

April 2020

Year 11 Preparing for the Next Phase



Preparation for Continued Study of Science

This booklet gives some advice on how students in Year 11 can prepare for the next phase in their education or employment during the school closures as a result of the Corona Virus.

Science

Preparing for...

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|-------|--|
| P2-3 | BTEC First and BTEC National Applied Science |
| P4-6 | A Level Biology |
| P7-8 | A level Chemistry |
| P9-10 | A Level Physics |

Preparation for Continued Study of Science

PREPARING FOR BTEC FIRST and BTEC NATIONAL in APPLIED SCIENCE

A BTEC in **Applied Science** is a **great** choice for students looking for a practical scientific qualification. The courses aim to provide students with the relevant skills and knowledge that employers value, as well as the confidence to progress into a fulfilling, exciting career.

BTEC First: (Level 1 and Level 2)

BTEC National: (Level 3)

- exemplify scientific principles in vocational contexts, leading to an understanding of how those principles are applied in practice, and can facilitate a move either onto further periods of study or into employment.
- give learners the opportunity to gain a broad understanding and knowledge of science principles and practice
- give learners the opportunity to develop a range of related skills and techniques that are essential for successful performance in working life
- give full-time learners the opportunity to enter potential employment within a wide range of science sectors such as process, industrial, medical, or forensic.

Colleges and schools will provide you with material or ideas about what you should be doing to prepare for your study of BTEC Applied Science. You should focus on preparing for your course as advised by them; however, if you need a little more guidance or want to challenge yourself further, you might find the ideas below useful.

Exam boards offering BTEC First and BTEC National

- [Edexcel BTEC Nationals](#)
- [Edexcel BTEC Firsts](#)

Useful science websites include

- <http://rsb.org.uk> Royal Society of Biology website
 - <http://www.biologymad.com>
 - <http://www.biologyguide.net/>
 - <http://www.rsc.org> Royal Society of Chemistry website
 - <http://www.chemistryworld.com>
 - <http://physicsworld.com>
 - <http://iop.org> Institute of Physics website
- New Scientist, SciShow and YouTube videos (particularly animations) are also handy.

Preparation for Continued Study of Science

EVERYDAY

Allocate a block of study time to the following:

- **Improve your general knowledge of the language of Science, including the root words and common prefixes and suffixes used**
- **Listen to relevant podcasts/talks such as:**
 - **[The Infinite Monkey Cage](#)**
Consistently topping the UK's science and medicine podcast chart, this extended version of the Radio 4 programme features expert guests and more irreverent contributors discussing big scientific questions or news. Witty, fun and informative, it is presented by physicist Brian Cox and comedian Robin Ince.
 - **[Radiolab](#)**
Known for its slick editing, Radiolab stitches together deep reportage, storytelling, interviews, archive sound clips and guest discussion to create revealing documentaries and compelling stories. Recent episodes have looked at the transmissibility of so-called 'devil tumours' in Tasmanian devils and the researchers who first cultured Henrietta Lacks' cells.
 - **[Waking Up with Sam Harris](#)**
Neuroscientist, philosopher and best-selling author Sam Harris tries to make sense of societal trends and events – from Donald Trump and ISIS to futurology and artificial consciousness – by looking at things from an evolutionary and neuroscience perspective. The podcast won a 2017 Webby Award for best podcast in the science and education category.
 - **[The Life Scientific](#)**
For those who don't make a date to tune in to the weekly Radio 4 programme, The Life Scientific is available to download as a podcast. Host Professor Jim Al-Khalili talks to leading scientists about their life and work, finding out what inspires and motivates them and asking what their discoveries might do for humanity.

[TED Talks on Science](#)

Including:

- The Wonders of the Molecular World
- How Does Alcohol Make You Drunk?
- Why Sleep Matters Now More Than Ever
- How We Can Change the Planets Climate Future
- A Brief Tour of the Last 4 Billion Years

Preparation for Continued Study of Science

PREPARING FOR A LEVEL BIOLOGY

The study of life itself, A Level Biology explores the theories and principles involved in living systems. Topics you might learn about include: lifestyle, transport, genes and health, development, plants and the environment, the natural environment and species survival, energy, exercise and co-ordination, as well as practical biology and research skills. By the end of the course, you will know about the principles of genetics, molecules, taxonomy, natural selection, evolutionary theory, global warming, bacteria and viruses, and more.

You will gain an understanding of how society makes decisions about scientific issues, as well some of the ways in which the scientific community contributes to the success of the economy and society.

If you are interested in recent developments in genetic engineering or disease prevention, understanding how we evolved, finding out how cells – “little bags of water with things dissolved in them” – carry out so many different processes in a seemingly effortless fashion, tracking down natural resources, the true impacts of pollution on the natural world, or animal care and conservation programmes, to name a few, then this is your subject.

There will be an expectation at A Level that you are able to take ownership over your learning by studying independently and managing your time well. Therefore, it would be useful to establish good independent habits before you start your course, and prepare yourself a little for what you will be studying.

Colleges and schools will provide you with material or ideas about what you should be doing to prepare for your study of A Level Biology. You should focus on preparing for your course as advised by them; however, if you need a little more guidance or want to challenge yourself further, you might find the ideas below useful.

Reading that will help prepare for A Level Biology:

- *The Greatest Show on Earth: The Evidence for Evolution* by Richard Dawkins;
- *Genome: the Autobiography of a Species in 23 Chapters* by Matt Ridley;
- *The Immortal Life of Henrietta Lacks* by Rebecca Skloot;
- *The Lives of a Cell: Notes of a Biology Watcher* by Lewis Thomas;
- *The Botany of Desire: A Plant's-Eye View of the World* by Michael Pollan;
- *Power, Sex, Suicide: Mitochondria and the Meaning of Life* by Nick Lane.

Exam boards offering A Level Biology

- [AQA](#)
- [Cambridge International Education](#)
- [Edexcel](#)
- [OCR](#)

Useful biology websites include

- <http://www.biologymad.com>
- <http://www.biologyguide.net/>
- New Scientist, SciShow and YouTube videos (particularly animations) are also handy.

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EVERYDAY

Allocate a block of study time to the following:

- **Improve your general knowledge of the language of Biology, including the root words and common prefixes and suffixes used**

Look at the following websites, and think about the areas you would like to know more about. Watch/read the information. Make some flashcards about what you have learnt.

- [Life: The Science of Biology](#) - useful website with animated tutorials, activities, flash cards, self-quizzes, glossary etc.
 - [Dr. Saul's Biology in Motion](#) - original, entertaining, interactive biology learning activities
 - [Biology-Online](#) - useful site for biological information, ideal for homework, research projects, and general interest
 - [The Biology Project \(University of Arizona\)](#) - an American site. It has some fantastic online tutorials on biochemistry, respiration, photosynthesis, immunology and many more
 - [Your Genes Your Health](#) - A multimedia guide to genetic disorders
 - [Cells Alive](#) - Cell Biology images and animations
 - [Cell Biology Animation](#) - A fantastic site that has many key concepts animated for easy learning
 - [Nucleus Medical Art](#) - A site with many interesting medical animations
 - [Multimedia Heart](#)
 - [Evolution Game](#) - Provided by the BBC
 - [You Try it \(A Science Odyssey\)](#) - Cool activities, including Atom Builder, Probe the Brain, and Technology at Home (requires Shockwave plug-in)
 - [Gary Carlson](#) - medical and biological illustrations and animations
 - [Study Stack](#) - use your computer to display a stack of "virtual cards" which contain information about a certain subject. Just like flashcards, you can review the information at your own pace discarding the cards you've learned and keeping the ones you still need to review.
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- [Waking Up with Sam Harris](#)
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[TED talks on Biology](#)

Including:

- My Favourite Animal
- The Future of Medicine
- Insects are Awesome
- Ocean Wonders

Preparation for Continued Study of Science

PREPARING FOR A LEVEL CHEMISTRY

A level Chemistry studies the material world, and through chemistry we can describe and explain questions such as: "what happens when sugar dissolves in tea?"; "why is mercury a liquid at room temperature?"; "how do we make plastics?"; "what can we do about global warming?"; "how and why will I be affected if oil runs out?"

From baking a cake to recharging a mobile phone, chemistry is involved in everything we do; and our lives are inextricably influenced by many aspects of chemistry. Chemistry will continue to be at the forefront of responding the needs of society; with chemists central to making advances in designing new materials, efficient energy use, drug development, and technology, to name but a few.

There will be an expectation at A Level that you are able to take ownership over your learning by studying independently and managing your time well. Therefore, it would be useful to establish good independent habits before you start your course, and prepare yourself a little for what you will be studying.

Colleges and schools will provide you with material or ideas about what you should be doing to prepare for your study of A Level Chemistry. You should focus on preparing for your course as advised by them; however, if you need a little more guidance or want to challenge yourself further, you might find the ideas below useful.

These transition activities will help prepare – from the Royal Society of Chemistry

- [Chemistry](#) Test your ability to balance equations, construct ionic formulae and write equations from text using our basic chemistry competencies Starters for ten questions.
- [Maths for Chemistry](#) Use these Starters for ten to gauge your grasp of basic mathematical competencies including rearranging equations, significant figures and unit conversions.
- [Practical Chemistry](#) These Starters for ten cover basic practical skills such as laboratory equipment, recording results and drawing scatter graphs.

Exam boards offering A Level Chemistry

- [AQA](#)
- [Cambridge International Education](#)
- [Edexcel](#)
- [OCR](#)

Preparation for Continued Study of Science

EVERYDAY

Allocate a block of study time to the following:

- **Improve your general knowledge of the language of Chemistry, including the root words and common prefixes and suffixes used**

Look at the following websites, and think about the areas you would like to know more about. Watch/read the information. Make some flashcards about what you have learnt.

- [Chemguide](#) A wealth of resources to support the learning of A Level Chemistry
- [Revision videos](#) A YouTube channel containing a large number of short videos designed to help you revise the essential chemistry you have already learnt elsewhere.
- [Khan Academy](#) A huge resource of shortish (10 minutes or so) video lectures on all sorts of educational topics (including chemistry, biology, physics and maths) organised by subjects.
- [Periodic Table of Videos](#) A full periodic table from which you can access short, quirky videos about any element. From the University of Nottingham.
- [makescienceeasy.com](#) This site has some really useful talks under the heading of "Scientific Literacy" dealing with some basic maths and graph skills, and detailed work on the things you need to think about in carrying out scientific investigations. There are also questions after each item.

Listen to relevant podcasts/talks such as:

- [Chemistry World](#)
Chemical stories, interviews, news and opinions
- [Distillations](#)
The Distillations podcast deftly weaves together science, culture and history to tell some truly engaging stories. It's produced by the Chemical Heritage Foundation, an organisation whose mission is to "foster dialogue on science and technology in society." Its headquarters in Philadelphia has a museum, library and more which looks at the history of chemistry, chemical engineering and the life sciences.
- [Science Elements](#)
These podcasts give a bite-sized overview of some of the latest research published by the American Chemical Society. It brings to life the impact chemistry can have on a range of aspects of modern life from diet and health to the environment and the energy industry. Some of the topics recently discussed include how a fruit protein could replace high-fructose corn syrup and sugar and optimizing biofuel production from algae using carbon dioxide emissions.

[TED Talks on Chemistry](#)

Including:

- The Galactic Recipe for a Living Planet
- How I Claimed A Seat at the Periodic Table
- The Incredible Chemistry Powering your Smartphone
- Is Fire a Solid, Liquid or a Gas?

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PREPARING FOR A LEVEL PHYSICS

A level Physics gives you the opportunity to explore the phenomena of the universe and to look at theories that explain what is observed. This subject combines practical skills with theoretical ideas to develop descriptions of the physical universe. You will learn about everything from kinematics to cosmology and many recent developments in fascinating topics, such as particle physics. If you are interested in the limits of space, the beginning of time and everything in between this is the subject for you. Physics is more than a subject – it trains your brain to think beyond boundaries.

There will be an expectation at A Level that you are able to take ownership over your learning by studying independently and managing your time well. Therefore, it would be useful to establish good independent habits before you start your course, and prepare yourself a little for what you will be studying.

Colleges and schools will provide you with material or ideas about what you should be doing to prepare for your study of A Level Physics. You should focus on preparing for your course as advised by them; however, if you need a little more guidance or want to challenge yourself further, you might find the ideas below useful.

Reading that will help prepare for A Level Physics:

- *A short History of Nearly Everything* by Bill Bryson;
- *Why don't penguins' feet freeze?* by New Scientist,
- *The Quantum Universe: Everything that can happen does happen* by Brian Cox and Jeff Forshaw.
- Good websites for Physicists include www.iop.org and www.physicsworld.com

Exam boards offering A Level Physics

- [AQA](#)
- [Cambridge International Education](#)
- [Edexcel](#)
- [OCR](#)

EVERYDAY

Allocate a block of study time to the following:

- **Improve your general knowledge of the language of Physics, including the root words and common prefixes and suffixes used**

Look at the following websites, and think about the areas you would like to know more about. Watch/read the information. Make some flashcards about what you have learnt.

- [S-cool](#) Great revision website. Interactive activities.
- [TopMarks](#) A database of physics resources
- [School Physics](#) Excellent animations + Teaching and revision resources
- [Animated Physics](#) A science and charcuterie blog!

Preparation for Continued Study of Science

YouTube Channels

- [Veritasium](#) = This is a channel of science and engineering videos featuring experiments, interviews, demos
- [MinutePhysics](#) = as the name suggests, physics concepts explained in a minute! Good way to start thinking broadly about physics
- [NASA channel](#) - keep up to date with NASA
- [Smarter Every Day](#) = nice collection of videos on interesting topics

Listen to relevant podcasts/talks such as:

- [The Titanium Physics](#) Podcast Dr. Ben Tippett and his team of physicists believe that anyone can understand physics. Black Holes! Lightning! Coronal Mass Ejections! Quantum Mechanics! Fortnightly, they explain a topic from advanced physics, using explanations, experiments and fun metaphors to a non-physicist guest. Visit the website to see a list of topics sorted by physics field.
- [Physics Frontiers](#) Jim Rantschler and Randy Morrison discuss physics from elementary particles to cosmological effects at the limits of our theoretical knowledge or have recently emerged.
- [Star Talk Radio](#) Science, pop culture and comedy collide on Star Talk Radio! Astrophysicist and Hayden Planetarium director Neil deGrasse Tyson, his comic co-hosts, guest celebrities and scientists discuss astronomy, physics, and everything else about life in the universe. Keep Looking Up!
- [Physics World](#) Weekly offers a unique insight into the latest news, breakthroughs and innovations from the global scientific community. Our award-winning journalists reveal what has captured their imaginations about the stories in the news this week

[TED Talks on Physics](#)

Including:

- The Lights and Sounds of the Universe
- Mind Bending Questions from Physics
- Jaw Dropping Science Breakthroughs
- The Search for Dark Matter and What We've Found So Far

For further information please contact Andy Pearson andrew.pearson@lancashire.gov.uk