Biology from GCSE to A Level

Biology is a brilliant subject and so congratulations on choosing it.
Biology, like most other A level subjects, is a continuation of what you have learnt at GCSE but in much more depth and detail.
The best thing you can do to prepare for A level is to fully understand key GCSE topics and principles, at GCSE standard so that we can extend your understanding without the need to review the topics.
There is **no expectation** that you need to study any of the A level content in advance although you can look at it if you wish.

We have provided a PDF copy of the textbook we use
This will give you a bit of a view of what we will cover, but please don't be put off by the challenge because we will be providing a lot of input in the classroom and with resources and practice questions.

Each year students make the transition successfully and so you can too.

In year 1 of the course we will cover sections 1 to 4
These are

1. Biological Molecules (Term 1)
2. Cells (Term 1)
3. Organisms exchange substances with their environment (Exchange) (Term 2/3)
4. Genetic information, variation and relationships between organisms (Variation) (Term 2/3)

The best areas to focus on in your preparations are Biological Molecules and Cells

Biological Molecules

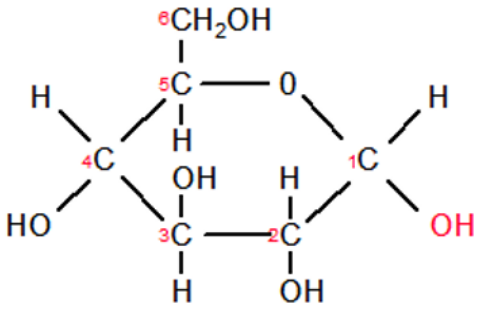
In one of your first lessons you will look at carbohydrates including glucose example below

Glucose a Monosaccharide

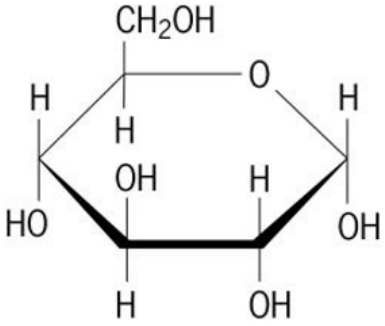
At GCSE you will have learned that the structure of glucose is $C_6H_{12}O_6$ now we are going to look in detail at how those atoms are arranged in the glucose molecule.

There are two forms of the glucose molecule α Glucose and β Glucose.

We are going to start with **α Glucose**



α-glucose



Here are some GCSE topics that will support the Biological Molecules content
You can use your GCSE revision guides, GCSE textbooks and your class notes to recap this work and revisit the GCSE detail.

1. Glucose formula
2. Production of glucose in photosynthesis
3. Glucose stored as starch in plants and glycogen in animals
4. Energy is released from glucose in respiration
5. Aerobic respiration and anaerobic respiration
6. Glucose is used to make cellulose for cell walls
7. Some glucose is used to make proteins
8. Excess glucose is converted to fat for storage (high energy store and high energy release)
9. Proteins are long chains of amino acids which fold into specific shapes
10. Proteins are varied in structure and function eg muscles, hormones, antibodies, enzymes
11. Enzymes as biological catalysts, lowering activation energy,
12. The shape of each enzyme is specific which makes sure each catalyses a specific reaction
13. Changes in temperature can affect enzyme activity; the idea of an optimum temperature and how temperatures above and below this can affect activity
14. Enzymes have optimum pH values; in most cases this will be around neutral but in some cases eg the digestive enzymes different enzymes can have different optimums
15. Most enzymes work within cells but some are extracellular (work outside cells) eg digestive enzymes
16. The basic structure of DNA
17. Biochemical (food) tests

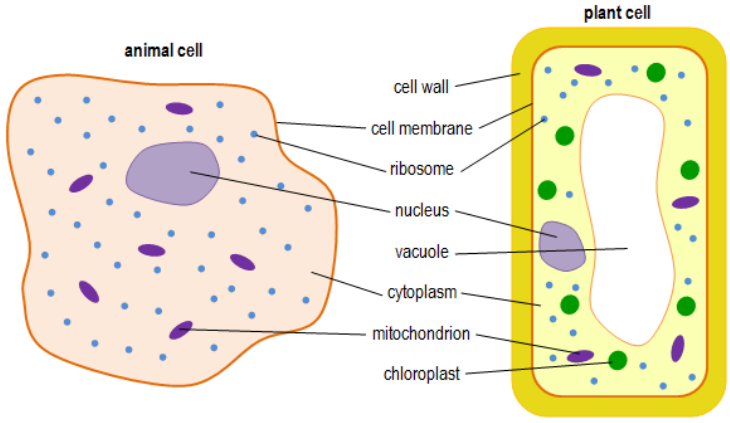
Here is a link to a short clip that discusses some of the key basics of carbohydrates.

https://www.youtube.com/watch?v=mUo4c2f9rpI

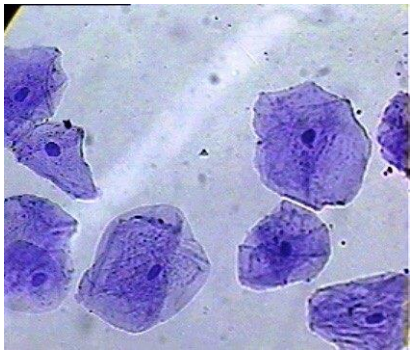
Cells

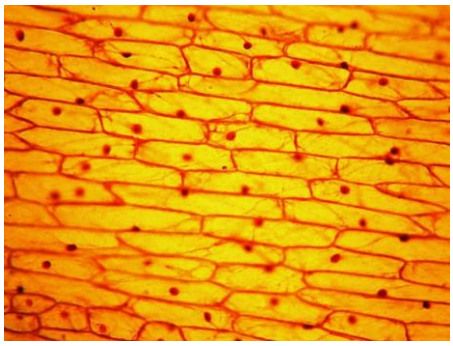
Running in parallel to Biological Molecules will be the Cells section.
You will have two teachers, each teaching one of these sections

Your current knowledge of cell structure is probably represented by these diagrams which is a good starting point

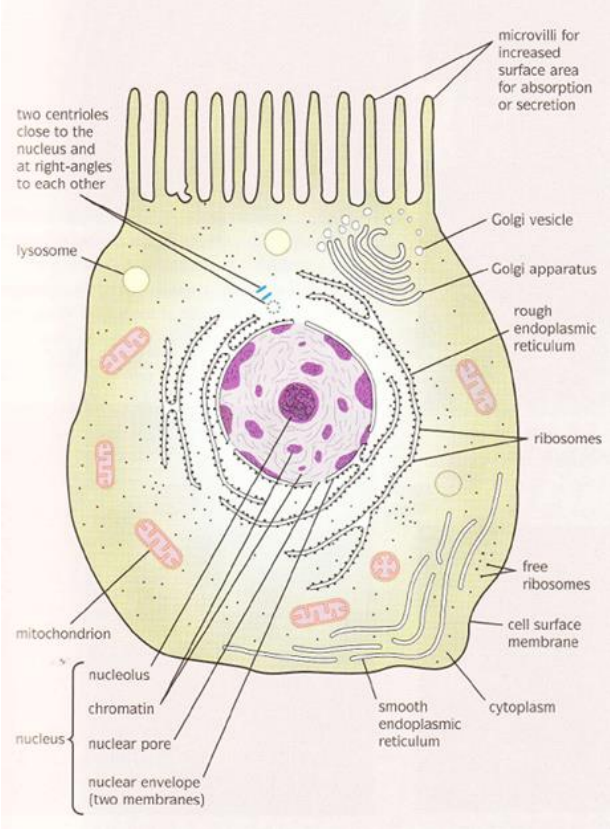


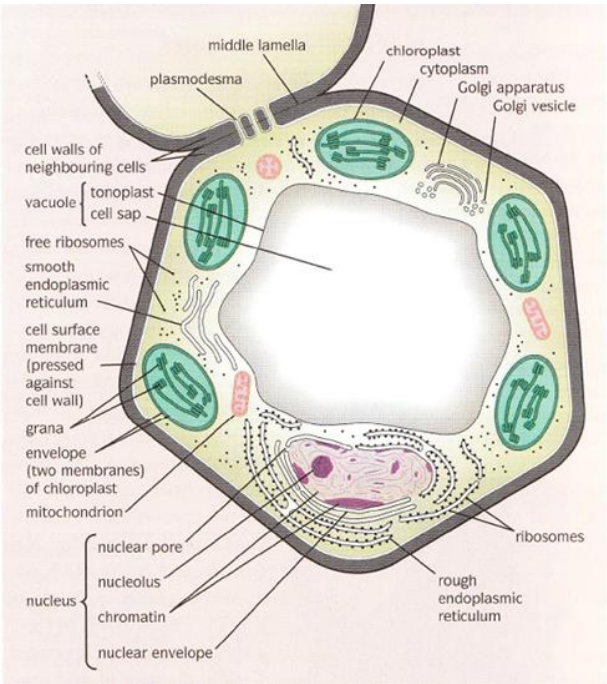
You may have prepared cheek cell slides and onion cell slides and viewed them with a light (optical) microscope as seen in the photos

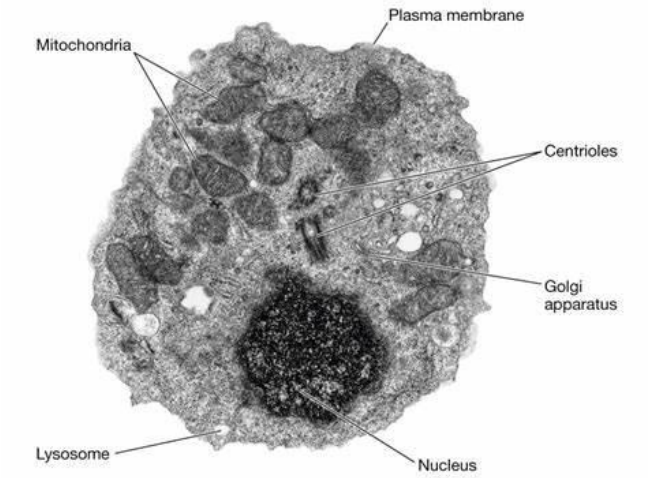


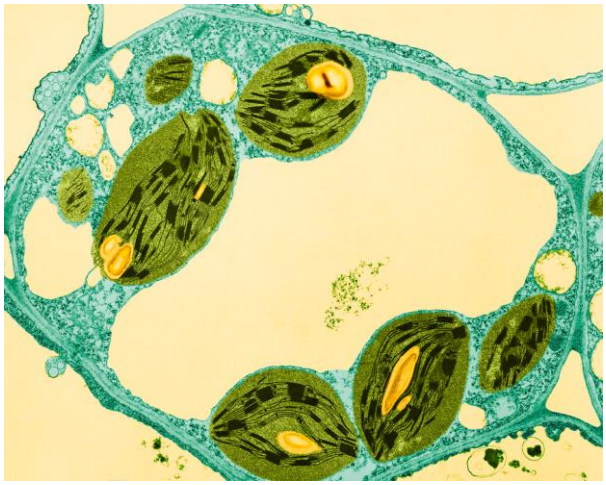


We will look at cells, their organelles and membranes in much more detail. To give you an idea of the level have a look at the diagrams and pictures below









Here are some GCSE topics that will support the Cells content
You can use your GCSE revision guides, GCSE textbooks and your class notes to recap this work and revisit the GCSE detail.

1. The structure of animal and plant cells (GCSE level)
2. Plant cells have chloroplasts, cellulose cell walls and a large permanent vacuole
3. Algae also have cellulose cell walls and algae can also photosynthesise
4. Differentiation and specialisation of cells
5. Bacterial cell structure and how it differs to animal and plant cell structure
6. Magnification calculations
7. Chromosomes are found in pairs
8. Mitosis and its role in producing identical new cells for growth and for asexual reproduction

9. Understand diffusion, osmosis and active transport and the roles they have in organisms and exchange
10. Pathogens as microorganisms that cause disease
11. The role of white blood cells in defending the body after infection by a pathogen; phagocytosis engulfing pathogens) , and production of antibodies and antitoxins
12. The specificity of antibodies
13. Immunisation

Here is a link to a clip that goes through some of the basics about cells

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

If you do want to do some additional work….

Biological Molecules

1. Biochemical tests.
   Try to complete this table to recap your knowledge of the biochemical (food) tests studies at GCSE.
   The first one has been done for you

Biochemical	Details of the test	Positive result and negative result
Starch	Add iodine to the sample	Positive: Iodine turns black Negative: Iodine stays orange/brown
(Reducing)sugar eg glucose		Positive: Negative:
Protein		Positive: Negative:

2. Carbohydrates (sugars) and Carbohydrates (polysaccharides) worksheets
   These are in separate resource folder for you to print off to write on, along with the markscheme
   These are **completely optional** and we will revisit them next year and so do the best you can but don't worry if you find them difficult.

Cells

For the Cells topic you can try the Magnification worksheet included in the separate resource folder.
Worked answers are provided
This is also **optional**.

Please do not send us your answers because we will be working though all of this work with you next year.