Bridging work: Making the transition from GCSE Biology to A-level Biology

Welcome to Biology – you've made a good choice of subject to study and are definitely up for a challenge!

This booklet contains six tasks for you to complete before you join the Sixth Form. You should not underestimate the time that it will take you to complete them properly.

You will need to hand in all work at your first Biology lesson in September. Remember, we can tell an awful lot about you from the quality of the work you submit, whether it is complete, whether it has been rushed and whether it is late. Make a good impression from the start!

You will probably have other work from your other subjects to complete, so here is what you need to do and how you could do it. The times are a guide to make sure you don't leave everything to the last minute and do a proper job. Do not rush the work, take breaks to keep your mind fresh and thinking properly!

Task no.	Task title and outline	Estimated time needed / hours	Tick when done
1	Getting up to speed again (download and revision task)	2	
2	Revision of enzymes and biological molecules	3	
3	Getting to grips with plant and animal cells	3	
4	Maths in Biology	4½	
5	Effective written communication in Biology	3	
6	Practical work in Biology	1	

We hope you enjoy completing these tasks and look forward to seeing you in September.

Dr Flores, Mr. Symes, Miss Crisp and Miss Riley

Task 1: Getting up to speed again

It would be good for you to have a copy of this CGP publication to refer to throughout the year, but especially at the start of each topic to remind you what you (should) already know from GCSE. This particularly important if you studied Combined Science (Trilogy/Synergy) as there will be some topics you haven't covered in the depth and detail that you'll need. It's a useful mini revision guide.

Look on Amazon.co.uk to see if the Kindle edition of **CGP's *Head Start to A-level Biology*** is still free and **download** it if it is.

https://www.amazon.co.uk/Head-Start-level-Biology-Level-ebook/dp/B00VE2NIOI/ref=sr_1_1?crid=3I2XZW32O1LYA&keywords=head+start+to+a+level+biology&qid=1585576270&sprefix=head+start+%2Caps%2C143&sr=8-1

You might be able to view Kindle files on a PC if you download an app to allow it. Worth a try?

You may be tempted to just start to work your way through it, which would be good, but you need to **complete these other tasks too**. Spend **at least an hour** looking through the guide, especially the sections on biological molecules and cell structure.

Task 2: Revision of enzymes and biological molecules

Thomas Mills students should **revise enzymes from GCSE topic B1 using Educake** before reading the pages.

(a) Watch these videos https://www.youtube.com/watch?v=H8WJ2KENlK0 and https://ed.ted.com/lessons/activation-energy-kickstarting-chemical-reactions-vance-kite

(b) Read *all* of the linked pages on this website about Biological Molecules https://www.s-cool.co.uk/a-level/biology/biological-molecules-and-enzymes

Task 3: Getting to grips with plant and animal cells

Cells are the basic units of all living organisms. Advances in microscopy such as the development of the electron microscope have allowed biologists to observe cells in more detail. At GCSE level animal and plant cells are relatively simple structures that you should be able to recognise.

(a) Go to Seneca Learning https://app.senecalearning.com/classroom/course/d0ce0c30-6417-11e8-8edc-d9cd1c890408/section/6561bc37-cff8-4b55-9035-68e9069b1c44/session and go through the Cells topic. **Complete the test and write down your score.**

(b) For this task you need to **produce a poster of a plant and animal cell with A level detail.** The poster must be **labelled** with all the major parts (see below) and include a **description of their function**. Cellular structures to be included: **nucleus, nucleolus, nuclear envelope, rough and smooth endoplasmic reticulum, Golgi apparatus, ribosomes, mitochondria, lysosomes, chloroplasts, plasma (cell surface) membrane, centrioles.**

You must be able to talk confidently about the structure of your cells and the functions of the parts when we cover this topic in Chapter 3.

Task 4: Maths in Biology

(a) **Watch** the Units PowerPoint and **complete** the Units worksheet (separate files).

(b) **Complete** the Standard Form worksheet (separate file).

(c) In Biology analysis of data is key. This task shows how biologists use data to make links.

You may have carried out a practical investigation in the past, during which you calculated your heart rate by taking your pulse. Heart rate can be used to calculate cardiac output, provided that you have a value for the individual's stroke volume, using the equation:

cardiac output = heart rate x stroke volume

i) **Define** the terms 'cardiac output' and 'stroke volume' (you may need to use the internet or other research to help you).

ii) Cardiac output is measured in cm^3min^{-1} (at GCSE this would have been written as cm^3/min). Heart rate is measured in beats per minute (beats min^{-1}). **Suggest** what units stroke volume is measured in.

iii) **Rearrange** the equation so that stroke volume is the subject of the equation. Use your rearranged equation to **calculate** the athlete's stroke volume after training, using the data below:

The table shows the cardiac output and resting heart rate of an athlete before and after completing a training event:

	Before training	After training
Cardiac output / cm^3	5000	5000
Resting heart rate / beats min^{-1}	70	55

iv) Using the data above, **calculate** the percentage decrease in the athlete's resting heart rate after training.

v) As well as the heart rate, breathing rate also increases during and following exercise. **What units are used to express breathing rate?**

vi) **Measure** your own breathing rate at rest fifteen times. You need to make sure you have 15 measurements and that you were at rest each time**. Calculate the mean, median and mode of your data. Extension**: Can you also define and calculate standard deviation? You might be

able to find a website that can calculate it for you. What does it express and why do biologists use it?

vii) During practicals, you will need to construct tables in which to put your results. **Watch** this video: http://ed.ted.com/on/x1a7JDW4 .

Then look at the guidelines below and use them to **evaluate** the table drawn in the video, i.e. did they do everything the way they should for A-level?

- All raw data should be in a single table with ruled lines.
- Put the independent variable (what you changed) in the first column, put the dependent variable (what you measured) or your descriptive comments (for qualitative observations like colour, appearance, etc.) in columns to the right.
- Put processed data (e.g. means, rates, standard deviations) in columns to the far right.
- Do not include any calculations in the table, just the calculated values (e.g. means).
- Each column needs to be headed with an informative description (for qualitative data) or physical quantity and correct SI unit (for quantitative data). Units should be separated from the physical quantity using a solidus (slash, /) rather than brackets as is done at GCSE.
- Do not put units in the body of the table, only in column headings.
- Raw data should be recorded to the same number of decimal places (i.e. accuracy and precision) and significant figures appropriate to the apparatus used to measure it.
- All raw data should be recorded to the same number of decimal places and significant figures.
- Processed data (e.g. means) may be recorded up to one decimal place more than the raw data.

viii) Then, use those guidelines to **construct** a results table for an investigation into the effect of temperature on the time taken for the enzyme trypsin to break down a protein in milk. You'll need to think about how the breakdown of milk protein by trypsin may be observed to make sure you have clear column headings. Hint: it's a bit like the disappearing cross practical in chemistry (see https://www.youtube.com/watch?v=A8Ts4V_osvo)

ix) **State** the type of graph that should be drawn to analyse the results from the practical described above. **Explain** why you have chosen that type of graph. The video at http://ed.ted.com/on/GV5hkNIA may be useful.

Task 5: Effective written communication in Biology

Choose **two** of these articles to read from one of the issues of the *Biological Sciences Review* periodical.

Write a summary (at least 250 words per article, not copied and pasted, summarised in your own words and spell-checked) of your chosen articles to share with the group at the start of the year. What was the article about and what is/are its key message(s)?

https://www.hoddereducation.co.uk/media/Documents/magazine%20e-reviews/December%202019/BiologicalSciences_update_Dec2019.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine%20e-reviews/October%202019/BiologicalSciences_update_Oct2019.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine%20e-reviews/March%202019/BiologicalSciences_update_Mar2019.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine%20e-reviews/December%202018/BiologicalSciences_update_Dec2018.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine%20e-reviews/October%202018/BiologicalSciences_update_Oct2018.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine-extras/Biological%20Sciences%20Review/BSR%20Vol%2030%20No%204/BiologicalReview30_4_BugsBeGone_Update.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine-extras/Biological%20Sciences%20Review/BSR%20Vol%2030%20No%203/BiologicalReview_30_3_MonarchMigration_Update.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/BiologicalReview30_2_Plastics_Update.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine%20e-reviews/March%202017/BiologicalSciences_e-review_Mar2017.pdf?ext=.pdf

https://www.hoddereducation.co.uk/getmedia/e3435eb3-ac62-4fad-87b9-58bf5da26a2d/e-review-BSR-D2016?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine-extras/Biological%20Sciences%20Review/BSR%20Vol%2029%20No%202/BiologicalReview29_2_ereview_Oct16.pdf?ext=.pdf

https://www.hoddereducation.co.uk/media/Documents/magazine-extras/Biological%20Sciences%20Review/BSR%20Vol%2028%20No%202/BiologicalSciences_e-review_Dec15.pdf?ext=.pdf

Task 6: Practical work in Biology

In A-level Biology you have 12 Required Practicals to be completed and you are assessed against five competencies which you must pass to achieve the Practical Endorsement.

(a) **Watch** this video about Required Practical 3
https://www.youtube.com/watch?v=M4LugywewAU

(b) You did something similar at GCSE. **Write a risk assessment for this practical.**
Use the format:

Hazard	Risk	precautions

(c) **Why** did she join the points on the graph with a straight line? **What** was the concentration of sucrose in the potato and how did she know this?

(d) **Find out and write down** the titles of the 6 Required Practicals that you will be doing in Year 12. (https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402/as-practical-assessment will help.)