Planning on studying A level Biology next year?

Biology is the study of living things and their environment and as such it covers a wide field of information over a considerable size range. On the one hand it involves the movement of electrons in photosynthesis and on the other, the migrations of populations around the earth.

There are two fundamental areas of Biology which you need to understand before the rest of the course is explained. These are cells and biological molecules. You have been taught quite a lot of both these topics at GCSE already.

The cell is the fundamental unit of life. All organisms, whatever their type or size, are composed of cells. Cells contain the genetic material of an organism and metabolic processes take place within them.

Biological molecules are the fundamental building blocks of the cells of all organisms. Cells are made up of only a few groups of molecules that react chemically with each other in very similar ways. More importantly, these molecules are all based on carbon.

Activity 1

Try and draw an animal and a plant cell from memory and label them.

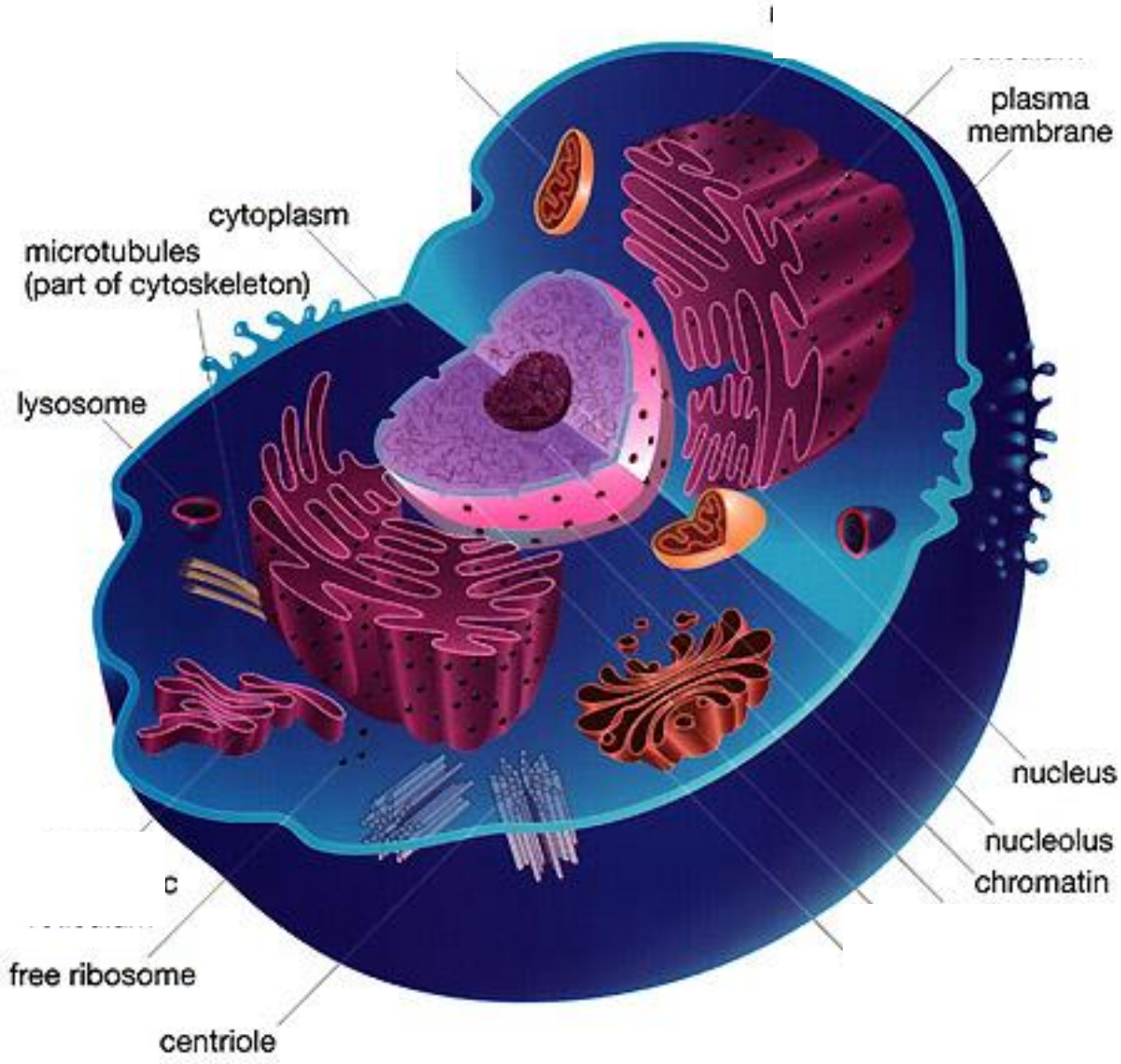
Much of what you have already learnt about cells from GCSE is very useful to you at A Level Biology. Now we need to expand on your diagrams.

The link below takes you on a virtual tour of the inside of a cell. It does talk through some of the complex processes all of which you will learn step by step so don't worry if it sounds very complex.

Look out for the following structures on the animation. Use the information to label the structures on the image of the cell on the next page and annotate it with the function of the organelles.

- Nuclear pores
- Ribosome
- Endoplasmic reticulum
- Golgi apparatus
- Vesicles

www.vcell.science/project/flythrough


plasma membrane
cytoplasm
microtubules (part of cytoskeleton)
lysosome
nucleus
nucleolus
chromatin
free ribosome
centriole

Activity 2

You may recall viewing cells at school in the past. Within the topic of cells we take a closer look at microscopes and how they work. We also examine how to prepare cells to make them ready to view.

Try and complete this task from memory.

Write a paragraph to explain how to prepare a microscope slide. Include the following key words:

Mounting needle	iodine	slide
cover slip	tweezers	
white tile	air bubbles	
specimen		

This technique is fine for viewing cells underneath a light or optic microscope like the ones we have in school. However, scientists view cells with an electron microscope which enables them to see a lot more detail. Sometimes they just need to study the organelles rather than the whole cell. To prepare the organelles they use a technique called cell fractionation and ultracentrifugation.

Click the link below to watch the video. Then answer the questions.

https://www.youtube.com/watch?v=jMBqK7fj4gk

1. Why do scientists homogenise the cells?
2. Explain why they need to filter the suspension.
3. Why must they keep the suspension ice cold?
4. Explain why they used isotonic solution during the process.

Activity 3

This activity introduces some of the biological molecules you need recognise. Within this section of biology there are lots of opportunities to complete practical work. You need to be able to identify from a sample what the biological molecule is and know the experimental techniques involved in figuring this out.

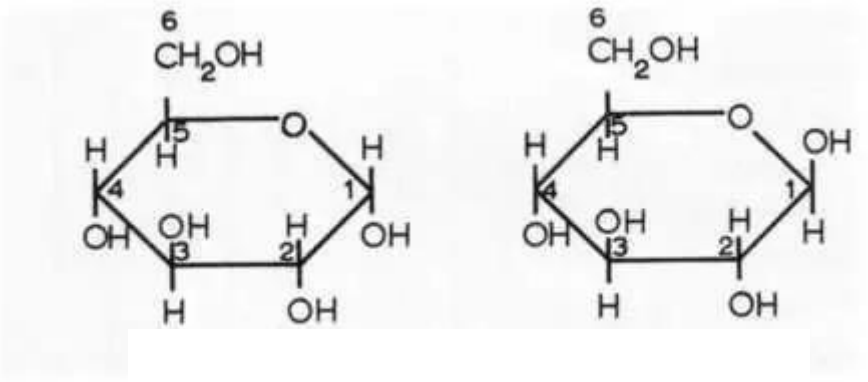
So what do you remember from GCSE?

1. Can you state the formula for glucose?
2. What are proteins made up of?
3. What chemical do you need to test for starch?

You may remember carrying out the food tests in year 9 or 10. These are the biochemical test that you need to learn for Biology A level and the great thing is you have already done them once!

During the A level Biology course you will be improving your practical skills all the time. So, whilst the biochemical tests you carried out at GCSE are the same as the A level ones, we need to begin to ensure that practical work is carried out accurately and precisely.

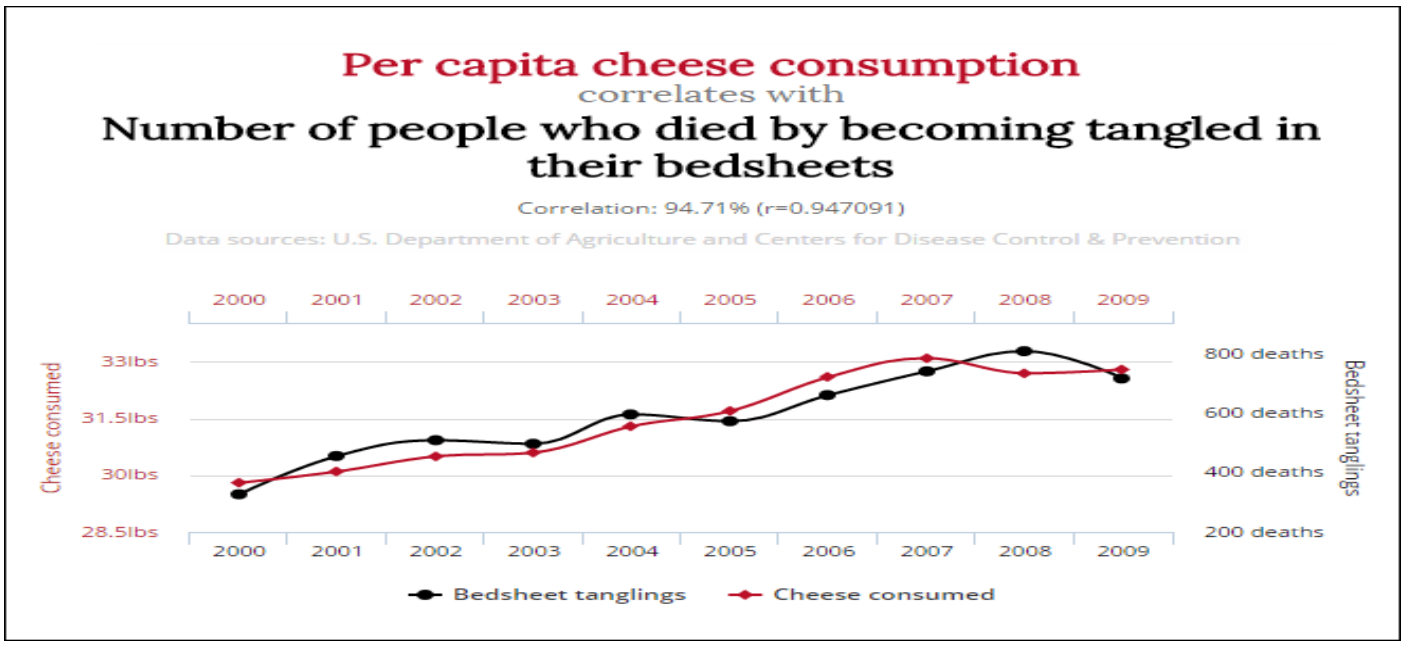
The molecules below are alpha and beta glucose. Find out which one is which and how you can tell the difference. Then, learn them! You may have to draw it in an exam.



<u>Investigating and Interpreting.</u>

In the same way as GCSE, Biology A level has several required practicals that you must undertake. However, the difference is you must become competent in a range of practical skills and your teacher will assess this. Similarly to GCSE you will be assessed in the exams on your knowledge of practical work and practical skills including interpreting data and mathematical skills.

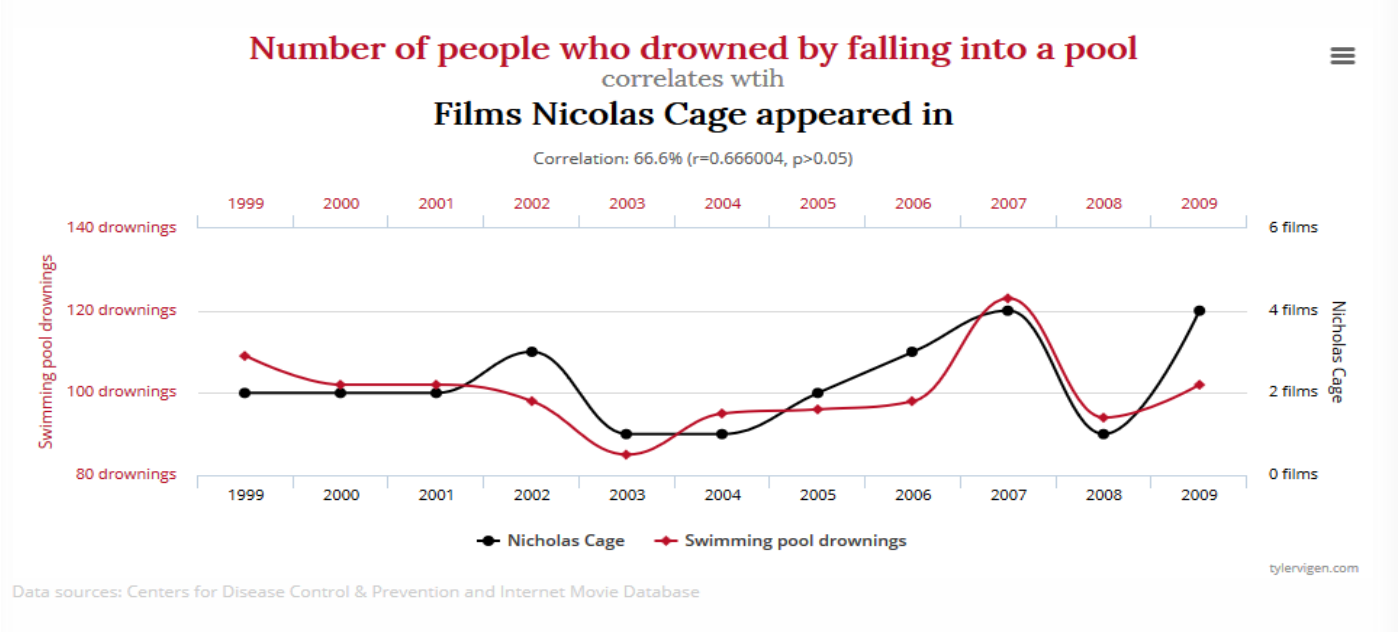
Can you see a correlation in the data below? If so, what?



Does this mean eating a lot of cheese can cause death by tangling in bedsheets?

How about this one?

Can you see a correlation and if so, what?



If Nicholas Cage makes a few extra films one year, would that mean more people would fall into a pool and drown?

Correlation and causation are two separate things. We examine this continually in Biology. If two sets of data correlate that does not mean that one causes the other. There could be other factors involved.

Further reading and research

Below is a list of websites for you to access to give you more of a taste of A level Biology.

https://www.cellsalive.com/

Explore this website to learn more about cells. Within this site there are lists of animations and videos plus information on the immune system and the cell cycle which are all part of the cells unit.

http://www.sumanasinc.com/webcontent/animations/biology.html

Plenty of information here which would be useful throughout the two year course.

http://www.sumanasinc.com/webcontent/animations/content/reflexarcs.html

This animation will expand on your knowledge of the reflex arc.

highered.mheducation.com/sites/0072495855/student_view0/chapter22/animation__conducting_system_of_the_heart.html

This is an animation about the heart but if you go to the home page you can select many chapters on the anatomy in general. Chapter 2 gives a closer look at cells. There are many animations and quizzes to help you learn and test your knowledge.

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

This is the website for the exam board. It is very good practice to download the specifications yourselves and put it in your folders. The specification clearly sets out all the topics you will be taught. This website will also give you more information about how many exams there are, how long they should take and the content assessed in each one.

Please complete the activities on this booklet and present your work in a format of your own choice. It could be a PowerPoint presentation or a word document. You could also do the activities on paper and take pictures of your work. Please send the work via email to jjones@sbsj.co.uk

Finally, if you have any questions regarding A Level biology then feel free to contact any of the biologists at school. That includes myself, Mrs Jones jjones@sbsj.co.uk, and Mrs Howell emhowell@sbsj.co.uk.