

A Level **Biology**

at The Priory Academy LSST

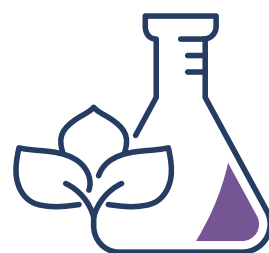
Introduction Booklet: helping you
transition from GCSE to A Level



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 Biology students have gone on to do:

Biology



Sport Science



Nursing



Pharmacology



Medicine



Pathology



Ecology



Biochemistry



Neuroscience



Possible Careers



Medical

Doctor
Nurse
Midwife
Physio
Radiographer
Pharmacist



Health

Food Scientist
Pathologist
Clinical Scientist



Education

Teacher
Lecturer



Animal/Environment

Vet
Agricultural Researcher
Conservation Officer
Soil/Water Scientist



Other

Science Journalist
Government Agency
Researcher
Bio Tech



Biology at LSST: Course Outline

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

Explores the detailed structure of cells before looking at transport mechanisms, cell division and cell recognition in the immune system



Topic 3: Exchange & Transport

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



Topic 4: Genetic Information, Variation & Relationships

Studies DNA and how genetic variation arises and its role in natural selection, taxonomy and biodiversity

Year 13



Topic 5: Energy Transfers In and Between Organisms

Explores the stages of respiration and photosynthesis in detail and their importance to ecosystems



Topic 6: Responding to Change

Studies nervous coordination in both plants and animals; you will discover detail on homeostasis, the kidney, heart and muscle coordination and the nervous system



Topic 7: Inheritance

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



Topic 8: Control of Gene Expression

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



Exam Outline



Paper 1



Weighting: 35%



91 Marks



2 Hours

What's Assessed?

Topics 1 to 4 and relevant practical skills



Paper 2



Weighting: 35%



91 Marks



2 Hours

What's Assessed?

Topics 5 to 8 and relevant practical skills



Paper 3



Weighting: 30%



78 Marks



2 Hours

What's Assessed?

Topics 1 to 8 and relevant practical skills and essay question



Practical Assessment

There are 12 core practicals that cover a range of 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



Preparing Over Summer

☐ Pens (Different Colours)

☐ Pencils

☐ Sharpener

☐ Ruler

☐ Rubber

☐ Calculator

☐ Paper/Notepad

☐ Folder

☐ Folder Dividers

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

Podcasts

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

Magazines

New Scientist
The Biologist

TV Shows

Anything by Sir
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:

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

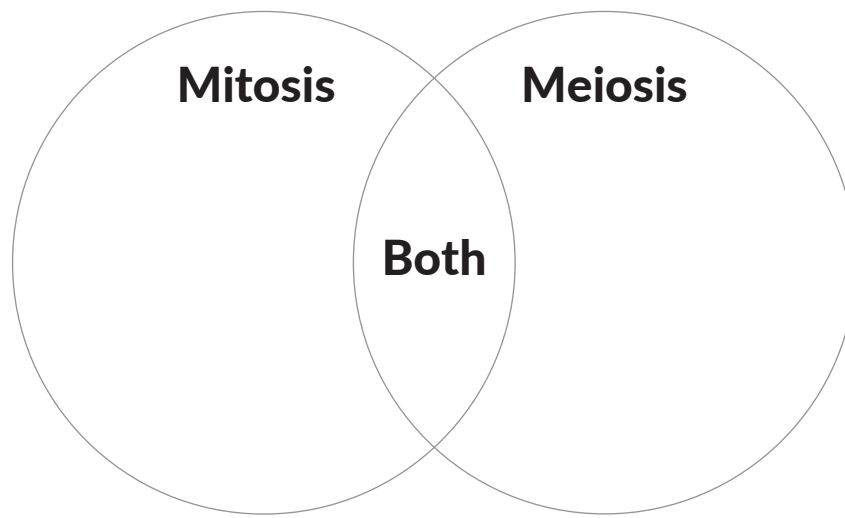
1. Write a sentence to summarise the trend shown in the table.
2. What is the optimum temperature for this enzyme?
3.
 - a. Between which temperatures is the increase in enzyme activity most rapid?
 - b. Calculate the increase in product formed between these temperatures.
4.
 - a. Between which temperatures 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 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 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.



Activity 3: Viruses

Viruses are obviously a hot topic at the moment so now is your chance to find out more about the biology of them.

Use the internet to complete some research on viruses. Write 10 simple bullet points to summarise your findings – you might choose to research viruses in general or focus on one particular virus - the more interesting the better!

What is a virus? What are they made of? How do they infect us? How does our body respond to viruses? How do we treat them? What are some of the most common viruses? What are some of the most dangerous viruses?

- [illegible]



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.

