A level Biology – OCR Biology A
Ecclesbourne School
2025 – 2026

GCSE to A level transition work

To bridge the gap between GCSE and A Level Biology, you should complete the following three transition work activities listed below. Use the table below as a checklist to ensure that you have completed every task and have it ready to bring to your first A Level Biology lesson. You will find more information about each activity in this document.

Activity number	**Summary of work to complete**	**Tick when completed**	**Given to teacher**
Activity one	Microscopy research		
Activity two	Cell ultrastructure research poster		
Activity three	The meaning of words and retrieval practice questions		

Activity one: Researching use of microscopes

The cell is the basic unit of all living things. During Year 1 of the course, it is important to have an understanding of how to use a light microscope and also to develop an understanding of why electron microscopes and laser scanning confocal microscopes are so important in biology. Careful observation using microscopes reveals details of cell structure and ultrastructure and provides evidence to support hypotheses regarding the roles of cells and organelles.

Research, read & then write about the different types of microscopes that we can use in biology:

1. **Light microscope**
2. **Scanning electron microscope**
3. **Transmission electron microscope**
4. **Laser scanning confocal microscope**

Your notes MUST include the following:

- A basic summary of how each microscope works
- how specimens are prepared for viewing under each of the three main types of microscope
- staining techniques used with each
- magnification possible with each
- resolution possible with each
- advantages and disadvantages of using each type of microscope
- computer enhancement of images produced by each microscope
- examples of typical images produced from each microscope.

Our expectation is that you write your own notes related to the following instructions. PLEASE DO NOT PLAGARISE.

You may want to present your notes in a table to make comparisons easier. It is up to you. This work will form part of your A level course notes.

You can use any source of information you like, but here are some links to get you started:

- http://www.biologymad.com/cells/microscopy.htm
- http://www.a-levelnotes.co.uk/biology-ocr-as-notes-foundations-in-biology-cell-structure.html
- https://www.youtube.com/watch?v=b4WOsYktdn4
- https://www.youtube.com/watch?v=tVcEEw6qbBQ

Activity two: Cell ultrastructure research poster

Aim – to produce a scientific poster (A3 or larger) to cover the following specification point:

'To be able to describe the ultrastructure of eukaryotic cells and the functions of the different cellular components.'

You should include the following cellular components and an outline of their functions:

- Nucleus
- Nucleolus
- Nuclear envelope
- Rough and smooth endoplasmic reticulum (ER)
- Golgi apparatus
- Ribosomes
- Mitochondria
- Lysosomes
- Chloroplasts
- Plasma membrane
- Centrioles
- Cell wall
- Flagella
- Cilia

You will probably need to research what the terms 'ultrastructure' and 'eukaryotic' mean before you begin your research in to the components of the cell. Be as creative as you like but remember that alongside pictures there should be clear scientific explanations of the role of each component. NO cut and paste. All explanations must be in your own words.

Resources that may help:

- A tour of the cell Bozeman Science - http://tinyurl.com/p784phe
- Biology mad – http://tinyurl.com/q6obqv2
- Other useful resources for learning about cell structure – http://tinyurl.com/l8mp5te

Activity three – retrieval questions and the meaning of words

The meaning of words:

Research indicates that if you take Biology for a first degree you will need to learn more new words in your first year than if you take French! One way of understanding new words (and hence remembering them) is by analysing their parts.

Task 1 Complete the table matching the prefix/suffix with its correct definition.

Prefix	Definition
hydro-	
intra-	
bio-	
proto-	
chloro-	
zoo-	
ex-	
hetero-	
in-	
pest-	
micro-	
photo-	
chemo-	
herb-	
uni-	
multi-	
auto-	

first
small
relating to water
light
inside
within
animal that causes harm
greenish-yellow
relating to chemicals
self-operating
related to life
many
relating to leafy plants
one
related to animals
different
out

Suffix	**Definition**
-ology	
-phyll	
-plast	
-troph	
-cellular	
-phyte	
-synthesis	
-ation	
-scope	
-lysis	
-cretion	
-gestion	
-meter	
-icide	

food
burst/release
study of
agent used to kill
instrument for viewing
leaf
to do with cells
separating
to make/put together
to carry
cellular 'container'
process
instrument used to measure
plant

Task 2 Use the information from Task 1 to work out definitions for the following words

Word	**Definition**
microscope	
herbicide	
intracellular	
ingestion	

Task 3 Use the information from Task 1 to construct words with the following definitions

Word	**Definition**
	the study of living things
	substance used to kill unwanted insects
	water meter
	to split using light during photosynthesis

Task 4 Use the information from task 1 to construct eight more words, check for their existence in a biology textbook or dictionary and write out their definitions.

Word	**Definition**

Task 5 Write out the following prefixes to SI metric units of measurement in factor order starting with the largest. Complete the last row by adding the abbreviation. Tick the four preferred prefixes.

Kilo- Micro- Centi- Milli- Nano- Deci-

	Largest					**Smallest**
Prefix						
Abbreviation						
Preferred						

Task 6 Write down the SI units for length, mass and time.

	Length	**Mass**	**Time**
SI unit			
Abbreviation			

Task 7 Complete the table by writing down an example of an organism/organelle/organic compound whose length would be most suitably recorded using the stated prefix and SI unit .

Length	**Organism/organelle/organic compound**
Kilometre	
Metre	
Millimetre	
Micrometre	
Nanometre	

Task 8 Complete the following standard form calculations

Number	Standard form
1270.0	1.27×10^{3}
4500.0	
898000.0	
	1.69×10^{8}
0.0052	
0.0000000048	
	8.6×10^{-7}

Retrieval questions

You need to be confident about the definitions of terms that describe measurements and results in A Level Biology.

Learn the answers to the questions below, then cover the answers column with a piece of paper and write as many answers as you can. Check and repeat.

Practical science key terms

When is a measurement valid?	when it measures what it is supposed to be measuring
When is a result accurate?	when it is close to the true value
What are precise results?	when repeat measurements are consistent/agree closely with each other
What is repeatability?	how precise repeated measurements are when they are taken by the *same* person, using the *same* equipment, under the *same* conditions
What is reproducibility?	how precise repeated measurements are when they are taken by *different* people, using *different* equipment
What is the uncertainty of a measurement?	the interval within which the true value is expected to lie
Define measurement error	the difference between a measured value and the true value
What type of error is caused by results varying around the true value in an unpredictable way?	random error

What is a systematic error?	a consistent difference between the measured values and true values
What does zero error mean?	a measuring instrument gives a false reading when the true value should be zero
Which variable is changed or selected by the investigator?	independent variable
What is a dependent variable?	a variable that is measured every time the independent variable is changed
Define a fair test	a test in which only the independent variable is allowed to affect the dependent variable
What are control variables?	variables that should be kept constant to avoid them affecting the dependent variable

Basic components of living systems

What is the formula to calculate magnification?	$\text{magnification} = \frac{\text{size of image}}{\text{actual size of object}}$
Why are cells stained before being viewed with a light microscope?	staining increases contrast between different cell components, makes them visible, and allows them to be identified
What is an eyepiece graticule?	a glass disc that fits on top of the eyepiece lens that is marked with a fine scale from 1 to 100
What is a stage micrometer?	a microscope slide with a very accurate scale in micrometers (μ) engraved on it
What is a scientific drawing?	a labelled line drawing that is used to highlight particular features and does not include unnecessary detail or shading, it should always have a title and state the magnification
What is magnification?	how many times larger an image is than the actual size of the object being viewed
What is resolution?	the ability to see individual objects as separate entities
What is the function of the nucleus?	controls the metabolic activities of the cell as it contains genetic information in the form of DNA
What is the nucleolus?	area within the nucleus that is responsible for producing ribosomes
What is the function of mitochondria?	site of production of ATP in the final stages of cellular respiration
What are vesicles?	membranous sacs that are used to transport materials in the cell
What are lysosomes?	specialised forms of vesicles with hydrolytic enzymes that break down waste material in cells
What is the role of the cytoskeleton?	controls cell movement, movement of organelles within the cell, and provides mechanical strength to the cell

Name the three types of cytoskeletal filaments	microfilaments, microtubules, and intermediate fibres
Give two types of extension that protrude from some cells	flagella (whip-like protrusions) and cilia (tail-like protrusions)
What is the endoplasmic reticulum (ER)?	a network of membranes enclosing flattened sacs called cisternae
What are the functions of the two types of ER?	smooth ER – lipid and carbohydrate synthesis, and storage rough ER – synthesis and transport of proteins
What is the function of the Golgi apparatus?	plays a part in modifying proteins and packaging them into vesicles