

THE PRIORY ACADEMY

**LSST**

**Purpose**

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# A Level **Biology**

At The Priory Academy LSST

Induction Booklet: helping you  
transition from GCSE to A level



## The Purpose of This Booklet

The transition from GCSE to A level is exciting, but it can be challenging too. This booklet is designed to support you with this transition; ensuring that you have all the necessary information about the A level Biology course and how you can prepare over the summer.



# Welcome to Biology

From studying tiny microbes to saving threatened ecosystems, developing therapies for diseases to feeding our ever growing population, Biology is a science that connects us to every aspect of life and the challenges we face in a world that is changing very quickly. It is the study of life, and what is more important than that?

Biology is a hugely broad topic so you are bound to find an area of interest; genetics, ecology, human biology, biochemistry, botany, evolution and more. It is also a subject that will equip you with an abundance of highly transferable skills; research, data analysis, team work, maths, problem solving and communication to name just a few. These are all skills that are highly regarded by universities and employers, even if you don't decide to take Biology any further than A level (although we hope you will!)










In this booklet we will explore a few of the degree and career options that studying Biology opens you up to as well as outlining the course and assessment structure. You will also have the opportunity to refresh your knowledge and skills in some of the key areas of Biology, just to give you a little head start before beginning the course in September.

We recommend you keep this somewhere safe, as you may need to refer to the information in it throughout your studies.



## Beyond A Level

Here are some of the courses that our students have gone on to do:

 <b>Biology</b>	 <b>Sport Science</b>	 <b>Nursing</b>
 <b>Pharmacology</b>	 <b>Medicine</b>	 <b>Pathology</b>
 <b>Ecology</b>	 <b>Biochemistry</b>	 <b>Neuroscience</b>

## Possible Careers



### Medical

Doctor  
Nurse  
Midwife  
Physio  
Radiographer  
Pharmacist



### Health

Food Scientist  
Pathology  
Clinical Scientist



### Education

Teacher  
Lecturer



### Animal/Environment

Vet  
Agriculture Research  
Conservation Officer  
Soil/Water Scientist

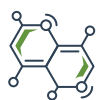


### Other

Science Journalist  
Government Agency  
Researcher  
Bio Tech



## Year 12



### **Topic 1: Biological Molecules**

A look at the chemicals of life: the molecules and ions that are fundamental to the structure and function of life



### **Topic 2: Cells, Viruses and Reproduction of Living Things**

Explores the detailed structure of cells and viruses, before looking at types of cell division and how these contribute to reproduction in both animals and plants



### **Topic 3: Classification and Biodiversity**

Studies the techniques and models used to classify organisms and looks into the principles of Natural Selection and Evolution



### **Topic 4: Exchange and Transport**

A look at how key nutrients are transported into and around a range of different organisms

## Year 13



### **Topic 5: Energy for Biological Processes**

Explores the stages of respiration and photosynthesis in detail



### **Topic 6: Microbiology**

Investigates microorganisms, how they act as pathogens to cause disease and how the human immune system responds to them



### **Topic 7: Modern Genetics**

Explores how organisms express genes and the techniques scientists are using and developing to manipulate this



### **Topic 8: Origins of Genetic Variation**

A look at the inheritance of genes and alleles and how allele frequencies change within populations



### **Topic 9: Control Systems**

Studies chemical and nervous coordination in both plants and animals; you will discover detail on hormones, homeostasis, the kidney and the human brain and nervous system



### **Topic 10: Ecosystems**

Considers the interactions between organisms and their environment and how different factors, including humans, affect them



# Exam Outline



## Paper 1



30% Weighting



90 Marks



1 hour 45 mins

All AS Level Topics

Energy for Biological Processes  
Microbiology and Pathogens  
Modern Genetics



## Paper 2



30% Weighting



90 Marks



1 hour 45 mins

All AS Level Topics

Origins of Genetic Variation  
Control Systems  
Ecosystems



## Paper 3



40% Weighting



120 Marks



2 hours 30 mins

General paper assessing all  
topics across AS and A Level

Experimental methods (including  
questions on core practicals)



## Practical Assessment

There are 16 Core Practicals that cover 12 techniques required for the practical competency measure.

Knowledge of all core practicals can be tested within exam papers.



### Mathematical skills make up 10% of the assessment at AS Level and A Level

This will include things like basic calculations e.g. percentages and calculating magnification, converting units, interpreting data, drawing and interpreting graphs and use of statistical tests (we will guide you through these, don't worry!)



You will also sit tests at the end of each topic and your end of year assessments as usual.



## Preparing Over Summer

### Equipment

- Pens (different colours)
- Pencils
- Sharpener
- Ruler
- Rubber
- Calculator
- Paper/Notepad
- Folder
- Folder Dividers

*no exercise books anymore!*

You will be provided with a text book from the library, issued on the first day of term.

You might also find revision guides and revision cards useful (but please ensure you buy the right revision guide!)

# Resources

To really succeed at A level we recommend you doing wider research around the subject. Doing this will consolidate your understanding, broaden your knowledge of current science and help you to see how the concepts you are studying link to science in the real world.

Wider research does not just have to mean reading (although it can)! Below are a range of resources you can use. Try and have a look at, or listen to, a few over the summer and throughout your course.

### YouTube

Crash Course  
Amoeba Sisters  
Ted Ed Biology  
TED Talks

### Magazines

New Scientist  
The Biologist

### Podcasts

60 Second Science  
Nature Podcast  
Words About Biology  
Science Versus  
Curiosity  
Medical Stuff  
The Science Hour

### TV Shows



Anything by David Attenborough, especially his more recent conservation documentaries



## Activities

The activities below all underpin parts of the A level course. Complete them to refresh your knowledge and understanding of key biological concepts before starting in September.

### Activity 1: Data Analysis

In this activity you will practice analysing data in detail.

At A level you will be expected to do more than just describe basic trends in data, you will need to look at it much more thoroughly and even do some mathematical calculations to help you identify trends and provide evidence for the points you are making.

Below is a table showing data about the effect of increasing temperature on enzyme activity. Answer the questions to analyse the data in detail.

Temperature °C	Product Formed (mg)
20	25.3
30	32.1
40	37.5
50	30.8
60	22.1
70	0

Remember the analysis techniques used here, you will need to use them during the course.

Percentage Increase:

$$\frac{\text{Change}}{\text{Original}} \times 100$$

1. Write a sentence to summarise the trend shown in the table.
2. What is the optimum temperature for this enzyme?
3.
  - a. Between which temperatures is the increase in enzyme activity most rapid?
  - b. Calculate the increase in product formed between these temperatures.
4.
  - a. Between which temperatures is the increase in enzyme activity slowest?
  - b. Calculate the increase in product formed between these temperatures.
5. Calculate the % increase in the product formed between 20°C and 30°C.
6. Calculate the % decrease in the product formed between 30°C and 40°C.
7. If all conditions are at their optimum the amount of product that can be formed at 40°C is 44.2mg. Calculate 37.5mg as a percentage of this.



## Activity 2: Cell Structure and Function

Complete the table to recap cell structure and function.

Structure	Function
Cell-Surface Membrane	
Chloroplast	
Cell Vacuole	
Mitochondria	
Nucleus	
Cell Wall	
Ribosomes	
Golgi Apparatus	

Draw the structure of a plant cell and an animal cell.

On each cell, add labels showing each of the structures in the table, if they exist.

A large empty rectangular box provided for drawing a plant cell and an animal cell. The box is intended for students to illustrate the structures listed in the table above, labeling them as they appear in the cells.



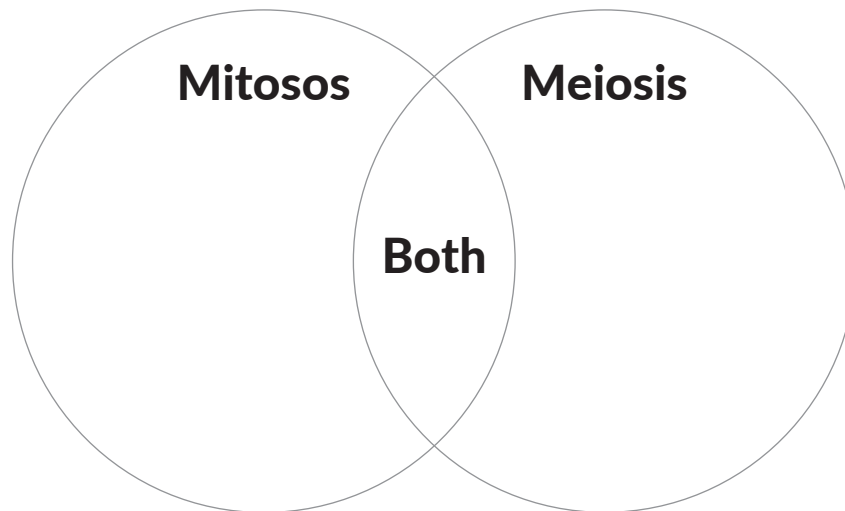




## Activity 4: Mitosis and Meiosis

Complete the Venn diagram to recap and compare mitosis and meiosis.

Some key words and phrases are provided but add more if you can!



Asexual Reproduction

Sexual Reproduction

One Division

2 Daughter Cells

e.g. Sperm Cells

e.g. Skin Cells

Production of Sex Cells

Parent Cell is Diploid

Human Reproduction

Daughter Cells are Haploid

Two Divisions

Involves Chromosomes

Growth and Repair

Somatic Cells Only

Bacterial Reproduction

Daughter Cells are Diploid

4 Daughter Cells

Both Plants and Animals

DNA is Replicated

### Extension activity 1:

Cells in different parts of the body undergo mitosis at different rates. Find out some examples of cells that reproduce quickly and examples of cells that reproduce slowly. For each of your examples explain why they reproduce quickly/slowly.

### Extension activity 2:

Both mitosis and meiosis occur in stages, called 'phases'. Find out the names of these phases and write one sentence to summarise what happens in each phase.



## Activity 5: Exchange and Transport

Complete the following re-cap questions:

1. Define diffusion.
2. Name and explain three factors that affect the rate of diffusion.
3. Define osmosis.
4. Explain why osmosis cannot occur in solids.
5. Explain how diffusion and osmosis are different to active transport?
6. Most plants close their stomata at night. Explain why.
7. State the correct name for a red blood cell.
8. Name the main artery carrying blood from the left ventricle.
9. Explain why veins need valves but arteries do not.

Match the examples to the correct transport mechanism:

Osmosis

Diffusion

Active Transport

Oxygen moving into the bloodstream from the lungs

Root hair cells in plants taking up Mg ions from soil that contains a low concentration of ions

Root hair cells in plants taking up water from the soil

Root hair cells taking up potassium ions from freshly fertilised soil

Salt kills slugs

Absorbing nutrients from the small intestine into the bloodstream

Potato pieces get heavier when put in pure water

Potato pieces get lighter when put in very salty water

It is dangerous to drink sea water because of this process

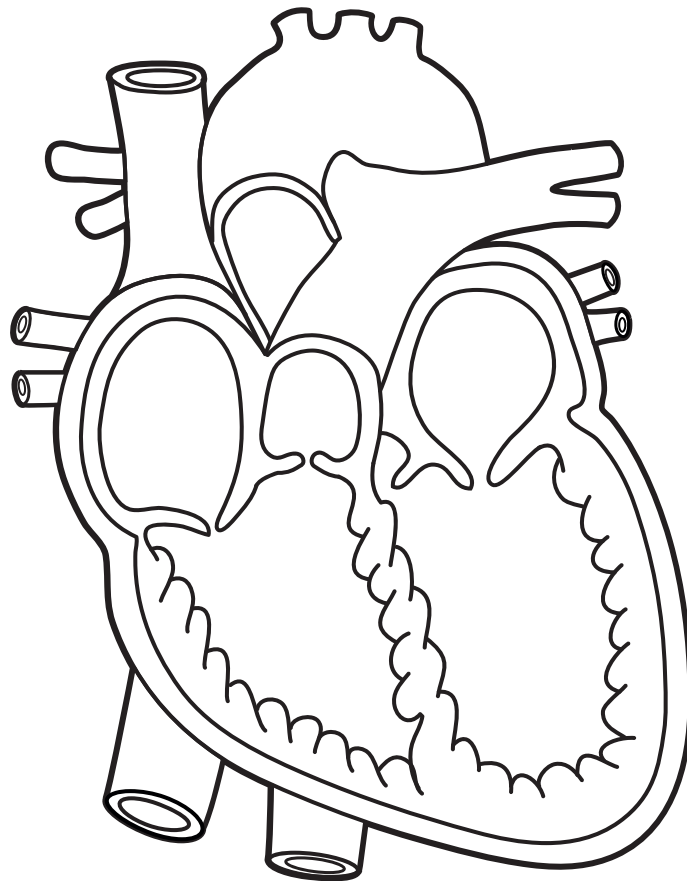
Carbon dioxide leaves the body



## Activity 5: Exchange and Transport

Label the structures of the heart.

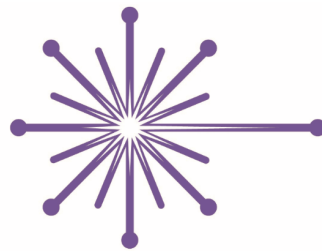
Draw arrows to show the journey of blood around the heart.



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