

High Storrs Sixth Form

2024 Bridging Work

Subject : Biology

Name: _____

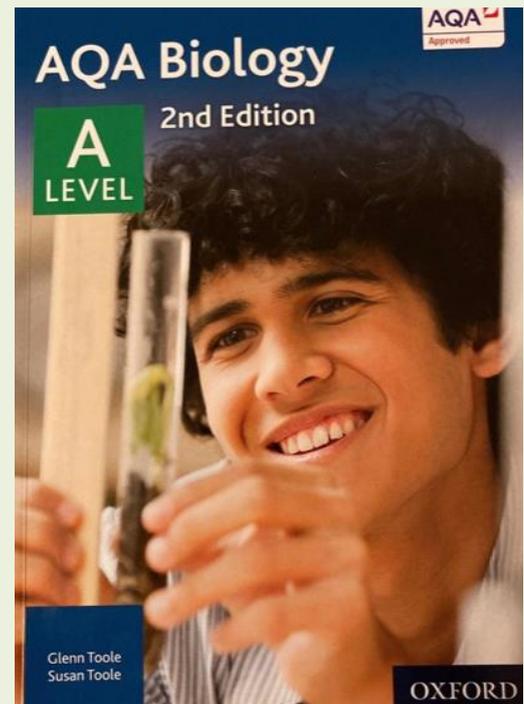


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A-level Biology Transition Pack



An Introduction to A-level Biology

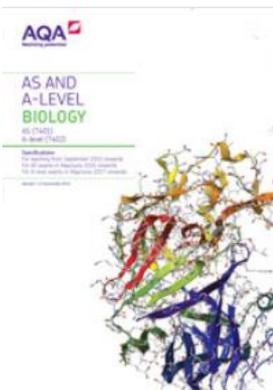
A-level Biology is a fascinating subject to study, it provides students with an understanding of life at all levels, from molecules and cells, to whole organisms and the way in which these organisms interact with one another and their environment.

The transition between GCSE and A-level is large, even for students who have completed GCSE Biology (rather than the combined science course) and achieve a high grade.

The objective of this pack is to help make this transition easier for all students. Students should work through it during the summer to help ensure you are ready to start the course in September.

The booklet addresses the 3 main problems students encounter when making the transition from GCSE to A-level.

1. Having secure knowledge of GCSE Biology.
2. The quantity of material that is in the specification that students have to learn – it's all fascinating!
3. The large number of key words that students are expected to use and explain in detail to be able to answer A-level exam questions.



Green headings are suggested activities.
Red tasks on page 6 are to be completed and brought with you to your first Biology lesson.

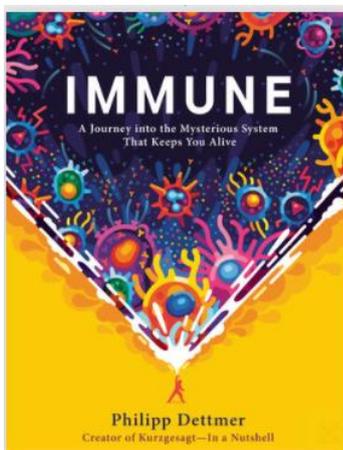
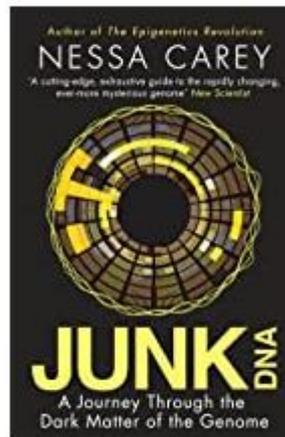
Book recommendations

The books below are all worth a summer read.

From rare genetic diseases to Down s Syndrome, from viral infections to the ageing process, only now are the effects and the vital functions of these junk regions beginning to emerge.

Scientists rapidly growing knowledge of this often controversial field has already provided a successful cure for blindness and saved innocent people from death row via DNA fingerprinting, and looks set to revolutionise treatment for many medical conditions including obesity.

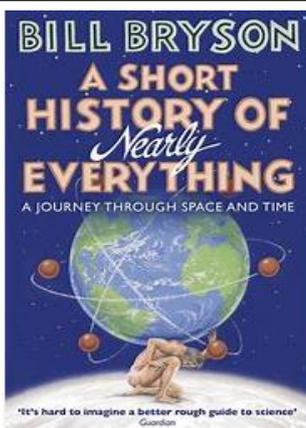
From Nessa Carey, author of the acclaimed *The Epigenetics Revolution*, this is the first book for a general readership on a subject that may underpin the secrets of human complexity even the very origins of life on earth.



The best selling book from the creator of the wildly popular science YouTube channel, Kurzgesagt – In a Nutshell, a gorgeously illustrated deep dive into the immune system that will change how you think about your body forever.

‘A truly brilliant introduction to the human body's vast system for fighting infections and other threats'

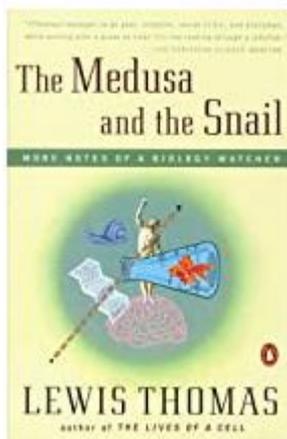
JOHN GREEN, #1 New York Times bestselling author of *The Fault in Our Stars*.



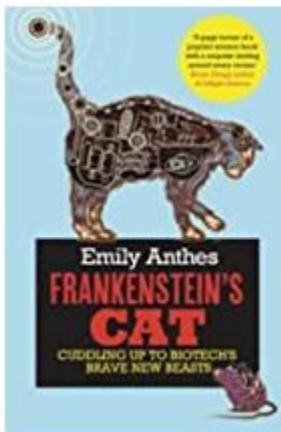
A Short History of Nearly Everything is his quest to understand everything that has happened from the Big Bang to the rise of civilization - how we got from there, being nothing at all, to here, being us. Bill Bryson's challenge is to take subjects that normally bore the pants off most of us, like geology, chemistry and particle physics, and see if there isn't some way to render them comprehensible to people who have never thought they could be interested in science.



Sex is as fascinating to scientists as it is to the rest of us. A vast pool of knowledge, therefore, has been gleaned from research into the nature of sex, from the contentious problem of why the wasteful reproductive process exists at all, to how individuals choose their mates and what traits they find attractive. This fascinating book explores those findings, and their implications for the sexual behaviour of our own species.



The medusa is a tiny jellyfish that lives on the ventral surface of a sea slug found in the Bay of Naples. Readers will find themselves caught up in the fate of the medusa and the snail as a metaphor for eternal issues of life and death as Lewis Thomas further extends the exploration of man and his world begun in *The Lives of a Cell*. Among the treasures in this magnificent book are essays on the human genius for making mistakes, on disease and natural death, on cloning, on warts, and on Montaigne, as well as an assessment of medical science and health care.



From the petri dish to the pet shop, meet the high-tech menagerie of the near future, as humans reinvent the animal kingdom

Fluorescent fish that glow near pollution. Dolphins with prosthetic fins. Robot-armoured beetles that military handlers can send on spy missions. Beloved pet pigs resurrected from DNA. Scientists have already begun to create these high-tech hybrids to serve human whims and needs. What if a cow could be engineered to no longer feel pain – should we design a herd that would assuage our guilt over eating meat?

Pod casts

To go to the ted talk right click and go to open link.

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?

Why Doctors Don't Know About the Drugs They Prescribe

Available at :

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

When a new drug gets tested, the results of the trials should be published for the rest of the medical world — except much of the time, negative or inconclusive findings go unreported, leaving doctors and researchers in the dark.



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.

Tasks

Task 1:

Download and print or save the specification. If you've printed it, put it into your new Biology A level folder!

<https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402>

Task 2:

Choose one topic from the boxes below (pages 6 - 9) – use the websites and podcasts to produce an A4 page of notes, (ensuring you answer the questions) in the style of Cornell's notes.

Task 3:

Choose a second topic from the boxes below (pages 6 - 9) – use the websites and podcasts to produce a poster, information booklet or PowerPoint (ensure you address all the questions).

Task 4:

Complete the A level biology transition baseline assessment.

If you are unable to print the tasks, you can e-mail them to:

cbillingsley@highstorrs-mlt.co.uk

Topic 1: Cells – What are cells?

The cell theory, that all life on Earth exists as cells, is a unifying concept in biology. There are eukaryotic cells (i.e., animal, plant and fungi cells), and prokaryotic cells (i.e. bacteria).

Read the information on these websites:

[Animal cells - Cell structure - AQA - GCSE Biology \(Single Science\) Revision - AQA - BBC Bitesize Cells • Revision Notes & Practice Quiz • Biology / Science | GCSE.CO.UK](#)

Watch these videos:

[Prokaryotic and Eukaryotic cells - GCSE Biology. The similarities, differences, and structures. - Bing video](#)

[The twisting tale of DNA - Judith Hauck | TED-Ed](#)

[Mitosis: Splitting Up is Complicated - Crash Course Biology #12 - YouTube](#)

[Meiosis: Where the Sex Starts - Crash Course Biology #13 - YouTube](#)

Questions

Draw and fully label a plant and animal cell.

What are differences between eukaryotic and prokaryotic cells?

Are viruses' cells? Explain your answer.

How do cells reproduce?

Topic 2: Biological molecules – why are they so important?

All life on Earth shares a common Chemistry. Biological molecules are often polymers and are based on a small number of chemical elements. Just a few groups of carbon-based compounds make up the cells of all living organisms. Carbohydrates, proteins, lipids, inorganic ions and water are all essential to life, and have important roles and functions related to their properties.

Read the information on these websites:

[Molecules of life - Animal organisation - digestion - AQA - GCSE Biology \(Single Science\) Revision - AQA - BBC Bitesize](#)
[Enzymes and Digestion Revision Notes • GCSE Biology & Science Exam Notes & Quizzes | GCSE.CO.UK](#)

Watch these videos / listen to the podcast:

[In Our Time - Enzymes - BBC Sounds](#)
[Biological Molecules - You Are What You Eat: Crash Course Biology #3 - YouTube](#)
[Activation energy: Kickstarting chemical reactions - Vance | TED-Ed](#)

Questions

What are the functions of carbohydrates, proteins, lipids and nucleic acids on a cellular level and within a whole organism?

Describe the structure of an enzyme.

Explain what enzymes do inside the body and why they are so important.

Topic 3: DNA and the Genetic Code -

DNA (deoxyribonucleic acid) is the molecule in cells that stores genetic information. The genetic code held within DNA is the same in all organisms, providing evidence of evolution. The sequence of bases in the DNA molecule determines the structure of proteins, including enzymes.

Read the information on these websites:

[DNA structure - Structure of DNA - Higher Biology Revision - BBC Bitesize](#)
[Chromosomes • Revision Notes & Practice Quiz • Biology / Science | GCSE.CO.UK](#)

Watch these videos / listen to the podcast:

[The twisting tale of DNA - Judith Hauck | TED-Ed](#)
[Where do genes come from? - Carl Zimmer | TED-Ed](#)

Questions

Define the words gene, chromosome, DNA and base pair.

How is the DNA arranged in prokaryotic and eukaryotic cells?

Describe the structure and function of DNA and RNA

Topic 4: Species and Biodiversity

Biodiversity is the variety of different species of organisms on Earth, or within an ecosystem. Biodiversity relates to habitats that range from a single pond to the whole Earth. A habitat is the place where individuals live, with specific biotic (living) and abiotic (non-living) factors. A species is a group of organisms that can breed together to produce fertile offspring. Each species has a binomial name, made up of two parts – its genus and species (e.g. *Homo sapiens*). This name can be identified universally.

Read the information on these websites:

[Biodiversity - Biodiversity and the effect of human interaction on ecosystems - AQA - GCSE Biology \(Single Science\) Revision - AQA - BBC Bitesize](#)
[Flashcards - Topic 7.3 Biodiversity and the Effect of Human Interaction on Ecosystems - AQA Biology GCSE - PMT \(physicsandmathstutor.com\)](#)

Watch these videos / listen to the podcast:

[Why is biodiversity so important? - Kim Preshoff | TED-Ed](#)
[Can wildlife adapt to climate change? - Erin Eastwood | TED-Ed](#)

Questions

Define what is meant by species and classification.

Describe how species are classified.

Explain one way in which scientists can collect data about the population of a species in a habitat (plant or animal). Give an example.

How might habitat change may pose a threat to niche species?

Topic 5: Bioenergetics

Bioenergetics is a field in biochemistry and cell biology that concerns energy flow through living systems. Photosynthesis and respiration are reactions included in bioenergetics. Endothermic and exothermic reactions are terms you will have come across in GCSE Chemistry. Remember, exothermic reactions transfer energy to the surroundings and endothermic reactions transfer energy from the surroundings.

Read the information on these websites:

[Photosynthesis - Photosynthesis - AQA - GCSE Biology \(Single Science\) Revision - AQA - BBC Bitesize](#)
[Cellular respiration - Respiration - AQA - GCSE Biology \(Single Science\) Revision - AQA - BBC Bitesize](#)

Watch these videos / listen to the podcast:

[ATP & Respiration: Crash Course Biology #7 - YouTube](#)
[Introduction to cellular respiration | Cellular respiration | Biology | Khan Academy - YouTube](#)

Questions

What are the word and symbol equations for photosynthesis and respiration?

Which one of these reactions is exothermic and which one is endothermic? Explain your answer.

How are plants adapted to photosynthesis?

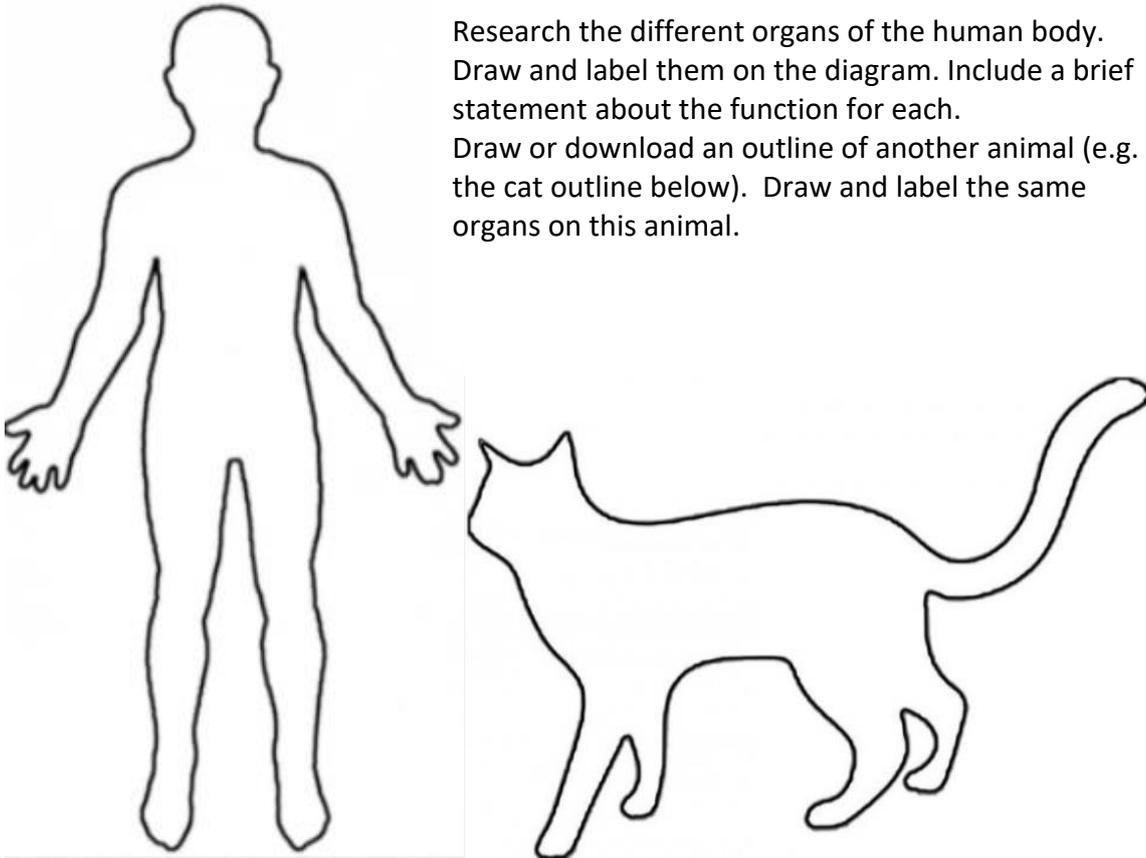
What is the biological energy molecule called?

Why does every cell have to carry out respiration?

Describe the difference between anaerobic respiration in plants and animals.

Topic 6: Physiology

Research the different organs of the human body. Draw and label them on the diagram. Include a brief statement about the function for each. Draw or download an outline of another animal (e.g. the cat outline below). Draw and label the same organs on this animal.

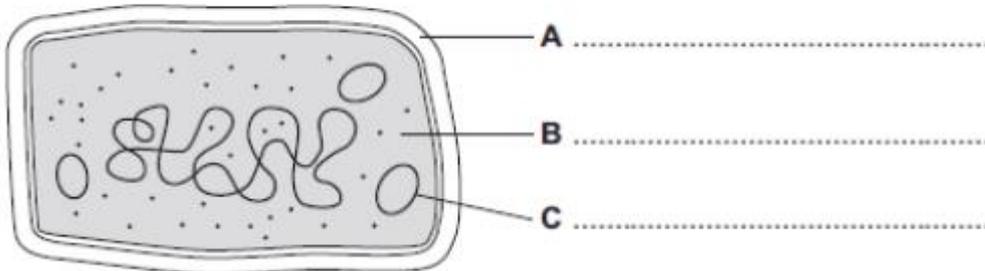


A-Level Biology Transition Baseline Assessment

The following 40 minute test is designed to test your knowledge and recall on the topic covered in this booklet. **Make sure you bring this to your first biology lesson in September.**

1. a) Label A, B and C in the diagram below.

The diagram shows the structure of a bacterial cell.



b) Give one difference between the structure of an animal cell and a bacterial cell.

c) Give one difference between the structure of a plant cell and a bacterial cell.

2. a) What is the role of the cell membrane?

b) Why do root cells in plants not contain chloroplasts?

3. What 2 main features of a virus differentiate it from life on Earth?

4. a) What are the 4 bases found in DNA, and how do they pair?

b) What does DNA code for?

c) Which organelle in a cell carries out protein synthesis?

5. Ecologists regularly study habitats to measure the species present and the effects of any changes. One team of ecologists investigated the habitat shown in the picture below:

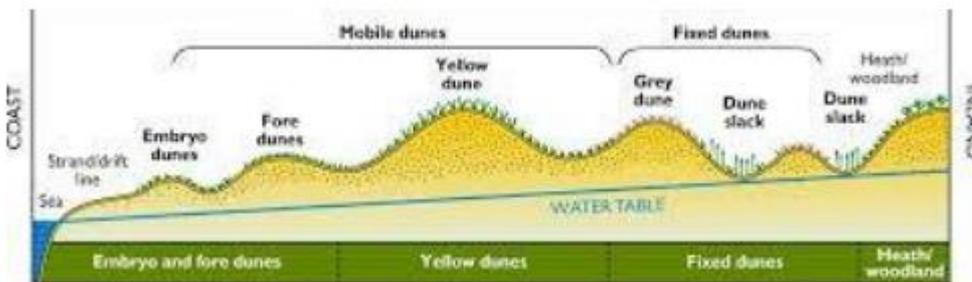


Image taken from <http://www.macaulay.ac.uk/soilquality/Dune%20Succession.pdf>

a) Define the following keywords:

Population

Community

b) Give an example of one biotic and one abiotic factor that would be present in this habitat.

Biotic:

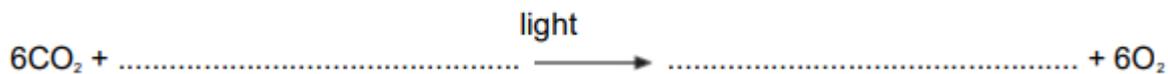
Abiotic:

c) Describe how the ecologist would go about measuring the species present between the coast and inland.

6. a)

.Photosynthesis needs light.

(a) Complete the **balanced symbol** equation for photosynthesis.



b)

Some people keep indoor plants which have variegated leaves (leaves with green and white regions).

If plants with variegated leaves are kept in dim light conditions the white areas of the leaves start to turn green.

This is an advantage to the plant.

Suggest why.

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7. a) What is the role of respiration?

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.....

b) In animals is carbon dioxide produced during anaerobic respiration?

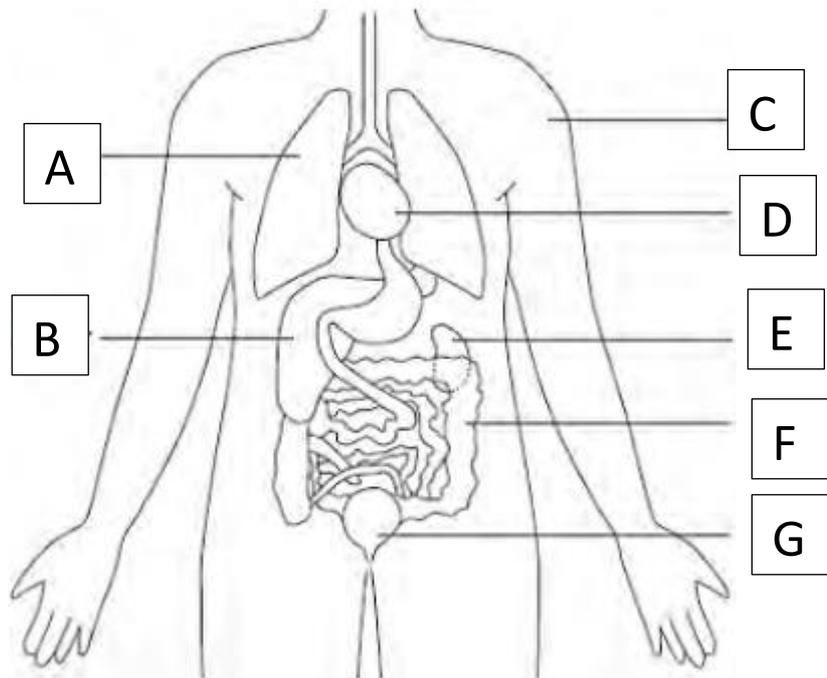
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c) Is respiration an endothermic or exothermic reaction?

.....
.....

d) Give 3 ways an organism may use the energy from respiration.

8. a) Label the organs on the diagram



- A -
- B -
- C -
- D -
- E -
- F -
- G -

Which organ labelled on the diagram:

(i) produces urine

(ii) stores urine

(iii) produces urea

(iv) gets rid of carbon dioxide

(v) helps to control body temperature?