

B) Exchange and Transport

Organisms need to exchange substances selectively between 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:

<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>

Task:

Produce a wall display to put up in your classroom in September. You might make a poster or a thinking map or produce a PowerPoint; your display must compare exchange surfaces in mammals and fish or compare exchange surfaces in the lungs and the intestines. Your poster should:

Describe diffusion, osmosis and active transport

Explain why oxygen and glucose need to be absorbed and waste products removed

Compare and contrast your chosen focus.

C) Cells and microscopy

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 on to daughter cells. Daughter cells formed during mitosis have identical copies of genes while cells formed during meiosis are not genetically identical. Our knowledge of cells stems from improvements in microscope technology that allow us to see cells and their components in ever more detail.

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/zvjyqdm/revision>

And take a look at these videos:

<https://www.youtube.com/watch?v=fKEaTt9heNM>

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

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

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

<https://bigpictureeducation.com/video-light-microscopy>

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, mitosis and meiosis or light microscopes and electron microscopes.

Whichever topic you choose, your revision guide should include:

Key words and definitions

Clearly labelled diagrams

Short explanations of each of the key ideas or processes.

D) 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 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 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 affects the nervous system.

Write a letter to a GP or a sufferer to explain what an enzyme is.

Your letter should include:

Description of the structure of an enzyme

Explain what enzymes do inside the body

Outline factors affecting the activity of enzymes

E) 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:

<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=2f7YwCtHcgk>

Task:

Produce an 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 explanation of each key idea or process

F) Scientific and Investigative Skills

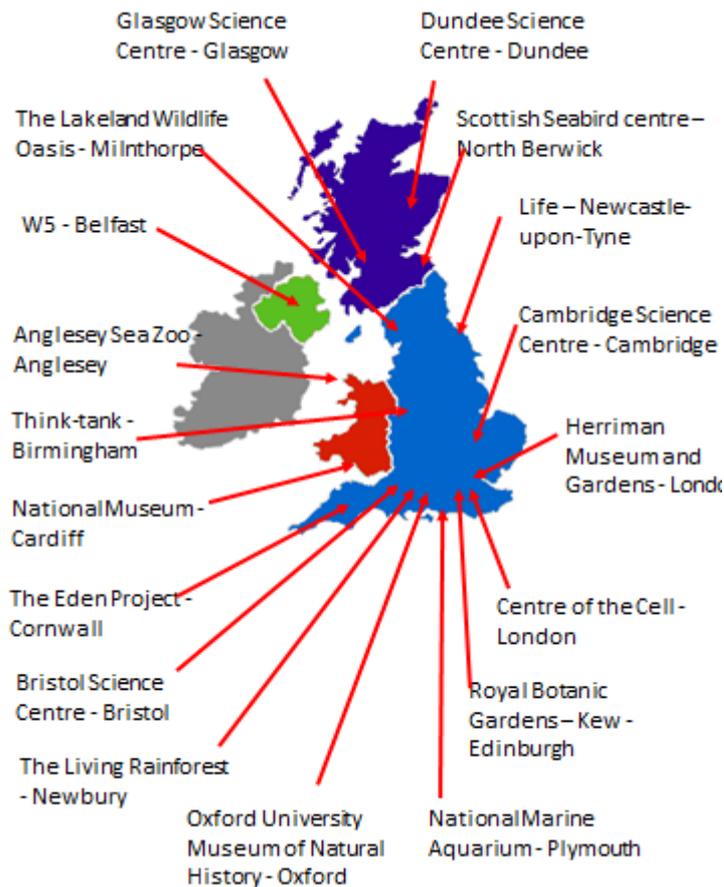
As part of your A level you will complete a practical assessment. This will require you to carry out a series of practical activities as well as planning how to do them, analysing the results and evaluating the methods. This will require you to: use appropriate apparatus to record a range of quantitative 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 including 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 which could be shared with other members of your class in September:

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,

Enrichment Activities: 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 and could consider visiting: **Whipsnade Zoo (Bedfordshire), Woburn Safari Park (Bedfordshire), 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 **Sandy (Bedfordshire), 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.

Natural History Museum in Tring (Hertfordshire) or London

Challenge and or Extension Tasks:

Books to read or films to watch to extend your understanding of Biology:

Junk DNA (Nessa Carey), A Short History of Nearly Everything (Bill Bryson), Frankenstein’s Cat (Emily Anthes)

Gorillas in the Mist (1988), Inherit the Wind (1960), Lorenzo’s Oil (1992), Something the Lord Made (2004)

There are also 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.

Research Activities:

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: 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

