Bridging the Gap

2015-16

Helping you make the transition between GCSE and AS-Level Biology
Introduction
Welcome to studying AS-levels at The Crypt. Biology is a fascinating subject and pupils tell us they enjoy studying this subject with the majority of individuals continuing to A2 biology. Over the year you will have 2 of the following teachers: Ms Glock and Mrs Letts or Mr Hargreaves.

The transition between GCSE and AS-level is large, even for pupils who have completed a single GCSE in Biology. If you have completed a double award science then the transition can be even more challenging. The objective of this booklet is to help all pupils, whatever your previous biological training, to make this transition more easily.

You will be given advice throughout this booklet for areas of the course you are expected to know about in advance of starting the AS-level. These areas will be directly taken from the Edexcel Certificate in Biology and will be relevant to AS-level biology. You may have covered a different exam board e.g. AQA or OCR, and this is not a problem. You will need to read through the information provided below and decide what additional work you need to complete.

During the first 2 weeks of term you will be expected to sit a GCSE level biology paper made of suitable questions that are relevant to AS-level Biology. You will be given the dates of the test in your first biology lesson. In addition, you will also be asked to sit a maths paper. You are not expected to do any preparation for the maths paper, we will just be checking your GCSE mathematical skills relevant to AS-level biology. Both these papers are designed to help us identify where you might need more support over the year.
Get Organised
As soon as the term starts in September things start to get busy. Get organised before the start of term. You will need to make sure you bring the following equipment with you:

- Writing pens (black)
- Green pen for marking work (a biro is best)
- Calculator (with its instructions if you don’t know how to use it properly)
- Ruler
- Pencils (ideally HB pencils)
- Pencil sharpener
- A4 ring binder (folder)
- File dividers (so you can organise your file)
- Lined paper
- Lab book (this is optional. We will provide you with a paper back lab book but many pupils prefer to have their own hardback books which they purchase themselves. If you buy your own lab book the pages have to be permanently bound so you cannot remove them).

Information for pupils new to The Crypt
You should start by working out which specification you completed at GCSE. If you completed the iGCSE (either Cambridge, AQA or Edexcel) or Certificate in Biology then you will have covered all the required knowledge and you will just need to keep this knowledge up to date over the summer (see the next section).

If you completed a different specification (such as OCR Gateway or AQA) then there may be gaps in your knowledge in comparison to other pupils. You will need to read through the specification in more detail. If you identify any gaps then you will need to work at learning these areas of the course and we have given you some ideas below for how to do this.

If, after looking at the specification section, you are still unsure then have a go at the practice paper under exam conditions and mark it. You need to be aiming for a minimum of a B grade in the practice paper (60%). If you get less than this you need to do more work to improve.

You must provide evidence of any work you have completed over the summer. You will need to put this in your AS-level biology folder and bring this to your biology lessons. Remember that that the material you learn now will help you improve your understanding of AS-Level. In addition you must have completed the practice exam paper.

Information for Pupils who have completed iGCSE (Cambridge or Edexcel) or Certificate in Biology (Edexcel)
This category includes all pupils who attend The Crypt in year 11. You are expected to stay up to date with your biological knowledge over the summer holidays. You are also expected to complete 1 practice exam paper (details below) and place this in your AS Biology folder and bring this to your lessons as evidence.
### Relevant links to the GCSE Specification


We have removed some sections of the specification that do not come up in the AS-level course. This is so you can focus on the areas that will come up in AS-level. Obviously, if you wish to extend your knowledge further into the areas not covered below then this is fine, many of the areas we have removed will be important in A2-level biology.

We expect you to have an understanding of the following specification points:

#### Characteristics of living organisms
1.1 Understand that living organisms share the following characteristics: They require nutrition, they respire, they excrete their waste, they respond to their surroundings, they move, they control their internal conditions, they reproduce and they grow and develop.

#### Variety of living organisms
1.2 Describe the common features shared by organisms within the following main groups: plants, animals, fungi, bacteria, protists, and viruses, and for each group describe examples and their features as follows (details of life cycle and economic importance are not required).

#### Levels of organisation
2.1 Describe the levels of organisation within organisms: organelles, cells, tissues, organs and systems.

#### Cell structure
2.2 Describe cell structures, including the nucleus, cytoplasm, cell membrane, cell wall, chloroplast, and vacuole.
2.3 Describe the functions of the nucleus, cytoplasm, cell membrane, cell wall, chloroplast, and vacuole.
2.4 Compare the structures of plant and animal cells.

#### Biological molecules
2.5 Identify the chemical elements present in carbohydrates, proteins, and lipids (fats and oils).
2.6 Describe the structure of carbohydrates, proteins, and lipids as large molecules made up from smaller basic units: starch and glycogen from simple sugar; protein from amino acids; lipid from fatty acids and glycerol.
2.7 Describe the tests for glucose and starch.
2.8 Understand the role of enzymes as biological catalysts in metabolic reactions.
2.9 Understand how the functioning of enzymes can be affected by changes in temperature, including changes due to change in active site.
2.10 Understand how the functioning of enzymes can be affected by changes in active site caused by changes in pH.
2.11 Describe experiments to investigate how enzyme activity can be affected by changes in temperature.

#### Movement of substances into and out of cells
2.12 Understand definitions of diffusion, osmosis, and active transport.
2.13 Understand that movement of substances into and out of cells can be by diffusion, osmosis, and active transport.
2.14 Understand the importance in plants of turgid cells as a means of support.
2.15 understand the factors that affect the rate of movement of substances into and out of cells, to include the effects of surface area to volume ratio, temperature and concentration gradient.

2.16 describe experiments to investigate diffusion and osmosis using living and non-living systems.

**Nutrition in Flowering Plants**

2.17 describe the process of photosynthesis and understand its importance in the conversion of light energy to chemical energy.

2.18 write the word equation and the balanced chemical symbol equation for photosynthesis.

2.19 understand how varying carbon dioxide concentration, light intensity and temperature affect the rate of photosynthesis.

2.20 describe the structure of the leaf and explain how it is adapted for photosynthesis.

2.21 understand that plants require mineral ions for growth and that magnesium ions are needed for chlorophyll and nitrate ions are needed for amino acids.

2.22 describe experiments to investigate photosynthesis, showing the evolution of oxygen from a water plant, the production of starch and the requirements of light, carbon dioxide and chlorophyll.

**Nutrition in Humans**

2.23 understand that a balanced diet should include appropriate proportions of carbohydrate, protein, lipid, vitamins, minerals, water and dietary fibre.

2.24 identify sources and describe functions of carbohydrate, protein, lipid (fats and oils), vitamins A, C and D, and the mineral ions calcium and iron, water and dietary fibre as components of the diet.

2.25 understand that energy requirements vary with activity levels, age and pregnancy.

2.29 understand the role of digestive enzymes, to include the digestion of starch to glucose by amylase and maltase, the digestion of proteins to amino acids by proteases and the digestion of lipids to fatty acids and glycerol by lipases.

2.30 understand that bile is produced by the liver and stored in the gall bladder, and understand the role of bile in neutralising stomach acid and emulsifying lipids.

**Respiration**

2.33 understand that the process of respiration releases energy in living organisms.

2.34 describe the differences between aerobic and anaerobic respiration.

2.35 write the word equation and the balanced chemical symbol equation for aerobic respiration in living organisms.

2.36 write the word equation for anaerobic respiration in plants and in animals.

2.37 describe experiments to investigate the evolution of carbon dioxide and heat from respiring seeds or other suitable living organisms.

**Gas exchange in Flowering Plants**

2.38 understand the role of diffusion in gas exchange.

2.39 understand gas exchange (of carbon dioxide and oxygen) in relation to respiration and photosynthesis.

2.40 understand that respiration continues during the day and night, but that the net exchange of carbon dioxide and oxygen depends on the intensity of light.

2.41 explain how the structure of the leaf is adapted for gas exchange.

2.42 describe the role of stomata in gas exchange.

**Gas exchange in Humans**

2.44 describe the structure of the thorax, including the ribs, intercostal muscles, diaphragm, trachea, bronchi, bronchioles, alveoli and pleural membranes.

2.45 understand the role of the intercostal muscles and the diaphragm in ventilation.

2.46 explain how alveoli are adapted for gas exchange by diffusion between air in the lungs and blood in capillaries.

2.47 understand the biological consequences of smoking in relation to the lungs and the circulatory system, including coronary heart disease.

2.48 describe experiments to investigate the effect of exercise on breathing in humans.

**Transport**
2.49 understand why simple, unicellular organisms can rely on diffusion for movement of substances in and out of the cell
2.50 understand the need for a transport system in multicellular organisms

**Transport in flowering plants**
2.51 describe the role of phloem in transporting sucrose and amino acids between the leaves and other parts of the plant
2.52 describe the role of xylem in transporting water and mineral salts from the roots to other parts of the plant
2.53 explain how water is absorbed by root hair cells
2.54 understand that transpiration is the evaporation of water from the surface of a plant
2.55 explain how the rate of transpiration is affected by changes in humidity, wind speed, temperature and light intensity
2.56 describe experiments to investigate the role of environmental factors in determining the rate of transpiration from a leafy shoot

**Transport in humans**
2.57 describe the composition of the blood: red blood cells, white blood cells, platelets and plasma
2.58 understand the role of plasma in the transport of carbon dioxide, digested food, urea, hormones and heat energy
2.59 explain how adaptations of red blood cells, including shape, structure and the presence of haemoglobin, make them suitable for the transport of oxygen
2.60 describe how the immune system responds to disease using white blood cells, illustrated by phagocytes ingesting pathogens and lymphocytes releasing antibodies specific to the pathogen
2.61 understand that vaccination results in the manufacture of memory cells, which enable future antibody production to the pathogen to occur sooner, faster and in greater quantity
2.63 describe the structure of the heart and how it functions
2.65 describe the structure of arteries, veins and capillaries and understand their roles
2.66 understand the general structure of the circulation system to include the blood vessels to and from the heart, the lungs, the liver and the kidneys.

**Inheritance**
3.13 understand that the nucleus of a cell contains chromosomes on which genes are located
3.14 understand that a gene is a section of a molecule of DNA and that a gene codes for a specific protein
3.15 describe a DNA molecule as two strands coiled to form a double helix, the strands being linked by a series of paired bases: adenine (A) with thymine (T), and cytosine (C) with guanine (G)
3.16 understand that genes exist in alternative forms called alleles which give rise to differences in inherited characteristics
3.23 understand that division of a diploid cell by mitosis produces two cells which contain identical sets of chromosomes
3.24 understand that mitosis occurs during growth, repair, cloning and asexual reproduction
3.25 understand that division of a cell by meiosis produces four cells, each with half the number of chromosomes, and that this results in the formation of genetically different haploid gametes
3.26 understand that random fertilisation produces genetic variation of offspring
3.27 know that in human cells the diploid number of chromosomes is 46 and the haploid number is 23
3.28 understand that variation within a species can be genetic, environmental, or a combination of both
3.29 understand that mutation is a rare, random change in genetic material that can be inherited
3.30 describe the process of evolution by means of natural selection
3.31 understand that many mutations are harmful but some are neutral and a few are beneficial
3.32 understand that resistance to antibiotics can increase in bacterial populations, and appreciate how such an increase can lead to infections being difficult to control

**The organism in the environment**
4.1 understand the terms population, community, habitat and ecosystem
4.2 explain how quadrats can be used to estimate the population size of an organism in two different areas.
4.3 explain how quadrats can be used to sample the distribution of organisms in their habitats.

**Food production**
5.5 understand the role of yeast in the production of beer
5.6 describe a simple experiment to investigate carbon dioxide production by yeast, in different conditions
5.7 understand the role of bacteria (*Lactobacillus*) in the production of yoghurt

**Selective breeding**
5.10 understand that plants with desired characteristics can be developed by selective breeding
5.11 understand that animals with desired characteristics can be developed by selective breeding.

**Ideas for work to do**

**Get yourself a book**

You may find it useful to get a GCSE level text book or revision guide to help you. Here are some suggested books you might find useful:

- Edexcel IGCSE Biology (Student Book) (June 2009) (this book costs ~£20 new, but you can buy them used for much less)
- Edexcel IGCSE Biology Revision Guide by Ann Fullick (cost £9)
- Edexcel Certificate/IGCSE Biology Revision Guide by CGP books (£5.99)
- Head start to AS Level Biology by Richard Parsons (This book usually costs around £4-5)

Other iGCSE biology revision books for other exam boards would also be a suitable resource.

**Download an App**

There are a number of Apps available to help you revise. For example, CGP offer one at a very reasonable price.

**Write notes**

Work your way through the specification outlined above and write summary notes about each section on the specification. Make sure you understand what you are writing. Don’t just copy from the text book, try to convert it into your own words so you are actively trying to learn each topic.

**Revise the topics**

Make your revision an active process. If you just read your notes through this will probably not be enough for you to remember all the details. Try some of the following tactics until you find a system that works for you:

- Draw a mind map or concept map. This is similar to a spider diagram joining all ideas about a particular topic together. Include key words you must know.
• Read through the text then go away and do something else. After a short period of time return to your desk and see how much you can remember by writing everything down. Then compare to your original notes. Keep doing this until you can remember virtually all of the information.
• Write yourself some test questions with model answers. You could do this on cards with the question on one side and the answer on the other. Get a friend or family member to test you.
• Download some more practice exam questions. The exam board also provides the mark scheme so you can mark your own papers.

Techniques for answering exam questions

1. Check how many marks the question is worth. If it is worth 2 marks you have to make two separate points to get both marks.

2. On any questions that ask you to describe the graph you should start by referring to the x-axis (which will be the independent variable) and say how this changes the variable on the y-axis. If there is a change in the trend of the line then you will need to refer to this. Finally, to get high marks on graph questions you should give figures (with units) from the graph.

Example answer: In the first 10 minutes (this tells you the independent variable is time) the rate of the reaction (the dependent variable) increases to [insert figure and unit here]. The rate of reaction then starts to slow down from 11 minutes onwards until it reaches [insert figure and unit here]. By 20 minutes the reaction has completely stopped.

3. If you are asked to explain a graph you need to use your scientific knowledge, i.e you will need to use scientific key words in your answer. The examiner is expecting you to tell them why something is happening.

4. If you are given an Evaluate question you need to work out advantages and disadvantages of the topic being asked by the examiner. You also need to give a conclusion. Your conclusion can’t just say ‘I think this is a good/bad idea’. You need to write a one sentence conclusion which summarises your perspective e.g. ‘This is a good idea because the advantage of … far outweighs the disadvantage of …’.

5. Avoid using words like ‘it’. Say what ‘it’ is. If the examiner is unsure what you are referring to they will automatically mark it wrong.

6. Don’t panic if you see a question you don’t believe you have learned. Sometimes examiners throw these kinds of questions in and expect you to be able to apply your knowledge. Usually this kind of question will start with ‘Suggest…’. Read the question very carefully and highlight the key words. Ask yourself: what part of this course is this likely to link to. Then try to answer the question.
Practice Exam Paper and Mark Scheme
For pupils from The Crypt (OR if you sat any iGCSE course) – you need to complete all of the June 2013 1BR paper. Once completed you need to mark the paper (please use a green pen). Convert your mark to a % and then work out your grade (see below)

For all other pupils please use the same paper, but you will only need to do questions 1, 2, 4, 5, 7, 8, 13, 15 as these are the ones most relevant to the AS-level biology course. Again, you should mark your paper and then convert your mark to a % and check your grade from those given below.

Grade boundaries as a % out of 120 (A* - 67%, A – 62%, B – 52%, C – 43%, D – 37%)

Need more help?
If you would like more help and don’t know where to turn then please email us (sglock@crypt.gloucs.sch.uk). We cannot guarantee an immediate response during the school holidays but will get back to you relatively quickly with any help we can give.