



Hinchingsbrooke School

A-Level Biology

Transition Pack

A guide to help you get excited about A-level Biology, including everything from topic guides to days out and online learning courses.

You have chosen A-level Biology. What now?

This pack contains ideas and resources to prepare you to start A level in Biology 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 inspire you to go deeper into Biology and to ensure you are ready to start your course in September.



Course Guidelines

At Hinchingsbrooke you will be following the OCR Biology A specification for A Level. The specification can be found using the following link:

<http://www.ocr.org.uk/qualifications/as-a-level-gce-biology-a-h020-h420-from-2015/>

The course is taught over two years and all exams are at the end of the course. There is no practical coursework however there are specific practical investigations that have to be completed in order for you to pass the course.

The modules include:

Module 1 – Development of practical skills in biology

- 1.1 Practical skills assessed in a written examination
- 1.2 Practical skills assessed in the practical endorsement

Module 2 – Foundations in biology

- 2.1.1 Cell structure
- 2.1.2 Biological molecules
- 2.1.3 Nucleotides and nucleic acids
- 2.1.4 Enzymes
- 2.1.5 Biological membranes
- 2.1.6 Cell division, cell diversity and cellular organisation

Module 3 – Exchange and transport

- 3.1.1 Exchange surfaces
- 3.1.2 Transport in animals
- 3.1.3 Transport in plants

Module 4 – Biodiversity, evolution and disease

- 4.1.1 Communicable diseases, disease prevention and the immune system
- 4.2.1 Biodiversity
- 4.2.2 Classification and evolution

Module 5 – Communication, homeostasis and energy

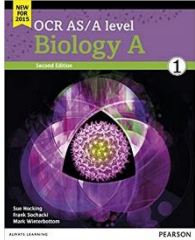
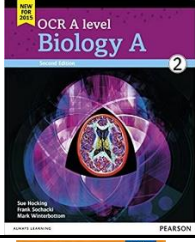
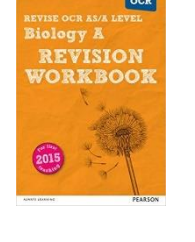
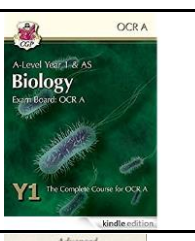
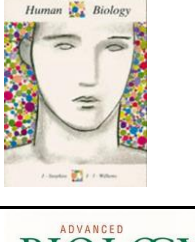
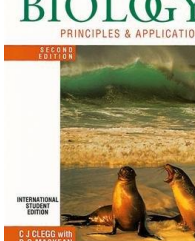
- 5.1.1 Communication and homeostasis
- 5.1.2 Excretion as an example of homeostatic control
- 5.1.3 Neuronal communication
- 5.1.4 Hormonal communication
- 5.1.5 Plant and animal responses
- 5.2.1 Photosynthesis
- 5.2.2 Respiration

Module 6 – Genetics, evolution and ecosystems

- 6.1.1 Cellular control
- 6.1.2 Patterns of inheritance
- 6.1.3 Manipulating genomes
- 6.2.1 Cloning and biotechnology
- 6.3.1 Ecosystems
- 6.3.2 Populations and sustainability.

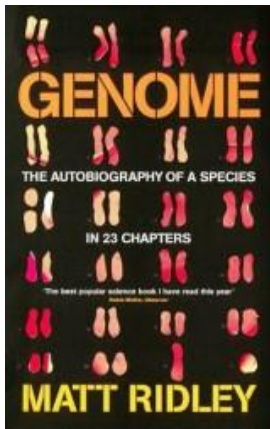
Biology Textbook Reading List

You can never read too little when taking your A-levels. Reading around the subject helps you to grasp concepts and see them represented in many different ways. Those who read ahead and make further notes using textbooks will achieve greater success at A-level. You will have access to an online textbook for the course through Kerboodle. The following books may help you with further reading also however not all of these books follow the specification so they should always be used in conjunction with the specification points.

TITLE	BOOK COVER	ISBN	NOTES
OCR Biology A A-Level Student Book 1		144799079X	Highly recommended. Good book to summarise the main points. Written for your A-level course It does follow the specification points.
OCR Biology A A-Level Student Book 2		1447990803	Highly recommended. Good book to summarise the main points. Written for your A-level course It does follow the specification points.
OCR A Revise Biology		1447984293	Recommended. This book is written by experienced examiners. It is packed with examiner tips on tricky areas. It is targeted at ensuring understanding with quick-check questions on each topic. It does follow the specification points.
CGP OCR A Biology Year 1		1447758466	Recommended. Good revision guide. Written for your A-level course It does follow the specification points.
Advanced Human Biology for A-Level		000322290X	Recommended. Ideal for stretch and challenge and for students. This is particularly useful for those who are interested in Human Biology.
Advanced Biology: Principles and Applications		0719576709	Recommended. Ideal for stretch and challenge and exam practice. Questions of different demand with answers make this book excellent for consolidation of knowledge and understanding.

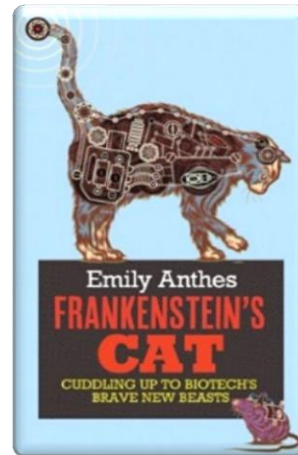
Book Recommendations

Kick back this summer with a good read. The books below are all popular science books and great for extending your understanding of Biology. If you're only going to read one I'd pick Genome.....



Genome

Definitely the BEST popular introduction to modern genetics. Ridley's structure is wonderfully simple – 23 chapters to cover the 23 human chromosomes – but he uses it brilliantly. We start with Chromosome number 1 and a gene that we share with every other life form, including, probably, the very first living organism. Stunning. And essential reading.



An easy read..

Frankenstein's cat

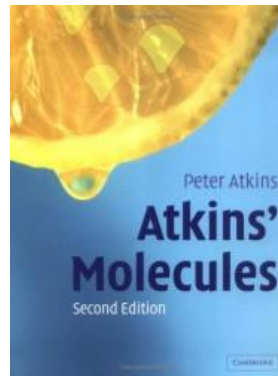
Discover how glow in the dark fish are made and more great Biotechnology breakthroughs.

Atkins' Molecules

This sounds terribly dry. A book about molecules? Ugh. But try this extract from the section of pheromones:

"Another component of male underarm sweat provides an engaging story. This component is a hormone molecule that closely resembles one secreted by a male pig encouraging mating behaviour in a sow. The same pheromone is also secreted by the fungus we know as the truffle. Because truffles do not appear above ground, they must be sought out by pigs, who end up frustrated. Whether our enjoyment of truffles is related to our perhaps unconscious enjoyment of our own underarm sweat is a matter of conjecture."

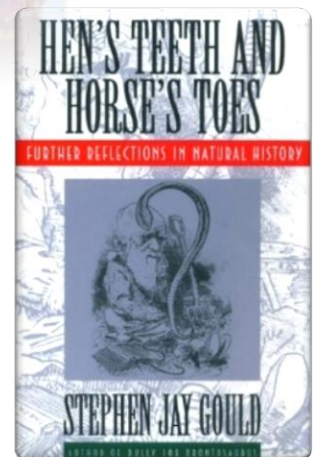
Could make you fall in love with Biochemistry...



Studying Geography as well?

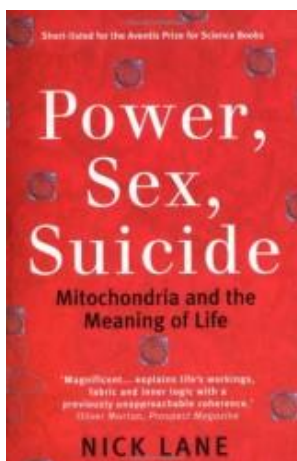
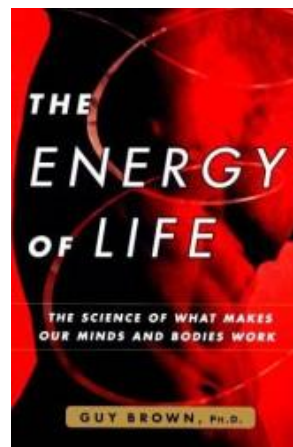
Hen's teeth and horse's toes

Stephen Jay Gould is a great Evolution writer and this book discusses lots of fascinating stories about Geology and evolution.



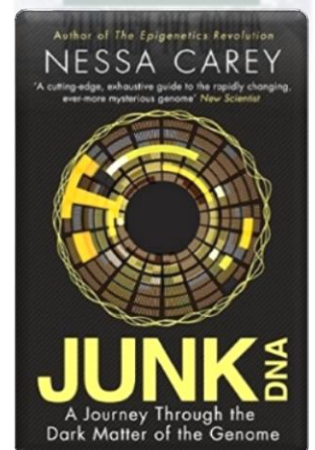
The Energy of Life

An enthralling account of the electricity that keeps you alive and one of the best popular science books ever written. It complements the A2 Respiration topic perfectly and makes all kinds of complex issues immediately accessible. If you read nothing else, read this.



Power, sex, suicide

Not an easy read, but awesome in scope and mind-boggling in its implications. From the very origins of mitochondria in the murky bacterial soup, to the dangers of keeping DNA next to this bubbling furnace of free radicals, and the role of mitochondria in apoptosis. Includes all the latest research and ideas in the field and is essential reading for anyone who's serious about Oxbridge.



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.

Movie Recommendations

Here are some great presentations from world leading scientists and researchers. They provide some interesting answers and ask some thought-provoking questions. Use the link or scan the QR code to view.

A New Superweapon in the Fight Against Cancer

Available at :

http://www.ted.com/talks/paula_hammond_a_new_superweapon_in_the_fight_against_cancer?language=en

Cancer is a very clever, adaptable disease. To defeat it, says medical researcher and educator Paula Hammond, we need a new and powerful mode of attack.



Why Bees are Disappearing

Available at :

http://www.ted.com/talks/marla_spivak_why_bees_are_disappearing?language=en

Honeybees have thrived for 50 million years, each colony 40 to 50,000 individuals coordinated in amazing harmony. So why, seven years ago, did colonies start dying en-masse?

Growing New Organs

Available at :

http://www.ted.com/talks/anthony_atala_growing_organs_engineering_tissue?language=en

Anthony Atalla's state-of-the-art lab grows human organs — from muscles to blood vessels to bladders, and more.



A video you definitely want to watch. One of the first topics you will learn about is the amazing structure of the cell. This BBC film shows the fascinating workings of a cell... a touch more detailed than the "fried egg" model you might have seen.

http://www.dailymotion.com/video/xzh0kb_the-hidden-life-of-the-cell_shortfilms

If this link expires – google "BBC hidden life of the cell"



Science websites

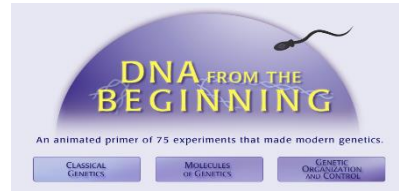
These websites all offer an amazing collection of resources that you should use again and again throughout your course.



Probably the best website on Biology....

Learn Genetics from Utah University has so much that is pitched at an appropriate level for you and has lots of interactive resources to explore, everything from why some people can taste bitter berries to how we clone mice or make glow in the dark jelly fish.

<http://learn.genetics.utah.edu/>



DNA from the beginning is full of interactive animations that tell the story of DNA from its discovery through to advanced year 13 concepts. One to book mark!

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



There is so much to learn about Biodiversity and Evolution. Many Zoos have great websites, especially London Zoo. Read about some of the case studies on conservation, such as the Giant Pangolin, the only mammal with scales.
<https://www.zsl.org/conservation>



Topical Biology – news, quizzes, events across the UK. Lots of things to get involved with.

<https://www.rsb.org.uk/>

BigPicture



The Big Picture is an excellent publication from the Wellcome Trust. Along with the magazine, the company produces posters, videos and other resources aimed at students studying for GCSEs and A level.

<https://www.stem.org.uk/big-picture/resource-collection>

Biology podcasts

These podcasts all are fascinating and fun insights into some of the scientific breakthroughs of our time and the people responsible for moving Biology on to another level.



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.

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



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.

<https://www.wnycstudios.org/podcasts/radiolab>



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.

<https://www.bbc.co.uk/programmes/b015sqc7>



Produced and presented by students at the University of Exeter's Centre for Ecology and Conservation, The Natural Selection presents cutting-edge research from the faculty, with those who have recently published papers invited to talk about their work.

<https://naturalselectionpodcast.weebly.com/about-the-podcast.html>

Transition Task 1 – choose 1 of these 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 this website:

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

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>

Task:

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, or Mitosis and Meiosis.

Whichever topic you choose, your revision guide should include:

Key words and definitions

Clearly labelled diagrams

Short explanations of key ideas or processes.

Biological Molecules

Biological molecules are often polymers and are based on a small number of chemical elements. In living organisms carbohydrates, proteins, lipids, inorganic ions and water all have important roles and functions related to their properties. DNA determines the structure of proteins, including enzymes. Enzymes catalyse the reactions that determine structures and functions from cellular to whole-organism level. Enzymes are proteins with a mechanism of action and other properties determined by their tertiary structure. ATP provides the immediate source of energy for biological processes.

Read the information on this website:

<http://www.s-cool.co.uk/a-level/biology/biological-molecules-and-enzymes>

And take a look at these videos:

<https://www.youtube.com/watch?v=H8WJ2KENIK0>

<http://ed.ted.com/lessons/activation-energy-kickstarting-chemical-reactions-vance-kite>

Task:

Krabbe disease occurs when a person doesn't have a certain enzyme in their body. The disease effects the nervous system. Produce a one-page revision guide to share with your class in September summarising how and why the disease impacts the body.

Your poster should:

Describe the structure of an enzyme

Explain what enzymes do inside the body

Transition Task 2 - complete the baseline assessment

The following test is designed to assess your recall, analysis and evaluative skills and knowledge.

Remember to use your exam technique: look at the command words and the number of marks each question is worth.

Bring it with you to the 1st lesson back as we will be reviewing it.

1. a) What are the four base pairs found in DNA?

..... (2)

b) What does DNA code for?

..... (1)

c) Which organelle in a cell carries out this function?

..... (1)

2. a) What theory did Charles Darwin propose?

..... (1)

b) Why did many people not believe Darwin at the time?

..... (1)

c) Describe how fossils are formed.

.....
.....
..... (3)

d) The fossil record shows us that there have been some species that have formed and some that have become extinct.

i) What is meant by the term 'species'?

..... (2)

ii) Describe how a new species may arise:

.....
.....
..... (3)

Every living organism is made of cells.

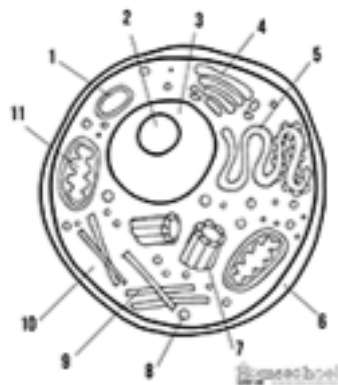


Image taken from <http://prestigebox.com/worksheet/label-an-animal-cell-worksheet>

a) Label the following parts of the animal cell:

2

5

8

(3)

b) Describe how is the structure of the cell membrane related to its function?

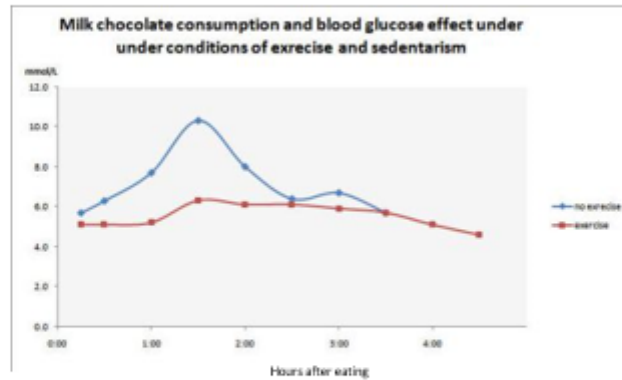
.....

.....

.....

(3)

5. A medical research team investigated how quickly the body deals with glucose after a meal. They studied the blood glucose concentration of people who exercised versus those who did not. Here are their results:



a) What organ in the body regulates blood glucose concentration?

.....
(1)

b) Explain how the stages that would bring about a return to normal blood glucose concentrations.

.....

(4)

c) Name one variable the researchers will have controlled.

.....
(1)

d) The researchers made the following conclusion:

“Blood glucose returns to normal values for all people after 4 hours”

To what extent do you agree with this conclusion.

.....

(3)