Longley Park
SIXTH FORM ACADEMY
Creating Excellence Together, through a culture of care

Get Ready For...

A Level Biology

Longley Park SIXTH FORM ACADEMY
Creating Excellence Together, through a culture of care

A Level Biology

What will I study?

In the first year you will study topics which underpin the main principles of biology. These include:

- Detailed cell structure, microscopy techniques and cell transport mechanisms
- Biomolecules describing the structure of carbohydrates, proteins, lipids and nucleic acids
- Exchange of materials by organisms including gas exchange, digestion and absorption and mass flow in animals and plants
- Genetic information, variation and relationships between organisms

Year 2 work covers:

- Energy transfers in and between organisms including photosynthesis, respiration and homeostasis
- How organisms respond to changes using homeostasis and the nervous system
- Genetic inheritance and populations in ecosystems
- The control of gene expression and recombinant DNA technology

What can I do next?

In the past students have gone on to university to complete courses including:

- Dentistry
- Dental hygiene
- Medicine
- Biomedical sciences
- Forensic science
- Nursing
- Midwifery
- Radiography
- Teaching
- Genetics
- Natural history

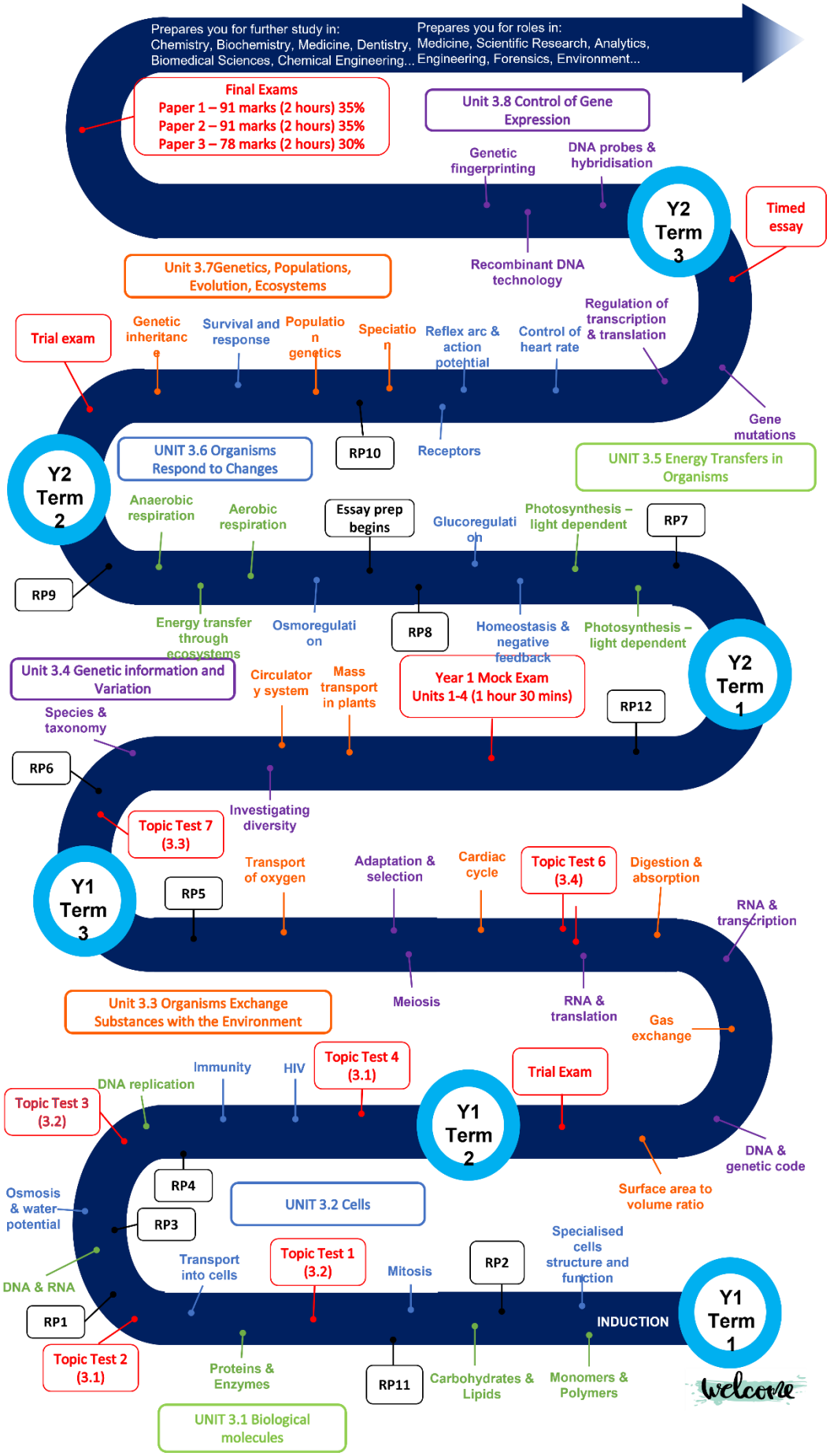
What additional opportunities will I have on my course?

- Visit to Yorkshire Wildlife Park which includes talks given by the Wildlife Park staff in careers relating to zoology
- Opportunity to apply for a Nuffield Research Placement. You would be placed with a STEM related organisation and carry out research for a few weeks during your summer holiday in Year 12. This experience would provide the opportunity to develop your research skills and could be used to support your application to university in Year 13.
- Visit to Whirlow Hall Farm to learn about intensive farming and carry out ecological sampling techniques to explore biodiversity.
- Talks from medical personnel including liver ICU nurse and a Doctor of Respiratory Medicine
- Compete in the British Biology Olympiad - Advanced problem solving competition for A level students and entry point for the International Biology Olympiad.

Longley Park
SIXTH FORM ACADEMY
Creating Excellence Together, through a culture of care

A Level Biology

Your Biology Learning Journey

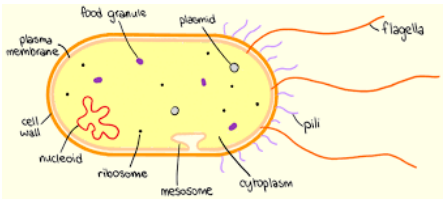


1. **Cell Structure** – use the information below to complete the tables on the next page

Cell Structure

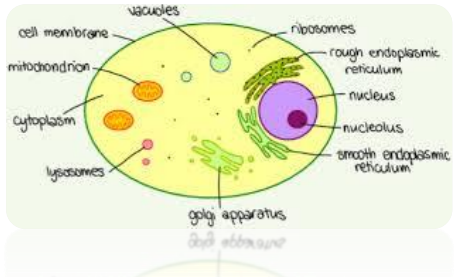
There are two types of cells, they can either be prokaryotic or eukaryotic. Eukaryotic tend to be more complex but prokaryotic are smaller and much simpler

Prokaryotic



Here is an example of a prokaryotic cell. It is a single celled organism

Eukaryotic

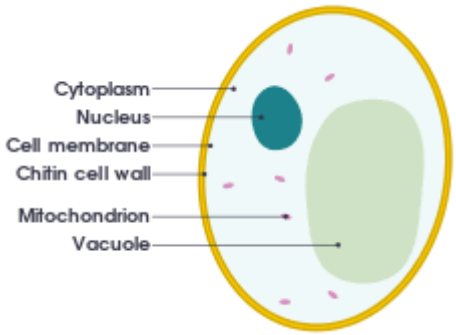


Here is an example of a Eukaryotic cell which tends to be more specialised and contain more

Animal cells

Most animal cells have various subcellular organelles

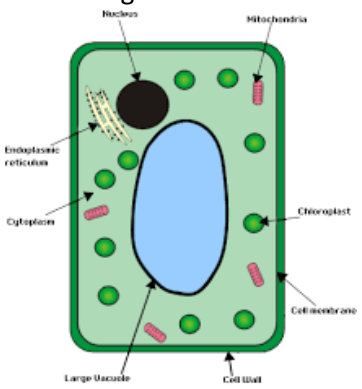
- Nucleus- Contains DNA and controls the cell
- Cytoplasm-Where chemical reaction occur.
- Cell Membrane-Hold the cell together
- Mitochondria-Where aerobic respiration occurs
- Ribosomes-Protein synthesis



Plant cells

Plant cells have all the same subcellular structure as an animal cell however it has a few extra

- Cell Wall-Made of cellulose and support the cell
- Permanent Vacuole-Contains cell sap
- Chloroplasts-Site of photosynthesis
- Chlorophyll- Absorbs light and is found within chloroplasts



Use the tables below to show the differences between cells and the functions of the key organelles:

	Eukaryotic		**Prokaryotic**
Organelle	**Animal**	**Plant**	**Bacteria**
Nucleus			
Cytoplasm			
Cell Membrane			
Ribosomes			
Mitochondria			
Cell Wall			
Chloroplast			
Permanent vacuole			

Organelle	Function
Nucleus	
Cytoplasm	
Cell Membrane	
Ribosomes	
Mitochondria	
Cell Wall	
Chloroplast	
Permanent vacuole	

2. Microscopy

Microscopes are instruments that allow scientists to see things that are too small to be seen with the naked eye, such as cells. Animal cells are usually around 10 – 30µm long. In contrast, prokaryotic cells (bacteria) are 1 or 2 order of magnitudes smaller (10 or 100 times smaller) with a length of approximately 0.2 – 2µm.

Prefix	**Metre**	**Metres power**	**Equivalents**
kilo-	km	10^3	1km = 1000m
-	m	10^0	=1m
centi-	cm	10^{-2}	1m = 100cm
milli-	mm	10^{-3}	1 mm = 1000µm
micro-	µm	10^{-6}	1cm = 10 mm
nano-	nm	10^{-9}	10µm = 1000 nm

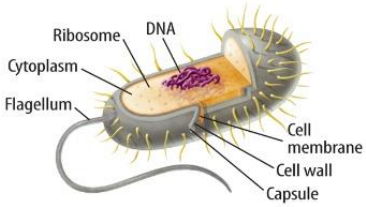
A level biology includes a lot of higher tier GCSE maths, so you need to be well prepared and ready for regular arithmetic!

Use the conversion table to the left to answer the questions on the next page.

Converting Units

An average eukaryotic cell is 50 µm.

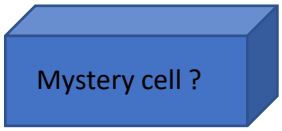
1. How many micrometres in one millimetre?
2. What is the length of two eukaryotic cell side by side?
3. How many eukaryotic cells do you need to put side by side to make 1000 µm?
4. How many eukaryotic cells do you need to put side by side to make 1mm?
5. How many millimetres is 50 µm? (This question is asking you to convert 50µm into mm).



An average prokaryotic cell is 5 µm.

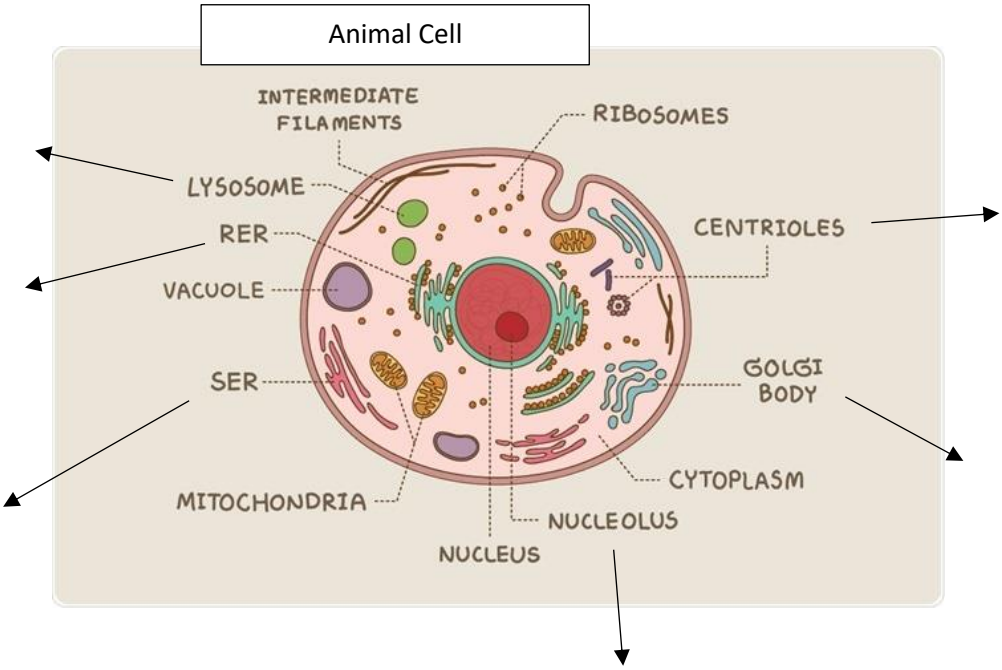
6. How many nanometres in one micrometre?
7. What is the length of two prokaryotic cells side by side?
8. How many prokaryotic cells do you need to put side by side to make 1000 µm?
9. How many prokaryotic cells do you need to put side by side to make 1mm?
10. How many millimetres is 5 µm? (This question is asking you to convert 5µm into mm).

A mystery cell is 7500 nanometres.



11. How big is this in micrometres?
12. Do you think this cell is a eukaryotic or a prokaryotic cell? Explain your answer.
13. Another mystery cell is 0.3cm. How many micrometres? How many nanometres?

3. At A level you need to know the jobs of more organelles. Do some research and write the jobs of the organelles below next to the arrows:



4. Osmosis is a key principle which you will need to understand and apply in both AS and A level biology. It is needed to explain formation of urine in the kidney; transport in plants; homeostasis and many other topics.

Watch the video below and answer the questions.

https://www.youtube.com/watch?v=L-osEc07vMs (Amoeba sisters video on osmosis)

Answer the following questions as you watch and listen to the osmosis video;

1. What is osmosis?

2. What type of transport is osmosis?

3. What are solutes?

4. If you have pure water on both sides of a semi-permeable membrane, in which direction would the water move?

5. What does hypertonic mean?

6. In osmosis, water moves from the h…….. side to the h…….. side.

7. If you ran pure water in an IV drip what would happen?

8. What is the word that means equal concentrations of solute on each side?

9. How does water get into plant roots?

Longley Park SIXTH FORM ACADEMY
Creating Excellence Together, through a culture of care

A Level Biology

How can I go the extra mile to prepare for my course?

Additional Reading/ Useful Websites:

- https://www.youtube.com/channel/UCN4caNO-iJ8-4jGB1WOdo9w Miss Estruch (great topic videos)
- https://www.khanacademy.org/science/biology
- https://www.youtube.com/watch?v=FeJKJ5MoCHY Top 10 natural history moments BBC Earth
- https://www.bbc.co.uk/programmes/b036f7w2 Radio 4 Inside Science program
- 'The Body' by Bill Bryson - Should be available in your local library or second hand from WoB

What else can I do to prepare for starting Sixth Form? What our students say

"Get ready emotionally, it is different from school!"

"Be confident. Put yourself out of your comfort zone and meet new people; you will meet lots of new people when you get here"

"Start looking at Universities/ Careers now! It will give you a focus when you start at Sixth Form"

"You will need to be more independent and be able to manage your time differently to school. Start building those skills now!"

Longley Park
SIXTH FORM ACADEMY
Creating Excellence Together, through a culture of care

Additional Opportunities

We offer a variety of different opportunities to enrich your time with us and support your next steps:

~A variety of Clubs and Societies through Project You

~Employer immersion visits & Trips to employers

~Work Experience & Placement

~Trips to Universities

~Guest Speakers

~Leadership through the Student Ambassador Programme

~ Independent Learning Centre with IT, books and journals, quiet and group study + Seminar Rooms

~Health and Fitness Activities in our onsite gym

~Duke of Edinburgh

~Career Ready internship Programme

~ Access to wellbeing, academic tutorial, and careers support