BBC Series called Shock and Awe in which Jim Al-Khalili charts the development of ideas around electricity over the past centuries up to the modern day. There are some clips on here or you can watch the 3 episodes on iPlayer.
<https://www.bbc.co.uk/programmes/p00kjq6d>

Best wishes,

Mr Bell
Head of Physics, LRGS

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