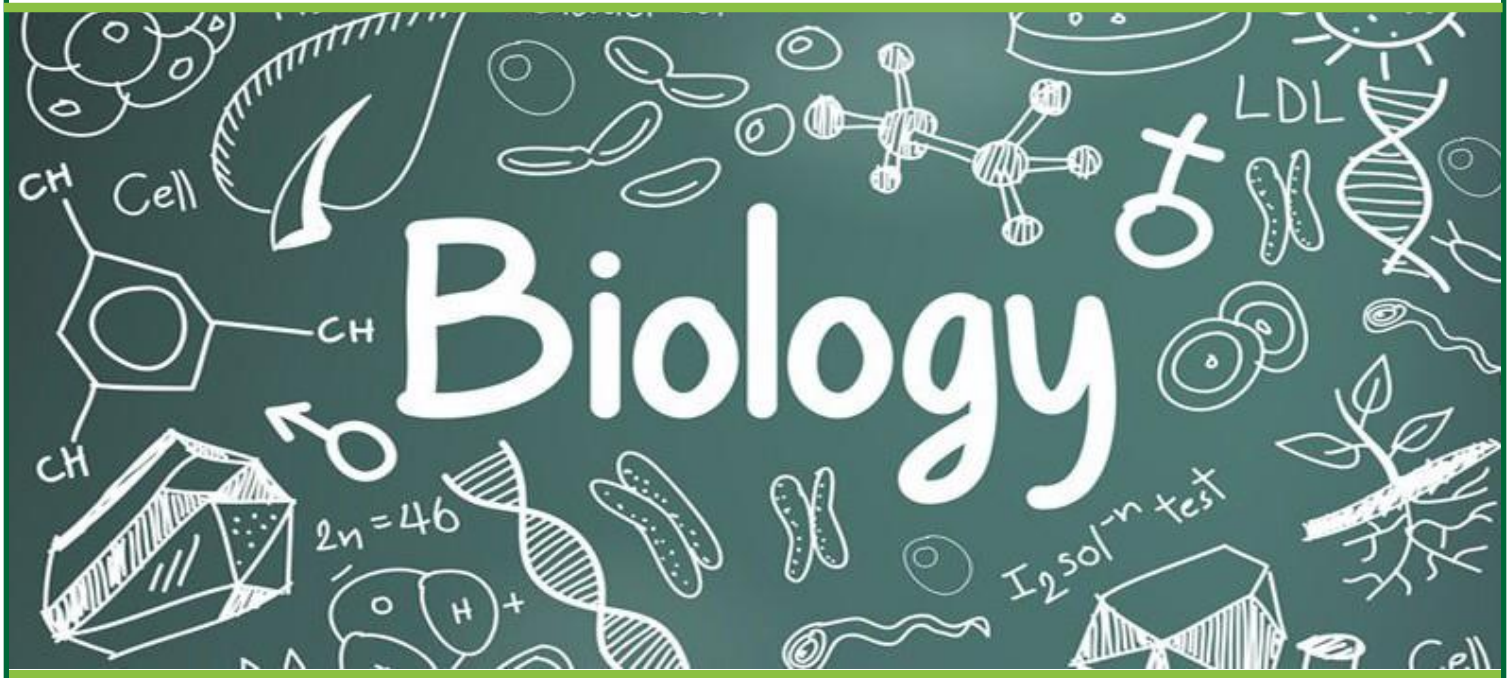
Bentley Wood

High School for Girls

AS Bridging Work
Biology

Summer Holiday Bridging Work 2021 Year 11 into 12



Name:_____

Tutor Group: _____

Teacher: _____

WELCOME TO AS-BIOLOGY

The purpose of this booklet is to give you essential information and resources for the AS Biology course. This booklet will also help you to understand and develop the skills you will need.

Please remember the following items for **EVERY** lesson – **ESSENTIAL**:

- Pens (highlighters are useful too) and paper
- A file with your (well organised) notes in
- Your textbook

SUPPORT

We hope you enjoy learning Biology BUT sometimes even the best of students can have problems:

- **Problems with work**
- **Problems understanding concepts**
- **Problems getting your head round all the theories in biology**
- **Problems with completing homework**
- **Problems in their personal lives**

If any of this applies to you, don't feel there's nowhere to turn – **THERE IS!**
ALL the staff in the Biology Department will be happy to talk through your concerns or can advise you – so don't panic or think about giving up, **HELP IS AT HAND**.

Come and find us, or e-mail – no problem is ever so big that we can't help, honest!

W Patel	wpatel@bentleywood.harrow.sch.uk
K Woolford	Kwoolford@bentleywood.harrow.sch.ul

EXPECTATIONS

As a part of its quality approach to teaching, the Biology Department follows a common policy on the setting and marking of work. This code of practice is followed by both staff and students and is aimed to help you achieve success in Biology.

What we expect of YOU

- It is expected that your attendance will be 100% - if you are absent you MUST inform your tutor (beforehand if possible). If you do miss a lesson for medical or academic reasons it is YOUR responsibility to catch up on the work that you have missed.
- You are expected to spend **FIVE** hours a week per subject on personal study. This time may be directed by homework set by the tutor; otherwise you will be expected to use this time to

read around your subject, supplement your notes and ensure that your notes are well organised and complete

- You will be set an assessment every WEEK. If you have been unable to complete the work, you will be expected to inform your tutor prior to the lesson that the work is due in and/or find a time to catch-up.
- You are expected to manage and organise your work effectively, and to be responsible for keeping your notes, files and assessment pack up to date.
- You are expected to listen respectfully to your peers in discussions and group work.

What you can expect of US

- Assessed work will be marked and handed back within TWO weeks of the handing in date.
- We will always be willing to discuss your progress and support your learning.

USEFUL WEBSITES

The following Internet resources are useful and will help with your AS Biology course:

Revision and consolidation of knowledge:

- http://www.biologymad.com/
- https://www.khanacademy.org/science/biology
- https://getrevising.co.uk/resources/level/a_ib/subjects/biology

Other useful websites include:

- https://snaprevise.co.uk/plans You can buy a subscription if you want
- https://snabbiology.wordpress.com/ : A great (and free!) archive for searching the core practicals.

You are encouraged to keep an eye on the news as many reports and articles will be relevant to the materials you are studying in class.

HOW DO WE STUDY BIOLOGY AT BENTLEY WOOD?

Exam board:

At Bentley Wood we study Edexcel Salters Nuffield Biology A (also known as SNAB)

- https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/biology-a-2015.html Contains the spec, past papers, exam dates and most importantly EXAMINERS' REPORTS which will tell you where students commonly go wrong/suggest how to improve.

Lessons:

You will have six periods of Biology every week. Three lessons will be spent with one teacher learning topics 1 and 2 and three lessons will be spent with a different teacher learning topics 3 and 4. At the end of the year you will sit two exam papers, each worth 50% of your AS grade (see image below)

Practical work:

Your grade will be based fully on your exams, there is no coursework. However, similar to your GCSEs, you will be carrying out nine core practicals throughout the year which are compulsory. Your teachers will be more strict in assessing your practical skills and will submit a pass or a fail to the exam board at the end of the year. In your final exams you will be assessed on these practicals for example by being asked to write a method or analyse data.

AS (first assessment: summer 2016)

- Exam questions will test students' knowledge and understanding of the relevant specification topics.
- Each paper will also assess students' knowledge and understanding of experimental methods, based on the core practicals in the specification.
- Question types: multiple choice, short and long answer questions (up to 9 marks), and calculations.
- Questions assessing students' use of mathematical skills will make up 10% of the exam papers.

Paper 1 – Lifestyle, Transport, Genes and Health

✓ 80 marks | 50% weighting | 1 hour 30 minutes

- Topic 1: Lifestyle, Health and Risk
- Topic 2: Genes and Health

Paper 2 – Development, Plants and the Environment

✓ 80 marks | 50% weighting | 1 hour 30 minutes

- Topic 3: Voice of the Genome
- Topic 4: Biodiversity and Natural Resources

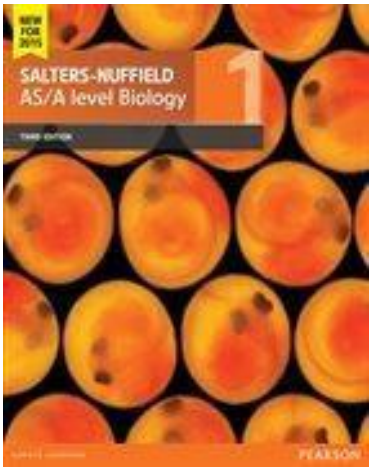
Note: All AS exams must be taken in the same examination series. Results from AS examinations will count towards the AS grade but will not form part of the A level grade.

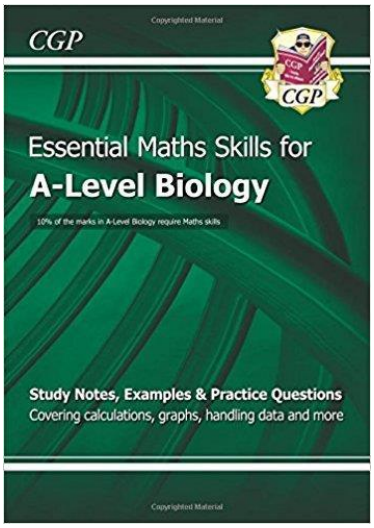
PREPARATION

<u>Prep task 1.</u> Buy some good books. You must buy the first textbook but there are more you might want to invest in- the more you have the better your grade! (We do have an online PDF copy for free if you don't want a hard copy)

Compulsory: Salters-Nuffield AS/A level Biology Student Book 1

Price: £15 from Amazon



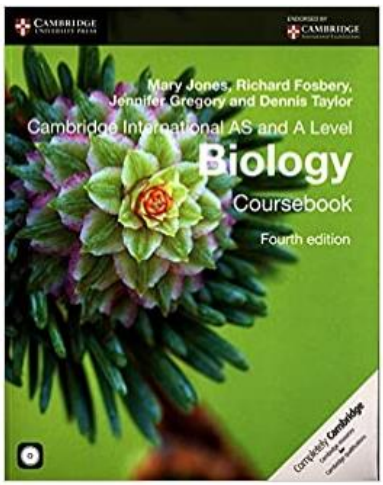


Recommended: CGP Essential maths skills for A-Level Biology

Price: £7.50

Recommended: Cambridge International AS and A Level Biology

Price: £40 from Amazon (expensive but covers both years and is worth it if you are serious)



<u>Prep task 2.</u> Read the specification from the Edexcel Pearson website:

https://qualifications.pearson.com/content/dam/pdf/A%20Level/biology-a/2015/specification-and-sample-assessment-materials/9781446930908_GCE2015_AS_BioA_spec.pdf

Print off the specification teaching points (pages 17-26) and put in the front of your folder

This is how it should look:

Topic 1: Lifestyle, Health and Risk

This topic builds on students' knowledge and understanding of the functioning of the circulatory system and the importance of lifestyle choices to health. The role of diet and other lifestyle factors in maintenance of good health is considered with particular reference to the heart and circulation and to cardiovascular disease (CVD). The structures and functions of some carbohydrates and lipids are also detailed within this context. Ideas about correlation, causation and the concept of risks to health are covered.

Students should be encouraged to carry out a range of practical experiments related to this topic in order to develop their practical skills. In addition to the core practicals detailed below possible experiments include heart dissection to relate heart structure to function, investigation of the structure blood vessels by measuring the elastic recoil of arteries and veins and by examining slides of blood vessels, measurement of blood pressure, and investigation of the hydrolysis of disaccharides.

Opportunities for developing mathematical skills within this topic include calculating probabilities, plotting two variables from experimental data, calculating % change, substituting numerical values into algebraic equations using appropriate units for physical quantities, constructing and interpreting frequency tables and diagrams, bar charts and histograms, translating information between graphical, numerical and algebraic forms and using scatter diagrams to identify a correlation between two variables. (Please see *Appendix 5: Mathematical skills and exemplifications* for further information.)

Students should:	
1.1	Understand why many animals have a heart and circulation (mass transport to overcome limitations of diffusion in meeting the requirements of organisms).
1.2	Understand the importance of water as a solvent in transport, including its dipole nature.
1.3	Understand how the structures of blood vessels (capillaries, arteries and veins) relate to their functions.
1.4	i) Know the cardiac cycle (atrial systole, ventricular systole and cardiac diastole) and relate the structure and operation of the mammalian heart, including the major blood vessels, to its function. ii) Know how the relationship between heart structure and function can be investigated practically.
1.5	Understand the course of events that leads to atherosclerosis (endothelial dysfunction, inflammatory response, plaque formation, raised blood pressure).
1.6	Understand the blood-clotting process (thromboplastin release, conversion of prothrombin to thrombin and fibrinogen to fibrin) and its role in cardiovascular disease (CVD).
1.7	Know how factors such as genetics, diet, age, gender, high blood pressure, smoking and inactivity increase the risk of cardiovascular disease (CVD).
1.8	Be able to analyse and interpret quantitative data on illness and mortality rates to determine health risks, including distinguishing between correlation and causation and recognising conflicting evidence.

Get ahead by looking and seeing what the GCSE links are and make some summary GCSE notes.

E.g. You would have looked at blood vessels during your GCSE – make a table of the three vessels and describe the structure and function.

Ensure that this is completed for as many of the spec points as possible. This will really help you.

SUMMER TASKS

Task 1. Revision task

As you can see from the specification A-level Biology builds upon GCSE knowledge. You are expected to know your GCSE topics well. You will be **retested** on the GCSE to A-level links (topics will include osmosis, diffusion, active transport, heart structure, enzymes, basic cell structures, basic mitosis and some maths application questions). Please complete some revision activities based around these topics and show us evidence of your revision.

Task 2. Research task

As an A-level student it is imperative that you are able to carry out independent research and articulate what you have learnt. One of the biggest reasons students don't achieve the highest grades in Biology is that they can't explain their ideas well.

Choose one of these research questions. Research and create a presentation to answer this question. You will be presenting to the class in September and you will be given a **grade by your teacher which will be on your first report**. You can create a powerpoint or just present without props but you **must talk for 5 minutes and you must show evidence of your research.**

1. Why is it essential to learn about cell structure when designing vaccines?
2. What is more important for an organism's survival- DNA or Protein?
3. Following the COVID pandemic, what changes would you make to healthcare and why?
4. How does the Palm Oil industry affect biodiversity and what are the possible solutions?
5. Pick an observable example of evolution and use that to explain the process of natural selection
6. You are stuck in a cave with no food. Why are these Biological molecules essential for your survival- lipids, carbohydrates and proteins?
7. Why are there different degrees of severity for cystic fibrosis?
8. DNA can be thought of as an instruction manual. Why can epigenetics be described as highlighting/annotating that manual?
9. Why is it so important to have seed banks? What would happen to the world without them?

Success Criteria:

- Present for 3-5 minutes
- Use correct scientific terminology
- Use diagrams to support your work
- Don't just read off the slide!
- Have a list of references for your sources of information

Task 3. Maths in Biology

We expect you to start year 12 with a good level of maths. At least 10% of the exam will require you to utilize basic maths skills. The maths requirements can be found on pages 68-72 in the specification. Have a look through these pages and tick off all the skills you are comfortable with.

Download a copy of the maths student guide. Choose at least two areas you would like to improve and make some revision notes on these topics
https://qualifications.pearson.com/content/dam/pdf/A%20Level/Biology/2015/teaching-and-learning-materials/Biology_Maths_Student_Guide_-_FINAL.pdf

Complete these basic maths questions. If you get stuck at any point go back to the student guide to get help. Remember you can always use a calculator in Biology!

SI Units and Prefixes

1. Using standard form, how many:
   (a) mg in an kg?
   (b) nmol in a mol?
   (c) μm in a Mm?
   (d) mm^3 in a dm^3?

2. (a) Convert 0.2 mm into μm
   (b) Convert 6000 μm into mm
   (c) Which is bigger, 0.005 mm or 50 μm?
   (d) Which is bigger, 0.5 dm^3 or 50 cm^3?

3. Convert these values to units with more suitable prefixes i.e. with values in the range 1–999. For example 0.0035 kg = 3.5 g.
   (a) 0.002 56 mm
   (b) 5 840 000 mm
   (c) 2.62×10^{-5} g
   (d) 1.98×10^{7} ms

Ordinary and Standard Form

4. Convert these values to metres and write them in standard form.
   (a) 1 mm
   (b) 47 nm
   (c) 7693 mm
   (d) 181 795 μm

5. Write the following as decimals, choosing a suitable prefix.
   (a) 1×10^{-4} m
   (b) 3.9×10^{5} m
   (c) 2.698×10^{-6} m
   (d) 4.55×10^{2} m

6. Calculate
   (a) $(4.8 \times 10^{4}) \times (9.3 \times 10^{6})$
   (b) $(5.6 \times 10^{8}) \div (2.8 \times 10^{2})$
   (c) $(5.6 \times 10^{4}) + (1.5 \times 10^{5})$
   (d) $(9.8 \times 10^{3}) - (1.7 \times 10^{4})$

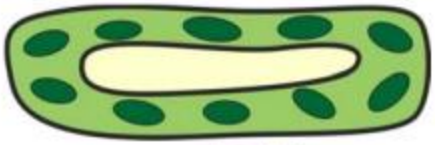
Significant Figures

7. State the number of significant figures in each of the following numbers.
   (a) 1302
   (a) 600
   (a) 0.005601
   (a) 0.04500

8. Round the following numbers to the specified number of significant figures.
   (a) 1865 to two significant figures
   (b) 0.358 to one significant figure
   (c) 0.09076 to three significant figures
   (d) 0.000 49648 to two significant figures

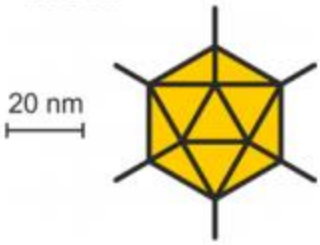
Magnification

9. (a) If this plant cell is 32 μm long, what is the magnification of the drawing?



   (b) How long is this leaf in real life?

   (c) Calculate the true length of this virus.



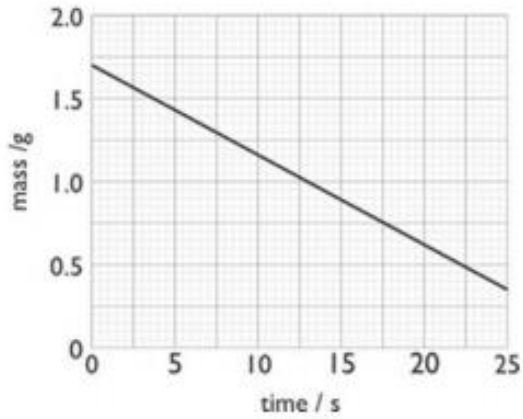
Percentage Change

15. Calculate the percentage change if:
   (a) a carrot chip changes from 5 mm long to 4.8 mm long in salt solution.
   (b) a reaction produces 22 mL of gas per min at 20°C and 48 mL of gas per min at 30°C.
   (c) the number of bacterial cells in a colony changes from 5×10^4 to 2×10^5 after an hour.
   (d) an athlete's pulse rate changes from 165 to 75 beats per min after a race.

Gradients and Rates

18. The graph shows the change in mass when gas is evolved during a chemical reaction.

    Calculate the rate of reaction. Don't forget the units.

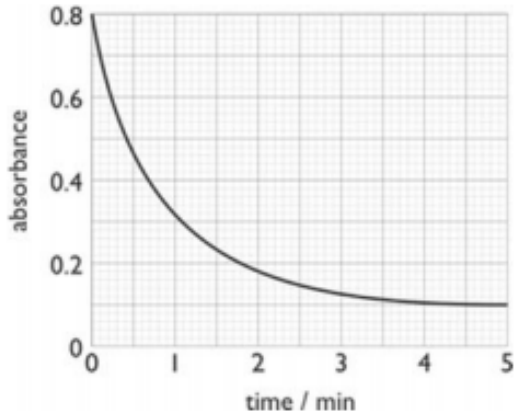


Biology Student Maths Guide

19. The graph shows the change in absorbance when an enzyme is mixed with a coloured substrate.

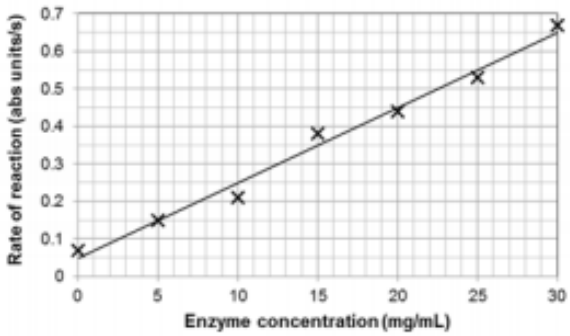
    (a) Calculate the initial rate of reaction over the first 0.2 min.

    (b) Calculate the rate of reaction at 3 min.



Equation for a straight line ($y = mx + c$)

20. The graph shows the results of an investigation into the effect of enzyme concentration on the rate of reaction, measured using a colorimeter. A line of best fit has been drawn.

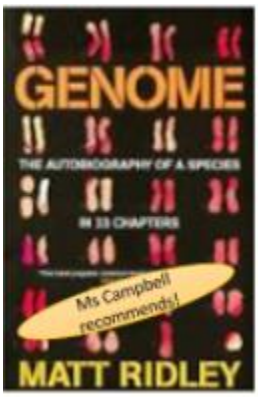


    (a) Using the equation $y = mx + c$, calculate m and c.

    (b) Use these values to determine the rate of reaction at an enzyme concentration of 50 mg ml^{-1}.

WIDER READING

It is essential that you have an appreciation of Biology within the wider world. This will make you a better scientist by helping you make links between topics, understand application questions better and be able to articulate your ideas more clearly using scientific language. It will also be beneficial to your UCAS applications by showing you have a genuine passion for your subject.

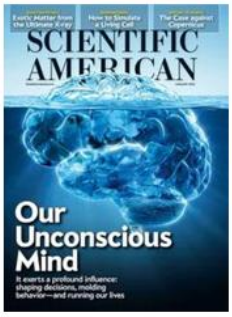


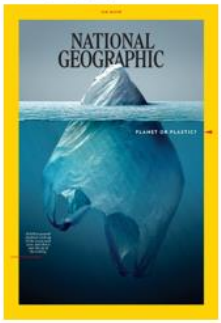
Read 'Genome' by Matt Ridley. This book describes the function of the genome by discussing one chromosome per chapter. This is compulsory and we will have a discussion about this in September.

Below are some equally amazing reads that you should check out- some come recommended by Ms Campbell. You can also look on Amazon or Waterstones in the 'popular science' section to choose your own.

You should look through the science section of a good newspaper such as The Guardian or The Independent every week.

You should also be looking at published journals such as Scientific America, New Scientist or National Geographic, all of which can be bought from newsagents such as WHSmith





WIDER WATCHING

Watch at least one science film or documentary. Here are some great ones (Ms Campbell has watched and recommended those indicated). Most of these are from Netflix but iPlayer is also a good source as well as the TED talks that can be found on YouTube. Obviously anything by David Attenborough is a must see!

Spend your summer finding out why you love Biology.
We look forward to working with you in September!