Biology

for the IB Diploma Exam Preparation Guide

First edition

Brenda Walpole

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- assist students in approaching complex questions, applying critical-thinking skills and forming reasoned answers.





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INTRODUCTION

This book is to help you as you prepare for your final IB exams in either Standard or Higher Level Biology. It contains all the information that is covered in your syllabus in a clear and concise way. It will help you revise the key points and also help you to prepare for writing answers in the exams. All the Options are included but you should only revise the one you have been taught and will need for your exam.

At the start of each topic you will find a list of what it contains and the key information to revise. You can use this to check off each topic as you work through it. Each revision point is presented in the form of a question in the chapters. You might like to try to answer the question before and after reading the information so you can monitor how much you have understood and remembered.

Also, look out for diagrams which you may be asked to draw or label – these are clearly marked. Finally, don't forget to check your practical notes or text book to make sure you are confident about the experiments you have carried out during your studies.

Good luck!

General tips for revision

- Make sure you take lots of breaks when revising and be aware of yourself stop if you are not taking anything in, do something else for a little while and then come back to your revision.
- Practise questions as well as learning material. There are some types of questions that come up regularly learn the methods for doing these.
- Try to understand the topics the more you can understand, the less you will have to learn by rote.
- You will not be allowed a calculator for Paper 1 (the multiple choice paper), so when you do past papers do them under timed conditions without a calculator.
- Do not learn mark schemes use them as a guide to the type of answers required. You are unlikely to get an identical question to one in a past paper.

General tips for examinations

- Get a good night's sleep so that you are fresh for the exams!
- Be aware of time. Use the number of marks for each question as a guide to plan how long you should spend on each question. Always use the time you are given to read the questions carefully before you answer. Don't rush and remember that marks are not deducted for wrong answers so it's always worth trying to answer, even if you are not absolutely sure you're correct.
- Be aware of the number of marks for each question if there are 3 marks available for a particular question then you should make sure that you make at least three points in your answer.
- Think carefully about your answers and try to make them concise and clear as possible you do not have to write in complete sentences.

In your exam you will have three papers summarised in the table below.

Paper	% of mark	Standard Level	Higher Level	Type of questions
1	SL and HL 20	45 mins	1 hour	Multiple choice questions: 30 for SL and 40 for HL
2	SL 40 HL 36	1 hour 15 mins	2 hours 15 mins	Section A: Short answer questions. Section B: Longer response questions. One out of two for SL and two out of three for HL
3	SL 20 HL 24	1 hour	1 hour 15 mins	Section A: Short-answer questions based on experimental work. Section B: Questions from one of the options that you have studied.

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HOW TO USE THIS BOOK: A GUIDED TOUR

Introduction – sets the scene of each chapter, helps with navigation through the book and gives a reminder of what's important about each topic.

CELL BIOLOGY

This chapter covers the following topics:

- $\hfill\Box$ The cell theory and cell size
- ☐ Membrane structure
- ☐ Origin of cells

- ☐ Ultrastructure of cells
- ☐ Membrane transport ☐ Cell division

Definitions – clear and straightforward explanations of the most important words in each topic.

DEFINITIONS

DIFFUSION is the passive movement of molecules such as oxygen, carbon dioxide or glucose down a concentration gradient.

FACILITATED DIFFUSION is a special case of diffusion across a membrane through specific protein channels.

OSMOSIS is the passive diffusion of water molecules from a region of higher concentration of water molecules to a region of lower concentration of water molecules.

ACTIVE TRANSPORT is the movement of substances against a concentration gradient. This process requires energy in the form of ATP.

Model answer – an example of an answer that would score full marks to show you exactly what an examiner wants to see.

🖒 Model answer 6.1

Explain how the function of arteries, capillaries and veins is related to their structure. [8]

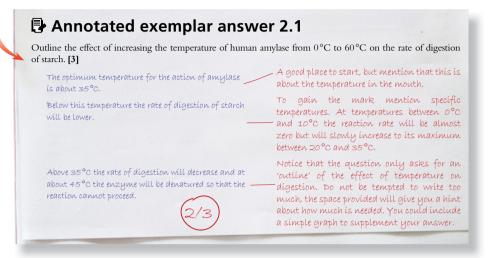
Arteries carry blood under high pressure, so their structure must withstand this pressure; they have thick muscular walls; elastic fibres that can recoil when blood has passed through them; and smooth lining to reduce friction.

Capillaries receive low-pressure blood; their function is to allow useful substances to pass from the blood into cells; structures that allow this are their very thin walls (one cell), so diffusion is easy, fenestrations or spaces which allow substances through, small diameter and large surface area that allow them to penetrate tissues and reach every cell.

Veins receive blood under low pressure from the capillaries; their role is to return it to the heart; walls are thin as there is no pressure to withstand; they contain valves so that blood does not flow backwards.

How to use this book: a guided tour

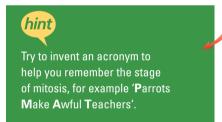
Annotated exemplar answer – a question with a sample answer plus examiners' comments about what was good and what could be improved. An excellent way to see how to snap up extra marks.



■ Worked example 1.1

Stage	Number of cells
interphase	530
prophase	19
metaphase	24
anaphase	8
telophase	18

To calculate the number of cells in mitosis: 19 + 24 + 8 + 18 = 69Total number of cells in the sample: 69 + 530 = 599Mitotic index for this sample: $\frac{69}{500} = 0.12$ Worked examples – a step by step approach to answering exam-style questions, guiding you through from start to finish.



Hints – quick suggestions to remind you about key facts and highlight important points.

Test yourself questions – check your own knowledge and see how well you're getting on by answering questions.



What are the three key parts of the cell theory?

Nature of Science – these discuss particular concepts or discoveries from the points of view of one or more aspects of Nature of Science.



Nature of Science. Chemiosmosis theory was proposed by Peter Mitchell in 1961, but it took many years to be accepted because it was a radical departure from the accepted theory of the time. The chemiosmotic theory produced a paradigm shift in biochemistry.

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