MAKING USE OF BIOLOGY

for GCSE

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and
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M
MACMILLAN

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INTRODUCTION FOR TEACHERS

This book concentrates on “topics related to the personal, social, economic and technological applications of biology.” In order to satisfy the *National Criteria: Biology*, a minimum of 15 per cent of all GCSE Biology Syllabuses is devoted to these topics, on which the traditional textbooks give little or nothing. This book has the emphasis on biotechnology required by the *National Criteria*.

It covers the London and East Anglian Group’s Syllabus for the GCSE Biology (Series 17) examination, including the practical work. Though originally described as the ‘Mature’ syllabus, this is available at any age and many schools have adopted it as their mainstream course because of its intrinsic interest. The reason there is no separate Human Biology (Series 17) examination is that it could differ only slightly from the one covered in this book. Not only does the LEAG’s Biology (Series 17) Syllabus include much human biology but a Human Biology (Series 17) Syllabus, in order to satisfy the *National Criteria*, would have to include much basic biology.

At least a week can be allowed for each Unit if the course is taught in a year, two weeks if it is taught in two years. Unit 6 on ‘Fermentation’ and Unit 25 on ‘Genetics, Cell Division and Genetic Engineering’ may need twice as long as most Units.

Part 1 deals with ‘Economic and Environmental Biology’, Part 2 with ‘Human and Social Biology’. Either Part can be taught first. Students who have done no Biology before might find it easier to begin with Part 2, where the early Units cover some basic subject-matter and have experiments that are easier than most. Many students coming to this Syllabus will have a basic biology background even if it is in ‘Science’: the early Units in Part 1, because their subject-matter is unfamiliar and up to date, are more likely to capture their attention and interest.

No attempt has been made to put an equal amount of practical work at the end of each Unit. The Experiments come at the ends of the Units to which they are relevant. Whereas Unit 8 has four Experiments, a number of Units have none. The Experiments should be spread throughout the course. They may be done in any order except where a ‘Note to teachers’ says not.

You should read not only Appendix D on ‘Practical Work’ but also the guidance on Individual Studies given to students in Appendix B, as well, of course, as the Syllabus. In Appendix B we advise students to choose for their Individual Studies experiments that test a hypothesis. The LEAG Mature Syllabus says that an experiment should include a statement of the “aim, problem or hypothesis” and that “Candidates should have the opportunity to formulate a hypothesis or state

a problem to be examined” but adds “and to design an experiment or investigation to test it.” Hypotheses lend themselves to testing whereas problems do not. Moreover the criteria for assessment for high standard and mid standard both assume a hypothesis; only the criteria for low standard make no mention of a hypothesis.

At the end of each Unit there are at least three questions of varying difficulty. Because students cannot have too much practice in answering suitable questions, it is desirable to supplement those in this book with past examination papers or specialist books of questions.

This book uses the Institute of Biology’s recommendations on biological nomenclature, units and symbols for secondary education. It uses billion to mean a thousand million (1 000 000 000). For the sake of clarity it hyphenates compound adjectives including chemical compounds when they are used as compound adjectives.

Nothing in this book requires students or teachers to kill animals. Animals brought into the classroom for study should be returned unharmed to their habitats.

INTRODUCTION FOR STUDENTS

This book tells you how yoghurt, beer and wine are made. It tells you about biological washing powders, contraception, test-tube babies, heart attacks, AIDS, drugs and new forms of food. It describes how criminals can be identified from a piece of skin, a hair root, a drop of blood or (in rape cases) a drop of semen; how smoking and drinking affect health; how we can find out if our children will be born with handicaps or diseases; how tiny organisms can be used to make things for us; how ladybirds can be used to eat the pests on crops, with the result that the pests need not be killed by chemicals that end up in our food.

It is unlike most biology textbooks because it is largely about humans and real life. Remember that what goes on in real life changes all the time. Cut out any stories you see in newspapers about new food or new methods of food production, new drugs, new methods of contraception, new dangers from pollution or anything else that involves something biological.

All the Units in this book have at least three questions at the end: the pages on which there are questions are flagged, which makes it easy to find them. The questions are all of the kind you will get in your GCSE examination. At the end of each Unit, the easy questions usually come first and the difficult ones last.

There is practical work at the end of many of the Units. The practical work includes all the 23 experiments you need to know for the LEAG Biology (Series 17) examination. Four experiments that you design yourself have 'Clues to help you design your experiment'. These clues are in tinted red boxes, as are passages that affect safety. The experiments you design yourself are good practice for the two Individual Studies you need to do during the LEAG course. These are two experiments which you choose, design and do yourself and write reports about. They are assessed by your teacher as part of your GCSE examination. Appendix B helps you with your Individual Studies.

Appendix A tells you the bits of mathematics, physics and chemistry you need to know. Appendix C tells you how to draw and compare biological specimens, how to answer examination questions and how to revise.