A Level Bridging Work 2020-2021
Biology

The tasks below are designed to support you as you prepare to start A Level Biology.

These tasks have been developed to build on your GCSE knowledge and help with the transition into sixth form, using your time wisely over the coming months to ensure you maintain a level of education that will be needed to be successful in your subject when you enrol into the sixth form in August/ September.

Plan how you will use your time over the next 3 months – these tasks are designed to give you work to do throughout this time.

Complete each of the tasks below in order and bring your work to your first lesson – be prepared to share what you have done. **Your work for Task 6 will link directly with the first few lessons of the course.**

Task 1: Folder Preparation

Being organised is a key part to your success at A Level! So that you are ready for September please get yourself 2 folders. One a smaller ring binder, this will be your day-to-day folder that you must bring to each and every lesson, and a larger A4 lever arch file, this will be for the long term storage of your notes. **Please bring these folders along with your other bridging work to the first lesson.**

Inside your lever arch file you will need dividers for the following topics:

Year 12

Module 2.1:

- 2.1.1 - Cell Biology
- 2.1.2 - Biological Molecules
- 2.1.3 - Nucleotides & Nucleic Acids
- 2.1.4 - Biological Membranes
- 2.1.5 - Enzymes
- 2.1.6 - Cell Division

Module 3.1:

- 3.1.1 - Exchange surfaces
- 3.1.2 - Animal Transport
- 3.1.4 - Plant Transport

Module 4.1:

- 4.1.1 - Communicable disease
- 4.2.1 - Biodiversity
- 4.2.2 - Classification and Evolution

Year 13

Module 5.1:

- 5.1.1 - Communication and Homeostasis
- 5.1.2 - Excretion
- 5.1.3 - Neuronal Communication
- 5.1.4 - Hormonal Communication
- 5.1.5 - Plant and Animal Responses
- 5.2.1 - Photosynthesis
- 5.2.2 - Respiration

Module 6.1:

- 6.1.1 - Cellular Control
- 6.1.2 - Patterns of Inheritance
- 6.1.3 - Manipulating Genomes
- 6.2.1 - Cloning and Biotechnology
- 6.3.1 - Ecosystems
- 6.3.2 - Populations and Sustainability

Inside your day-to-day folder, please split into these sections:

Teacher 1
Teacher 2
Assessments

Keep all your bridging work in this folder

Task 2 – GCSE Biology Revision

Use the information below to guide your revision around key topics from GCSE to ensure that your knowledge and skills are secure for you to be successful as you start at A Level Biology.

Revision topics AQA GCSE Biology Specification: https://filestore.aqa.org.uk/resources/biology/specifications/AQA-8461-SP-2016.PDF	**Topics that were not covered in trilogy biology (combined) but you need to be aware of.**
4.1 Cell Structure	Culturing microorganisms https://www.bbc.co.uk/bitesize/guides/z8fkmsg/revision/7
4.2 Organisation	
4.3 Infection and response	Monoclonal antibodies https://www.bbc.co.uk/bitesize/guides/zt8t3k7/revision/1 Plant disease https://www.bbc.co.uk/bitesize/guides/z3tgw6f/revision/1
4.4 Bioenergetics	
4.5 Homeostasis and response	The brain The eye Control of body temperature Maintaining water and nitrogen balance in the body. Plant hormones Uses of plant hormones https://www.bbc.co.uk/bitesize/topics/zy468mn
4.6 Inheritance, variation and evolution	Advantages and disadvantages of sexual and asexual reproduction. DNA structure Protein synthesis Cloning https://www.bbc.co.uk/bitesize/guides/z9pkmsg/revision/1 Theory of evolution Speciation The understanding of genetics https://www.bbc.co.uk/bitesize/guides/zcqbdxs/revision/1
4.7 Ecology	Decomposition https://www.bbc.co.uk/bitesize/guides/zy7gw6f/revision/1 Impact of environmental change https://www.bbc.co.uk/bitesize/guides/zt8f4qt/revision/1 Trophic levels in an ecosystem https://www.bbc.co.uk/bitesize/guides/zs7gw6f/revision/1 Food production https://www.bbc.co.uk/bitesize/guides/ztwvk2p/revision/1

Task 3 – Multiple Choice Questions

INSTRUCTIONS – Each section is out of 20 - Read the question carefully and either print out 2 pages per side of A4 and circle the answer or write down on a piece of paper. Answer all questions.

SECTION A – Cell Biology

1. Which cell group does not possess a true nucleus?

a. Prokaryotes b. Eukaryotes c. Plants d. Animals

2. Which of the following is a eukaryote?

a. Bacteria b. Virus c. Archaea d. Sperm

3. Which of the following is found in all prokaryotic cells but only some eukaryotic cells?

a. Cell membrane b. Cell wall c. Mitochondria d. Ribosome

4. Where in the cell are proteins synthesised?

a. Mitochondria b. Vacuole c. Ribosomes d. Nucleus

5. Where do the majority of metabolic reactions take place?

a . Cytoplasm b. Nucleus c. Cell membrane d. Ribosomes

6. How do you calculate the magnification of a magnified object?

a. Image size x actual size b. Image size ÷ actual size

c. Actual size x image size d. Actual size ÷ image size

7. Which of these cells contain spirals of lignin?

a. Palisade cells b. Bacterial cells c. Yeast cells d. Xylem cells

8. What are cells called if they are adapted to perform a certain job?

a. Specific b. Functional c. Unique d. Specialised

9. What are cells produced by mitosis called?

a. Sister cells b. Daughter cells c. Haploid cells d. Zygotes

10. How many cell divisions occur in mitosis?

a. None b. 1 c. 2 d. 3

11. A cell that has half the usual number of chromosomes is called what?

a. Haploid b. Diploid c. Homozygous d. Heterozygous

12. What is the name of the first stage of mitosis?

a. Prophase b. Metaphase c. Anaphase d. Telophase

13. What is the term for when a cell divides?

a. Cytolysis b. Cytocrenation c. Cytodivision d. Cytokinesis

14. Diffusion is the movement of particles from…

a. a higher concentration to a lower concentration.
b. a lower concentration to a higher concentration.
c. a higher water potential to a lower water potential through a partially permeable membrane.
d. a lower concentration to a higher concentration using ATP.

15. Small circular pieces of DNA in a bacterial cell are called:

a. Plasmids b. Loose DNA c. Ribosomes d. Enzymes

16. Root hair cells are adapted to absorb water and mineral ions by…

a. having no chloroplasts. b. being transparent.
c. having a thick cell wall. d. having a large surface area.

17. Respiration in the mitochondria requires which two chemicals?

a. Glucose b. Carbon dioxide c. Water d. Oxygen

18. Electron microscopes are able to distinguish between two points just a few nanometers apart. This is called…

a. magnification b. resolution c. resolving power d. image size

19. The food producer within the plant cell uses energy from the sun and converts carbon dioxide and water into sugars. This sub-cellular structure is called the…

a. vacuole. b. mitochondria. c. chloroplast. d. nucleus.

20. The thick rigid layer that surrounds plant cells and provides support and structure is called the…

a. nucleus b. mitochondria. c. cell wall. d. chloroplast.

SECTION B –Transport systems

1. What are the four main components of blood?

a. Red blood cells, white blood cells, plasma, carbon dioxide
b. Red blood cells, white blood cells, oxygen, sugar
c. Plasma, red blood cells, white blood cells, platelets
d. Oxygen, platelets, red blood cells, white blood cells

2. What is the function of red blood cells?

a. Carry oxygen b. Carry carbon dioxide c. Carry glucose d. Carry water

3. Which of these statements is not an adaptation of the red blood cell?

a. Biconcave disc shape b. No nucleus c. Contains haemoglobin d. Has a flagellum

4. Which blood vessels have thick walls made of muscle and elastic fibres?

a. Veins b. Arteries c. Capillaries d. Venules

5. Which blood vessel has very thin walls for efficient exchange of substances?

a. Veins b. Arteries c. Capillaries d. Venules

6. What are the top two chambers of the heart called?

a. Atria b. Ventricles c. Aorta d. Vena Cava

7. Why does the left ventricle have thicker muscle than the right ventricle?

a. Pumps blood to the lungs b. Pumps blood to the body

c. Increases blood pressure d. Reduces cardiac output

8. What treatments are available for blocked coronary arteries?

a. Heart transplant b. Valve transplant c. Pacemaker d. Stents

9. What are the movements of the diaphragm when breathing in?

a. Up/relaxes b. Down/contracts c. Dome/relaxes d. Flattens/contracts

10. When does air enter the lungs?

a. When pressure in the lungs is lower than atmospheric pressure.
b. When pressure in the lungs is higher than atmospheric pressure.
c. When pressure in the lungs is the same as atmospheric pressure.
d. When pressure in the lungs is the same as blood pressure.

11. Which of these is not an adaptation of the alveoli for gas exchange?

a. Thin walls b. Large surface area c. Good blood supply d. Large diffusion distance

12. Which cells in the leaf are adapted for photosynthesis?

a. Guard cells b. Palisade cells c. Upper epidermal cells d. Lower epidermal cells

13. Which two substances move in the xylem?

a. Sugar b. Amino acids c. Water d. Ions

14. By what process does water get into a plant?

a. Diffusion b. Active transport c. Co-transport d. Osmosis

15. What two are functions of the stomata?

a. Gas exchange b. Sugar production c. Water loss d. Absorb light

16. Sugar in plants is stored as starch. What chemical could you use to check for starch?

a. Ethanol b. Iodine c. Benedict's solution d. Biuret reagent

17. What is transpiration?

a. Process of making glucose. b. Movement of sugars through a plant
c. Movement of H_2O through a plant. d. Movement of minerals through a plant.

18. What does not affect the rate of transpiration?

a. CO_2 b. Temperature c. Light d. Wind

19. Which structure in a plant has columns of hollow, dead reinforced cells?

a. Phloem b. Xylem c. Roots d. Leaf

20. Translocation occurs in the…

a. Phloem b. Xylem c. Lungs d. Kidneys

Task 4 – Summarising ideas with 5 sentences, 5 words

There are 2 different sections to complete, with 10 questions in total.

INSTRUCTIONS

- For each statement, use either the suggested website or your own resources to write a 5-point summary. In examinations, answers frequently require more than 1 key word for the mark, so aim to include a few key words.
- It is important to stick to 5 sentences. It is the process of selecting the most relevant information and summarising it that will help you remember it.
- Write concisely and do not elaborate unnecessarily, it is harder to remember and revise facts from a big long paragraph.
- Finally, identify 5 key words that you may have difficulty remembering and include a brief definition. You might like to include a picture to help you remember it.

EXAMPLE QUESTION:

Describe the principles of organisation.

Keywords: tissue, organ, system, organism, differentiation

Website – https://www.bbc.co.uk/bitesize/topics/zwj22nb

1. **During the development, cells differentiate to become specialised so that they can carry out different functions.**
2. **Multicellular organisms usually contain differentiated cells, organised into tissues.**
3. **Organs contain different tissues, working together to carry out particular functions. Organ systems contain different organs.**
4. **The stomach is one of the organs that form the digestive system. The stomach contains various tissues, and each tissue is made of a particular type of cell.**
5. **The digestive system is an example of an organ system in which humans and other mammals exchange substances with the environment.**

SECTION 1 – Cell Biology

QUESTION 1: Explain how the main sub-cellular structures, including the nucleus, cell membranes, mitochondria and chloroplasts in plant cells as well as plasmids in bacterial cells, are related to their functions.

Website – https://www.khanacademy.org/test-prep/mcat/cells/eukaryotic-cells/a/organelles-article
Video - https://www.youtube.com/watch?v=JL19uv7NT7s

QUESTION 2: Describe and explain how a sperm cell is adapted for its function

Website – http://slideplayer.com/slide/6031489/
Video - https://www.youtube.com/watch?v=7z6W2xv4upc

QUESTION 3: Explain the importance of cell differentiation
Website – http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_gateway/living_growing/growthdevrev5.shtml
Interactive - https://www.youtube.com/watch?v=9db44fBrWrE

QUESTION 4: Compare and contrast an electron microscope with a light microscope
Video - https://www.youtube.com/watch?v=b4WOsYktdn4

QUESTION 5 - Describe the cell cycle including the stages of mitosis
Website – http://www.biology.arizona.edu/cell_bio/tutorials/cell_cycle/cells3.html
Interactive - http://www.sumanasinc.com/webcontent/animations/content/mitosis.html

SECTION 2 – Transport systems

QUESTION 1: Describe and explain the lock and key model using digestive enzymes as examples
Website – https://www.youtube.com/watch?v=smtCH5HX44o
Interactive - http://www.bbc.co.uk/schools/gcsebitesize/science/add_aqa/proteins/proteinsrev4.shtml

QUESTION 2: Describe and explain how the lungs are adapted for gas exchange
Website – https://www.youtube.com/watch?v=aPUPfzsqDgs
Interactive - https://www.youtube.com/watch?v=mZvzl8KH6iI

QUESTION 3: Describe the different methods of transport across a membrane
Website – http://www.biologymad.com/resources/diffusionrevision.pdf
Interactive - https://www.youtube.com/watch?v=eDeCgTRFCbA
https://www.youtube.com/watch?v=PRi6uHDKeW4

QUESTION 4: Explain the relationship between the circulatory system and the respiratory system
Website - https://www.healthcentral.com/article/how-the-heart-and-lungs-work-together
Video - https://www.youtube.com/watch?v=9fxm85Fy4sQ

QUESTION 5: Explain how the structure of root hair cells, xylem and phloem are adapted to their function
Website – http://www.bbc.co.uk/schools/gcsebitesize/science/triple_aqa/transport_systems/transport_in_plants/revision/1/
Interactive - https://www.youtube.com/watch?v=jtuX7H05tmQ

Task 5 – Maths skills in Biology

There are a number of maths skills that you should be confident with at the start of year 12 Biology.

Areas in which you should be confident include those listed below:

- Converting units e.g. mm to cm, or mm^3 to cm^3
- Use of standard form e.g. 5.0×10^{-3}
- Calculating percentage, or percentage change
- Use of fractions and ratios
- State an answer to a number of significant figures
- State an answer to a number of decimal places
- Calculating mean, mode and median averages
- Drawing a histogram or bar chart
- Know the meaning of all these Maths symbols: = < << >> > ∝ ~
- Re-arranging equations
- Understand the formula for a linear relationship y=mx+c
- Calculating rate from the straight line of a graph
- Using the slope of a tangent to a curve to measure rate of change
- Calculating circumference, surface area and volume of a circle
- Calculating circumference, surface area and volume of a rectangular prism
- Calculating circumference, surface area and volume of a cylindrical prism
- Calculating circumference, surface area and volume of a sphere

A) Standard form: Use page 9 on the link to review what standard form is and how to write large and small numbers in standard form: https://www.ocr.org.uk/Images/294471-biology-mathematical-skills-handbook.pdf

Once you have done this see if you can convert the following numbers into standard form.

1) 2560
2) 30000
3) 450
4) 5678
5) 45310
6) 6789010
7) 2678991
8) 0.000569
9) 0.00018
10) 0.000000486
11) 0.21
12) 0.365
13) 0.0047
14) 0.1

B) Unit conversions: Use page 7 on the link here https://www.ocr.org.uk/Images/294471-biology-mathematical-skills-handbook.pdf to review the different prefixes and how to convert between units.

Once you have done this, see if you can identify the missing unit headings in the table and then complete the conversions.

	Micrometre (µm)	
5		0.000005
1	0.001	
	1	0.001
1,000,000		1
	3	0.003
7	0.007	
500,000		0.5

C) Surface area: volume ratio: Use page 12 and page 58 on the link here https://www.ocr.org.uk/Images/294471-biology-mathematical-skills-handbook.pdf to review how to calculate surface area to volume ratio.

Once you have done this, see if you can calculate the surface area: volume ratio of the following spherical cells.

Diameter of cell (mm)	1	2	3	4	5
Surface area (mm^2)					
Volume (mm^3)					
Surface area: volume ratio					

D) Percentage change: Use page 12 on the link here https://www.ocr.org.uk/Images/294471-biology-mathematical-skills-handbook.pdf to review how to calculate percentage change.

Once you have done this, see if you can calculate the % change in mass of some potato cylinders that have been placed into different concentrations of sugar solution?

Concentration of sugar solution (mol/dm^3)	Starting mass (g)	Final mass (g)	Change in mass (g)	% change in mass
0.0	1.30	1.51		
0.2	1.35	1.50		
0.4	1.30	1.35		
0.6	1.34	1.28		
0.8	1.22	1.11		

Task 6 – Enzymes report

Your work for this task will link directly with the first few lessons of the course, where you will complete a project on enzymes and this project will be written up as a report.

To start this report, research enzymes and write an introduction. This should include:

- An overview of the role and action of enzymes
- How enzymes work in terms of the lock and key theory and the induced fit theory. **Challenge** – how are these theories different and which one is more accepted and why?
- What factors can change the rate of enzyme controlled reactions and try to describe the effect each factor has. This could include, but not be limited to, temperature, pH and substrate concentration.
- **A challenge for you** will be to not only describe the effect, but to explain the impact the factor has on the enzyme / the overall reaction. You will want to discuss ideas like bonding and tertiary structure.
- Information about trypsin, the specific enzyme you will use, and casein, the substrate, which is a protein found in milk.

A good report will include sub-headings, diagrams and references. Your reference list should include the author's name, year of publication, publisher and title. If you are unsure, this link will help: http://www.bbc.co.uk/schools/gcsebitesize/dida/managing_projects/copyrightrev4.shtml

If possible, complete this task using a word processor so you can easily modify and improve your work during later stages of the report.

Task 7 – Enzyme questions

Please attempt all questions. These will help you to recap and check your knowledge of GCSE content and apply new knowledge learnt from your project in task 6 to A Level style questions. Print out if you can or write your answers on paper.

GCSE Level Questions

Q1. (easier)

(a) Enzymes are used in body cells.

(i) What is an enzyme?

Draw a ring around the correct answer.

an antibody **a catalyst** **a hormone**

(1)

(ii) All enzymes are made of the same type of substance.

What is this substance?

Draw a ring around the correct answer.

carbohydrate **fat** **protein**

(1)

(iii) Where is the enzyme amylase produced in the human body?

Draw a ring around the correct answer.

liver **salivary glands** **stomach**

(1)

(b) Enzymes are sometimes used in industry.

Draw **one** line from each enzyme to the correct industrial use of that enzyme.

Enzyme	Industrial use
	Changes starch into sugars
Carbohydrase	
	Removes grease stains from clothes
Isomerase	
	Pre-digests proteins in some baby foods
Protease	
	Changes glucose syrup into fructose syrup

(3)

(Total 6 marks)

Q2. (harder)

Starch is broken down into sugar by amylase. Amylase is produced in the salivary glands.

(a) Name **two** other organs in the digestive system which produce amylase.

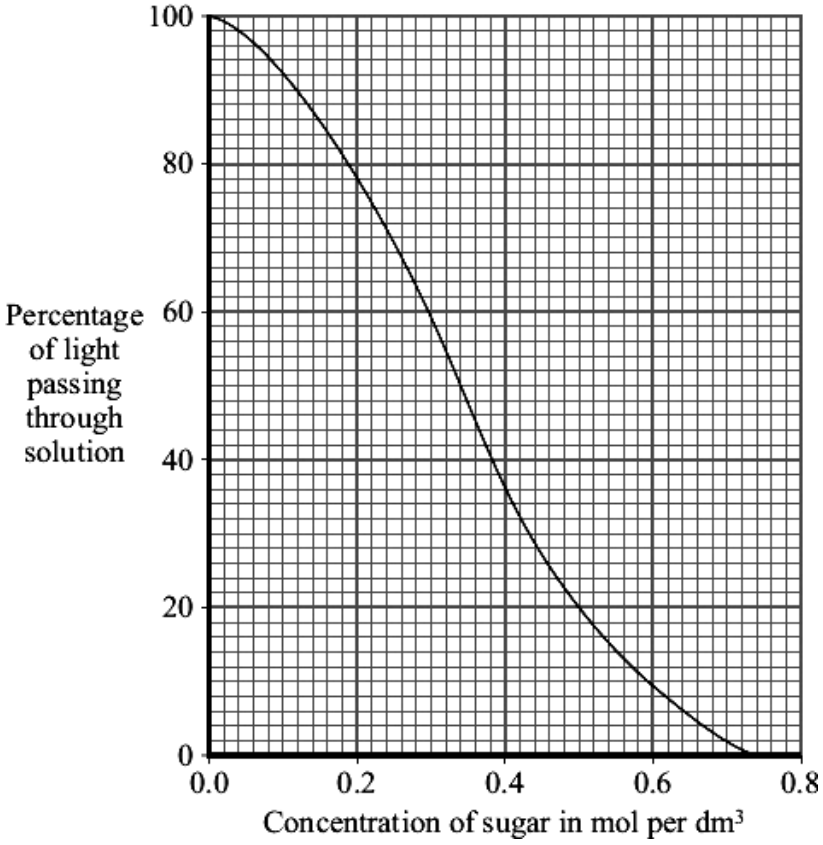
_____ and _____

(2)

(b) A colorimeter measures colour intensity by measuring the percentage of light that passes through a solution.

Graph 1 shows the percentage of light passing through sugar solutions of different concentrations to which a test reagent has been added.

Graph 1



Students used a colorimeter to compare the starch-digesting ability of amylase enzymes obtained from two organs, **P** and **Q**.

- The students collected 5 cm^3 samples of amylase from **P** and **Q** and placed them into a water-bath at 40 °C.
- Two test tubes containing 10 cm^3 samples of starch solution were also placed into the water-bath.
- All the tubes were left in the water-bath for 10 minutes.
- Each amylase sample was added to one of the tubes containing the starch solution.
- The test tubes were placed back into the water-bath.
- Every minute, a few drops were taken from each tube, the test reagent was added and the percentage of light passing through this solution was measured in the colorimeter.

The tubes containing amylase samples and starch solution were left in the water-bath for ten minutes before the amylase was added to the starch.

Explain why.

_____

_____

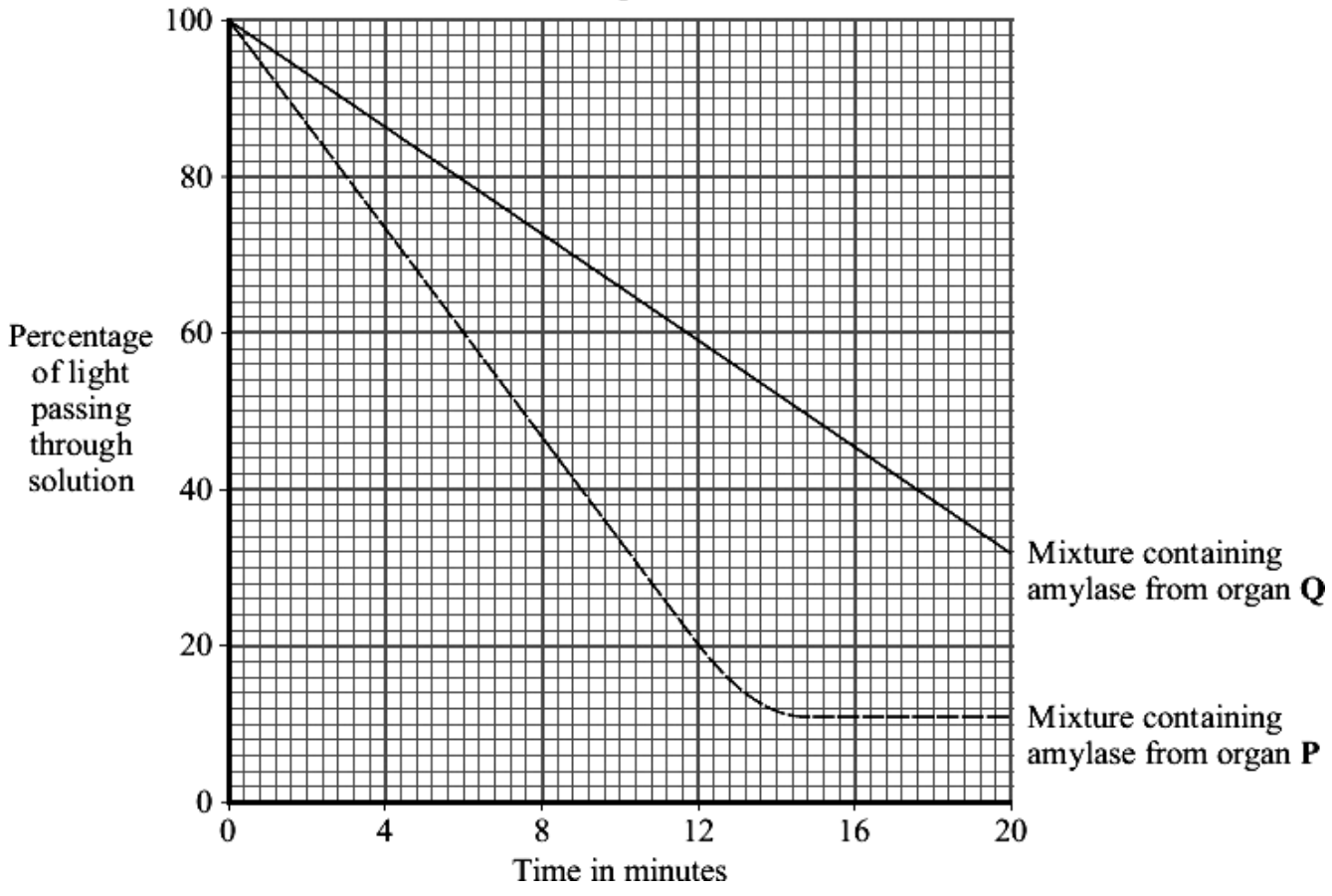
_____

_____

(2)

(c) **Graph 2** shows how the readings from the colorimeter changed over the next 20 minutes.

Graph 2



(i) Use **Graph 1** and **Graph 2** to determine the concentration of sugar in the mixture from organ **Q** after 20 minutes.

_____

Answer _____ mol per dm^3

(1)

(ii) Use your answer to (c)(i) to calculate the rate at which sugar was produced in the mixture containing amylase from organ **Q**.

Show clearly how you work out your answer.

_____

_____

_____

Answer _____ mol per dm^3 per minute

(2)

(iii) Suggest why the amount of light passing through the mixture from organ **P** did not change after 16 minutes.

_____

_____

_____

(1)

(iv) One of the students suggested that they could have completed their experiment more quickly if the temperature of the water-bath had been set at 80 °C.

This would **not** have been the case.

Explain why.

_____

_____

_____

_____

_____

(2)

(Total 10 marks)

A level Questions - up to grade C

2 **(a)** Enzymes are biological catalysts.

Explain the term *biological catalyst*.

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..... **[2]**

(b) When the enzyme catalase is added to hydrogen peroxide, the following reaction occurs:

$$\underset{\text{hydrogen peroxide}}{H_2O_{2\,(l)}} \xrightarrow{\text{catalase}} 2\,H_2O_{(l)} + O_{2\,(g)}$$

In an investigation into the effect of temperature on the rate of this reaction, a student set up apparatus as shown in Fig. 2.1, using liquidised celery as a source of catalase.

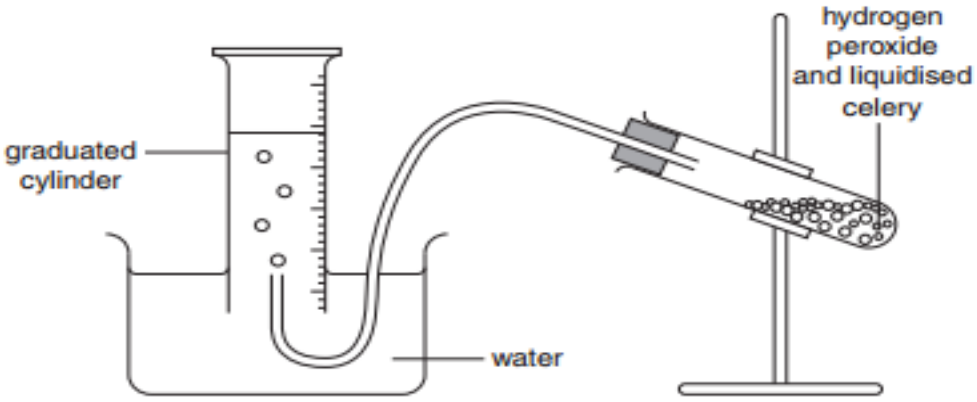

Fig. 2.1

The student measured the volume of oxygen produced at five different temperatures using samples of the liquidised celery.

(i) State the other variable that needs to be measured in order to calculate the **rate** of reaction.

..... **[1]**

(ii) Identify **one** potential problem with using samples of liquidised celery as a source of catalase in this investigation **and** suggest a way to minimise this problem.

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..... **[2]**

(iii) The student collected the data shown in Table 2.1.

Table 2.1

temperature (°C)	volume of oxygen (cm^3)
5	4
10	7
12	10
25	28
28	32

Suggest how the student could check the reliability of the data.

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..... **[2]**

(c) Another student carried out a similar procedure and presented his results as a graph. The graph that he drew is shown in Fig. 2.2.

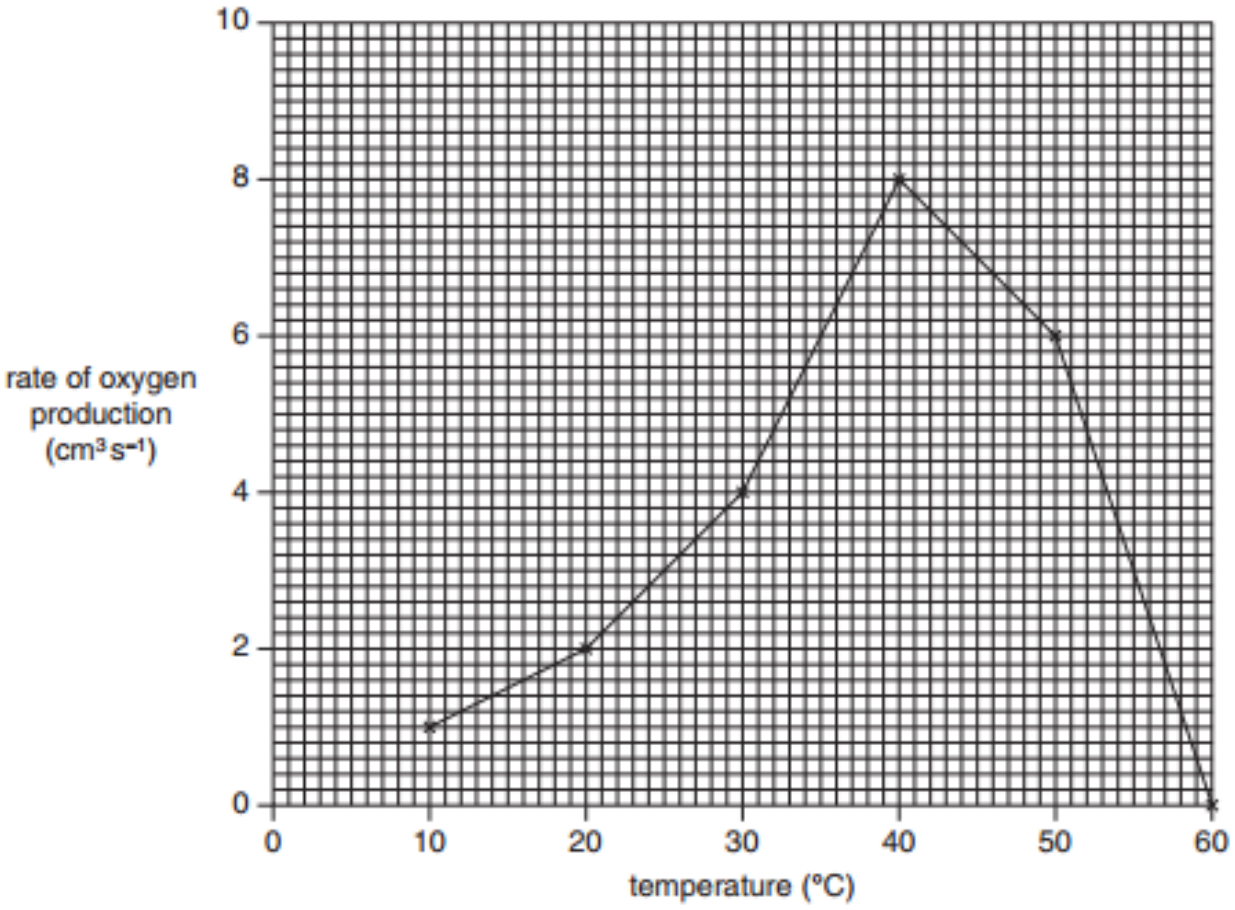

Fig. 2.2

(i) Describe the data shown in Fig. 2.2.

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..... **[4]**

(ii) Q_{10} is a measure of the increase in the rate of reaction for a 10 °C rise in temperature.

It is calculated using the following formula:

$$Q_{10} = \frac{\text{rate at } (t + 10\,°C)}{\text{rate at } t\,°C}$$

where $t + 10$ °C = rate at the higher temperature
t = rate at the lower temperature

Using the information in Fig. 2.2, calculate Q_{10} between 15 °C and 25 °C.

Show your working.

Answer = ... **[1]**

(iii) In the conclusion to this experiment, the student wrote the following:

> ***As the heat increased, the reaction went faster until it got to its highest. After this, the rate of reaction fell. This happened because the enzyme was killed and the hydrogen peroxide could not fit into the enzyme's key site.***

Suggest a more appropriate word to replace each of the underlined words.

heat should be replaced with .....

highest should be replaced with .....

killed should be replaced with .....

key should be replaced with ..... **[4]**

[Total: 16]

A level Questions - up to grade A

1 Pepsin is an enzyme that digests protein foods in the mammalian stomach.

(a) Protein molecules are made from chains of amino acids.

(i) Name the covalent bond between two adjacent amino acids in a chain of amino acids.

..... [1]

(ii) Name the type of reaction involved in breaking this bond **and** describe what happens in this reaction.

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..... [2]

(b) Describe how an enzyme, such as pepsin, breaks down a substrate.

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..... [5]

(c) A student investigated how changing the pH affected the activity of pepsin.

- He used a blender to make a suspension of egg white (protein) in water.
- At the start of the investigation the suspension was cloudy.
- He prepared fixed concentrations of egg white suspension, acid and pepsin to add to each of six test-tubes.
- He removed 0.1 cm^3 of the mixture from each test-tube and used universal indicator to measure the pH of each mixture.
- He incubated each test-tube in a water bath at 35°C and timed how long it took for the egg white suspension in each tube to clear.
- He prepared a table in which he recorded his results (Table 1.1).

Tube	Volume of egg white suspension	Volume of acid added (cm^3)	Amount of pepsin added (cm^3)	Measured pH	Time for suspension to clear (m)
1	5	2.0	3.0	1	
2	5	1.5	3.0	2	
3	5	1.0	3.0	3	
4	5	0.5	3.0	4	
5	5	0.0	3.0	5	
6	5	2.0	0.0	1	

Table 1.1

(i) Identify **three** errors the student made in the preparation of his **table** before he recorded his results.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(ii) Identify a change the student could make to his procedure that would increase the **validity** of the investigation.

.....

..... **[1]**

(iii) State the term that best describes the purpose of **tube 6**.

..... **[1]**

(iv) Another student suggested that he should repeat the investigation at least twice.

How would this have improved the investigation?

.....

.....

.....

..... **[2]**

(d) Fig. 1.1 shows the effect of increasing the substrate concentration on the rate of activity of pepsin.

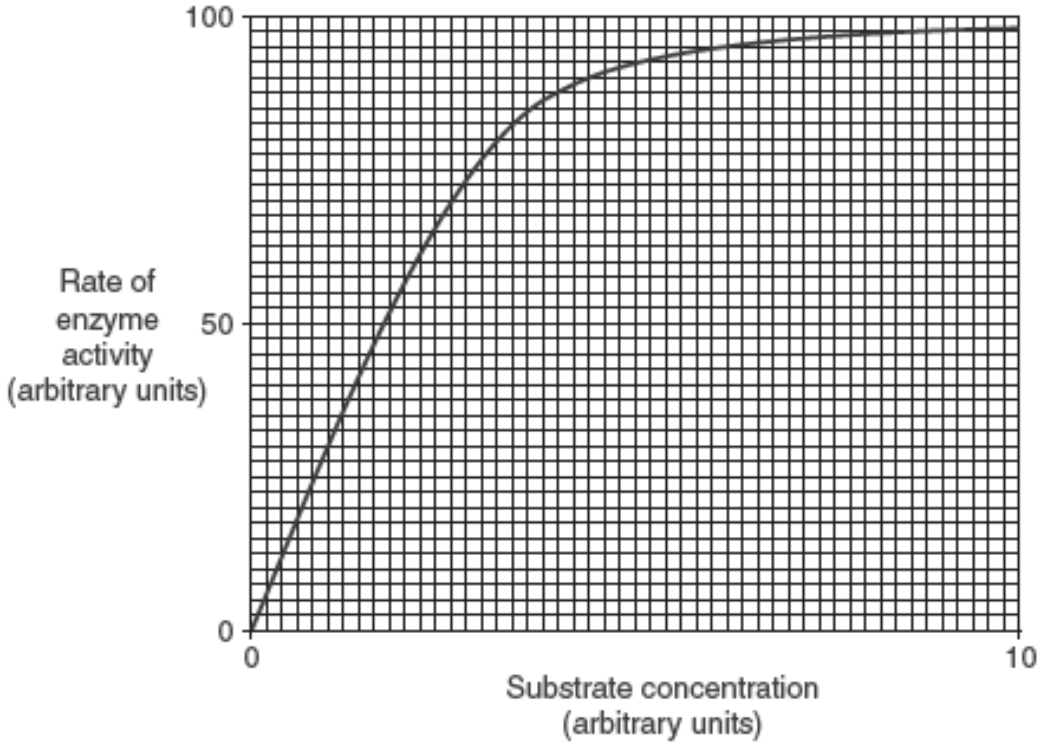


Fig. 1.1

(i) Pepstatin is a competitive inhibitor of pepsin.

On Fig. 1.1, draw a line to represent the effect of adding a fixed concentration of pepstatin on the rate of pepsin activity over the whole range of substrate concentrations.

..... *This should be answered on Fig. 1.1* .....**[2]**

(ii) Pepstatin acts as a competitive inhibitor of pepsin.

What can you conclude about the structure of pepstatin?

.....

.....

.....

..... **[2]**

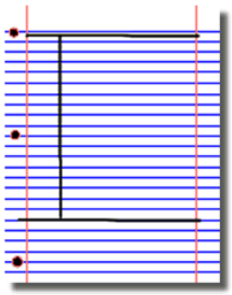
[Total: 19]

Task 8 – Note taking skills and further reading (optional)

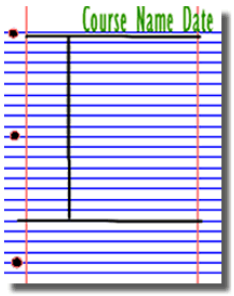
Research, reading and note making are essential skills for A Level Biology study. Producing 'Cornell Notes' is a very effective way to summarise your reading.

How to produce Cornell Notes:

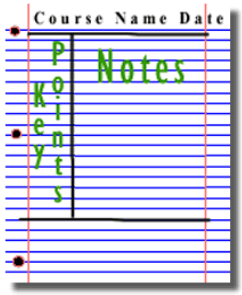
1. Divide your page into three sections like this:



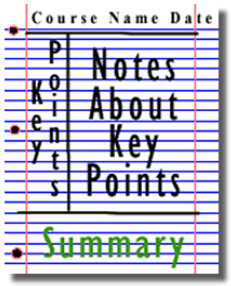
2. Write the name, date and topic at the top of the page



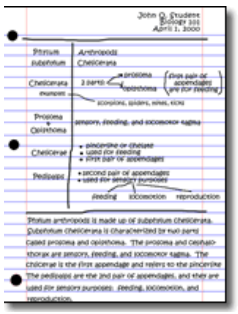
3. Use the large box to make notes. Leave a space between separate ideas. Abbreviate where possible.



4. Review and identify the key points in the left hand box



5. Write a summary of the main ideas in the bottom space



Use the links below from 'The Big Picture' to take you to further resources to broaden your knowledge. Then, produce Cornell Notes for each topic.

Topic 1: The Cell

Available at: http://bigpictureeducation.com/cell

The cell is the building block of life. Each of us starts from a single cell, a zygote, and grows into a complex organism made of trillions of cells. In this issue, we explore what we know – and what we don't yet know – about the cells that are the basis of us all and how they reproduce, grow, move, communicate and die.

Topic 2: The Immune System

Available at: http://bigpictureeducation.com/immune

The immune system is what keeps us healthy in spite of the many organisms and substances that can do us harm. In this issue, explore how our bodies are designed to prevent potentially harmful objects from getting inside, and what happens when bacteria, viruses, fungi or other foreign organisms or substances breach these barriers.

Topic 3: Exercise, Energy and Movement

Available at: http://bigpictureeducation.com/exercise-energy-and-movement

All living things move. Whether it's a plant growing towards the sun, bacteria swimming away from a toxin or you walking home, anything alive must move to survive. For humans though, movement is more than just survival – we move for fun, to compete and to be healthy. In this issue we look at the biological systems that keep us moving and consider some of the psychological, social and ethical aspects of exercise and sport.

Topic 4: Populations

Available at: http://bigpictureeducation.com/populations

What's the first thing that pops into your mind when you read the word population? Most likely it's the ever-increasing human population on earth. You're a member of that population, which is the term for all the members of a single species living together in the same location. The term population isn't just used to describe humans; it includes other animals, plants and microbes too. In this issue, we learn more about how populations grow, change and move, and why understanding them is so important.

Topic 5: Climate change and human activities

Available at: http://bigpictureeducation.com/health-and-climate-change

The Earth's climate is changing. In fact, it has always been changing. What is different now is the speed of change and the main cause of change – human activities. This issue asks: What are the biggest threats to human health? Who will suffer as the climate changes? What can be done to minimise harm? And how do we cope with uncertainty?