Clitheroe Royal Grammar Sixth Form: Transition Pack

Welcome to the Biology Department

We look forward to meeting you and welcoming you to the Sixth Form.

This Transition Pack contains information to support your transition from GCSE to A Level study.

Please read all the pack ready to begin Year 12:

- Biology Independent Learning Sheet
- Biology FAQ sheet
- Biology – Useful Websites
- Biology A Level - Helpful Previous Knowledge
- Biology Introductory Task

✓ **Read the Subject Information Sheet** which is available here:
CRGS Sixth Form Subject Sheet - Biology

✓ **Download the exam board specification** which is available here:
AQA A Level Biology

✓ **Read the section called 'Specification at a Glance'**, focusing on the A Level content.

✓ Some of these resources will become more useful when you have moved further through the course, such as the A Level specification, so store them where you can revisit them over the next 2 years.

✓ Don't worry if some of the work sounds challenging. A Level work is more difficult than GCSE work after all. Your teachers will be supporting you through this transition. Please talk to us if you are unsure about any aspect of the course.

We look forward to seeing you soon.

Dr Ellis - Head of Learning, Biology

Biology A Level
Frequently asked questions (FAQS)

Welcome to Biology at CRGS Sixth Form - Biology A Level is relevant to real world experiences and is interesting to teach and learn. A-level Biology is a stepping-stone to future study, the AQA specification allow students to develop the skills that employers and universities want to see. It is hoped that the subject content and teaching will inspire students, nurture a passion for Biology and lay the groundwork for further study in courses like biological sciences and medicine.

1. **How is the teaching organised?**
    - You will have **two** Biology teachers who both teach you for 2 hours per week (4 periods in total)
    - There are 4 topics in Year 12 and 4 in Year 13

2. **When are the exams and what are the weightings of the units?**
    - All the external AQA exams are in May / June of your Upper Sixth year
    - You will sit 3 exams based on work over both years
    - We have internal end of year exams towards the end of Year 12

3. **How much practical work is there and why is it important?**
    - There are 6 AQA compulsory practicals from which questions can be asked in Paper 1 and 2 summer examinations
    - You will carry out additional practicals and have your skills assessed e.g. the ability to accurately draw biological specimens
    - At the end of two years, you will either pass or fail the practical skills part of A-level Biology. This is recorded, separate to the grade, on your A-level certificate. Note: it is likely that university offers for Science courses will require a pass for the practical skills portion of this qualification.
    - You will have to catch up any missed practical work at lunchtimes to ensure that all your skills have been passed.

4. **How will I know how well I am doing in Biology?**
    - You will get regular feedback on homework and graded tests
    - You will have a meeting with a teacher to discuss your progress, as well as receiving three grades a year for all subjects.

5. **What support is there is Biology?**
    - There are numerous lunchtimes a week where staff are available to give you help with work.
    - You may be required to attend one of these sessions for, example, catching up on missed work or completing a re-test.

6. **What should I bring to lessons?**
    - You will be told to bring your lab coat in the previous lesson, if you are going to need it.
    - Bring your biology file and any homework that you have completed.
    - Pens, pencils, paper, ruler and calculator.

7. What are the characteristics of a successful A-level Biology student?

- They read about what they have learned in class (using their textbook)
- They learn as they go, building up a thorough understanding of the subject. This is vital as lots of areas of the syllabus are related to each other. Students who save their efforts for just before the exams tend to struggle
- Reading around the subject e.g. Biological Sciences Review
- Take heed of feedback; if you can think how you can improve by just one mark for each homework then you'll really progress in the subject
- Get good at what exams want; examining why marks are lost on questions and developing techniques to avoid careless errors e.g. highlighting key words in questions

8. How much homework should I expect?

- The Sixth Form recommends that you complete a minimum of 4 hours of homework and independent study per subject, per week.
- Successful students read ahead on the topic in their textbook before their next lesson. Then, after the lesson, they consolidate their understanding by adding details to their lesson-notes by using their textbook and other resources.
- We hope that students are motivated to seize any opportunity to test their understanding by trying to complete their homework without further prompting. If you do not understand your homework, don't wait to tell your teacher when it is due to be handed in. Instead find your teacher and ask for their advice or ask classmates what resources they used to complete it.
- You will normally have a written piece of homework once per week from both of your Biology teachers. These tend to be worth about 30 marks and would each take approximately 30 minutes in exam conditions.

9. Access to textbooks

- There are many copies of the textbook in the Library for reference and for 1-week loan.
- You will be issued with a textbook for each of the two years.

10. What can I do in my personal study time to help me achieve the highest grade possible?

- Lots of students make flash cards / summary diagrams
- We issue a blank glossary that you can build up your own definitions of the myriad of words and phrases in biology
- Working on exam technique by tackling past papers questions
- Thinking about what you are doing and why in practical work

Useful Biology Websites

URL	Content
http://www.bbc.co.uk/schools/gcsebitesize/science/aqa/	We will study **AQA** A level Biology. If your GCSE was a different exam board, or you did not study Separate Sciences, then looking back at the AQA Biology GCSE content might be useful
http://www.youtube.com/watch?v=1Z9pqST72is	Search for '**Bozeman Science**' or 'crash course biology' there are animations / presentations on core Biology topics.
http://www.bbc.co.uk/science/	Search for Biology news stories e.g. stem cells / new drugs etc. Wider reading will help when it comes to applying to University / seeing the bigger picture and developing your general knowledge. The final Biology exam paper in Year 13 contains an essay question that will require you to show evidence of wider reading to access the highest marks.
https://cognitoresources.org/	This is a good site for past paper questions by topic. They also make excellent and short videos of GCSE topics on YouTube. Go to their YouTube channel "Cognito"

Biology A Level – Helpful previous knowledge

Students starting A-level Biology will have a variety of GCSE qualifications (e.g. different exam boards) and different journeys through those exams (e.g. 'Triple Science' or 'Core and Additional Science' sometimes called Dual Award). You may wish to read ahead on topics that you did not do as part of your Biology course at GCSE. All these topics are taught at A-level. Understanding these before you start will help you make rapid progress.

Area of Biology	Topic	Essential knowledge	Desired knowledge
Cells, tissues, organs and organ systems	Structure of a typical animals cell	✓	
	Structure of a typical plant cell	✓	
	Anatomy of the human digestive system	✓	
	Structure and function of a broad leaf	✓	
	How roots absorb water and mineral ions		✓
	Structure of the lungs		✓
	Structure and basic function of the mammalian heart		✓
Biological molecules	Amino acids and proteins	✓	
	Carbohydrates (sugars and starch)	✓	
	Fats		✓
Chemical reactions	Diffusion	✓	
	Osmosis		✓
	Enzymes – conditions in which they work at their optimum	✓	
	Role of enzymes in digestion		✓
	Photosynthesis	✓	
	Respiration	✓	
DNA / genetics	Structure of DNA and how it codes for a protein		✓
	Difference between genes and alleles		✓
	Mitosis and meiosis		✓
	Cloning and genetic modification		✓
	Genetic crosses and heredity		✓
Evolution	Natural selection	✓	
Processes in the human body	Control of body temperature		✓
	Control of blood sugar		✓
	Nervous system inc. reflex arcs		✓
	Immune system inc. white blood cells and antibodies	✓	
	Menstrual cycle		✓
Environment	Human Causes of Global Warming		✓
	Sampling techniques e.g. use of quadrats / transects		✓
Maths skills	Percentages / ratios / fractions	✓	
	Graphs (bar charts, histograms, line graphs, scatter graphs)	✓	
	Presenting scientific data in tables	✓	
	Averages (mean, medians, modes)	✓	
	Rearranging equations	✓	
Skills	Using a microscope		✓
	Using pipettes / measuring cylinders		✓

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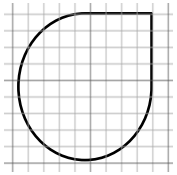
A Level Biology – Key knowledge and maths skills Introductory Task

Please complete this Introductory Task to the best of your ability and bring it to your first lesson. It is not a test. By working through these questions you will be able to gauge your current knowledge and understanding of some aspects of How Science Works and key topics.

1. Measuring and using a microscope.



The diagram below shows a tracing of the outline of a leaf on graph paper. A small square has a side length of 2mm.

a) Estimate the area of this leaf.

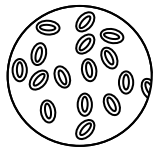
Leaf area = _____ mm^2

b) Convert the area of the leaf into m^2 and write your answer in standard form.

Leaf area = _____ m^2

c) Describe how you could modify this technique to give the area of the leaf with increased **accuracy**.

A piece of the lower epidermis of the leaf was examined with an optical (light) microscope at a magnification of 400. The diagram shows a field of view, as seen from looking down the microscope and many stomata.



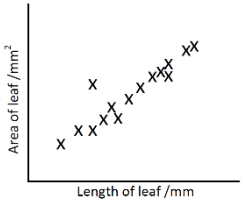
d) Given than the field of view has a diameter of 0.4mm. Calculate the number of stomata per mm^2 of leaf.

Number of stomata = _____ per mm^2 of leaf

e) Describe how would you count the number of stomata in a field of view **accurately**?

f) How could the **reliability** of the estimate of the number of stomata per leaf be improved?

g) 15 leaves from the same plant were taken and their maximum length and area were measured. This data was then plotted as a scatter graph.



i) **Describe** how leaves could be selected to avoid human bias.

ii) **Evaluate** the statement "There is a positive correlation between leaf length and leaf area." *In '* ***evaluate'*** *questions you should give reasons why you agree and disagree with the statement.*

2. Investigations

An investigation was conducted to find out if caffeine increases heart rate. Five test subjects were given a single caffeine tablet with 200ml of water. Their heart rate was measured at rest before and ten minutes after taking the caffeine pill. The results are shown below.

Test subject	Heart rate			Percentage increase
	Before	After	Increase	
1	65	75	10	15.4
2	78	79	1	1.3
3	60	62	2	3.3
4	60	79	19	31.7
5	67	70	3	4.5
			Mean	11.2

a) **Suggest** suitable units to measure heart rate.

b) **Explain** why it was necessary to calculate the percentage increase instead of drawing conclusions from the raw increase.

c) Use the information given in question 2 to complete this table will detail.

Independent variable	
Dependent variable	
Resolution of the data	

d) The group of test subjects are matched to allow for a fair comparison. One example would be to use the same age of test subject. Give two other ways in which you would match the group.

e) The use of a control group would have made the test more valid. Describe what a control group would look like and how its inclusion the investigation would increase validity.

f) Give **two** further examples of factors that would have to be controlled if valid data was to be obtained.

3. Digestion of carbohydrates

100g of the carbohydrate starch) was mixed with amylase solution. The mass of sugar present was measured at different time intervals. The data collected is shown below.

Time in amylase solution / seconds	Mass of sugar present / g
0	0
30	1.6
60	3.4
100	6.8
200	20.4

a) Describe how you should use the data to find the likely mass of sugar present after 2 minutes.

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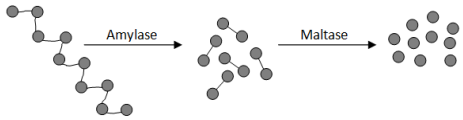
b) The diagram shows the digestion of **starch** by two types of carbohydrase enzyme.



i) Label the molecules to show what type of carbohydrate they are. Use the words: Disaccharide, Monosaccharide and Polysaccharide.

ii) Complete the table with examples of different carbohydrates (two have been done for you).

The Carbohydrates		
Polysaccharides	The Sugars	
	Disaccharides	**Monosaccharides**
1. Stored in plants: **Starch** 2. Stored in the liver of animals: 3. Forms plant cell walls:	4. Digested starch results in: **Maltose** 5. Common sugar: 6. Sugar found in milk:	7. Sugar made in photosynthesis: 8. Sugar found in fruit: 9. Sugar found in DNA

iii) Explain why the carbohydrase enzymes are shown above the arrows in the diagram.

iv) Explain why amylase does not function in the stomach.

Questions 4 – 6 Cell structure and function

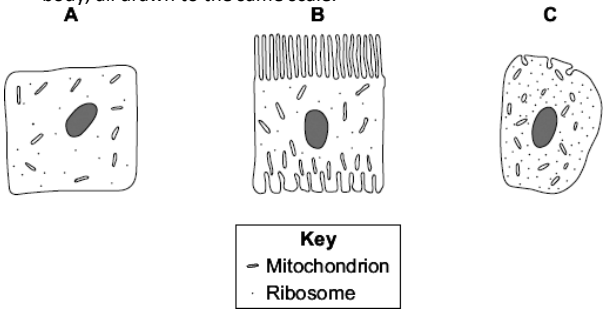
4. In a living organism, the cells are organised into organs, systems and tissues.

a) Use words from the box to complete the list of these structures in order of size. Write these words out in order of size, from smallest to largest: Organ, Tissue, System

b) **List A** gives three tissues found in the human body. **List B** gives four functions of tissues.
Draw a straight line from each tissue in **List A** to its correct function in **List B**. [3]

List A – Tissue	**List B – Function**
Muscular tissue	Covers many parts of the body
Glandular tissue	Contracts to cause movement
Epithelial tissue	Divides by meiosis
	Releases hormones or enzymes

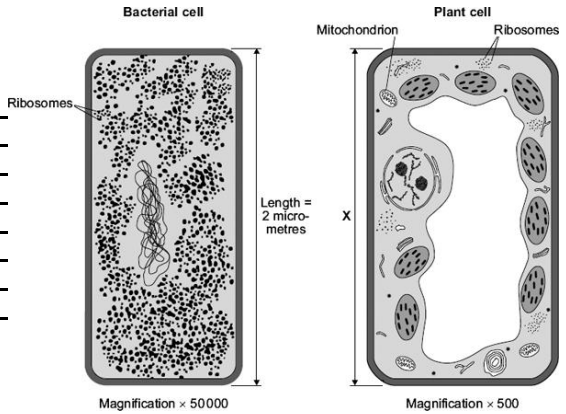
5. Diagrams **A**, **B** and **C** show cells from different parts of the human body, all drawn to the same scale.



a) Which cell, **A**, **B** or **C**, appears to have adaptations to increase diffusion. Give **one** reason for your choice. [1]

bi) Cell **C** is found in the pancreas. Name **one** useful substance produced by the pancreas. [1]

ii) Use information from the diagram to explain how cell **C** is adapted for producing this substance. [2]



6. The diagram shows two cells, a bacterial cell and a plant cell.

ai) Both the bacterial cell and the plant cell contain ribosomes. What is the function of a ribosome? [1]

ii) The plant cell contains mitochondria but the bacterial cell does **not** contain mitochondria. Give **one** other way in which the plant cell is different from the bacterial cell. [1]

bi) Both cells are drawn the same length, but the magnification of each cell is different. The real length of the bacterial cell is 2 micrometres. Calculate the real length, **X**, of the plant cell. Give your answer in micrometres. Show clearly how you work out your answer. [2]

X = ... micrometres

ii) Most mitochondria are about 3 micrometres in length. The plant cell contains mitochondria but the bacterial cell does **not** contain mitochondria. Use your answer to part (b)(i) and the information in the diagram to suggest why. [1]