

TRANSITION WORK



PHYSICS 2020

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Below is an extensive list of activities you can do before the start of your A levels. This is by no means exhaustive, and there are loads of other examples out there. You do not need to read all the books, watch all the documentaries or listen to all the podcasts. That decision is up to you. However, try to explore lots of different areas of Physics as suggested in order for you to broaden your knowledge. The written work that needs to be done must be on paper with examples of each task. Enjoy!

Reading list (books / academic articles / journals etc)

- **What If? (Serious Scientific Answers to Absurd Hypothetical Questions)** by *Randall Munroe*
- **A Short History of Nearly Everything** by *Bill Bryson*
- **Big Bang: The Most Important Scientific Discovery of All Time and Why You Need to Know About It** by *Simon Singh*
- **A Brief History of Time** by *Stephen Hawking*
- **The Universe in a Nutshell** by *Stephen Hawking*
- **The Making of the Atomic Bomb** by *Richard Rhodes*
- **Carrying the Fire: An Astronaut's Journeys** by *Michael Collins* (the Apollo 11 astronaut).
- **13 Things That Don't Make Sense: The Most Intriguing Scientific Mysteries of Our Time** by *Michael Brooks*
- **Surely you're joking Mr Feynman** by *Richard P Feynman and Ralph Leighton.*
- **Six Easy Pieces: Fundamentals of Physics Explained** by *Richard P Feynman* (or any other book by the same author)

You can read as many of these as you want, but pick just one to write a brief report on it. The main thing I would like to know is, what did you learn from it?

Documentaries

Particle Fever

https://www.youtube.com/watch?v=GR0enyj24es&has_verified=1

Gravity and me

https://www.youtube.com/watch?v=aNeR_fHcQSs

How the Universe works – Black Holes

<https://www.youtube.com/watch?v=u88IHVRI13A>

Einstein's biggest blunder

<https://www.youtube.com/watch?v=Hxr9tkalD8I>

The Fantastic Mr Feynman

<https://www.youtube.com/watch?v=H9fjhQMsDW4>

Inside the Milky Way

<https://www.youtube.com/watch?v=rw6TwaqNsYw>

The Science of Dr Who

<https://www.youtube.com/playlist?list=PLKEzuOOEQvYPEQHJ-nApnOOORvOxEriAf>

The Challenger Disaster

<https://www.youtube.com/watch?v=DT7Yx5kxYco>

Cosmos: A Spacetime Odyssey – Netflix

https://www.youtube.com/watch?v=_erVOAbz420 (trailer)

The Secrets of Light and Energy

https://www.youtube.com/watch?v=TvUb_-NI58M

The Secrets of Quantum Physics

<https://www.youtube.com/watch?v=ISdBAf-ysl0>

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Podcasts

The Titanium Physics podcast

<http://titaniumphysicists.brachiolopemedia.com/2020/02/01/episode-85-decoherence-not-incoherence-with-ted-leo/>

Star Talk with Neil de Grasse Tyson

<https://www.startalkradio.net/show/cosmic-queries-theoretical-physics/>

The Infinite Monkey Cage with Professor Brian Cox

<https://www.bbc.co.uk/programmes/b00snr0w/episodes/downloads>

Talk Nerdy

<https://soundcloud.com/talk-nerdy/introducing-lifes-little-mysteries>

Physics Frontiers

<https://physicsfrontiers-rantschler.podomatic.com/>

Ask a Spaceman!

<https://www.youtube.com/PaulMSutter>

The Royal Institution

<https://www.youtube.com/user/TheRoyalInstitution>

You can listen to as many of these as you want, but pick just one to write a brief report on it. The main thing I would like to know is, what did you learn from it?

Written work required

These are the most important skills you should master before the start of your A levels:

- Being expert at using standard form.
- Knowing how to express answers to a certain number of significant figures.
- Knowing the different prefixes, e.g. 10^{-3} = milli
- Learning the GCSE Physics equations in both word and symbol forms.
- Being expert at rearranging all GCSE Physics equations
- Knowing the units for all the GCSE Physical quantities, e.g. Energy is measured in joules, or J.
- For each GCSE Physics topics, you must know the correct spellings and definitions of key physical terminology, e.g. frequency = the number of wave crests passing a fixed point every second.
- Finding links between different areas of Physics, e.g electricity and magnetism, forces and energy, waves and particles etc...
- Practical skills (choices of equipment and reasons, accuracy in observations and measurements, identifying sources of error,

interpreting results, analysing graphs in as much detail as possible, making conclusions and evaluations).

- **Practicing writing extended answers (6 mark questions) showing links between different ideas, using correct terminology, showing structure to your explanations...**