

Introduction

Welcome to your IGCSE Biology course. This introduction will serve as a guide to what you can expect from the course, and it will show you how to plan your study of this course effectively. Take your time to read this Introduction thoroughly before you start the lessons.

The course is designed to prepare students for examination in the **Edexcel IGCSE Biology specification (syllabus) (4BIO)**.

The Arrangement of Lessons

The lessons are planned so that all the material and preparation required for the final examination papers is in the following five course modules:

- Module 1: Cells and Organisms
- Module 2: Plant and Animal Physiology A
- Module 3: Plant and Animal Physiology B
- Module 4: Inheritance
- Module 5: Ecology and Food Production

It is advisable that you do the modules in order, as the content has been written to enable you to develop your knowledge and skills as you progress through the lessons.

The Course

The course is designed to develop (1) a broad understanding of biological facts, concepts and principles (2) skills in biological investigation and (3) an ability to evaluate the benefits and drawbacks of modern scientific developments.

In combination with other suitable IGCSE entry subjects the course is an ideal preparation for those who wish to go on to study Biology, or other biological subjects, at AS and A2 level.

The course is designed to be accessible to students who may have only a limited previous background in science. If you have some background in Biology then you should find that some of the lessons build upon things that you have met before in your earlier studies.

The practical work described at various places in this course is to help to develop your skills for the practical-based components of the theory exams. You should try to carry out this work yourself; if you can undertake some of it at home, or have the opportunity to perform supervised laboratory work in the course of your studies, this will be a great help. Three of the lessons are devoted to the development of practical skills, and there is a very useful Appendix at the back of the textbook (pages 247 - 254) to help you further.

NB. The exam will include written questions on practical-based study, so you should make sure that you have studied these lessons carefully and have carried out some of the experiments yourself.

Lesson Contents and Textbook References

Biology IGCSE		
Module 1: Cells and Organisms		
<i>Lesson</i>	<i>Title</i>	<i>Book Reference</i>
1	Cells, Organisms, and the Variety of Life	Chapter 1 pages 1–3, 12–13, and Chapter 2 pages 16–21
2	Movement of Substances into and out of Cells TMA A	Chapter 1 pages 9–11 and Chapter 11 pages 122–123, 123–126
3	Investigative Skills A: Design	Appendix A, pages 247, 252–254
4	Respiration and Enzymes TMA B	Chapter 1, pages 3–9.
5	Investigative Skills B: Carrying Out	Appendix A, pages 247–250

Module 2: Plant and Animal Physiology A		
<i>Lesson</i>	<i>Title</i>	<i>Book Reference</i>
6	Human Nutrition TMA C	Chapter 4 pages 37–51
7	Investigative Skills C: Interpreting	Appendix A, pages 249–251
8	Photosynthesis TMA D	Chapter 10 pages 109–20.
9	Transport in Plants and Animals	Chapter 5 pages 53–63 and Chapter 11 pages 127–133.
10	Gas Exchange in Plants and Animals TMA E	Chapter 3 pages 26–35 and Chapter 10 pages 114–115.

Module 3: Plant and Animal Physiology B		
<i>Lesson</i>	<i>Title</i>	<i>Book Reference</i>
11	Homeostasis and Excretion	Chapter 8 pages 83–94.
12	The Human Nervous System TMA F	Chapter 6 pages 65–76.
13	Hormones in Plants and Animals	Chapter 7 pages 78–82 and Chapter 12 pages 135–142.
14	Human Reproduction TMA G	Chapter 9 pages 96–105.
15	Reproduction in Plants	Chapter 13 pages 143–148.

Module 4: Inheritance		
<i>Lesson</i>	<i>Title</i>	<i>Book Reference</i>
16	Chromosomes, Genes and DNA TMA H	Chapter 16, pages 181–188
17	Cell Division	Chapter 17, pages 190–195
18	Genes and Inheritance TMA I	Chapter 18, pages 197–206.
19	Natural and Artificial Selection	Chapter 19 pages 208–217 and Chapter 20 pages 218–221
20	Genetic Engineering and Cloning TMA J	Chapter 20 pages 221–224 and Chapter 22 pages 235–244.

Module 5: Ecology and Food Production		
<i>Lesson</i>	<i>Title</i>	<i>Book Reference</i>
21	Ecosystems	Chapter 14 pages 152–162
22	Human Impact on the Environment TMA K	Chapter 15 pages 170–175.
23	Food Production TMA L : Mock Exam (1) TMA M: Mock Exam (2)	Chapter 15 pages 165–170 and Chapter 21 pages 228–233

Textbook

The textbook that is referred to throughout this course is:

Phil Bradfield and Steve Potter, *Edexcel IGCSE Biology* (2009, Pearson Education, ISBN: 978 0 435966 88 1)

You will need to use a copy of this textbook throughout the course; you can buy a copy through the Oxford Open Learning website. It is referred to in every lesson and provides excellent coverage of the material. By using the textbook and the course you will have very full coverage of all the material. The book has an accompanying CD-ROM which contains useful extra questions with answers.

You should not need other books throughout the course but you may like to look in other biology books from time to time. If you feel that you would like to use a revision guide before the examination you should ask your tutor which one they recommend.

Tiering and IGCSE Examination Entry

Science IGCSE examinations are not divided into different entry tiers.

Twig Resources

We hope that students of this course will also take the opportunity to learn from the wealth of Twig resources to which this course is linked. Twig have produced more than a thousand educational films, particularly for science, maths and geography and these complement the lesson materials here to enhance the learning experience.

To view the films, you will need an e-mail account, internet access and a password, supplied to you on enrolment. As you work through the lessons, you will come across Twig-links quite regularly, looking like this:

	<p>Log on to Twig and look at the film titled: Deforestation</p> <p>www.ool.co.uk/1257ud</p> <p>Discover how the destruction of the rainforest impacts ecosystems, and begins a cycle that contributes to global warming.</p>
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To reach the film, you would either type the URL into your web-browser (here www.ool.co.uk/1257ud) or search the Twig site (www.twig-world.co.uk) for 'Deforestation'. Having watched it, you return to the lesson.

Access to these resources is offered on the following terms:

1. OOL is not responsible for the content of the Twig films or for the technology which transmits them.
2. The films may not be accessible at certain times.
3. OOL cannot be responsible for any technical difficulties students may have in viewing the films and cannot advise on any software or hardware issues.
4. Access is limited in any case to the period until the student's expected exam date.

5. Students are responsible for remembering their own usernames and passwords. Please note: once assigned, a username *cannot* be changed. Passwords can be.
6. Passwords are supplied for the use of the named student only and should not be passed on to any third parties under any circumstances – because each password is unique it will be apparent if it is used on numerous machines.
7. The films are of greater or lesser relevance and it is probable that some parts of many of the films will be too “advanced” for your needs, include ideas you have not yet covered, or introduce information that is not required for the Edexcel specification.
8. If you find that a film is not helpful or interesting, stop watching it! It is possible to study the course successfully without watching *any* of the films. Remember that this is bonus material only, adding depth and context to the course, and this pack forms the spine of the learning material. But each film we have selected should make studying that little bit easier and more enjoyable.
9. Alongside each film, the Twig site offers various additional resources. You can download a transcript of the film, take a quiz or even an advanced quiz. These are optional extras if you have time and inclination.

Other Internet Resources

In most lessons of the course other internet sites are also given which have been carefully selected to provide additional activities. Some of these have been designated as “Extension” activities.

These internet sites are an important tool to help your understanding of your Biology course, and you should make every effort to view at least the ones not designated as Extension.

If you do not have an internet connection at home, consider building in regular trips to a library or internet café as part of your study schedule.

Please bear in mind that internet addresses change regularly so we cannot guarantee that all addresses listed in the course will remain current.

The Structure within each Lesson: How to Study

Front Page

The front page of each lesson shows:

- The title.
- **Aims** for the lesson. These set out the position that you should reach after working through the lesson; keep these in mind while reading the lesson material. Paper 2 examines all of these aims, but Paper 1 does not examine the aims picked out in **bold** print. Where possible, some Paper 2 material has been identified with an asterisk (*) in the lesson content. However, some Paper 2 material is integrated with Paper 1 material and cannot be separately identified and you should refer to the lesson aims in **bold** to identify all Paper 2 content.
- **Context**. This shows how the lesson relates to the Specification.
- **Reading**. The individual textbook references for each lesson. This is additional reading to accompany this course.

Lesson Notes

There then follow the notes; these are an outline of the subject material to be studied in the lesson. Read the notes carefully several times and carry out the activities until you feel that you have understood the broad outline of the theory involved, and then tackle the reading references.

The textbook may deal with the subjects in greater detail, and, as with the notes, you will probably need to read the passages several times. The textbook and accompanying CD-ROM also contain relevant questions, and at revision time you may want to return to these to further test your knowledge.

At the end of each lesson there is a list of new technical words whose meanings you should know. There is also a summary to which you can add your own comments.

Activities

Activities are placed in the notes at the relevant point. They are indicated as follows:

Activity 7	Find out your own breathing rate per minute. How does this compare to the results shown above.
	

The pencil symbol indicates that you should make your own notes in the space provided.

Self-Assessment Tests

Every lesson is concluded with either a Self-Assessment Question or a Tutor-Marked Assignment. Only tackle these when you feel that you have fully mastered the material in the lesson.

If it is a Self-Assessment Question, first try to check your answers by referring back to the lesson, and then compare your answers with those given right at the end of the lesson.

Tutor-Marked Assignments

After every two lessons there is a Tutor-Marked Assignment (TMA). These are in IGCSE examination style and will thoroughly check your understanding of the previous two lessons. You should send your answers to your tutor, who will return your marked script, together with a set of suggested answers.

Revision

Do **not** leave all your revision until the end of the course! You will need to revise thoroughly for your examination, but frequent revision throughout the course is **essential**. Plan your revision sensibly, and re-read as you feel necessary, if your knowledge is beginning to fade.

The last TMA in the course is a mock exam of two papers, following closely the format of the exam itself. You are recommended to study the online practice exam and mark scheme (see the section Past Papers below) before attempting this TMA and sending it to your tutor. It is also a good idea to restrict yourself to the time specified for the exam, so you have practice writing under time pressure.

Checking the Specification

As you know, this course has been written to cover the contents of the **Edexcel Specification 4BIO** which is available to download at

<http://www.edexcel.com/quals/igcse/int-gcse11/biology/Pages/default.aspx>

To see this you will need Adobe Acrobat reader on your computer which you can download freely at:

<http://get.adobe.com/uk/reader>

In the specification, you should look in particular at:

- The Qualification Content
- The Assessment Objectives

NB. Please make sure that you look at the current issue of the specification – the one that was for first examination in May/June 2013 (at the time of writing).

You should check the specification periodically throughout the course, so bookmark the Edexcel IGCSE Biology homepage.

The Edexcel International General Certificate of Secondary Education (IGCSE) in Biology is designed for use in schools and colleges. It is part of a suite of IGCSEs in Science offered by Edexcel. The course gives students the opportunity to experience biology within the context of their general education.

The Edexcel IGCSE in Biology enables students to:

- acquire knowledge and understanding of biological facts, concepts and principles;

- develop an appreciation of the significance of biological facts, concepts and principles and the skills needed for their use in new and changing situations;
- appreciate the importance of accurate experimental work to scientific method and reporting;
- form hypotheses and design experiments to test them;
- sustain and develop an enjoyment of, and interest in, the study of living organisms;
- evaluate, in terms of their biological knowledge and understanding, the benefits and drawbacks of scientific and technological developments, including those related to social, environmental and economic issues.

Key Features and Benefits of the Edexcel Specification

The IGCSE in Biology:

- includes aspects of science appropriate for the 21st century
- has straightforward linear assessment
- assesses investigative skills through examination.
- provides a sound foundation for progression to AS and A2 examinations in Biology or other biological disciplines

The Edexcel IGCSE Biology homepage can be accessed at:

<http://www.edexcel.com/quals/igcse/int-gcse11/biology/Pages/default.aspx>

There are no forbidden combinations, so you can do Biology *and* Human Biology.

The Examination

The examination you will sit consists of two papers. There is no separate practical exam and no practical coursework component; testing of practical skills is built into both of the theory papers. It is likely that you will need to give written answers to practical-based questions.

Biology Paper 1**Paper code: 4BI0/1B**

This is a two-hour examination paper. The total number of marks is 120, two thirds of the overall total. The paper examines all of the Specification content *except* those items printed in **bold**, and all of the assessment objectives.

Biology Paper 2**Paper code: 4BI0/2B**

This is a one-hour examination paper. The total number of marks is 60, one third of the overall total. This paper examines all of the Specification content, including those items printed in **bold (see also the Aims and Context sections of lessons)**, and all of the assessment objectives.

In both papers there will be a range of compulsory short-answer, structured questions, which are ramped to ensure accessibility for less-able students, as well as to stretch more-able students.

In both papers, students may be required to perform calculations, draw graphs and describe, explain and interpret biological phenomena. Some of the question content will be unfamiliar to students; these questions are designed to assess data-handling skills and the ability to apply biological principles to unfamiliar information. Questions targeted at grades A* – B will include questions designed to test knowledge, understanding and skills at a higher level, including some questions requiring longer prose answers.

The IGCSE qualification will be graded and certificated on an eight-grade scale from A* to G. Students whose level of achievement is below the minimum standard for Grade G will receive an unclassified U. Where unclassified is received it will not be recorded on the certificate.

You will find some sample assessment materials on the Edexcel website. These show you what to expect in your exam, so make sure you look at them and work through the sample questions. You can find this material at:

<http://www.edexcel.com/quals/igcse/int-igcse11/biology/Pages/default.aspx>

(Click on the link to 'Specification': this will also give you access to sample assessment materials for the latest Issue of the specification.)

If you do not have access to the Internet, it is possible to buy a paper copy from Edexcel. The contact details are:

Edexcel Publications
Adamsway
Mansfield
Notts NG18 4FN
Tel: 01623 467 467
Fax: 01623 450 481
Email: publication.orders@edexcel.com

Past Papers

At the time of writing, past exam papers for the previous issue of the specification are available for download from the Edexcel website at:

<http://www.edexcel.com/quals/igcse/int-gcse11/biology/Pages/default.aspx>

You can also use these as exam practice. You will find the past papers under the link 'Exam paper'. Do not send these to your tutor for marking.

A mock examination that is marked by your tutor is provided as part of this course.

Your Tutor

You have a lot of resources to help you in your studies; your course file, your textbook, internet resources and your tutor. You should make good use of your tutor to help you with any difficulties that you may have during the course especially at the start.

And finally... very good luck with your studies!

Philip West

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IGCSE

Biology

Module One: Cells and Organisms