

A-Level Biology Summer Work

Instructions

- Complete all 5 tasks.
- You can either print the work out and complete the tasks on paper or complete the work in a digital form (by using the Word document provided). Whichever way you feel most comfortable with is fine.
- Please bring your completed work to your first Biology lesson in September.

1. Cells Gap-Fill Exercise

Cells are fundamental to understanding Biology. Complete the paragraph on cells below using the words below to fill in the gaps. Words may be used multiple times or not at all. If you are unsure about what cells are made of, revise this using the following link:

<https://www.bbc.co.uk/bitesize/guides/z84jtv4/revision/1>

Words: micrometres, functions, metre, irregular, tissues, glucose, regular, membrane, cytoplasm, wall, small, vacuole, nucleus, tissues, organs, cell, dead, plastic, single, chloroplasts.

The _____ is the basic unit of life. Microorganisms such as bacteria, yeast, and amoebae exist as single cells. By contrast, the adult human is made up of about 30 trillion cells which are mostly organized into collectives called _____. Tissues are made from cells of a similar type. Organs are made from _____, and systems are made from several _____ working together. Some cells have specialised _____. Cells are usually _____ with lengths measured in _____ (μm , where $1000 \mu\text{m} = 1 \text{ mm}$). The first person to observe and record cells was Robert Hooke (1635–1703) who described the celsa (open spaces) of plant tissues. Animal cells usually have an _____ shape, and plant cells usually have a _____ shape. Cells are made up of different parts. Animal cells and plant cells both contain: cell surface _____, _____, _____. Plant cells also contain these parts, not found in animal cells: _____, _____, cell _____.

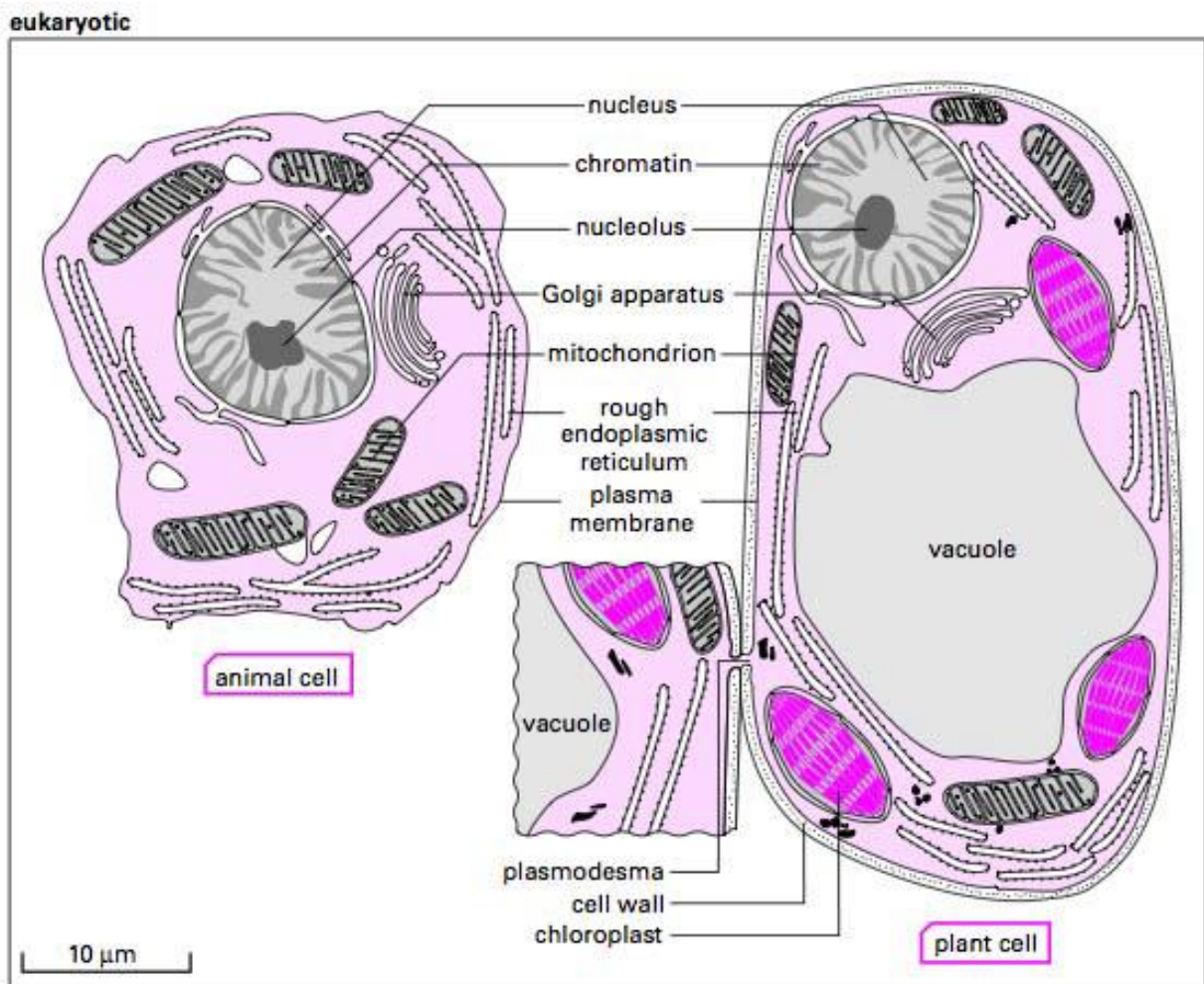
2. Comparison of Plant & Animal Cells

You will have encountered animal and plant cells before and will be familiar with some of the features visible under the light microscope. The image shown here is a diagram showing the features visible under an electron microscope. You can see there are a lot more structures in the cell which are now visible: the electron microscope allows much better resolution of the detail in the cell.

- a) Use your knowledge from GCSE and some internet research to make notes on **the functions of all of the parts** of the plant and animal cells shown on the diagram.

You can use the following blank page for your notes.

- b) Not all the parts of the cells below are labelled. Add in labels for:
- Cytoplasm
 - Vesicle
 - Ribosome



3. Graphing exercise

The table below shows the activity of three enzymes at different temperatures. You will have to plot data like this during your biology course. Before drawing any graph there are several things you will need to consider such as:

1. How big should the graph be? What proportion of the paper should you use?
2. What type of graph should it be? A line graph, a bar chart or a histogram?
3. If you choose a line graph how will you draw a line to show the pattern the data shows?
4. On which axis should the Dependent Variable be and which axis the Independent Variable?
If you do not know what these terms mean please look them up.
5. How will you label each axis?
6. What will you title your graph?
7. What scale will you use on each axis? Does each scale have to start at zero?

Once you have made all of the decisions above convert the data in the table into a suitable graph and answer the 3 questions about the data.

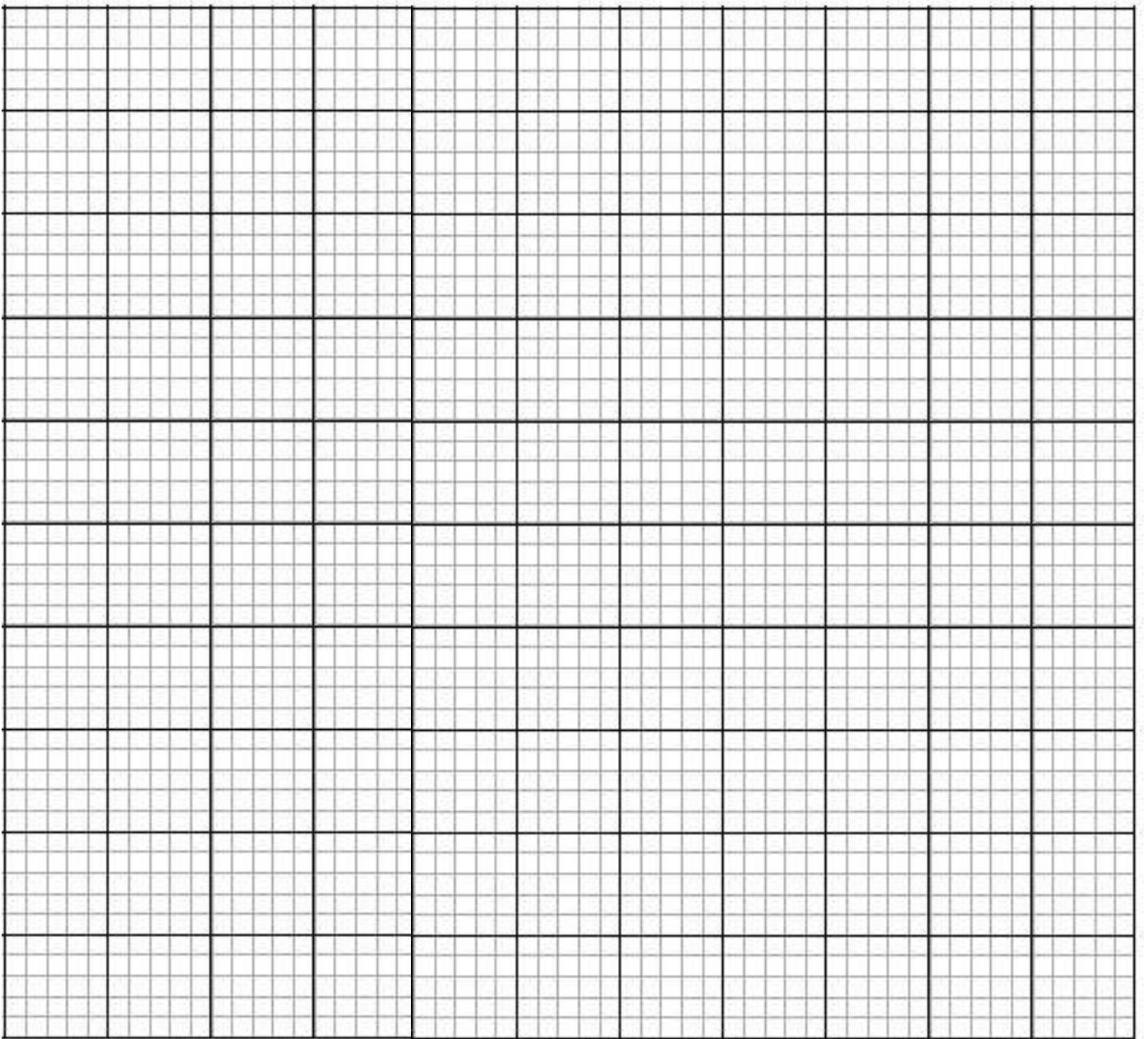
Temperature (°C)	The percentage reaction rate for each enzyme (%)		
	DNA Polymerase (from <i>Thermus aquaticus</i>)	Amylase	Trypsin
0	0	17	0
20	2	48	27
30	5	87	81
40	12	75	98
60	55	7	32
80	86	0	0
100	73	0	0

Questions

1. What can you conclude about the effect of temperature on amylase's activity?

2. Which enzyme has the greatest activity at the highest temperature? Which enzyme is the most active at the lowest temperature?

3. What is the optimum temperature for each enzyme?



4. Note Taking

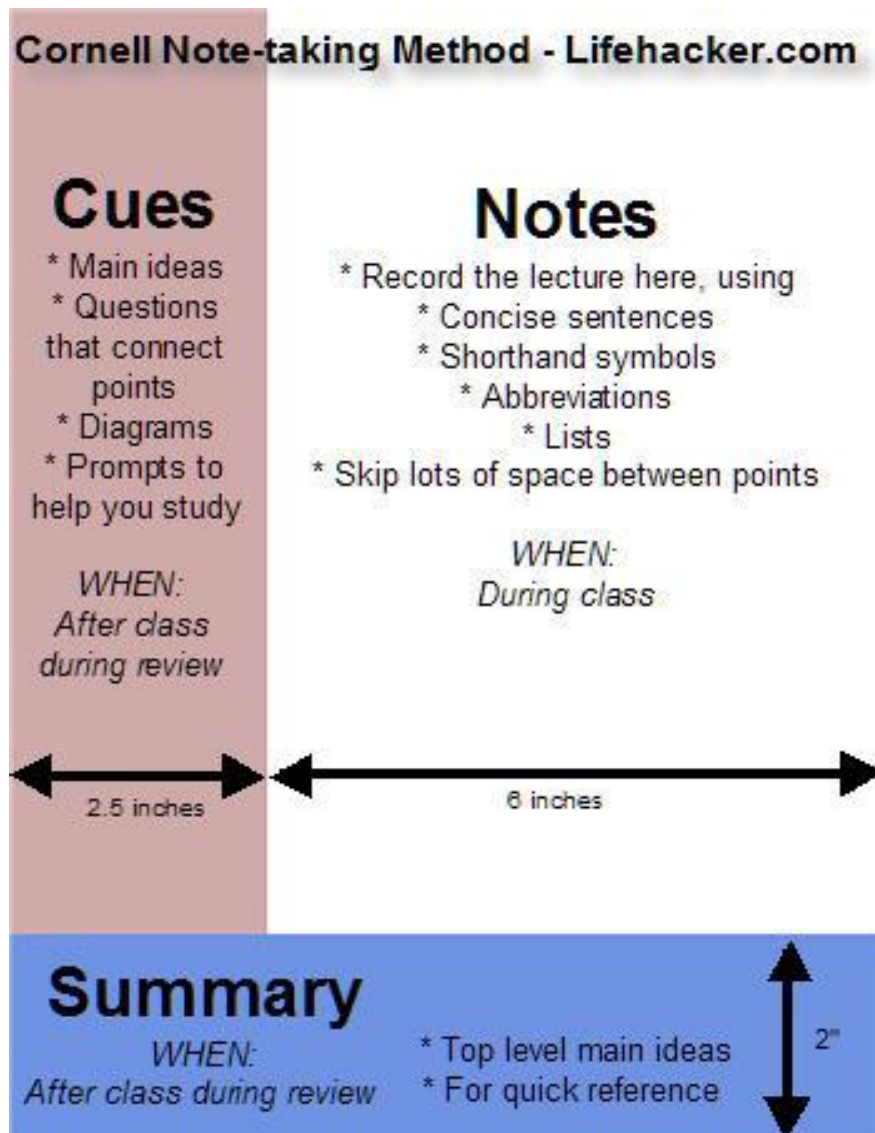
Note making is a good skill to learn which will help support you with your A-levels and University Degrees. It is different to just copying down all the information given to you.

An important activity throughout your A-levels will be to go back and review the work. One way to do this is to make summary notes and the Cornell note-making method is a good way of doing this. This reviewing will make it easier to learn for tests and exams.

The video linked gives you more information on this method:

<https://www.youtube.com/watch?v=WtW9lyE04OQ>.

Divide your page into 3 areas as shown below (you can use the following blank page).



Use this method of note taking to make notes on Biological Molecules from the video linked: <https://www.youtube.com/watch?v=1Dx7LDwINLU> You may use the next page for this if you want.

5. Biomolecules Quiz

Enzymes are important molecules inside cells. You will need to know a lot about the molecules of life in Biology, so it is a good idea to make sure you are familiar with molecules like enzymes, proteins and DNA.

Answer the following questions about biological molecules. You can only select one answer. If you need to revise this look here: <https://www.bbc.co.uk/bitesize/guides/zcttv9q/revision/1>

1. Enzymes are _____ because they only work on one substrate.
 - a) specific
 - b) particular
 - c) exact
2. The substrate fits into the _____ of the surface of the enzyme.
 - a) location
 - b) slot
 - c) active site
3. Enzymes affect the rate of a chemical reaction by
 - a) slowing them down
 - b) speeding them up
 - c) keeping them the same rate
4. Enzymes are only needed in small amounts by cells because
 - a) they are very efficient
 - b) they can be reused
 - c) they are destroyed by the reaction
5. Enzymes are made of
 - a) carbohydrate
 - b) lipid
 - c) protein
6. As temperature increases, molecules gain _____ kinetic energy.
 - a) less
 - b) the same
 - c) more
7. If the temperature gets too high the rate of reaction will
 - a) increase as the enzyme carries on working well
 - b) plateau as the enzyme is working at a maximal rate
 - c) decrease as the enzyme becomes denatured
8. Why is an enzyme specific for a particular substrate?
 - a) the shape of the substrate fits exactly into the active site like a lock and key
 - b) proteins can be made in many shapes and so it is possible to make an enzyme that will fit any possible biological molecule that may be encountered
 - c) the product diffuses away so the enzyme is free to associate with another substrate
9. There will be a set of conditions where an enzyme will work at its maximal rate. This is known as the
 - a) correct temperature and pH
 - b) favourite conditions
 - c) optimum conditions
10. In our bodies, enzymes are found
 - a) only in our digestive systems
 - b) in biological washing powder
 - c) in all cells
11. Carbon can form _____ bonds.
 - a) 3
 - b) 4
 - c) 5
12. How many strands make up a molecule of DNA?
 - a) 1
 - b) 2
 - c) 3
13. What are the bases in DNA?
 - a) guanine, cytosine, thymine, adenine
 - b) adenine, uracil, cytosine, thymine
 - c) thymine adenine, guanine, uracil

14. Insulin is an example of a

- a) lipid
- b) carbohydrate
- c) protein

15. An example of a structural protein found in the skin is

- a) chlorophyll
- b) haemoglobin
- c) collagen

16. If a plant cell is placed in a concentrated sugar solution what will happen?

- a) Water will diffuse into the cell by osmosis
- b) Water will diffuse out of the cell cytoplasm by osmosis
- c) Sugar diffuses into the cell through the cell surface membrane