

*Study English for Science*

# 科普英语进阶

强化篇

[英] A.R.Bolitho P.L.Sandler

高等教育出版社

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(英) A.R. Bolitho

(英) P.L. Sandler



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## 出版说明

《科普英语进阶》是一套通过系统的英语学习,了解、掌握一些最基本的科学知识的教科书。旨在帮助非英语专业、具有中等英语水平的学生和具有一定英语基础和能力的自学者,提高运用英语阅读、理解科技资料或书写简单科技报告和论文的能力。同时,通过本套书的学习,可使读者积累一部分科技资料中常见的、基本的词汇与术语,掌握科普知识的英语表达,如科学计量、科学观察分析、科学实验、科学论述、科学预测等方面的常识性知识。

本套书共分为三册:《入门篇》(Start English for Science);《提高篇》(Learn English for Science);《强化篇》(Study English for Science)。三篇形成一门完整的英语课程体系,同时各篇又自成体系,可单独适用于相应水平的读者需求。每篇分为两大部分:Students' book 和 Teachers' book。Students' book 内容包括一些最基本的科学技术原理和普及知识,从《入门篇》至《强化篇》难度、深度循序渐进。每一单元课文后附有大量可激发读者深入学习兴趣 and 语言反应能力的练习,包括词汇(Words)、课文内容提问(Questions on the Text)、句型与段落(Sentences and paragraphs)、图表理解(Graphs)、补充阅读(Extensive reading)等方面的练习。练习形式多样,可帮助读者进一步理解课文内容,掌握一定数量的科技基本词汇,提高基本的英语阅读和书写能力。Teachers' book 既可作为教师教学参考,也可帮助学生自学和自测。Teachers' book 中给出每一单元学习的重点和建议,以及每一单元中主要练习的答案。书末附有全书词汇表,列出全书每一单元中的主要词汇和术语,并给出每一单词的音标、词性及汉语注释。

本系列丛书可供中等职业学校和高等专科学校作为科技专业英语教材或公共英语课程的辅助教材,也适用于初、中级英语水平以上的读者作为课外科普英语阅读或科技英语阅读的学习读本。

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# 学习导引

## 本课程的目的

学完《科普英语进阶·提高篇》(Learn English for Science)后进入下篇——《强化篇》(Study English for Science),读者会发现这两篇之间天然的延续性。本篇的目标是使读者在中等水平的基础上,通过学习本书上升到一个新的阶段:

- 1) 能阅读理解科技方面的经典文章,并作必要的笔记;
- 2) 能用清晰连贯的英语书写简单的科技文章;
- 3) 能在不依赖教师的情况下满足自身对英语应用的需求。

学完本书,读者应在其所选择或所从事的专业领域中继续学习一些更专门学科方面的科技文章或资料。本系列教材可为中等程度读者提供学习科技英语语言的一般基础知识,以及科技英语专业的入门知识。

本书可作为一门科技英语课程来学习,也可作为中等水平英语课程的辅助教材。

## 本课程的科学内容

本书实质上是一本语言教科书,旨在通过英语课文的学习和练习激发学生对科学技术的兴趣。读者通过学习会发现,本书所包含的材料要比专为中等程度学生准备的专门语言类材料更加简明和更便于理解,许多课文内容紧密结合实际进行描述,同时还涉及了科学技术和工业领域在飞速发展中出现的一些问题。

当前,我们正处于一个科学技术高速发展、各类问题层出不穷的变化万千的世界,本书通过用英语语言揭示科学真谛和技术发展,力图激发生活在这一环境下的各种年龄层学习者对科学真理与现实的兴趣。配套使用一本通用英语辞典或科技英语辞典将会对学习本书很有帮助。

## 本课程使用的语言

本书前面的一些单元比较好掌握,一些课文内容是专门编写的,还收录了一些引用文章的内容。课后练习紧密围绕该课文的

语言点,重点在句型结构、重要概念及构词。课文中的语言难度逐步深入、循序渐进。学完本书,读者会对主动地应用语言与被动地接受语言之间的区别有所认识。书中出现的词汇没有必要全部记忆,读者可根据自己的需要记忆相应的单词。本书在语言方面的训练重点在技能的培养,如词汇的定义、比较、差异、关联、分类和构词等等。同时注重培养读者在英语写作和语言结构方面的实际能力。

### 每一单元的构成

《强化篇》由 10 个教学单元和 2 个复习单元组成。每一单元的教学内容可安排 6 个课时(每课时 45 分钟),具体内容分以下几个方面:

#### 1. 课文(The texts)

课文中收集了各种相关科学技术学科不同类型的文章和论述。通过学习这些课文,希望能引发学生在更深层次的研讨。每篇课文分为若干段落,每一段落叙述相关主题的一个分层次内容,课文中插入了许多生动清晰的图表,帮助读者加深理解。建议的教学方法如下(自学者可采用若干适合自己的步骤):

1) 要求学生合上书,教师通过提问引出本单元课文的主题,以便了解学生对此主题的认知程度。可预习一些课文中的生词和重要概念;

2) 根据 Teachers' Book 中各单元列出的提问建议,教师可在黑板上写出 2~3 个主要问题或正/误判断论述句子;

3) 学生默读课文,可通篇读,也可分段读,从课文中找出答案;

4) 检查学生对主要问题的答案;

5) 学生就不清楚的地方提问;

6) 教师分段就课文细节提问;

7) 学生用口头或书面总结课文主要内容或段落大意;

8) 课文某些段落可作听写练习。

#### 2. 词汇(Words)

词汇是科技文章中非常重要的组成部分。词汇练习(Word study)对课文中的一些关键词给出了定义,此部分可作为教师和学生作词汇预习的参考指导。词汇定义本身是学习者需努力获取的一种

重要技能,这里的词汇练习提供了有用的模式。在后面的一些单元中,词汇练习的方式从被动认知向主动应用过渡,同时给出一些容易出现错误的辨析。词汇练习中的单词均列入书后的词汇表中。

有些单元还包括了构词、词汇组合及词典应用方面的练习。本书提倡学生运用词典,有些学生太依赖教师讲解词汇,以至不会有效地使用词典,尤其是英-英词典。

### 3. 课文内容提问(Questions on the text)

这部分练习中所提供的问题有直接提问式的,也有正/误判断式和设问式的,设问练习是培养学生自己提出问题进行交流的能力。这部分中许多练习可以采用两人或小组的方式进行。

### 4. 句型和段落(Sentences and paragraphs)

这部分练习主要针对每单元的语法点,提供了包括写作句子或段落的训练,有些练习重点在句型结构,还有一些则注重科技英语的功能和注释。

### 5. 图表理解(Graphs)

此部分练习主要出现在前面的单元中,重点是有关数字符号的图示表达及其转换。

### 6. 补充阅读(Extensive reading)

在后面单元中增设了一些额外的阅读材料,这些材料均是紧扣主题的补充性论述文章,每一段补充阅读后还设了一项作笔记的练习,以此提高阅读的效率。这部分内容不要求作句型结构分析和词汇掌握,仅作为阅读技能的提高练习。

## 复习单元

在复习单元中的练习是具有重复刺激特征的。练习内容包括短语动词、动词、介词、前缀以及有关定义和动词时态的进一步训练。复习单元还设有综合测试,使教师或学生本人能对学习本书的效果进行检验和反馈。

Teachers' Book 为教师或自学者提供了一些提示和建议,同时对容易引起争议的题目给出了答案,而直接可从课文中找到答案的问题则不列答案。本书对各单元教学和学习的建议仅供教师和学生在学习时参考。

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封面设计 王凌波  
责任印制 宋克学





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# **STUDENTS' BOOK**



# UNIT 1 The preservation of food

## 1 Why does food go bad?

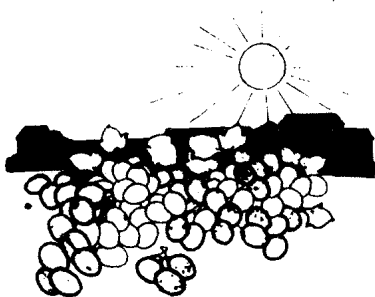
Food contains the proteins, fats, carbohydrates and vitamins which are vital to life. It should be fresh when we eat it. If it is bad, it can make us ill. There are two main agents which turn food bad—fungi (such as yeast and various moulds), and bacteria. These are micro-organisms which cannot make their own food and which live and grow on our food. Moulds, for example, are often seen on old bread. Yeast can spoil fresh food but it also has some very useful properties. For hundreds of years it has been used by man in the making of bread and wine. It acts as a catalyst in the process of fermentation.

In order to grow and multiply, all these micro-organisms need food, water, warmth and, in some cases, air. The methods used to preserve our food are intended to make conditions dry and very cold, unsuitable for the growth and multiplication of micro-organisms.

The great distances which often separate the producer of food from the consumer in the 20th century make effective food preservation vital. But in most preservation processes, many important vitamins and proteins are wholly or partially destroyed. One of the tasks of food technologists today is to find ways of preserving without losing these vital substances.

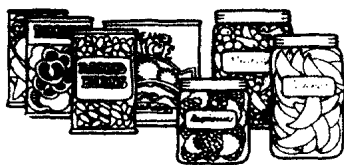
## 2 How is food dried?

In hot countries, food is dried simply by the heat of the sun. The moisture level in most fruits can be reduced to between 5% and 15%, which is low enough to inhibit the growth of micro-organisms. Some other foods are subjected to a process known as dehydration. In this process, a current of hot, dry air is passed over the food to absorb as much moisture as possible. Tea and coffee are often dried in this way.



## 3 What happens to foods when they are canned or bottled?

High temperatures kill micro-organisms in food and most micro-organisms need air. That is why food is vacuum-sealed in cans and bottles and then heated up to a temperature of  $100^{\circ}\text{C}$  (acidic foods) or  $120^{\circ}\text{C}$  (non-acidic foods) for about 10 minutes.

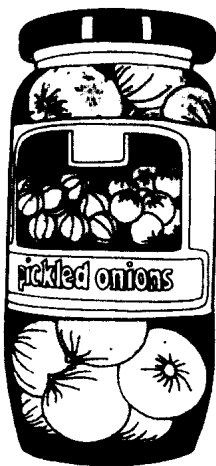


The food will then keep for a long time provided that the can or bottle remains airtight.

#### 4 How else can food be preserved?

There are several other ways of preserving food. One of them, freezing, will be dealt with in the next unit. Two very old methods, salting and smoking, are still used today.

A concentration of 5% or more of salt in food inhibits the growth of most micro-organisms. Smoking causes partial dehydration. Certain acids and chemicals are useful preservers as they stop the action of the enzymes produced by micro-organisms. Vinegar, for instance, is used to preserve onions and other vegetables. One of the newest methods is radiation. It is especially effective because it kills not only micro-organisms, but also their spores, thus stopping their reproduction.



## WORDS

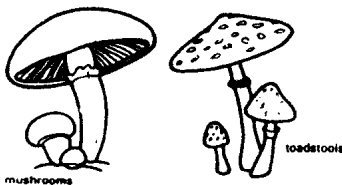
### WORD STUDY

**proteins** (1): very complex chemical substances in living cells. We must eat food containing proteins in order to replace cells in our own bodies. Proteins give us energy; they consist mainly of carbon, hydrogen, oxygen and nitrogen.

**carbohydrates** (1): chemical compounds found in both animals and vegetables (e.g. sugars and starch). Carbohydrates are the main source of energy in our food.

**vitamins** (1): chemical substances which are needed in small amounts for growth and health. Shortage of vitamins can cause illness. The main groups of vitamins are often called by letters of the alphabet: A, B, C, D, E, H, K and P.

**fungi** (1) (singular: *fungus*): simple non-flowering plants that cannot make their own food. We eat some fungi, such as mushrooms; others, toadstools for example, are poisonous.



*catalyst* (1): a substance which helps or speeds up a chemical change without itself changing. Biological catalysts (e.g. those produced by yeast during fermentation) are known as *enzymes* (4).

*fermentation* (1): the breaking down of a chemical substance with the help of a catalyst such as yeast. Heat or gas is usually given off during the process of fermentation. A *ferment* is a substance which causes fermentation. Note the different stress in the verb, *to ferment*. (Check this in the pronunciation glossary.)

*consumer* (1): a person who uses, or eats, a product.

*inhibit* (2): slow down or hold back.

*absorb* (2): take in, usually moisture or liquid. When rain falls on sand, the sand absorbs the rain.

*vacuum* (3): space which has been emptied of air or gas.

*sealed* (3): closed completely.

*airtight* (3): closed so that no air can get in or out.

*partial* (4): not complete. If food is partially dehydrated, some water remains in it.

*vinegar* (4): an acidic liquid produced by fermenting malt or wine. It is used to preserve eggs, onions and some vegetables. Preserving in vinegar is known as *pickling*.

*spores* (4): cell produced by fungi or other micro-organisms to reproduce the organism. A single spore often consists of several cells.

#### DICTIONARY WORK

1 *You may need an English/English dictionary to find out the answers to these questions*

- a) What is a vacuum pump used for?
- b) What can be done with a vacuum cleaner?
- c) How does a vacuum flask keep coffee warm?
- d) Describe how a partial eclipse of the sun happens.
- e) In which direction does the current of a river flow?
- f) How is electrical current measured?
- g) Bottled food is usually preserved in jars, not bottles. Draw two pictures to show the difference between a bottle and a jar.

#### WORD BUILDING

2 *Look at these two methods of making nouns from some verbs and adjectives*

i) grow—growth  
deep—depth  
long—length

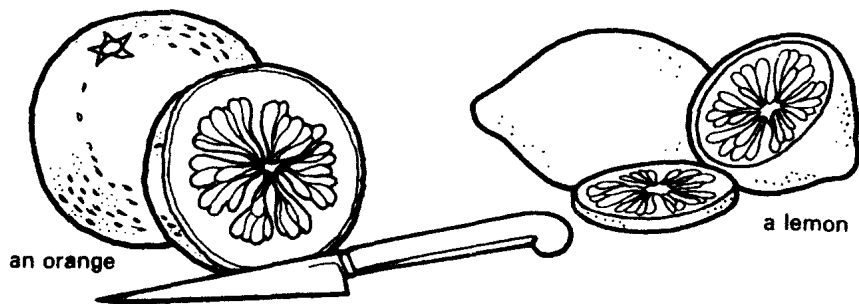
warm—warmth  
strong—strength  
wide—width

broad—breadth  
heal—health

- |                   |                 |                         |
|-------------------|-----------------|-------------------------|
| ii) dark—darkness | thick—thickness | soft—softness           |
| hard—hardness     | sweet—sweetness | loose—looseness         |
| black—blackness   | wet—wetness     | bitter—bitterness       |
| light—lightness   | tight—tightness | effective—effectiveness |

*Now choose words from the two lists to complete these sentences*

- The area of a rectangle can be calculated by multiplying the ..... by the.....
- ..... falls after the sun has set.
- Micro-organisms need air, water, food and.....
- The property which makes diamond useful for cutting glass and metals is.....
- Pressure under water increases according to.....
- Lemons are well liked because of their..... whereas oranges are usually eaten because of their natural.....



## QUESTIONS ON THE TEXT

### 3 Answer these questions

- What have yeast and mould in common?
- What is the principle behind all food preservation?
- How effective is the drying of fruit in the sun?
- How is food dried quickly in industry?
- What have the processes of canning and bottling in common?
- What effect does smoking have on food?

### 4 Make questions for these answers

- Both are vital to life and health.
- No, it is useful as well as harmful.
- No, it is boiled after it has been sealed.
- They are both very old methods of preserving food.
- Both substances are used to preserve food.
- There must be at least 5%.

5 Say whether these statements are true or false and correct the false ones

- a) Yeast, mould and bacteria are all fungi.
- b) Preserved food is just as good for you as fresh food.
- c) Food has to be boiled during the process of preservation by bottling or canning.
- d) Acid is a catalyst in the process of fermentation.
- e) It is more difficult to kill spores than the micro-organisms themselves.

## SENTENCES AND PARAGRAPHS

### RELATIVES

6 Look at these sentences

The methods *which are used* to prepare food inhibit the growth of micro-organisms.

Food contains the proteins, fats, carbohydrates and vitamins *which are vital* to life.

*They can be shortened to*

The methods *used* to prepare food inhibit the growth of micro-organisms.

Food contains the proteins, fats, carbohydrates and vitamins *vital* to life.

*Now shorten these sentences in the same way*

- a) Smoking and salting are processes which are used to preserve food.
- b) The meat which is in that lorry is all canned.
- c) Proteins are substances which are necessary for the growth of new cells.
- d) Smoking is a way of preserving food which has been familiar to man for centuries.
- e) Canning is a way of preserving which is suitable for most types of food.
- f) The food which is to be preserved is vacuum-sealed in the cans.
- g) Malaria is a disease which is carried by the mosquito.
- h) A barometer is an instrument which is used to measure atmospheric pressure.

### CONDITIONS

7 Look at these two sentences

Food will not spoil *if it is boiled* in an airtight container.



A Frenchman, Nicolas Appert, found out that food *would not spoil if it was boiled* in an airtight container.

*Now complete the second sentence in each pair below in the same way*

- a) Meat and fish can be kept for long periods if they are salted or smoked.

Ancient peoples knew that.....

- b) Food will not go bad if it is frozen.

In the 19th century, scientists found out that.....

- c) Food will lose most of its moisture if it is dried in the sun.

People in hot countries found out long ago that.....

- d) Vegetables lose many of their vital vitamins if they are boiled in water.

Food technologists discovered some time ago that.....

- e) Food keeps longer if it is treated with radiation.

A few years ago, American scientists proved that.....

## 8 Look at this example

Water/evaporate/boil → Water evaporates *if* it is boiled.

*Now make sentences in exactly the same way*

- a) gas/liquefy/compress
- b) water/solidify/freeze
- c) metals/expand/heat
- d) metals/contract/cool
- e) most micro-organisms/die/boil
- f) air/rise/heat

## DEFINITIONS

### 9 Look at this sentence

Canning



*Word to be defined*

is a process



*General class word*

(which is) used to preserve fo



*Closer definition*

*Look at this example*

vinegar/acidic compound/used/pickling

Vinegar is an acidic compound used in pickling.