国家级课题

"我国素质教育背景下的双语教学理论与实践研究"课题组

推荐用书

BIOLOGY

高中生物英文课本

（中文注释）

[英]D·G·麦基恩 著

世界图书出版公司

本书引进自英国经GCSE（普通中学证书）审定的教材，根据我国现行高中教学大纲整理汇编而成。本书形式新颖、程度适中、实例丰富、图片精美，符合我国教育改革的方向，特别有利于一般学生学习，是一本值得推荐的双语教学范本。

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The Textbook Series of *Bilingual Pedagogy and Practice for Capacity Education in China* — a National Education Science Project for the Tenth Five-Year Plan

Foreword

The 21st century will be a special one for China. The past century witnessed a series of great changes in the country of a 5000-year civilization. China has changed from a closed, backward, despised monarchical nation into an open, dynamic and respectable socialist state with strong comprehensive strength. However, the 20th century left behind only a newly-decorated stage for the Chinese people, and their historical task is to stage a really splendid life drama in the 21st century.

China in the 21st century cannot develop without being closely linked with the international environment. In today's world there is a trend of integration of science, economy, and culture, which are promoting each other, learning from each other, and blending each other. China's entry into WTO, her hosting the 2008 Olympic Games and the 2010 World Expo, and her increasing use of the Internet all require that the whole nation, especially the adolescents, should enhance their foreign language ability. It will be of great significance to carry out bilingual teaching research and practice in some regions with advanced education system. *Bilingual Pedagogy and Practice for Capacity Education in China* — a National Education Science Project for the Tenth Five-Year Plan — is a comprehensive research project including the development of the textbook series.

Generally speaking, in the Chinese language context, bilingual teaching refers to the practice that all non-linguistic subjects are instructed totally or partly in a foreign language. This sort of teaching demands new textbooks and new approaches to learning. Thus, all teachers face great challenges in terms of their language ability, subject expertise, teaching skills and methodology. The aim of bilingual teaching is not merely language acquisition, for language is a tool of thinking, and the command of a new language means the command of a new way of thinking. And the change of thought pattern will lead to a better communication and a better understanding between different races, different nations and also different cultures. Strictly speaking, bilingual teaching should go for the multiple objectives of languages, disciplines and thought patterns.

The natural science textbooks by the British JOHN MURRY Press are quite novel, both in the content and in the style, and has a wide coverage with proper levels according to the educational reforming in China. The series of textbooks are also supervised by GCSE (General Certificate of Secondary Education of Britain). These are all characteristics beneficial to students' learning. Our compilers of the series have made careful adaptation and necessary explanation in line with the status quo of education in China. The layout of the series, with necessary notes of special terms at the end of each section, can not only meet the needs of different students, but also make easy reading. The series is a worthwhile model among bilingual textbooks. We hope the users of the textbooks will kindly give us their valuable comments and suggestions so as to contribute to the development of bilingual teaching.

Professor Qian Yuanwei
Head of *Bilingual Pedagogy and Practice for Capacity Education in China*
(A National Education Science Project for the Tenth Five-Year Plan)
Fundamental Educational Office
Shanghai Teachers' University
April 5, 2003

序　言

21世纪对于中国来说，将是一个不寻常的100年。过去的100年是我们这个具有5000年文明史的国家变化极为剧烈的时期。从一个闭关自守的、落后的、被世人看不起的君主国家演变为开放的、充满活力和具有不可忽视的综合国力的新型社会主义国家。然而，20世纪留给国人的还只是一个装饰一新的大舞台，在这一舞台上演出一台绚丽的生活秀是身处21世纪的人们不可推卸的历史重任。

21世纪中国的发展离不开国际大背景，当今世界正在涌动着一体化大潮，科学的、经济的、乃至文化的各个领域，正在互相推动，互相借鉴，互相交融。中国进入WTO，申奥成功，申博成功，国际互联网的广泛运用……都迫切需要全面提高国民，尤其是青少年一代的外语能力。在具备基本条件的若干教育发达地区，率先展开双语教学的实践研究具有前瞻性的重要意义。教育科学“十五”国家课题《我国素质教育背景下的双语教学理论与实践研究》是一项全面的行动研究，其中包括课程教材研发。

一般而言，在我国语言环境下，双语教学是指在非语言学科课程中使用部分或全部外国语的教学。这种教学，在学生的学习资料、学习方式等方面，提出了新的要求；而教师的语言与学科底蕴、教学技能、教学方法等也将面临全新的严峻挑战。双语教学目标并非单纯的是语言，语言是思维的工具，掌握一门新的语言也就是掌握了新的思维方式，而思维方式的改变必将导致不同民族、不同国家乃至不同文化之间的沟通和理解。规范地讲，双语教学应研究语言、学科知识、思维等多元目标。

英国JOHN MURRY出版公司出版的自然科学教材无论在内容上，还是在形式上都比较新颖，面广且深度适中，正符合我国教育改革的方向，特别有利于一般学生学习。这套教材是GCSE的审定教材，GCSE是英国General Certificate of Secondary Education （普通中学证书）的简称。本书整理者又根据我国的教学背景作了合理的编排调整和注释，这种编排顾及了不同层次学生的需求；又对专业知识、专业术语作了必要的注释，均列在每小节末，便于阅读。这是一套值得去试一试的双语教学范本。希望使用本书的师生提出宝贵意见，让我们共同为双语教学的健康发展而努力。

“十五”国家课题《我国素质教育背景下的双语教学理论与实践研究》课题负责人钱源伟

2003年4月5日 于上海师范大学基础教育处

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To the student

This is a textbook to help you in studying biology for the GCSE or IGCSE. You will be following the GCSE specification of only one examination group but this book contains the material needed by all the groups. For this reason, amongst others, it is not expected that you will need to study or learn everything in this book.

Furthermore, the emphasis in GCSE is on the ability to understand and use biological information rather than on committing it all to memory. However, you will still need to use a book of this sort to find the facts and explanations before you can demonstrate your understanding or apply the biological principles.

The questions included in the chapter are intended to test your understanding of the text you have just read. If you cannot answer the question straightaway, read that section of text again with the question in mind.

There is a checklist at the end of each chapter, summarising the important points covered.

The questions at the end of each section are selected from the specimen papers published by the GCSE examining groups as sample material for their examinations in 2003 and from the November 2000 papers of the IGCSE.

In many cases they are designed to test your ability to apply your biological knowledge. The questions may provide certain facts and ask you to make interpretations or suggest explanations. In such cases the factual information may not be covered in this textbook.

Looking up information

To find the information you need, use the index, the contents pages and the summary at the beginning of each chapter. If the word you want does not appear in the index, try a related word. For example, information about 'sight' might be listed under 'vision', 'eyes' or 'senses'.

Practical work

Given standard laboratory equipment, it should be possible for you to attempt any of the practical work described in the book, though you will probably not have time to do it all.

For this reason, it has been necessary to give the expected results of the experiments so that you can appreciate the design and purpose of the experiment, and consider alternative interpretations of the results, even if you have not been able to do the experiment yourself.

Third Edition

'Now it remains I acquaint you with what I have performed in this edition, which is either by mending what was amiss, or by adding such as formerly were wanting; some places I have helped by putting out ... the kinds in divers places where they were not very necessary, by this means to get more room for things more necessary'.

John Gerard, 1633, in the preface to the second edition of his Herbal.

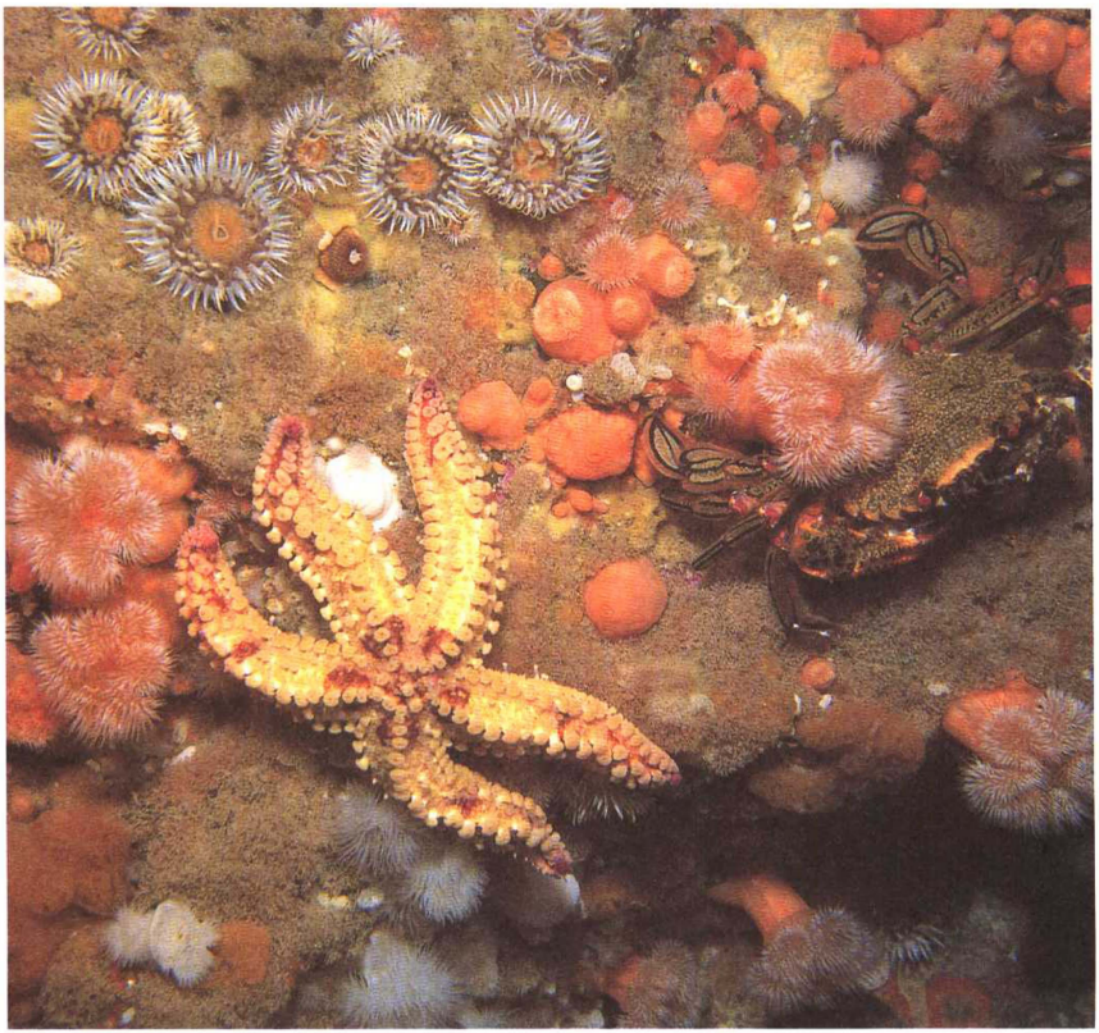
This edition has been adapted to meet the specifications of the GCSE Biology and Double Award Science for the 2003 examinations.

A new chapter on Applied genetics includes genetic engineering, cloning, GM crops, DNA fingerprinting, the human genome project and stem cells. A chapter on Conservation has also been included.

The requirements of 'Ideas and evidence' have been met in two ways. Throughout the book there are references to controlled experiments, homeostasis, negative feedback, interpretation of experimental results, cause and correlation, and hypothesis testing. In addition, there are two new chapters; one dealing with the historical development of ideas and the other addressing some of the scientific principles underlying the gathering of evidence in Biology.

Contents

Diversity of organisms



1 Classification

Kingdoms
Monera, Protoctista, Fungi, Plants, Animals and their subdivisions.

Species
Binomial nomenclature.

Animal kingdom
Plant kingdom
Keys for identification

You do not need to be a biologist to realize that there are millions of different organisms living on the Earth, but it takes a biologist to sort them into a meaningful order, i.e. to **classify** them.

There are many possible ways of classifying organisms. You could group all aquatic organisms together or put all black and white creatures[1] into the same group. However, these do not make very meaningful groups; a seaweed and a porpoise[2] are both aquatic organisms, a magpie[3] and a zebra are both black and white but neither of these pairs has much in common apart from being living organisms and the latter two being animals. These would be **artificial systems** of classification.

A biologist looks for a **natural system** of classification using important features which are shared by as large a group as possible. In some cases it is easy. Birds all have wings, beaks[4] and feathers; there is rarely any doubt about whether a creature is a bird or not. In other cases it is not so easy. As a result, biologists change their ideas from time to time about how living things should be grouped. New groupings are suggested and old ones abandoned.

Kingdoms[5]

The largest group of organisms recognized by biologists is the kingdom. But how many kingdoms should there be? Most biologists used to favour the adoption of two kingdoms, namely **Plants** and **Animals**. This, however, caused problems in trying to classify fungi, bacteria and single-celled organisms which do not fit obviously into either kingdom. A scheme now favoured by many biologists is the Whittaker 5-kingdom scheme comprising the **Monera**, **Protoctista**, **Fungi**, **Plants** and **Animals**.[6]

Viruses are not living organisms (p. 21) and are therefore not included in this scheme.

Kingdom Monera

These are the bacteria (p. 19) and the blue-green algae. They consist of single cells but differ from other single-celled organisms because their chromosomes are not organized into a nucleus.

Kingdom Protoctista

These are single-celled (unicellular) organisms which have their chromosomes enclosed in a nuclear membrane to form a nucleus.

Some of them, e.g. *Euglena*[7] (Figure 1.1), possess chloroplasts and make their food by photosynthesis. These protoctista are often referred to as unicellular 'plants' or **protophyta**[8]. Organisms such as *Amoeba*[9] and *Paramecium* (Figure 1.1) take in and digest solid food and thus resemble animals in their feeding. They may be called unicellular 'animals' or **protozoa**[10].

Amoeba (Figure 1.1) is a protozoan which moves by a flowing movement of its cytoplasm. It feeds by picking up bacteria and other microscopic organisms as it goes. *Vorticella* has a contractile stalk and feeds by creating a current of water with its cilia (Biology 1 p.7). The current brings particles of food to the cell. *Euglena* and *Chlamydomonas* have chloroplasts in their cells and feed, like plants, by photosynthesis.

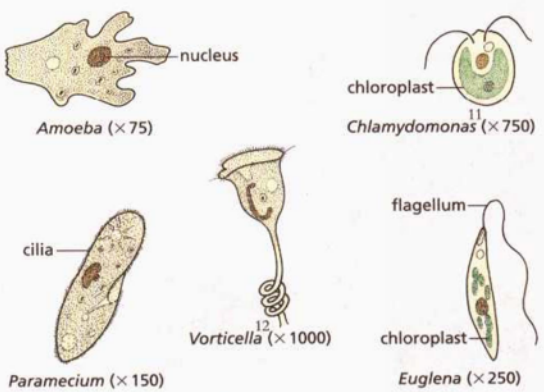


Figure 1.1 Protoctista. *Chlamydomonas* and *Euglena* have chloroplasts and can photosynthesize. The others are protozoa and ingest solid food

Kingdom Fungi

Most fungi are made up of thread-like hyphae[13] (p. 22), rather than cells, and there are many nuclei distributed throughout the cytoplasm in their hyphae.

The fungi include fairly familiar organisms such as mushrooms[14], toadstools[15], puffballs[16], and the bracket fungi[17] that grow on tree-trunks. There are also the less obvious, but very important, mould fungi which grow on stale bread, cheese, fruit or other food. Many of the mould fungi live in the soil or in dead wood (Figure 1.2). The yeasts are single-celled fungi similar to the moulds in some respects.

Some fungal species are parasites and live in other organisms, particularly plants, where they cause diseases which can affect crop plants (Figure 1.3).

Figure 1.2 Toadstools. They are getting their food from the rotting tree stump

Figure 1.3 Mildew[18] on wheat. Most of the hyphae are inside the leaves, digesting the cells, but some grow out and produce the powdery spores seen here

Kingdom Plants

These are made up of many cells – they are multicellular. Plant cells have an outside wall made of cellulose. Many of the cells in plant leaves and stems contain chloroplasts with photosynthetic pigments, e.g. chlorophyll. Plants make their food by photosynthesis.

Kingdom Animals

Animals are multicellular organisms whose cells have no cell walls or chloroplasts. Most animals ingest solid food and digest it internally.

It is still not easy to fit all organisms into this scheme. For example, many protoctista with chlorophyll (the protophyta) show important resemblances to some members of the algae, but the algae are classified into the plant kingdom. The viruses are not included in the scheme because, in many respects, viruses are not independent living organisms.

This kind of problem will always occur when we try to devise rigid classificatory schemes with distinct boundaries between groups. The process of evolution[19] would hardly be expected to result in a tidy scheme of classification for biologists to use.

An outline classification of plants and animals is given below and illustrated in Figures 1.4–1.7 (pp. 4). Bacteria and fungi are described more fully on pp. 19.

Question

1 Which kingdoms contain organisms with
a many cells, **b** nuclei in their cells,
c cell walls, **d** hyphae, **e** chloroplasts?

Words and phrases 单词和短语

1 all black and white creatures 指各种生物
2 porpoise / 'pɔ:pəs / n. [动]海豚，小鲸
3 magpie / 'mægpaɪ / n. 鹊
4 beak / bi:k / n. 鸟嘴，喙
5 kingdom / 'kɪŋdəm / n. 王国，领域，这里指生物分类学中的界
6 scheme / ski:m / n. 组织，系统，体制 favour / 'feɪvə / n. 亲切，宠爱，这里应理解为支持，赞成，喜欢 monera / 'məʊnərə / n. 原核生物界 protocitista / ˌprəʊtə'sɪtɪstə / n. 原生动物界 A scheme now...Plants and Animals. 译：许多生物学家，(但并不是所有的生物学家)都支持惠特克的五界分类系统，即生物由原核生物界、原生生物界、真菌界、植物界和动物界五界组成。
7 *euglena* / ju:'gli:nə / n. [动]眼虫属
8 protophyta / 'prəʊtəfaɪtə / n. [植]原生植物门
9 *amoeba* / ə'mi:bə / n. 阿米巴，变形虫
10 protozoa / prəʊtəʊ'zəʊə / n. 原生动物，原形动物
11 *chlamydomonas* / ˌklæmɪdə'məʊnəs / n. [生]衣滴虫，(单)衣藻
12 *vorticella* / ˌvɔ:tɪ'selə / n. 钟形虫
13 hypha / 'haɪfə / n. 菌丝
14 mushroom / 'mʌʃrʊm / n. 蘑菇
15 toadstool / 'təʊdstu:l / n. [地]伞菌，毒菌，羊肚菌
16 puffball / 'pʌfbɔ:l / n. [植]马勃(菌)
17 bracket fungi 檐状菌
18 mildew / 'mɪldju: / n. 霉，霉菌，(植物的)霉病
19 evolution / i:və'lu:ʃən / n. 进化

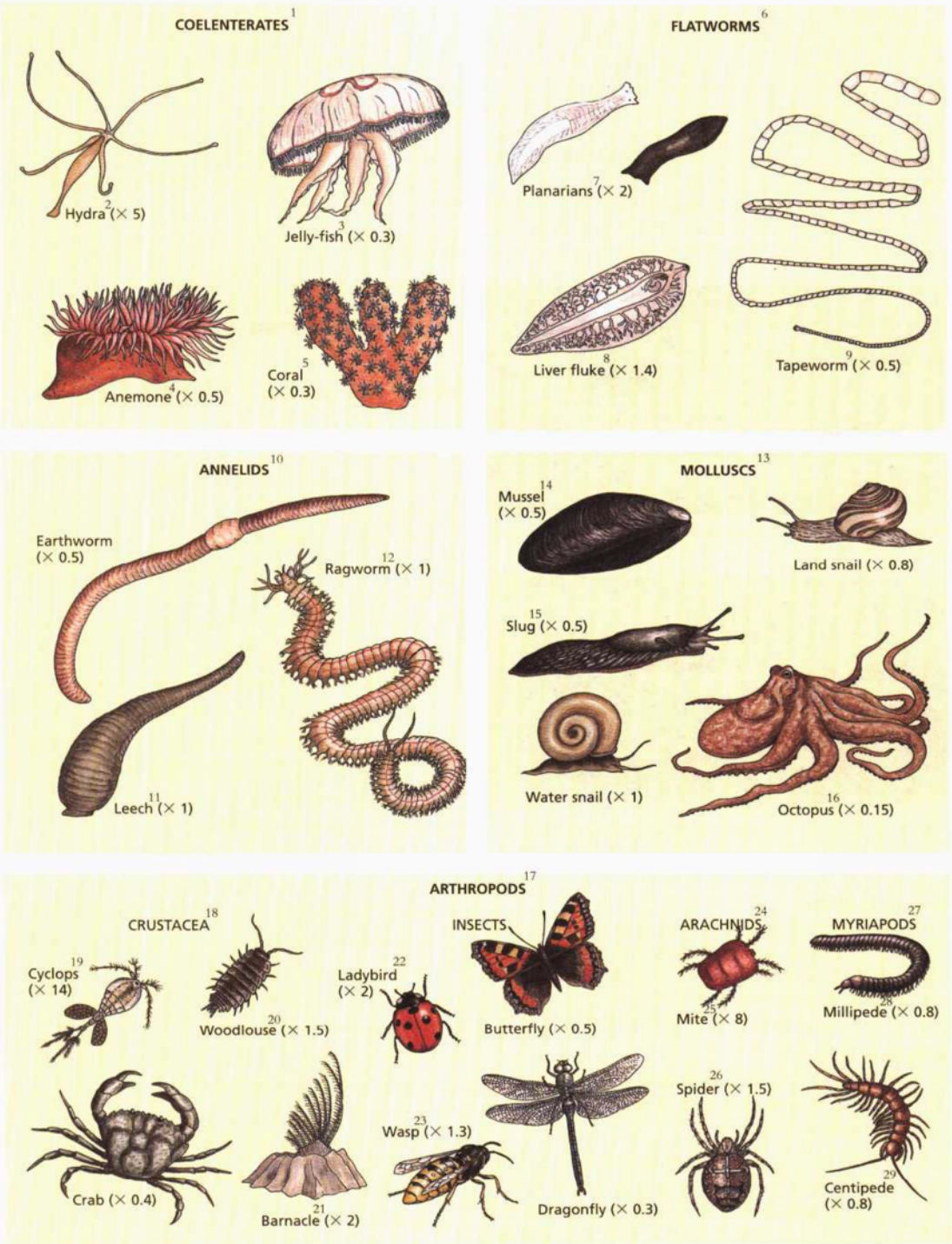


Figure 1.4 The animal kingdom; examples of five invertebrate groups (phyla)

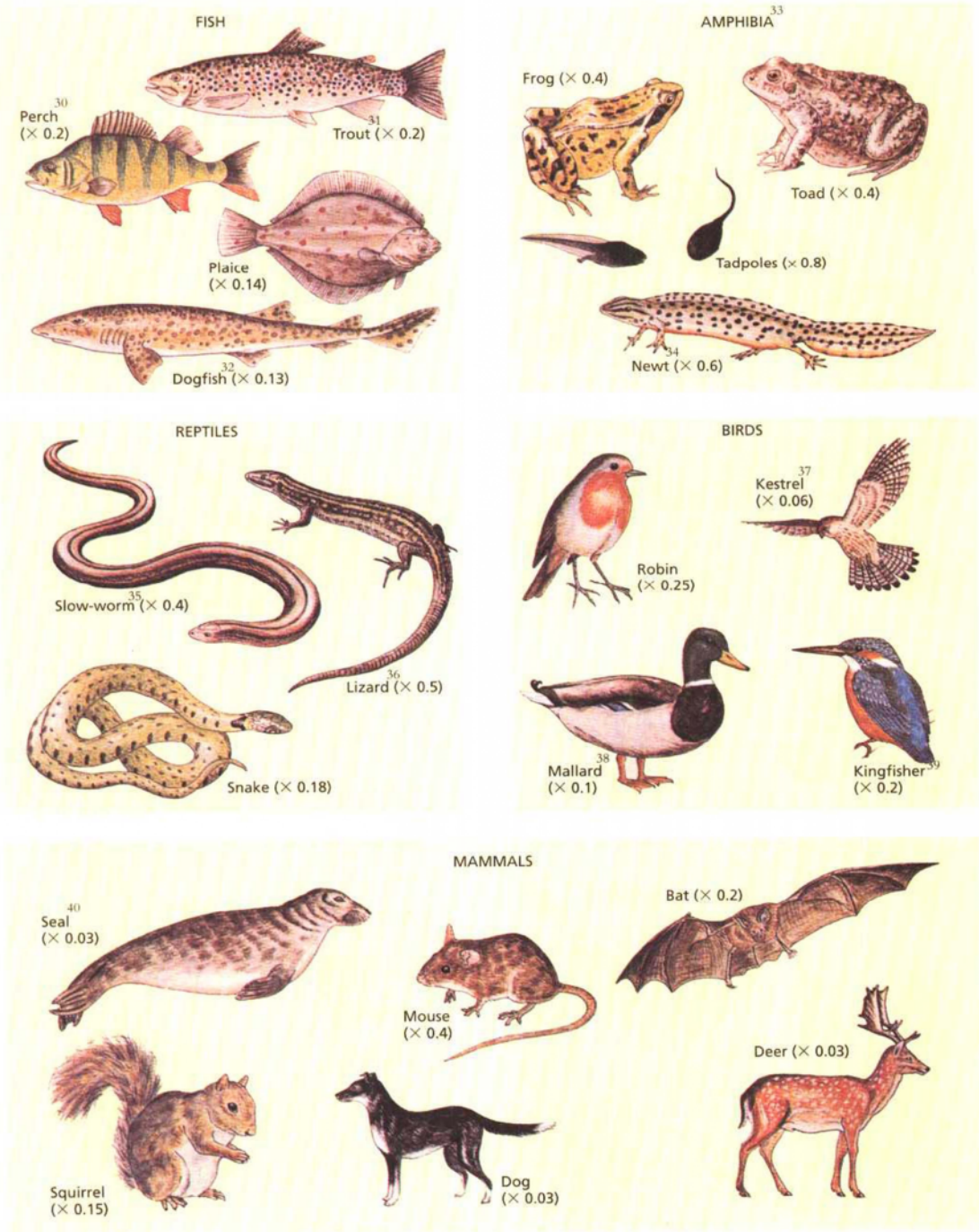


Figure 1.5 The animal kingdom; the vertebrate classes

Figure 1.6 The plant kingdom; plants that do not bear seeds

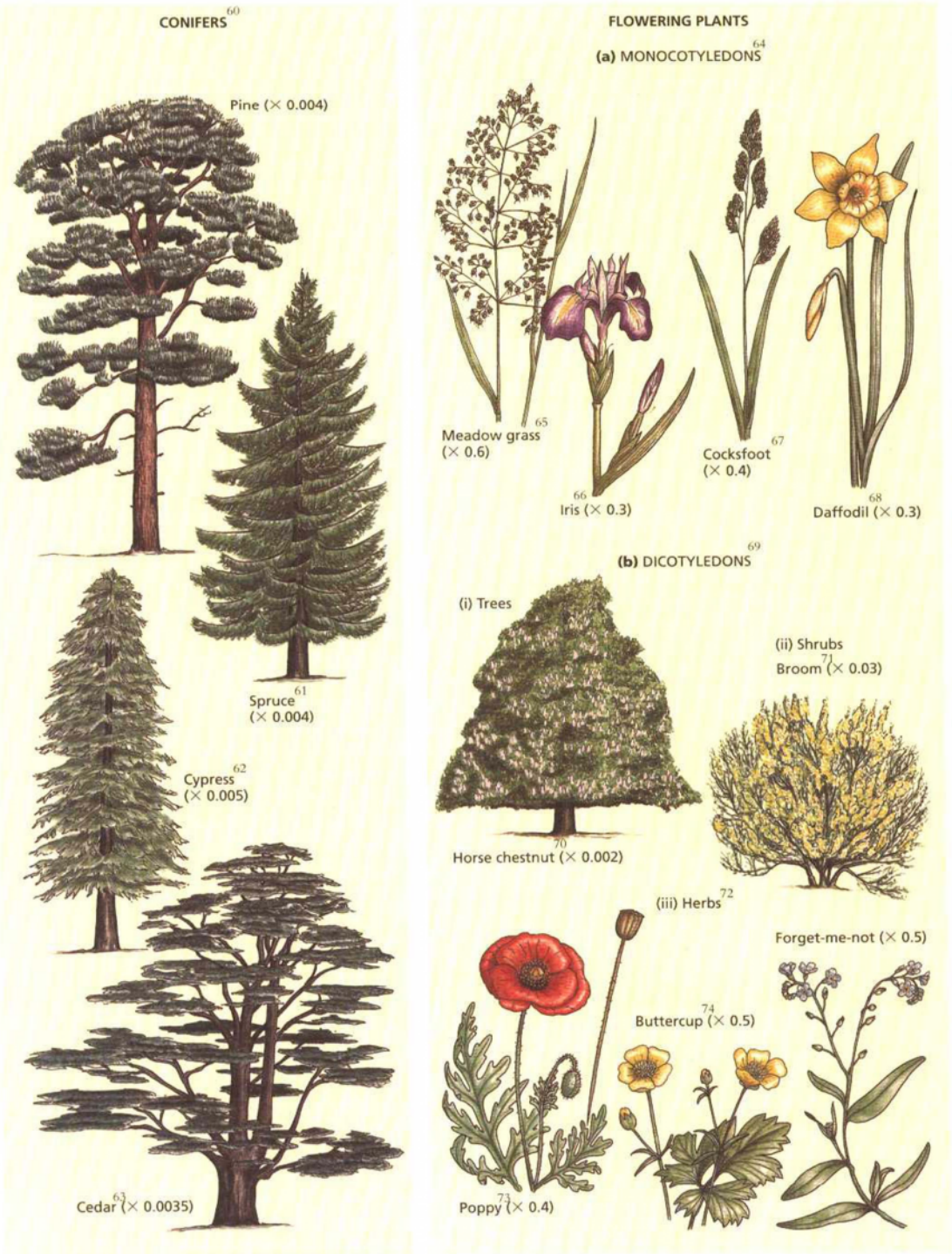


Figure 1.7 The plant kingdom; seed-bearing plants