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**Biology Department**

**A-level welcome booklet**

**2022-2023**

*Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Welcome**

Dear student

Welcome to Ursuline High School and congratulations on your decision to join us. We hope that you have an enjoyable and successful time here.

Now that you’ve chosen to study biology in more depth, you may be feeling rather unsure about starting you’re A-level biology course. But don’t worry – this guide has been designed to help you work through you’re a-level course! A-level and GCSE courses have recently changed, the biggest change for biology being that all examinations will take place in the summer of 2016 at the end of your 2 year course. Additionally, all coursework has been removed. What this now means is that you will be expected to perform experiments in much more detail, keeping a lab book and full write up of all experiments. 12 key experiments will be tested in your written papers which will have questions designed to test your knowledge about how these practical’s (and skills) work.

**The enjoyment factor**

Biology is the scientific study of life. We are living things ourselves so biology is about us too! Discovering how your body works and fits in with other living things is fascinating – hopefully you already enjoy this aspect of biology.

During your 2 year course, you will get the chance to delve deeper into *why* things are the way they are. It can be very satisfying to really grasp the more difficult concepts and the links between them.

Most of us enjoy a good medical story and enjoy learning about how the body, cells and animals work- which you will learn throughout the 2 years. If you prefer more up-to-date, technological topics, biology covers cutting edge issues too. These can include DNA technology, which can even make news headlines!

However if you are more *hands-on*, then biology is also very much about seeing and doing.

**What are the main differences between GCSE and A-level biology?**

Although there is much overlap in topics and terms, there is quite a lot of *new material* that you won’t have met before. Also, you need to go into more *detail* regarding the topics you are already familiar with and your level of *thinking and explaining* has to be deeper.

* **New material**

There will be many more facts and unfamiliar terms to learn and recall in exams than there were at GCSE. Examples of new areas include the structure of cell membranes, the immune response and classification. Don’t be put off by all the complex terms you will start to come across, they are important for scientists to communicate *precisely* what they mean, and as your AS course progresses you will become more comfortable and confident with using them.

* **Detail**

You must be prepared to go into a topic or subtopic in much more detail than at GCSE. This sometimes means using specific examples of what you know in general (e.g. named examples of types of body tissues). It might involve describing something in much more detail than before (e.g. exactly how your heart beats and how this is controlled). Another good example is mitosis – if you can’t remember what it is, have a quick look at your GCSE notes! For AS biology you need to name and explain what happens in each *stage* of mitosis and show an *understanding* of why these things happen. This brings us on to …

* **Thinking and explaining**

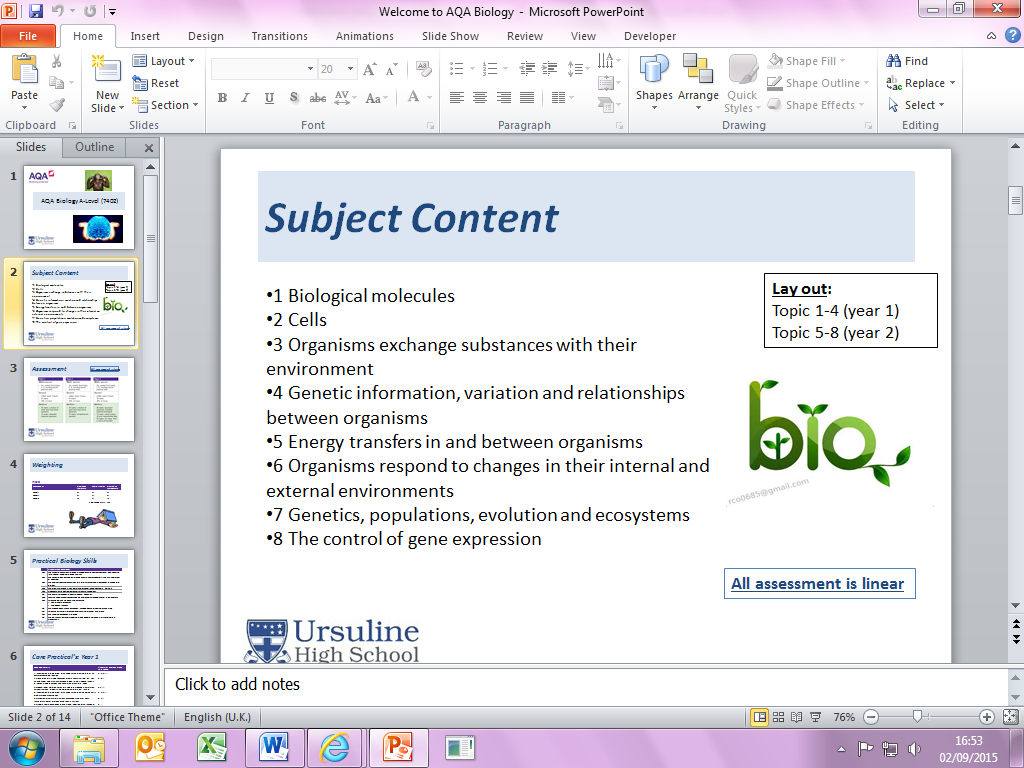
As well as going into more detail and giving examples wherever you can, you need to *justify* your statements and *apply* your knowledge and skills to unfamiliar examples. Justifying what you are saying in AS biology often involves relating structure to function, i.e. explaining why something looks the way it does or why a particular structure allows it to function. For example, knowing the detailed structure of the cell membrane allows you to explain its many functions. Now you can apply this knowledge to discuss how an unfamiliar medical drug might work by changing the structure of the membrane.

* **Developing practical skills**

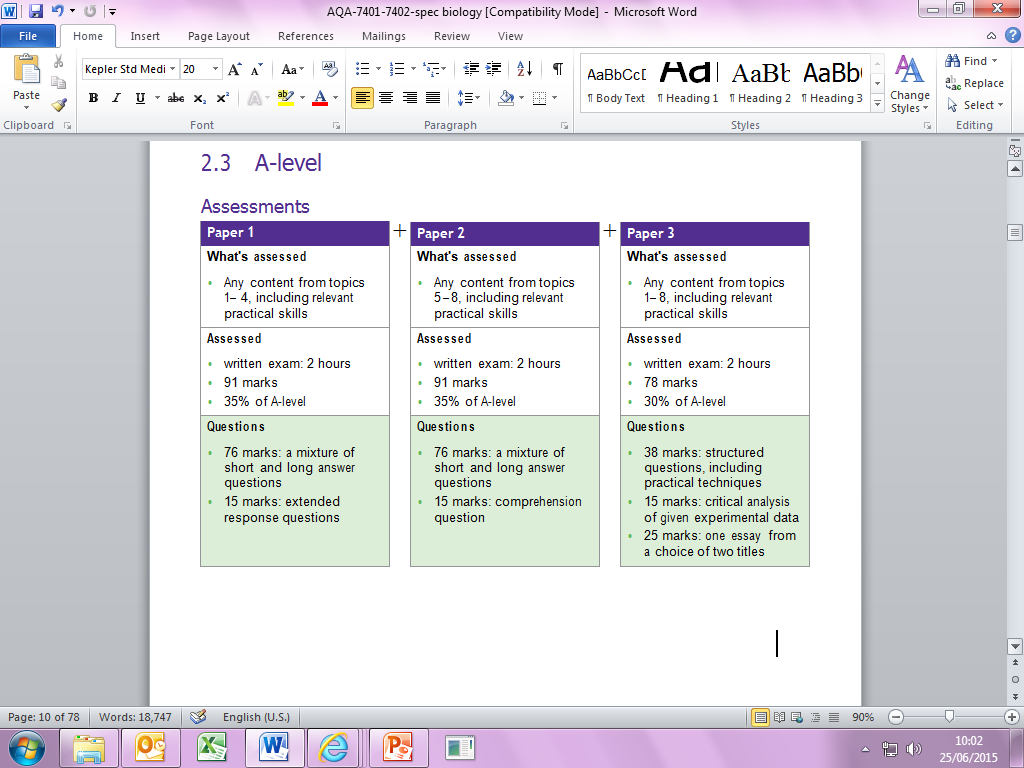
You will develop your practical skills further in AS biology, such as *using* the microscope to measure and calculate sizes of cells. In fact, there is a unit devoted to practical assessment – worth 20% of the whole AS course mark – so you should take every opportunity to practise your experimental/lab skills. There will also be a second practical assessment unit within the second year.

**Organising yourself during the course**

Compared with you’re a-level course, your GCSE course in school was less detailed and your progress was more structured. At AS you need to structure your own personal study. You need to *organise* yourself and do it in advance as much as possible. Everything from paper, pens, folders and a hole punch to textbooks and specifications (we’ll come back to this). And finally, construct a *time planner* (daily, weekly and termly). At AS you are likely to cover more than one biology topic in the same week – depending on how your classes are organised – so you will have notes, handouts, homework, practical’s and suggested reading for each topic. This will be the same for *each* AS subject such as chemistry, physics etc. that you are studying! But remember, we are all different and the way you work should suit *you* and may be different from how other students work.



**Assessment**



Weighting



Practcal skills needed to be used and developed



Key core practicals that can be tested in the exam papers

Year 1



Year 2



These practicals are aimed at building your skills in the 5 following areas:

|  |  |
| --- | --- |
| 1. Follows written procedures | a. Correctly follows instructions to carry out experimental techniques or procedures. |
| 2. Applies investigative approaches and methods when using instruments and equipment | a. Correctly uses appropriate instrumentation, apparatus and materials (including ICT) to carry out investigative activities, experimental techniques and procedures with minimal assistance or prompting.  b. Carries out techniques or procedures methodically, in sequence and in combination, identifying practical issues and making adjustments when necessary.  c. Identifies and controls significant quantitative variables where applicable, and plans approaches to take account of variables that cannot readily be controlled.  d. Selects appropriate equipment and measurement strategies in order to ensure suitably accurate results. |
| 3. Safely uses a range of practical equipment and materials | a. Identifies hazards and assesses risks associated with these hazards, making safety adjustments as necessary, when carrying out experimental techniques and procedures in the lab or field.  b. Uses appropriate safety equipment and approaches to minimise risks with minimal prompting. |
| 4. Makes and records observations | a. Makes accurate observations relevant to the experimental or investigative procedure.  b. Obtains accurate, precise and sufficient data for experimental and investigative procedures and records this methodically using appropriate units and conventions. |
| 5. Researches, references and reports | a. Uses appropriate software and/or tools to process data, carry out research and report findings.  b. Cites sources of information demonstrating that research has taken place, supporting planning and conclusions. |

Study skills

* **How do you work throughout the course?**

Don’t just slog! By just putting in the hours (in class or at home) but not being efficient or not testing yourself you may literally waste that time. Reading through or rewriting notes is a start but you also need to *process your study*. Now is a good time to look back at how you worked and revised for GCSE. Make a note of what worked and where it went wrong – remember, everyone is different, and you should find out what suits *you*, develop a routine and stick to it.

*Processing* your work is very important. It means engaging with the concepts and facts and reorganising them somehow, not just reading a book and hoping it goes in. How do you process information? There are many ways of doing this – some of which will suit you while others won’t – here are some suggestions.

**(a) Bullet points and practice questions**

Instead of rewriting notes word for word (tedious!), you could write out revision bullet points, preferably from memory. You could also answer questions such as those found in the textbook or use online revision sites such as *Exams Tutor* (<http://www.examstutor.com/biology/>), as well as the multiple choice quizzes and sample student answers on the Exam Café CD. You will also find revision flashcards on the Exam Café CD or you could make your own.

**(b)** **Working with others**

Another good way to process information is to explain it to others – teachers will tell you that they only really understood some things when they had to teach them for the first time! If you can find a friend who will partner you regularly, you can explain topics to each other. This will be a great way of processing and understanding the work – and be a bit more fun too (beware of distracting each other though!).

**(c) Use** **manageable chunks**

It is easy to feel overwhelmed by a whole unit, module or topic but if you approach it week by week in smaller chunks, it will feel manageable. But you have to be organised and work regularly to keep up with the constant flow of new material. AS biology now has a shorter first unit, making it easier to get fully prepared for a January exam. It is a good idea to get this unit out of the way – with the best grade you can of course! – so that in June you only have two units to deal with. In fact, this is a good example of how to split work into manageable chunks, though for your personal study planning you would do this for a week or a month at a time.

* **How do you remember facts?**

There are many more facts, terms and definitions in AS biology compared with GCSE. Many of these will be unfamiliar, and feature more complex terminology. However, some are more important than others and there are ways of dealing with them.

**(a) Multicoloured highlighting**

A good starting point is the specification itself. Here, the key terms are picked out for you and you will find similar key terms and definitions highlighted in your textbook. Highlighting in your notes or making your own glossary (look at the one in your textbook) are good ways of making key facts memorable and familiar.

**(b) Study skills**

Once again, memorising is an individual skill; everyone is different in how they learn. However, certain things are known about how we learn. These can be found in study skills books such as the *Sciences Good Study Guide* from the Open University, which is well worth a look. You can also use revision/study websites (see above).

**(c) Reminder notes and concept mapping**

We have mentioned that explaining to others is a good way of learning, but for more personal study you need to consider things such as note writing and memory techniques as well as revision, self-testing and practising exams. Visual memory is far better than verbal memory – it uses a different part of your brain and is more efficient. So make your study and revision notes as visual as possible. Use your own drawings, flow charts and diagrams. Some people also like to use *concept maps* or *spider diagrams*, especially for revision. If you have never done one of these, have a go.

* **Examination papers**

You should plan to *practise exam questions as you go along*, not just before you sit an exam. However, once a whole unit is nearing completion, you need to practise whole papers to get a feel of what it is like in a real exam. You will be used to this from GCSE, including mock exams arranged by your school. Do as many of your own *mocks* as you can

**Careers in Biology**

Biology can open the doors to many careers and is often a good ‘link subject’ between science and arts subjects. Here are some careers in which further study in biology will be an advantage if not a requirement.

**Forensic Scientist**

A forensic scientist works with law enforcement agencies to investigate crime. Forensic scientists might be responsible for collecting or analyzing evidence, analyzing a crime scene to determine what occurred or creating DNA profiles of victims and suspects.

**Conservation Biologist**

A conservation biologist is concerned with the preservation of natural resources and studies the impact of human beings on the environment.

**Toxicologist**

Toxicologists study the nature and effects of toxins on various organisms, including humans, plants and animals. Medical examiners often use toxicology reports to rule out causes of death, and many environmental and pharmaceutical companies employ toxicologists to conduct research.

**Geneticist**

Geneticists study human, animal and plant genetics to determine the causes of diseases and defects. Geneticists conduct research in a number of different areas, including agriculture, pharmaceuticals, epidemiology and reproduction.

**Environmental Consultant**

Environmental consultants may work with environmental organizations, businesses or federal agencies to formulate new environmental programs; look for ways to reduce environmental costs; or aid in developing marketing strategies for environmental products.

**Pharmaceutical Sales Representative**

Pharmaceutical sales representatives are responsible for promoting and selling pharmaceutical products to individuals and organizations within the health care industry. These representatives regularly interact with doctors, hospitals and medical organizations, and they're responsible for providing accurate information about their product.

**Zoologist**

Zoologists are concerned with the study of animal biology and behavior. Zoologists might work for a zoo or a wildlife reserve, or they may work independently, conducting research on specific behaviors or groups within the animal kingdom.

**Marine Biologist**

Marine biologists are concerned with the study of the plants and animals that live in marine environments. Marine biologists may work in a laboratory setting, on a research ship, or they may study specific marine environments such as wetlands or sea marshes.

**Forester**

Foresters are responsible for the care and management of woodland areas. Foresters may work for federal agencies, such as the National Forestry Service, or they may work with private organizations such as a timber or logging company.

Useful sources of information

* Useful websites (not an exhaustive list – try Google for others)

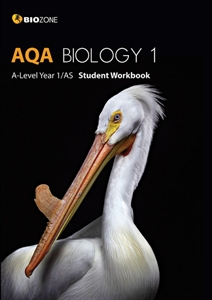
[www.biozone.co.uk](http://www.biozone.co.uk/)   
This is an excellent gateway to many other websites with useful material to support topics in both AS and A2. Click on Biolinks on the home page.

[www.biologymad.com/](http://www.biologymad.com/)   
This site is full of useful notes to support AS and A2 topics and also useful web links and advice for students.

[www.s-cool.co.uk](http://www.s-cool.co.uk/)   
Many web pages of structured notes

<http://www.biology-innovation.co.uk/>Useful diagrams for AS and A-Level Human Biology topics.

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| --- |
| [www.biology.com/](http://www.biology.com/)  Click on The Biology Place and find tutorials, animations and tests on a variety of topics including common A level Biology practicals.  [www.who.ch](http://www.who.ch/)  Use this website to find up-to-date information on infectious and non-infectious diseases.  <http://www.s-cool.co.uk>  Use the search functions to find a host of resources that some teachers have even been known to use!  <http://www.examstutor.com/biology/>  Fantastic revision website which even has podcasts for all the topics! Also a great revision planner. |

* <http://www.ibiblio.org/virtualcell/index.htm> – An interactive cell biology site
* <http://www.accessexcellence.org/RC/VL/GG> – A web site showing illustrations of many processes of biotechnology
* [http://www.uq.oz.au/nanoworld](http://www.uq.oz.au/nanoworld/) – Visit the world of electron-microscopy
* <http://www.dnai.org/a/index.html> – Explore the genetic code
* <http://nobelprize.org> – Details of the history of the best scientific discoveries
* <http://nature.com> – The site of the scientific journal
* <http://royalsociety.org> – Podcasts, news and interviews with scientists about recent scientific developments
* <http://www.nhm.ac.uk> – The London Natural History Museum’s website with lots of interesting educational material
* <http://www.bmj.com> – The website of the British Medical Journal
* <http://www.bbc.co.uk/news/science_and_environment> - The BBC news page for Science and the Environment
* Useful books

# ****Recommended –** Biozone AQA A-level Biology workbook and model answers book**

# Year 2 one also available

# <http://www.biozone.co.uk/products/aqa1/aqa-biology-1-student-workbook/>

New Scientist Magazine – Copies available in room S2 and the library

**Reading List**

**Magazines, Newspapers and journals**

New Scientist

Scientific American

Nature

Science

Biological Sciences Review

British Medical Journal

Any scientific articles in newspapers (eg the Guardian on Wednesday)

**Books**

Research these on Amazon and select a few to read:

Richard Dawkins:

The Selfish Gene

The Blind Watchmaker.

Unweaving the Rainbow

Climbing Mount Improbable

The Ancestor’s Tale

Steve Jones:

Y: The Descent of Men

[In the Blood: God, Genes and Destiny](http://www.amazon.co.uk/Blood-God-Genes-Destiny/dp/0002555123/ref=pd_sbs_b_4/202-5159057-0957406?ie=UTF8&qid=1185891131&sr=1-23)

[Almost Like a Whale: The 'Origin of Species' Updated](http://www.amazon.co.uk/Almost-Like-Whale-Species-Updated/dp/055299958X/ref=cm_lmf_tit_1_rdssss0/202-5159057-0957406)

The Language of the genes

Matt Ridley

[Genome: The Autobiography of a Species in 23 Chapters](http://www.amazon.co.uk/Genome-Autobiography-Species-23-Chapters/dp/185702835X/ref=pd_sbs_b_1/202-5159057-0957406?ie=UTF8&qid=1185891131&sr=1-23)

[The Red Queen: Sex and the Evolution of Human Nature](http://www.amazon.co.uk/Red-Queen-Evolution-Human-Nature/dp/0060556579/ref=pd_sbs_b_2/202-5159057-0957406?ie=UTF8&qid=1185891131&sr=1-23)

The Language of Genes

Francis Crick: Discoverer of the Genetic Code

**Nature Via Nurture: Genes, Experience and What Makes Us Human**

James Watson:

DNA: The Secret of Life

The Double Helix: Personal Account of the Discovery of the Structure of DNA

Lewis Thomas:

The Lives of a Cell: Notes of a Biology Watcher.  
The Medusa and the Snail: More Notes of a Biology Watcher Barry Gibb: [The Rough Guide to the Brain (Rough Guides Reference Titles)](http://www.amazon.co.uk/Rough-Guide-Guides-Reference-Titles/dp/1843536641/ref=pd_bbs_sr_1/202-5159057-0957406?ie=UTF8&s=books&qid=1185891563&sr=8-1)

Charles Darwin: The origin of species

Armand Marie Leroi: Mutants: On the Form, Varieties and Errors of the Human Body

David S. Goodsell: The Machinery of Life

Ernst Mayr: This Is Biology: The Science of the Living World

George C. Williams: Plan and Purpose in Nature

Steve Pinker: The Language Instinct

Edward O Wilson: The Diversity of Life

Primo Levi: The Periodic Table

Richard Leaky: The Origin of Humankind

Bill Bryson: A Short History of Nearly Everything

GOOD LUCK IN YOUR STUDIES – WE HOPE YOU ENJOY THE COURSE!