



# Corby Technical School

## A Level Biology

### Transition Booklet

**This booklet is designed to prepare you for the Biology A level course and to bridge the gap and extend into A-Level.**

#### What is included:

- Book recommendations
- Movie recommendations
- Guidance on how to make notes
- Research activities
- **5 Week Transition Classes (topics and practice)**
- Ideas for day trips
- Science on social media
- Science Websites
- Science things to do

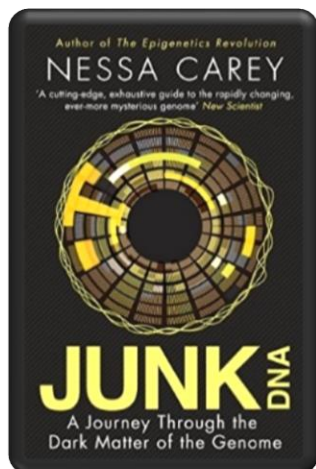
Contact Details:

Mr. Cox

[scox1@corbytechnicalschool.org](mailto:scox1@corbytechnicalschool.org)

## 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

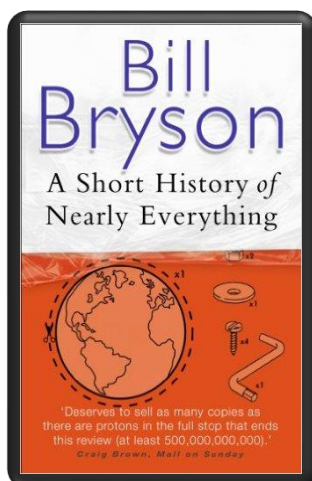
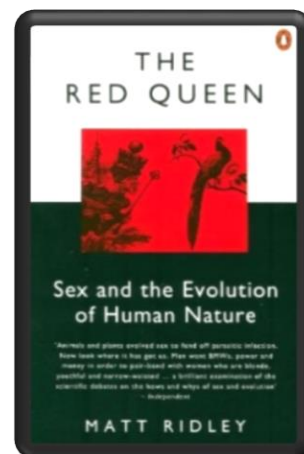


### Junk DNA

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. Available at [amazon.co.uk](http://amazon.co.uk)

### 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. Available at [amazon.co.uk](http://amazon.co.uk)



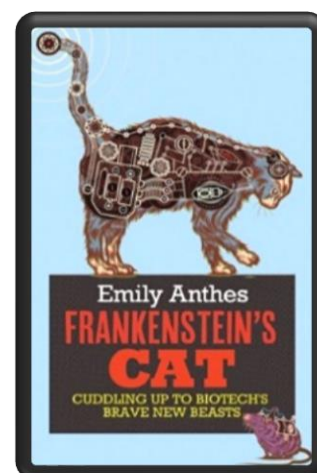
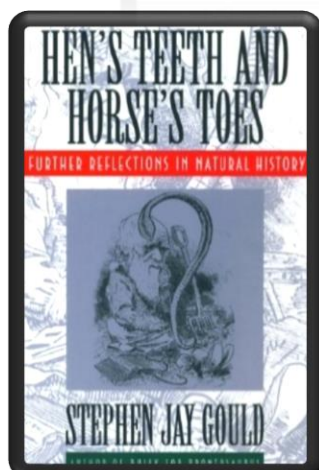
### A Short History of Nearly Everything

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! Available at [amazon.co.uk](http://amazon.co.uk)

Studying Geography as well?

### Hen's teeth and horses toes

Stephen Jay Gould is a great Evolution writer and this book discusses lots of fascinating stories about Geology and evolution. Available at [amazon.co.uk](http://amazon.co.uk)



An easy read..

### Frankenstein's cat

Discover how glow in the dark fish are made and more great Biotechnology breakthroughs. Available at [amazon.co.uk](http://amazon.co.uk)

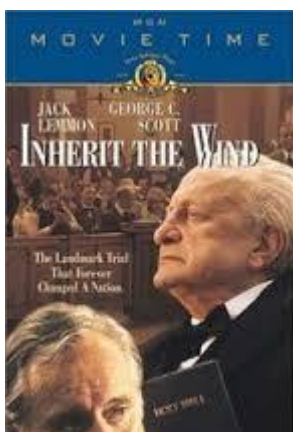
## Movie Recommendations

Everyone loves a good story and everyone loves some great science. Here are some of the picks of the best films based on real life scientists and discoveries. You won't find Jurassic Park on this list, we've looked back over the last 50 years to give you our top 5 films you might not have seen before. Great watching for a rainy day.



### Inherit The Wind (1960)

Great if you can find it. Based on a real life trial of a teacher accused of the crime of teaching Darwinian evolution in school in America. Does the debate rumble on today?

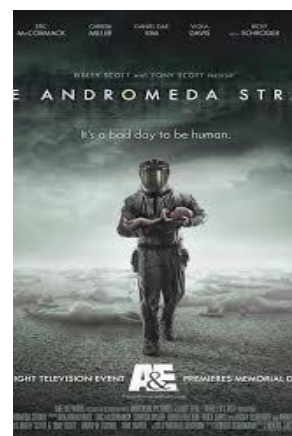


### Gorillas in the Mist (1988)

An absolute classic that retells the true story of the life and work of Dian Fossey and her work studying and protecting mountain gorillas from poachers and habitat loss. A tear jerker.

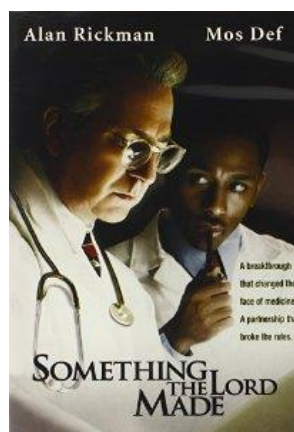
### Andromeda Strain (1971)

Science fiction by the great thriller writer Michael Crichton (he of Jurassic Park fame). Humans begin dying when an alien microbe arrives on Earth.



### Lorenzo's Oil (1992)

Based on a true story. A young child suffers from an autoimmune disease. The parents research and challenge doctors to develop a new cure for his disease.



### Something the Lord Made (2004)

Professor Snape (the late great Alan Rickman) in a very different role. The film tells the story of the scientists at the cutting edge of early heart surgery as well as issues surrounding racism at the time.

There are some great TV series and box sets available too, you might want to check out: Blue Planet, Planet Earth, The Ascent of Man, Catastrophe, Frozen Planet, Life Story, The Hunt and Monsoon.

## Movie Recommendations

If you have 30 minutes to spare, here are some great presentations (and free!) from world leading scientists and researchers on a variety of topics. 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](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](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](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\\_atalla\\_growing\\_organs\\_engineering\\_tissue?language=en](http://www.ted.com/talks/anthony_atalla_growing_organs_engineering_tissue?language=en)

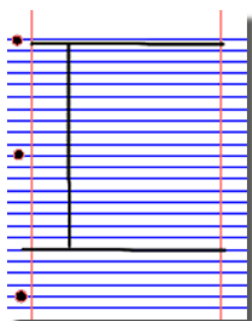
Anthony Atalla's state-of-the-art lab grows human organs — from muscles to blood vessels to bladders, and more.



## Research activities

Research, reading and note making are essential skills for A level Biology study. For the following task you are going to produce 'Cornell Notes' to summarise your reading.

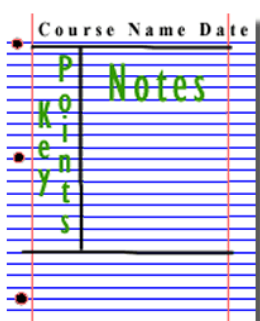
1. Divide your page into three sections like this



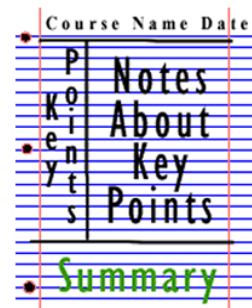
2. Write the name, date and topic at the top of the page



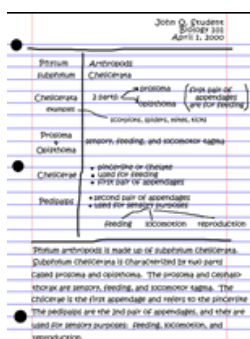
3. Use the large box to make notes. Leave a space between separate idea. Abbreviate where possible.



4. Review and identify the key points in the left hand box



5. Write a summary of the main ideas in the bottom space



Images taken from <http://coe.jmu.edu/learningtoolbox/cornellnotes.html>

## Research activities

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.

For each of the following topics, you are going to use the resources to produce one page of Cornell style notes.

Use the links of scan the QR code to take you to the resources.

# BigPicture



### Topic 1: The Cell

Available at: <http://bigpictureeducation.com/cell>

The cell is the building block of life. Each of us starts from a single cell, a zygote, and grows into a complex organism made of trillions of cells. In this issue, we explore what we know – and what we don't yet know – about the cells that are the basis of us all and how they reproduce, grow, move, communicate and die.



### Topic 2: The Immune System

Available at:

<http://bigpictureeducation.com/immune>

The immune system is what keeps us healthy in spite of the many organisms and substances that can do us harm. In this issue, explore how our bodies are designed to prevent potentially harmful objects from getting inside, and what happens when bacteria, viruses, fungi or other foreign organisms or substances breach these barriers.



### Topic 3: Exercise, Energy and Movement

Available at:

<http://bigpictureeducation.com/exercise-energy-and-movement>

All living things move. Whether it's a plant growing towards the sun, bacteria swimming away from a toxin or you walking home, anything alive must move to survive. For humans though, movement is more than just survival – we move for fun, to compete and to be healthy. In this issue we look at the biological systems that keep us moving and consider some of the psychological, social and ethical aspects of exercise and sport.



#### Topic 4: Populations

Available at:

<http://bigpictureeducation.com/populations>

What's the first thing that pops into your mind when you read the word population? Most likely it's the ever-increasing human population on earth. You're a member of that population, which is the term for all the members of a single species living together in the same location. The term population isn't just used to describe humans; it includes other animals, plants and microbes too. In this issue, we learn more about how populations grow, change and move, and why understanding them is so important.



#### Topic 4: Populations

Available at: <http://bigpictureeducation.com/health-and-climate-change>

The Earth's climate is changing. In fact, it has always been changing. What is different now is the speed of change and the main cause of change – human activities. This issue asks: What are the biggest threats to human health? Who will suffer as the climate changes? What can be done to minimise harm? And how do we cope with uncertainty?



## Pre-Knowledge Topics

A level Biology will use your knowledge from GCSE and build on this to help you understand new and more demanding ideas. Complete the following tasks to make sure your knowledge is up to date and you are ready to start studying:

### **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>

### **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.



# Organelles

<u>Organelle</u>	<u>Explanation</u>	<u>A/P/B?</u>
Lysosomes		
Free Ribosomes		
Cytoplasm		
Nucleus		
Nucleolus		
Endoplasmic Reticulum		
Vacuole		
Mitochondrion		
Plasma Membrane		
Cell Wall		
Chloroplast		

1. Which cell group does not possess a true nucleus?

- Prokaryotes
- Eukaryotes
- Plants
- Animals

2. Which of the following is a eukaryote?

- Bacteria
- Virus
- Archaea
- Sperm

3. Which of the following is found in all prokaryotic cells but only some eukaryotic cells?

- Cell membrane
- Cell wall
- Mitochondria
- Ribosome

4. Where in the cell are proteins synthesised?

- Mitochondria
- Vacuole
- Ribosomes
- Nucleus

5. Where do the majority of metabolic reactions take place?

- Cytoplasm
- Nucleus
- Cell membrane
- Ribosomes

6. How do you calculate the magnification of a magnified object?

- Image size x actual size
- Image size ÷ actual size
- Actual size x image size
- Actual size ÷ image size

7. Which of these cells contain spirals of lignin?

- Palisade cells
- Bacterial cells
- Yeast cells
- Xylem cells

8. What are cells called if they are adapted to perform a certain job?

- Specific
- Functional
- Unique
- Specialised

9. What are cells produced by mitosis called?

- Sister cells
- Daughter cells
- Haploid cells
- Zygotes

10. How many cell divisions occur in mitosis?

- None
- 1
- 2
- 3

11. A cell that has half the usual number of chromosomes is called what?

- Haploid
- Diploid
- Homozygous
- Heterozygous

12. What is the name of the first stage of mitosis?

- Prophase
- Metaphase
- Anaphase
- Telophase

# 5 questions, 5 sentences, 5 words– Cell biology

## INSTRUCTIONS

- For each statement, use either the suggested website or your own text book to write a 5-point summary. In examinations, answers frequently require more than 1 key word for the mark, so aim to include a few keywords.
- It is important to stick to 5 sentences. It is the process of selecting the most relevant information and summarising it that will help you remember it.
- Write concisely and do not elaborate unnecessarily, it is harder to remember and revise facts from a long paragraph.
- Finally, identify 5 key words that you may have difficulty remembering and include a brief definition. You might like to include a clip art style picture to help you remember it.

## Example:

QUESTION:	Describe the differences between prokaryotes and eukaryotes.			
Sources:	Website – <a href="http://www.ivyroses.com/Biology/Cells/Prokaryotic-and-Eukaryotic-Cells.php">http://www.ivyroses.com/Biology/Cells/Prokaryotic-and-Eukaryotic-Cells.php</a> Interactive - <a href="https://www.my-gcscience.com/aga/biology/eukaryotic-and-prokaryotic-cells/">https://www.my-gcscience.com/aga/biology/eukaryotic-and-prokaryotic-cells/</a>			
<ol style="list-style-type: none"><li>1. All animal and plant cells are eukaryotic, which makes all plants and animals eukaryotes.</li><li>2. Many eukaryotic cells belong to more complex organisms so often such organisms are made from more than one cell and so we call them multicellular.</li><li>3. Plant and animal cells are eukaryotic. They can be unicellular or belong to multicellular organisms</li><li>4. All bacterial cells are prokaryotic, which means that all bacteria are prokaryotes.</li><li>5. Prokaryotes are single celled, do not have a nucleus containing their genetic material (DNA) and are smaller than eukaryotic cells.</li></ol>				
Prokaryotic cells Cells that do not contain a nucleus (bacterial cells).	Prokaryote A prokaryotic organism (a bacterial cell).	Eukaryotic cells Cells that contain a nucleus.	Eukaryote An organism that is made of eukaryotic cells (those that contain a nucleus).	Multicellular An organism made of many cells.

QUESTION 1:	Explain how the main sub-cellular structures, including the nucleus, cell membranes, mitochondria and chloroplasts in plant cells as well as plasmids in bacterial cells, are related to their functions.			
Sources:	<b>Website</b> – <a href="https://www.khanacademy.org/test-prep/mcat/cells/eukaryotic-cells/a/organelles-article">https://www.khanacademy.org/test-prep/mcat/cells/eukaryotic-cells/a/organelles-article</a> <b>Video</b> - <a href="https://www.youtube.com/watch?v=JL19uv7NT7s">https://www.youtube.com/watch?v=JL19uv7NT7s</a>			

QUESTION 2:	Describe and explain how a sperm cell is adapted for its function.			
Sources:	Website – <a href="http://slideplayer.com/slide/6031489/">http://slideplayer.com/slide/6031489/</a> Video - <a href="https://www.youtube.com/watch?v=7z6W2xv4upc">https://www.youtube.com/watch?v=7z6W2xv4upc</a>			

## Pre-Knowledge Topics

### Exchange and Transport

Organisms need to exchange substances selectively with their environment and this takes place at exchange surfaces. Factors such as size or metabolic rate affect the requirements of organisms and this gives rise to adaptations such as specialised exchange surfaces and mass transport systems. Substances are exchanged by passive or active transport across exchange surfaces. The structure of the plasma membrane enables control of the passage of substances into and out of cells

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

<http://www.s-cool.co.uk/a-level/biology/gas-exchange>

<http://www.s-cool.co.uk/a-level/biology/nutrition-and-digestion/revise-it/human-digestive-system>

And take a look at these videos:

<http://ed.ted.com/lessons/insights-into-cell-membranes-via-dish-detergent-ethan-perlstein>

<http://ed.ted.com/lessons/what-do-the-lungs-do-emma-bryce>

1. What are the four main components of blood?
  - a. Red blood cells, white blood cells, plasma, carbon dioxide
  - b. Red blood cells, white blood cells, oxygen, sugar
  - c. Plasma, red blood cells, white blood cells, platelets
  - d. Oxygen, platelets, red blood cells, white blood cells
2. What is the function of red blood cells?
  - a. Carry oxygen
  - b. Carry carbon dioxide
  - c. Carry glucose
  - d. Carry water
3. Which of these statements is not an adaptation of the red blood cell?
  - a. Biconcave disc shape
  - b. No nucleus
  - c. Contains haemoglobin
  - d. Has a flagellum
4. Which blood vessels have thick walls made of muscle and elastic fibres?
  - a. Veins
  - b. Arteries
  - c. Capillaries
  - d. Venules
5. Which blood vessel has very thin walls for efficient exchange of substances?
  - a. Veins
  - b. Arteries
  - c. Capillaries
  - d. Venules
6. What are the top two chambers of the heart called?
  - a. Atria
  - b. Ventricles
  - c. Aorta
  - d. Vena Cava
8. What treatments are available for blocked coronary arteries?
  - a. Heart transplant
  - b. Valve transplant
  - c. Pacemaker
  - d. Stents
9. What are the movements of the diaphragm when breathing in?
  - a. Up/relaxes
  - b. Down/contracts
  - c. Dome/relaxes
  - d. Flattens/contracts
10. When does air enter the lungs?
  - a. When pressure in the lungs is lower than atmospheric pressure.
  - b. When pressure in the lungs is higher than atmospheric pressure.
  - c. When pressure in the lungs is the same as atmospheric pressure.
  - d. When pressure in the lungs is the same as blood pressure.
11. Which of these is not an adaptation of the alveoli for gas exchange?
  - a. Thin walls
  - b. Large surface area
  - c. Good blood supply
  - d. Large diffusion distance
12. Which cells in the leaf are adapted for photosynthesis?
  - a. Guard cells
  - b. Palisade cells
  - c. Upper epidermal cells
  - d. Lower epidermal cells
13. Which **two** substances move in the xylem?
  - a. Sugar
  - b. Amino acids
  - c. Water
  - d. Ions

# Scientific Posters

## GCSE Biology – Transport systems

### INSTRUCTIONS

#### Scientific Posters

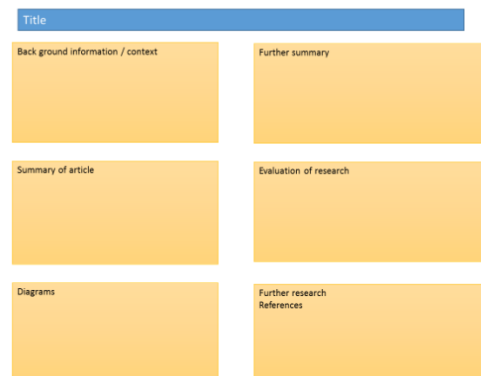
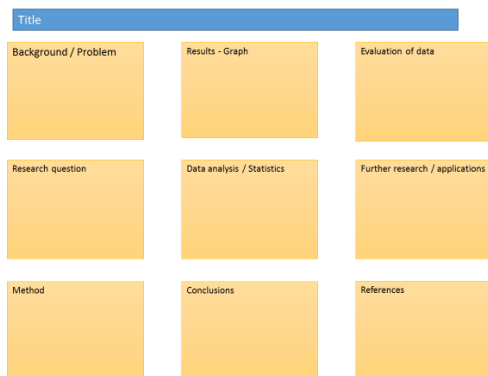
Scientists communicate research findings in three main ways. Primarily, they write journal articles much like an experiment write up. These are very concise, appraise the current literature on the problem and present findings. Scientists then share findings at conferences through talks and scientific posters. During a science degree, you would practise all three of these skills.

Scientific posters are a fine balance between being graphically interesting and attracting attention and sharing just the right amount of text to convey a detailed scientific message. They are more detailed than a talk and less detailed than a paper.

Use this information to help structure your poster – [www.tiny.cc/posterskills](http://www.tiny.cc/posterskills) (that's Poster Skills not Posters Kill!) More detailed guidance is available at: [www.tiny.cc/posterskills2](http://www.tiny.cc/posterskills2)

#### Creating your poster

It is easiest to create a poster in PowerPoint; however, you need to add custom text boxes rather than using the standard templates.



Posters need to be eye catching, but readable from a distance. If you use PowerPoint, start with a 4:3 slide (for easier printing, it can then be printed on A3) and use a 14-16 pt font. The first box could be larger to draw people in. You can use a background image, but pick a simple one that is of high quality. Select text box fill and select change the transparency to maintain the contrast and partially show the picture.

You can experiment with different layouts and you should include images. Avoid a chaotic layout. Posters are read from top left column downwards.

Remember to include the authors and references.

Finally, look at the examples given on the University of Texas website which also offers an evaluation of each [www.tinyurl.com/postereg](http://www.tinyurl.com/postereg)



# Human Transport systems

## Background

Even with specialised exchange surfaces, the size of larger organisms means that they must still have a system to transport substances between the exchange surface and the cells of the body. In humans and large animals, this is achieved through the circulatory system.

### Source articles:

<http://www.s-cool.co.uk/a-level/biology/transport/revise-it/the-heart>

[http://www.bbc.co.uk/schools/gcsebitesize/science/triple\\_aqa/transport\\_systems/blood\\_system/revision/4/](http://www.bbc.co.uk/schools/gcsebitesize/science/triple_aqa/transport_systems/blood_system/revision/4/)

[http://www.bbc.co.uk/schools/gcsebitesize/science/triple\\_aqa/transport\\_systems/blood\\_system/revision/5/](http://www.bbc.co.uk/schools/gcsebitesize/science/triple_aqa/transport_systems/blood_system/revision/5/)

<http://www.s-cool.co.uk/gcse/biology/heart-and-circulation/revise-it/the-blood>

[http://www.bbc.co.uk/schools/gcsebitesize/science/triple\\_aqa/transport\\_systems/blood\\_system/revision/3/](http://www.bbc.co.uk/schools/gcsebitesize/science/triple_aqa/transport_systems/blood_system/revision/3/)

### Task:

Produce a scientific poster on the heart, blood vessels and components of blood.

Recall	The structure and function of the human heart.
Describe	Describe the structure and functions of the aorta, vena cava, pulmonary artery, pulmonary vein and coronary arteries.
Compare	Compare the different types of blood vessels within the circulatory system. Compare the functions of the different components of blood.
Evaluate	Evaluate the advantages and disadvantages of treating cardiovascular diseases by drugs, mechanical devices or transplant.

## Pre-Knowledge Topics

### **Energy for Biological Processes**

In cellular respiration, glycolysis takes place in the cytoplasm and the remaining steps in the mitochondria. ATP synthesis is associated with the electron transfer chain in the membranes of mitochondria and chloroplasts in photosynthesis energy is transferred to ATP in the light- dependent stage and the ATP is utilised during synthesis in the light-independent stage.

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

<http://www.bbc.co.uk/education/guides/zcxrd2p/revision>

<http://www.s-cool.co.uk/a-level/biology/respiration>

And take a look at these videos:

[https://www.youtube.com/watch?v=00jbG\\_cfGuQ](https://www.youtube.com/watch?v=00jbG_cfGuQ)

<https://www.youtube.com/watch?v=2f7YwCtHcgk>

### **Task:**

**Produce an A3 annotated information poster that illustrates the process of cellular respiration and summarises the key points.**

Your poster should include:

Both text and images

Be visually stimulating

Key words and definitions

Clearly labelled diagrams

Short explanations of key ideas or processes.

# 5 questions, 5 sentences, 5 words– Transport

## INSTRUCTIONS

- For each statement, use either the suggested website or your own text book to write a 5-point summary. In examinations, answers frequently require more than 1 key word for the mark, so aim to include a few keywords.
- It is important to stick to 5 sentences. It is the process of selecting the most relevant information and summarising it that will help you remember it.
- Write concisely and do not elaborate unnecessarily, it is harder to remember and revise facts from a long paragraph.
- Finally, identify 5 key words that you may have difficulty remembering and include a brief definition. You might like to include a clip art style picture to help you remember it.

	Explain the relationship between the circulatory system and the respiratory system.			
Sources:	Website - <a href="https://www.healthcentral.com/article/how-the-heart-and-lungs-work-together">https://www.healthcentral.com/article/how-the-heart-and-lungs-work-together</a> Video - <a href="https://www.youtube.com/watch?v=9fxm85Fy4sQ">https://www.youtube.com/watch?v=9fxm85Fy4sQ</a>			

QUESTION 5:	Explain how the structure of root hair cells, xylem and phloem are adapted to their function.			
Sources:	Website – <a href="http://www.bbc.co.uk/schools/gcsebitesize/science/triple_aqa/transport_systems/transport_in_plants/revision/1/">http://www.bbc.co.uk/schools/gcsebitesize/science/triple_aqa/transport_systems/transport_in_plants/revision/1/</a> Interactive - <a href="https://www.youtube.com/watch?v=jtuX7H05tmQ">https://www.youtube.com/watch?v=jtuX7H05tmQ</a>			

## Background

The following short crash course clips present two topics that link to your learning. The first video is where Hank describes the different methods of transport across the membranes. The second video concentrates on vascular plants. These plants have found tremendous success and their secret is also their defining trait: conductive tissues that can take food and water from one part of a plant to another. Though it sounds simple, the ability to move nutrients and water from one part of an organism to another was an evolutionary breakthrough for vascular plants, allowing them to grow exponentially larger, store food for lean times, and develop features that allowed them to spread farther and faster.

### Source articles:

#### Video 1 – In da club- Membranes and transport

Crash course biology: <https://www.youtube.com/watch?v=dPKvHrD1eS4>

#### Video 2 – Vascular plants= winning!

Crash course biology: <https://www.youtube.com/watch?v=h9oDTMXM7M8>

### Task:

**You need to produce a set of Cornell notes for the videos given above.**

**Use the following objective to guide your note taking, this links to your learning.**

1. Discuss why membranes do not allow some substances to pass freely across them and the different methods that can be used to overcome this problem.
2. Describe the strategies used by vascular plants to move materials around the plant and discuss the importance of this ability.

#### Objectives

What are the main learning outcomes that have been shared with you?  
This will help guide you to taking the RIGHT notes during the video.

Title  
Date

Sketch down note and key words

Do not write in full sentences whilst you listen, put quick sketches, single words, mind maps, short hand etc.

To help train you for university, try not to pause the video because you could not pause a live lecture (However, a lecture may give more natural pauses for you to catch up).

#### Summary (after the video)

What are your main points of learning from this video.

This is your chance to make sense of your notes.

Make clear connections to the things you need to know

## Pre-Knowledge Topics

### **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 pH), use appropriate instrumentation to record quantitative measurements, such as a colorimeter or photometer, use laboratory glassware apparatus for a variety of experimental techniques to include serial dilutions, use of light microscope at high power and low power, including use of a graticule, produce scientific drawing from observation with annotations, use qualitative reagents to identify biological molecules, separate biological compounds using thin layer/paper chromatography or electrophoresis, safely and ethically use organisms, use microbiological aseptic techniques, including the use of agar plates and broth, safely use instruments for dissection of an animal organ, or plant organ, use sampling techniques in fieldwork.

### **Task:**

#### **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,

Please complete an experiment on a page for the following practicals:

<https://www.youtube.com/watch?v=aHVcJ1fHYWg&list=PLJI5rFr3KefAaBxkj0UsuX5PDOcwnGoN&index=5>

<https://www.youtube.com/watch?v=WLgN9UE0xrs&list=PLJI5rFr3KefAaBxkj0UsuX5PDOcwnGoN&index=6>

<https://www.youtube.com/watch?v=iPbUCzkF tk&list=PLJI5rFr3KefAaBxkj0UsuX5PDOcwnGoN&index=8>



Experiment on a Page

Experiment Title:

Method (Watch video and write out a method)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

Labelled Diagram of Experiment Setup

Identify Variables (Independent, Dependent and Control)

Summarize the science behind the experiment including any equations or maths which must be used.

Practical Improvements (What changes would you make to make it more accurate/reliable.

Equipment List

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

Results Table:

Draw a results table and populate with predicted results or observations.

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**Results Table:**

Draw a results table and populate with predicted results or observations.

If you are on holiday in the UK, or on a staycation at home, why not plan a day trip to one of these :

Glasgow Science  
Centre - Glasgow

Dundee Science  
Centre - Dundee

The Lakeland Wildlife  
Oasis - Milnthorpe

Scottish Seabird centre –  
North Berwick

W5 - Belfast

Life – Newcastle-  
upon-Tyne

Anglesey Sea Zoo -  
Anglesey

Cambridge Science  
Centre - Cambridge

Think-tank -  
Birmingham

Herriman  
Museum and  
Gardens -  
London

National Museum -  
Cardiff

Centre of the Cell -  
London

The Eden Project -  
Cornwall

Bristol Science  
Centre - Bristol

Royal Botanic  
Gardens – Kew -  
Edinburgh

The Living Rainforest  
- Newbury

Oxford University  
Museum of Natural  
History - Oxford

National Marine  
Aquarium - Plymouth

If you are on holiday in the UK, or on a staycation at home, why not plan a day trip to one of these :

Remember there are also lots of zoos, wildlife and safari parks across the country, here are some you may not have heard of or considered:

Colchester Zoo, Cotswold Wildlife Park, Banham Zoo (Norfolk), Tropical Birdland (Leicestershire), Yorkshire Wildlife Park, Peak Wildlife Park, International Centre for Birds of Prey (York), Blackpool Zoo, Beale Park (Reading)

There are also hundreds of nature reserves (some of which are free) located all over the country including:

RSPB sites at Lochwinnoch, Saltholme, Fairburn Ings, Old Moor, Conwy, Minsmere, Rainham Marshes, Pulborough Brooks, Radipole Lake, Newport Wetlands.

Wildlife Trust Reserves and others at Rutland Water, Pensthorpe, Insh Marshes, Attenborough Centre, Inversnaid, Skomer, Loch Garten, Donna Nook, Chapmans Well, Woodwalton Fen, London Wetland Centre, Martin Down and Woolston Eyes Reserve.

Many organisations also have opportunities for people to volunteer over the summer months, this might include working in a shop/café/visitor centre, helping with site maintenance or taking part in biological surveys. Not only is this great experience, it looks great on a job or UCAS application.

For opportunities keep an eye out in your local press, on social media, or look at the websites of organisations like the RSPB, Wildlife Trust, National Trust or Wildlife & Wetland Trust.

There are also probably lots of smaller organisations near you who would also appreciate any support you can give!



## 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 of our top tips to keep up to date with developing news or interesting stories:

### Follow on Twitter:

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

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

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

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

Sci Curious – feed from writer and Bethany Brookshire tweeting about good, bad and weird neuroscience  
@scicurious

The SETI Institute – The Search for Extra Terrestrial Intelligence, be the first to know what they find!  
@setiinstitute

Carl Zimmer – Science writer Carl blogs about the life sciences  
@carlzimmer

Phil Plait – tweets about astronomy and bad science  
@badastronomer

Virginia Hughes – science journalist and blogger for National Geographic, keep up to date with neuroscience, genetics and behaviour  
@virginiahughes

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



### Find on Facebook:

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

Marin 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 its amazing stories in pictures and words.

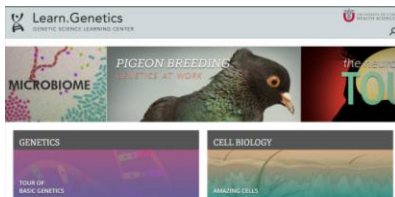
Science News Magazine - Science covers important and emerging research in all fields of science.

BBC Science News - The latest BBC Science and Environment 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 should use again and again through out 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/>

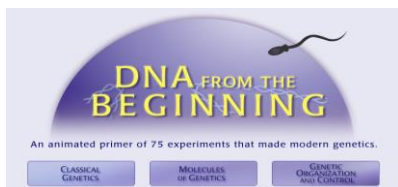


In the summer you will most likely start to learn about Biodiversity and Evolution. Many Zoos have great websites, especially London Zoo. Read about some of the case studies on conservation, such as the Giant Pangolin, the only mammal with scales.  
<https://www.zsl.org/conservation>



At GCSE you learnt how genetic 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/>



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/>



Ok, so not a website, but 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](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: Things to do!

Day 4 of the holidays and boredom has set in? There are loads of citizen science projects you can take part in either from the comfort of your bedroom, out and about, or when on holiday. Wikipedia does a comprehensive list of all the current projects taking place. Google 'citizen science project'



**AgeGuess**



# MOOC

Want to stand above the rest when it comes to UCAS? Now is the time to act.

MOOCs are online courses run by nearly all Universities. They are short FREE courses that you take part in. They are usually quite specialist, but aimed at the public, not the genius!

There are lots of websites that help you find a course, such as edX and Future learn.

You can take part in any course, but there are usually start and finish dates. They mostly involve taking part in web chats, watching videos and interactives.



Completing a MOOC will look great on your Personal statement and they are dead easy to take part in!

