

Summer work for BTEC Applied Science

This pack contains a programme of activities and resources to prepare you to start Applied Science in September. It is aimed to be used after you complete your GCSE throughout the remainder of the Summer term and over the Summer Holidays to ensure you are ready to start your course in September.

Recommended reading

Junk DNA

Our DNA is so much more complex than you probably realize, this book will really deepen your understanding of all the work you will do on Genetics.

The Red Queen

Its all about sex. Or sexual selection at least. This book will really help your understanding of evolution and particularly the fascinating role of sex in evolution.

A Short History of Nearly Everything

A whistle-stop tour through many aspects of history from the Big Bang to now. This is a really accessible read that will re-familiarise you with common concepts and introduce you to some of the more colourful characters from the history of science!

Periodic Tales: The Curious Lives of the Elements

This book covers the chemical elements, where they come from and how they are used. There are loads of fascinating insights into uses for chemicals you would have never even thought about.

PRE-KNOWLEDGE TOPICS

BTEC will use your knowledge from GCSE and build on this to help you understand new and more demanding ideas.

1. Complete the tasks described.
2. Complete **Scientific and Investigative Skills** assignment described below.

Scientific and Investigative Skills

As part of your A level you will complete a practical assessment. This will require you to carry out a series of practical activities as well as planning how to do them, analysing the results and evaluating the methods. This will require you to: use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and current), use appropriate instrumentation to record quantitative measurements, such as a colorimeter or photometer, use physics apparatus for a variety of experimental techniques to include micrometres.

Task 1:

Produce a glossary for the following key words:

accuracy, anomaly, calibration, causal link, chance, confounding variable, control experiment, control group, control variable, correlation, dependent variable, errors, evidence, fair test, hypothesis, independent, null hypothesis, precision, probability, protocol, random distribution, random error, raw data, reliability, systematic error, true value, validity, zero error.

Task 2: Cells

The cell is a unifying concept in biology, you will come across it many times during your two years of A level study. Prokaryotic and eukaryotic cells can be distinguished on the basis of their structure and ultrastructure. In complex multicellular organisms cells are organised into tissues, tissues into organs and organs into systems. During the cell cycle genetic information is copied and passed to daughter cells. Daughter cells formed during mitosis have identical copies of genes while cells formed during meiosis are not genetically identical

Read the information on these websites (you could make more Cornell notes if you wish):

<http://www.s-cool.co.uk/a-level/biology/cells-and-organelles>

<http://www.bbc.co.uk/education/guides/zvjycdm/revision>

And take a look at these videos:

<https://www.youtube.com/watch?v=gcTuQpuJyD8>

<https://www.youtube.com/watch?v=L0k-enzoeOM>

<https://www.youtube.com/watch?v=qCLmR9-YY7o>

Produce a one page revision guide to share with your class in September summarising one of the following topics: Cells and Cell Ultrastructure, Prokaryotes and Eukaryotes Whichever topic you choose, your revision guide should include: Key words and definitions, Clearly labelled diagrams
Short explanations of key ideas or processes.

Task 3: The hole in the ozone layer

Why did we get a hole in the ozone layer? What chemicals were responsible for it? Why were we producing so many of these chemicals? What is the chemistry behind the ozone destruction?

An interesting documentary from 1995 which provides a fascinating insight into the discovery of the ozone hole and how researchers found out the chemistry behind it.

https://youtu.be/LI_TR7C4xr4

This quick video discusses the role of the ozone layer and how CFCs can cause ozone depletion.

<https://youtu.be/Bz9sc5Jgsvc>

Write a persuasive letter to an MP, organisation or pressure group promoting the control of ozone depleting chemicals.

Your letter should: Define what is ozone and the ozone layer. Describe how the ozone layer protects us. Explain the chemistry behind "ozone depletion". Explain and describe some of the alternatives to CFC's

Places to visit

Science museums.

You could visit your nearest science museum. They often have special exhibitions that may be of interest to you.

https://en.wikipedia.org/wiki/List_of_science_museums#United_Kingdom

Royal Observatory – London - Visit the Royal Observatory Greenwich to stand on the historic Prime Meridian of the World, see the home of Greenwich Mean Time (GMT), and explore your place in the universe at London's only planetarium.

The Royal Institution – London – The birthplace of many important ideas of modern physics, including Michael Faraday's lectures on electricity. Now home to the RI Christmas lectures and many exhibits of science history.