

Gordon's School

A Level Biology

A guide to help you prepare for A Level Biology, including a summary of the course, recommended book to read and movies to watch, websites to visit and social media to follow.

Over the summer you need to:

- print out the specification using the link on page 2**
- complete the two transition tasks on pages 7 and 8**

These will be checked during your first Biology lesson in September.

Course Guidelines

At Gordons School you will be following the AQA Biology specification

The specification can be found using the following link:

<http://filestore.aqa.org.uk/resources/biology/specifications/AQA-7401-7402-SP-2015.PDF>

Please print out pages 8 – 35 inclusive for your first lesson in September. You will need to constantly refer to this document through the course.

The AS course is taught in one year and examined at the end of Year 12.

The A Level content is taught in Year 13 and then all the AS and A Level content is examined at the end of Year 13.

There is no practical coursework however there are specific required practicals that are examined in the AS and A Level exams.

Core content

AS Level

1. Biological molecules
2. Cells
3. Organisms exchange substances with their environment
4. Genetic information, variation and relationships between organisms

A Level

5. Energy transfers in and between organisms
6. Organisms respond to changes in their internal and external environments
7. Genetics, populations, evolution and ecosystems
8. The control of gene expression

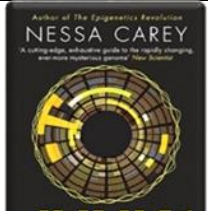
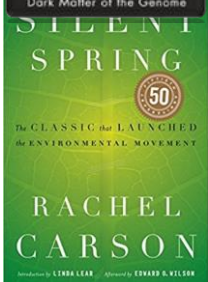
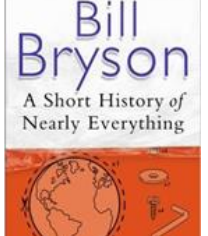
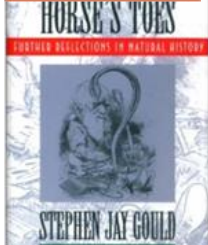
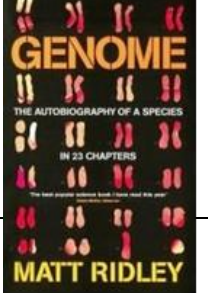
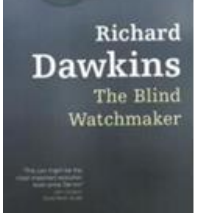
AS Level Exams

Paper 1	Paper 2
Topics 1 – 4, including relevant practical skills	Topics 1 – 4, including relevant practical skills
Written exam: 1 hour 30 minutes	Written exam: 1 hour 30 minutes
75 marks	75 marks
50% of AS	50% of AS

A Level Exams

Paper 1	Paper 2	Paper 3
Topics 1- 4, including relevant practical skills	Topics 5 – 8, including relevant practical skills	Topics 1- 8, including relevant practical skills
Written exam: 2 hours	Written exam: 2 hours	Written exam: 2 hours
91 marks	91 marks	78 marks
35% of A Level	35% of A Level	30% of A Level

Book Recommendations

 <p>Author of <i>The Epigenetic Revolution</i> NESSA CAREY A cutting-edge, authoritative guide to the rapidly changing world of genetics</p> <p>JUNK DNA A Journey Through the Dark Matter of the Genome</p>	<p>Junk DNA “Our DNA is so much more than you probably realise. This book will really deepen your understanding of the world of Genetics.”</p>
 <p>SILENT SPRING THE CLASSIC THAT LAUNCHED THE ENVIRONMENTAL MOVEMENT</p> <p>RACHEL CARSON</p>	<p>Silent Spring “Now recognized as one of the most influential books of the twentieth century, <i>Silent Spring</i> exposed the destruction of wildlife through the widespread use of pesticides. Despite condemnation in the press and heavy-handed attempts by the chemical industry to ban the book, Rachel Carson succeeded in creating a new public awareness of the environment which led to changes in government and inspired the ecological movement. “</p>
 <p>Bill Bryson A Short History of Nearly Everything</p>	<p>A Short History of Nearly Everything “A whistle-stop tour through many aspects of history from the Big Bang through to modern day. 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.”</p>
 <p>HORSE'S TEETH FURTHER REFLECTIONS ON NATURAL HISTORY</p> <p>STEPHEN JAY GOULD</p>	<p>Hen's Teeth and Horse's Toes “Studying Geography as well? This is a great read about Evolution and discusses lots of fascinating stories from the world of Geology and Evolution.”</p>
 <p>GENOME THE AUTOBIOGRAPHY OF A SPECIES IN 23 CHAPTERS</p> <p>MATT RIDLEY</p>	<p>Genome “Definitely the BEST popular introduction to modern genetics. Ridley's structure is wonderfully simple – 23 chapters to cover the 23 human chromosomes. We start with Chromosome 1 and a gene that we share with every other life form, including, probably, the very first living organism.”</p>
 <p>Richard Dawkins The Blind Watchmaker</p>	<p>The Blind Watchmaker “Every A Level Biology student should read at least one of Dawkins' books and this may be the best place to start. Readable and provocative, you can accuse Dawkins of many things, but he is never dull. This book outlines how Evolution can result in astonishingly complex structures such as the eye, while rubbishing the claim that such things provide evidence for the existence of God.”</p>

Movie Recommendations

If you have 30 minutes to spare, here are some great presentations from world-leading scientists. They provide interesting answers and ask thought-provoking questions.



A New Superweapon in the Fight against Cancer.

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



Why Bees are disappearing

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

Why doctors don't know about the drugs they are prescribing.

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



Growing new organs

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

Science on Social Media

Science communication is essential in the modern world and all the big scientific companies, researchers and institutions have their own social media accounts. Here are some that you could follow to keep up to date with developing news or interesting stories:

Follow on Twitter:

Commander Chris Hadfield – former resident of the International Space Station @cmdrhadfield

Tiktaalik roseae – a 375 million year old fossil with its own Twitter account! @tiktaalikroseae

NASA' Voyager 2 – a satellite launched nearly 40 years ago that is now travelling beyond our Solar System @NSFVoyager2

Neil deGrasse Tyson – Director of the Hayden Planetarium in New York @neiltyson

SciCurious – from writer Bethany Brookshire about good, bad and weird neuroscience @scicurious

Carl Zimmer – science writer Carl Zimmer blogs about life sciences @carlzimmer

Phil Plait – tweets about astronomy and bad science @badastronomer

Virginia Hughes – science journalist and blogger for National Geographic @virginiahughes

Maryn McKenna – science journalist who writes about antibiotic resistance @marynmck

Find on Facebook:

Nature – the prolific page for nature.com for news, features, research and events from the Nature Publishing Group

Marine Conservation Institute – publishes the latest science to identify important marine ecosystems around the world

National Geographic – since 1888, National Geographic has travelled the Earth, sharing amazing stories in pictures and in words

Science News Magazine – covers important and emerging research in all fields of science

BBC Science News – breaking news, analysis and debate on science and nature around the world

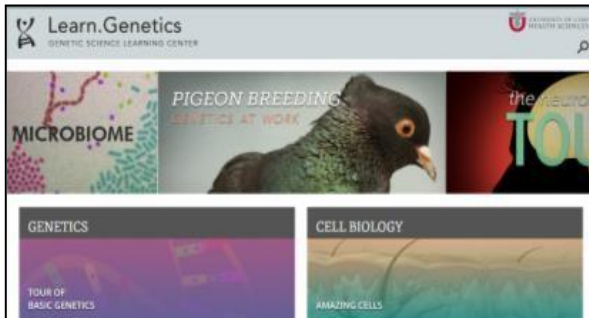


Science websites

These websites all offer an amazing collection of resources that you could refer to for wider interest.

Probably the best website on Biology.... <http://learn.genetics.utah.edu/>

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



At GCSE you most likely learnt about Biodiversity and Evolution. Many zoos have great websites, especially London Zoo. You can read about some of the case studies on conservation, such as the Giant Pangolin, the only mammal with scales... <https://www.zsl.org/conservation>



Many diseases are inherited. In this virtual fly lab you get to breed fruit flies to investigate how different features are passed on. <http://sciencecourseware.org/vcise/drosophila/>.

The Royal Society of Biology covers all aspects of the subject. The website contains news, quizzes and events from across the UK. <https://www.rsb.org.uk/>

Transition Task 1

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 can be organised into tissues, tissues into organs, and organs into systems.

During the cell cycle, genetic information is copied and passed on to daughter cells. Daughter cells formed during mitosis are genetically identical while those formed during meiosis show variation.

An understanding of cells and their sub-cellular structures enables us to fully grasp the process that take place within cells and whole organisms.

Read the information on these websites:

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

<https://www.ck12.org/book/CK-12-Biology/section/3.2/>

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=URUJD5NEXC8>

Task:

Produce a revision guide summarising Cells and Cell Ultrastructure, Prokaryotes and Eukaryotes, and Microscopes.

You must include:

Key words and definitions

Clearly labelled diagrams

Short explanations of key ideas and processes

Refer to section 3.2.1 in the AQA Biology specification to ensure you cover all necessary information

Transition Task 2

Biological Molecules

The key biological molecules you will study are generally polymers and are made up of only a few 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.

Read the information on these websites:

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

<http://www.bbc.co.uk/education/guides/zb739j6/revision>

And take a look at this video:

<https://www.youtube.com/watch?v=H8WJ2KENIKO>

Task:

Produce notes on carbohydrates, proteins and lipids.

You must include:

Elements they contain

Diagrams of structures

Diagrams of reactions

Names of relevant bonds

Uses/functions

Refer to sections 3.1.2 – 3.1.4 in the AQA Biology specification to ensure you cover all necessary information.