

外教社——麦克米伦中学双语教材系列

# 生物

BIOLOGY 1B

教师用书

Teacher's Edition

Sarah Rigby (吴珊丽)

李富种 (Eric Lee Fu Chung)



上海外语教育出版社



SHANGHAI FOREIGN LANGUAGE EDUCATION PRESS



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图书在版编目 (CIP) 数据

生物. 1B: 教师用书 / 吴珊丽, 李富种编. —上海: 上海外语教育出版社, 2003  
(外教社—麦克米伦中学双语教材系列)

ISBN 7-81080-984-9

I. 生… II. ①吴…②李… III. 生物课—双语教学—高中—教学参考资料—英文  
IV. G633.913

中国版本图书馆CIP数据核字 (2003) 第071723号

图字: 09-2003-258号

出版发行: 上海外语教育出版社

(上海外国语大学内) 邮编: 200083

电 话: 021-65425300 (总机), 35051812 (发行部)

电子邮箱: bookinfo@sflep.com.cn

网 址: <http://www.sflep.com.cn> <http://www.sflep.com>

责任编辑: 高云松

印 刷: 深圳中华商务联合印刷有限公司

经 销: 新华书店上海发行所

开 本: 850×1168 1/16 印张 16.75 字数 498 千字

版 次: 2004年1月第1版 2004年1月第1次印刷

印 数: 2 100 册

书 号: ISBN 7-81080-984-9 / Q · 007

定 价: 32.00 元

本版图书如有印装质量问题, 可向本社调换



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MACMILLAN

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Unit 1812, 18/F, Paul Y. Centre,  
51 Hung To Road,  
Kwun Tong, Kowloon,  
Hong Kong.

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First published 1993

Reprinted 1994

Second edition 1996

Reprinted 1998

Reprinted 1999

© Macmillan Publishers Ltd 2002

Published by arrangement with Macmillan Publishers (China) Limited.

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## 出版前言

双语教育以外语作为学科的教学语言,直接进行学科知识的教学。这种新的教学尝试引起了教育主管部门、教育工作者、外语专家以及成千上万学子和家长的关注。随着对外开放的不断深入以及成功加入WTO,我国在经济、科技、教育等领域全面步入国际舞台,在更大范围内和更深层次上参与国际竞争,这对我们人才培养的规模和规格提出了崭新的要求。为了培养能够熟练运用外语吸收先进科技知识、参与国际交流的人才,基础教育的改革势在必行。双语教育对教师、学生、教育研究人员以及教育服务机构都是一种新的挑战。这种新的教学方法要取得成功,需要大胆而又科学的摸索与实践,也需要教师、学生、教育研究人员和教育服务机构各方的协同努力。

作为外语教育出版领域的专业出版社,外教社秉承一贯“全心致力中国外语教育事业的发展”的宗旨,为更好地推动双语教育,抓住时机,经过精心策划,从众多的双语教材中选择了原由麦克米伦出版社出版、在我国香港地区广泛使用的教材,供大陆地区进行双语教育试验的学校使用。本套《外教社—麦克米伦中学双语教材系列》主要有以下特点:

1. 英语语言纯正流畅,适合中学生水平,学生可以比较轻松地掌握学科知识,并在学习的过程中不知不觉地提高英语应用能力。
2. 教学内容丰富,编写体系完整,例证贴近生活,注重跨学科教育。
3. 版式活泼,插图精美,表格详细,各种知识的表现更加直观易懂,从而提高学生兴趣,增强教学效果。
4. 注意现代化教学手段的运用。页边空白处列出与授课内容相关的网址,为学生了解更多相关知识提供了有益的参考。
5. 教师用书英汉对照,采用和合页形式,便于教师授课。教师授课提示单独用红色标出。

尽管本套教材可能在编写体系、知识结构、学科内容等方面与大陆地区传统学科教学稍有不同之处,我们相信其纯正地道的英语、丰富的课程资源以及全新的教学理念会对大陆地区的双语教育产生良好的推动作用。

本套教材可供有较好英语基础的双语学校、国际学校、外国语学校以及重点中学进行双语教学使用。

本教材承蒙上海外国语大学双语学校的李秀萍、胡敏老师仔细审读,在此表示衷心的感谢。同时也欢迎使用本套教材的师生向我们提出宝贵意见。

上海外语教育出版社  
2003年5月



# Preface

*Biology – A Process Approach* was first published in 1993 and since then we have been lucky enough to receive a number of comments and suggestions from those Biology teachers using the course. It is these invaluable comments and suggestions that have formed the backbone of changes and which hopefully have resulted in a Second Edition that is even more in tune with the expectations and requirements of both teachers and students.

As we worked on the Second Edition, we took a careful look at the contents and approach of every chapter and reviewed the 'usefulness' of every feature of the book. The Second Edition is just as direct and informative in style and, if anything, is more concise as any parts of the book that fell outside the syllabus have been removed or clearly delineated in the section called 'Understanding more'. Many of the illustrations have been redrawn and relabelled, and the photographs have been more extensively labelled to aid comprehension.

The exercises have been enriched to include both recall and higher level processing types. We have also introduced a section called 'Misconception analysis' where students can do a self-check to ensure that they do not hold any wrong concepts.

To show students that Biology really is relevant to everyday life, we have also included even more of the social, environmental and technological aspects of Biology. These are covered in the 'Understanding more' sections, in the 'Talking point' sections and also in the questions.

In short, we think we have managed to build on all the welcomed features of the First Edition to create a truly improved Second Edition. We would like to thank all those teachers who were kind enough to contribute and look forward to receiving any further comments.

Sarah Rigby  
Eric Lee Fu Chung



## Summary of the important features of this course

### Simple text

- The writing style is direct and informative.
- Text is kept to an absolute minimum and is often presented in clear, numbered points. Paragraphs are short.
- Important words appear in bold.
- Chinese translations are provided where necessary.
- Photographs appear next to relevant diagrams to aid understanding and encourage interest.

### Process diagrams

- Process diagrams explain in a step-by-step way the important processes encountered in Biology.
- They aid learning by avoiding convoluted and wordy explanations.
- They show students what is happening and where.

### Experiments

- All experiments recommended by the CDC and HKCEE Syllabuses are included.
- Experiments are accompanied by detailed step-by-step illustrations.
- The experiments include questions and, in addition, students are encouraged to design control experiments.

### Prevention of misconceptions

- Each chapter contains a set of multiple-choice questions that test for common misconceptions and mistakes. This 'Misconception analysis' allows students to identify their misconceptions early in the learning process and provides a sound foundation for future learning.
- Most chapters also contain an exercise that asks students to identify sentences that contain misconceptions and rewrite them accurately.

### Everyday Biology

- Students' interest in Biology is aroused by a feature called 'Talking point'. These focus on everyday issues and encourage students to think about the everyday relevance of Biology. This feature also prompts students to apply what they have learnt to new situations.
- Every chapter begins with a small cartoon of everyday life that encourages students to think about what they might already know about a subject or what they can expect to learn.

### Skill Building

- At various points throughout the text, 'Skill Pages' identify skills that may need further reinforcement, for example, drawing diagrams, drawing graphs, analysing a genetics problem, and exam skills.
- 'Important words to learn and spell' are listed at the back of each chapter. Poor spelling is a common weakness and this feature ensures that students address the problem as they learn.
- Word building helps students to learn difficult words by explaining how words are constructed. This feature is introduced in the margin next to the word and will help spelling and also give clues to the meaning of new, unknown terms.

### Extension

- 'Understanding more' introduces extension material. The extension material is designed to help students *understand* more about a topic and does not burden them with excessive new structures and terms.

### Glossary

- The glossary contains all the words in the 'Important words to learn and spell' together with a definition and a Chinese translation. It also contains a range of biological terms that students will encounter both in this textbook and in their wider reading.



## Summary of the important features of the Teacher's Edition

The Teacher's Edition is overprinted in red and contains further features: The overprinted notes can be found in the margin next to the relevant text and comprise:

- 'Wrong concepts' which highlight those common misconceptions held by students. At the end of each chapter, teachers can test students by asking them to complete the 'Misconception analysis' section. Answers are overprinted for easy classroom reference. In addition, it is possible to test for common mistakes and misconceptions by asking the students to complete the True/False exercise at the end of the chapter.
- Classroom questions and answers which provide convenient additional teaching material for teachers to use at their discretion.
- 'Syllabus objectives' which provide simple statements of the requirements stated by the CDC and HKCEE Syllabuses.
- Additional teaching notes, including notes about the 'Talking points', which provide teachers with extra material for the lesson.
- Teaching hints which highlight common mistakes, common confusions, common spelling mistakes, etc.
- 'It's a fact !' which gives the teacher the kind of crazy facts that capture the imagination of students!

In addition, the book contains:

- All answers to questions, which are either overprinted or provided at the back of the book.
- Marking scheme for all answers.
- Suggested controls for experiments.



## 序言

生物学是一门活泼的、多姿多彩的和令人振奋的科学，上述的生物学精神促成了本书的面世。

本书采用最简明的但资料丰富的编写方式，传达生物学的重要过程和原理，并特别使用一种创新的、称为“过程图”的表达形式。

“过程图”的特点是利用生物绘图，逐步解释生物学上的重要过程，避免了冗长的文字解说，又能显示过程的详尽资料和发生的位置，令学生更容易学习，更容易清晰地了解整个过程，把学到的生物学知识应用在日常生活中并可自行解答新的难题。

本书的内容全面涵盖了中学生物学课程纲要，并特别针对学生容易犯错误的地方加以引导和指正。

本书的主要特色如下：

### 简洁的课文

- 采用直接表达的编写方式且资料详备。
- 文字精简，并以清晰的形式逐点表达。段落力求简短。
- 凡重要的生物学名词都以黑体印刷。
- 在需要的地方加上中英文名词对译。
- 在绘图旁附以相关的照片，帮助学生理解并提高学生的学习兴趣。

### 具挑战性的问答题

- 每章末都附有创新的和极具挑战性的“错误概念分析”多项选择题，学生可自我考核，以确保所学习的概念正确无误。
- 问答题已包罗香港中学会考的要求，并尽量模拟会考试题的形式，跟随会考试题的模式变化趋势。
- 课文也与相关的会考试题互相参照，当学生学习至某一阶段时，便会被引导去解答一些过往的会考试题，令他们体验到那份能达到会考水平的满足感。

### 实验

- 课文全面涵盖了课程纲要所要求的全部实验，并附以引导性的问答题，以考核学生对实验原理的理解程度。关于对照实验的设计原理，也加以详尽的解说。



## 复习

- 每章末都附有“需要重点学习和默写的重要名词”。当学生了解各个名词之后，他们对课文也已有相当的了解。
- “词汇”也有助于学生温习所学过的内容。

## 培养学生的学习兴趣

- “多了解一点”介绍了一些应用生物学知识的例子。虽然这些知识并不是课程纲要所要求的，但能帮助学生了解课文。
- “论坛”提出了一些与生物学有关的课题，供学生在课堂上讨论，藉此鼓励他们自发性的学习。

吴珊丽

李富种

## 重要特色

提供给老师的额外资料以套红方式印在教科书上有关的课文旁边，其中包括：

- “错误概念”特别指出现在许多学生都有的不正确概念。为了让老师了解学生所学的概念是否正确，每章后都备有“错误概念分析”多项选择题和是非题，供学生练习，并附有答案，方便教师在课堂上参考。
- 老师可根据教学需要，利用教师用书所提供的简单问答题和答案来丰富教学资源。
- “教学目标”列出“香港教育署课程发展议会”和“香港中学会考”生物科课程对于修读的学生的要求。
- 诸如“论坛”等额外教学讲义，使老师在课堂上有更多的教学资源可利用。
- “教学提示”重点指出学生常犯的错误，特别是模糊的概念和用字的失误。
- “信不信由你！”帮助学生们对无奇不有的大千世界展开充分的联想。

此外，教师用书还包括：

- 全部问答题的答案，这些答案都是用套红方式加印在有关的问题旁边或书末。
- 全部答案的评分标准。
- 每项实验的合适对照实验。

## 体例说明

作为一套编写体系合理、知识结构完整、学科内容全面的旨在满足我国双语教育需要的全新教材，本书在体例编排上有如下一些特色：

- 中英文对照，采用和合页的形式，即左面为英文，右面为中文；
- 为方便查阅，本书正文页码采用对应形式，英文部分为 1a、2a、3a ……，相对应的中文部分为 1b、2b、3b ……；
- 分 1、2 两级，每一级书分 A、B 两册，B 册正文页码、章节顺接 A 册正文页码、章节；每册正文之前的前言等部分和附录部分页码用罗马数字表示；
- 每课中设计给学生的问题分为两部分：课前部分供学生预习时思考并在课程进行中逐一解答；课后部分为学生复习、巩固而准备。练习题序号后的 \* 表示该题选自香港中学会考 (HKCEE)、南方考试团体 (SEG)、MEG、ULEAC 等的试题。

希望我们独具匠心的设计能够为您的教学工作提供便利。



# Acknowledgements

The author and publishers would like to thank the following for permission to reproduce photographs:

*Asian Medical Journal*

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## 致谢

作者和出版者衷心感谢为本书提供精彩图片的有关机构、团体和个人：

*Asian Medical Journal*

Australasian Nature Transparencies

Biofotos

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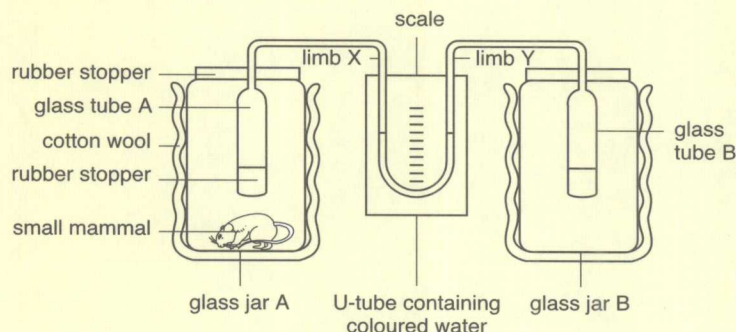
# 7

## Respiration

As you work through this chapter, you should be able to answer these questions.

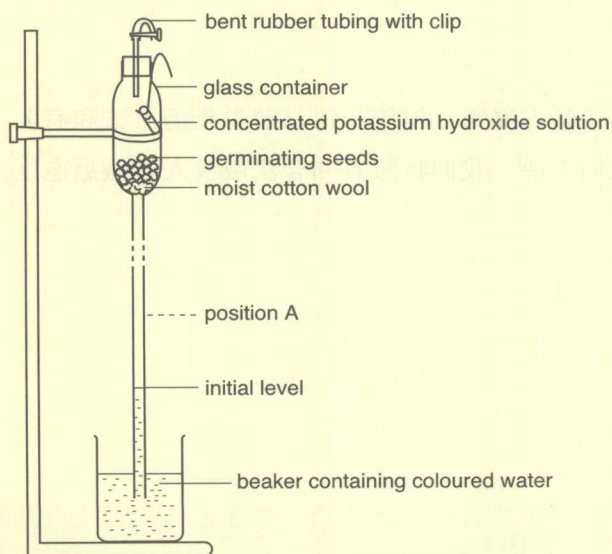
(\*These questions are from HKCEE, SEG, MEG and ULEAC.)

- 1\*** The diagram below shows an experimental set-up to investigate the respiration of a small mammal. All the joints are airtight.



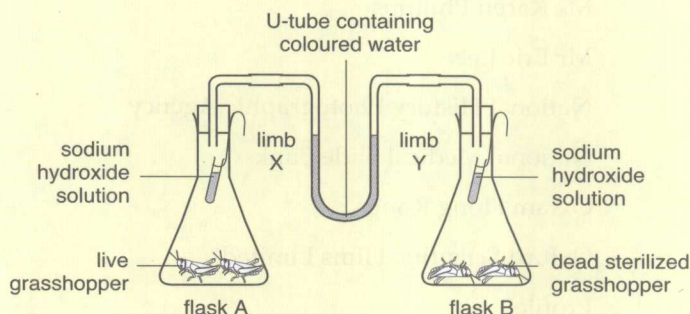
- What will be the change in the level of the coloured water in the U-tube at the end of the experiment? Explain your answer. (3 marks)
- What is the purpose of surrounding the glass jars with cotton wool? (1 mark)
- State the function of glass jar B. (1 mark)
- If you were provided with a beaker of potassium hydroxide solution, describe and explain how you would modify this experimental set-up, without using additional apparatus, to indicate the uptake of oxygen by the small mammal. (6 marks)

- 2\*** The diagram below shows an apparatus used to study the respiration of germinating seeds.



- At the beginning of the experiment, it is better to set the initial water level near the middle of the glass tubing.
  - Suggest a reason for this. (1 mark)
  - Suggest a method of doing this. (2 marks)
- After one hour the water level rose to position A. Explain this phenomenon. (5 marks)
- In another experiment, the concentrated potassium hydroxide solution was replaced by water. After one hour, the water level remained unchanged. Explain this observation in terms of gaseous exchange. (1 mark)

- 3\*** The diagram below shows a set-up used to measure the rate of respiration of grasshoppers:



- Write a simple word equation of aerobic respiration. (1 mark)
  - The set-up measures the change in the amount of a substance in the word equation. What is this substance? (1 mark)
- What change will occur to the water level in the U-tube after 15 minutes? Explain your answer. (4 marks)
- What is the use of flask B? (1 mark)
- How will the result be different if the experiment is repeated at a higher room temperature? Explain your answer. (2 marks)