

孔庆炎 张旭 童光燧 主编

新科技英语阅读教程

(下 册)

English for
Science and
Technology
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大连理工大学出版社

NEW EST READING COURSE

新科技英语阅读教程

下 册

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内 容 提 要

本教材是根据国家教委颁发的《大学英语教学大纲》(理工科用)编写的,可作为《大纲》规定的专业阅读阶段的教材,也可供具有中等英语水平的广大科技人员进一步进修英语使用。

本教材的特点是:一、通过精选的范文归纳、介绍不同文体英语科技文的篇章结构特点,以便帮助读者更有效地阅读英文科技文献,迅速搜集所需科技信息。二、围绕当代若干重要科技领域(如计算机、无线电通讯、航空航天、交通、能源、环保等)选取阅读文章,介绍这些领域的科技新成果和发展动向,但不过深涉及具体专业内容,因此本教材可供理工科各专业的学生和科技人员使用。

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Unit Six

Part One Discourse Features

Calculation and Measurement (计算和计量)

一、计算与计量离不开特定的计算语言。本章主要介绍长、宽、高等度量表示法；比例与倍数的表达以及运算过程中的套语。

1. 长、宽、高、厚、深度表示法

X is 数量 + 单位 long (wide, high, thick, deep)

e. g. The steel plate is about 2mm thick.

X is 数量 + 单位 in length (width, height, thickness, depth)

e. g. The building is 25m in height.

X has a length (width, height, thickness, depth) of 数量 + 单位

e. g. The gate has a width of 2ft.

The length (width, height, thickness, depth) of X is 数量 + 单位

e. g. The length of the railway is 2,000 miles.

2. 面积、体积表示法

X is 数量 $\begin{cases} \text{square} \\ \text{cubic} \end{cases}$ 单位 in $\begin{cases} \text{area} \\ \text{volume} \end{cases}$

e. g. The water in the container is 3 cubic cm in volume.

X has a(n) $\begin{cases} \text{area} \\ \text{volume} \end{cases}$ of 数量 + 单位

e. g. China has an area of 9.6 million square kilometers.

3. 容积表示法

X has a capacity of 数量 + 单位

e. g. The truck has a capacity of 10 tons.

X $\begin{cases} \text{is capable of holding} \\ \text{can hold (contain)} \end{cases}$ 数量 + 单位

e. g. The new dinning room can hold 200 people.

X is 数量+单位 in capacity

e. g. The tanker is 1,000 tons in capacity.

4. 重量表示法

X weighs 数量+单位

e. g. The big apple weighs 100g.

X is 数量+单位 in weight

e. g. Each egg in the box is 50g in weight.

X has a weight of }
The weight of X is } 数量+单位

e. g. The new-born baby has a weight of 3.5kg.

5. 比例表示法

The ratio (proportion) of X to Y is ...

X and Y are in the ratio of ...

e. g. The ratio of my annual income to my annual expenditure is five to four.

X { is directly (inversely) proportional to }
 { is directly (inversely) related to } Y
 { varies directly (inversely) with }

e. g. The development of industry varies directly with the natural resources in a country.

6. 倍数增加表示法

用表示增加意义的词 (increase, exceed, grow, rise, raise etc.) 加上...fold, ...times, by a factor of ..., etc.

e. g. The electric power produced in this area has increased { two fold.
 { twice.
 { by a factor of two.

7. 倍数减少表示法

用表示减少意义的词 (decrease, reduce, lower etc) 加上 by...times, by a factor of ... etc. 来表示

e. g. The loss of energy in the new engine has been lowered by { four times.
 { a factor of four.

8. 倍数的比较

1) 向上比, 即“...是...的 n 倍”或“比...大 $(n-1)$ 倍”

n times $\begin{cases} \text{as...as...} \\ \text{比较级 than} \\ \text{名词短语} \\ \text{what clause} \end{cases}$

e. g. The people there will pay four or five times as much as they used to pay for a dinner.

In 1987, the grain yield per mu in this village reached 1,350 kilos, 4.7 times the 1963 figure.

In 1988, they turned out 400 kinds of products with a total value more than 42 times what it was in 1950.

2) 向下比, 即“是...的几分之几”

分数 $\begin{cases} \text{as...as...} \\ \text{名词短语} \end{cases}$

e. g. This substance reacts with oxygen one tenth as fast as the other one does.

The leads of the new condenser are one-third the length of those of the old, yet the functions are the same.

9. 运算过程中的套语

1) 假设

If... (then/therefore/consequently)

Suppose that

Now assume that

Let

e. g. If $a-b=b-a$

then $2a=2b$

hence $a=b$

e. g. Let $s(x)=x$, Let $p(x)=2$

Now consider the function $f(x)=\sin \frac{1}{x}$

2) 解释或说明

For..., we have...

This shows that ...

The fact that... is / has...

The graph is shown in ...

The following is ...

As discussed / mentioned above

3) 求证

To prove this formula, note that...

Prove the following.

Prove that...

The calculation / formula is ...

This can be expressed as follows:

4) 归纳

Now it is obvious / clear that ...

We can conclude that ...

That is (to say) / i. e. / In other words...

As a result ...

Therefore we have ...

Exercise

划出下列定律论证的“套语”:

THEOREM

Suppose f is continuous at a , and $f(a) > 0$. Then there is a number $\delta > 0$ such that $f(x) > 0$ for all x satisfying $|x - a| < \delta$.

PROOF

Consider the case $f(a) > 0$. Since f is continuous at a , if $\varepsilon > 0$ there is a $\delta > 0$ such that, for all x ,

$$\text{if } |x - a| < \delta, \text{ then } |f(x) - f(a)| < \varepsilon$$

Since $f(a) > 0$ we can take $f(a)$ as the ε . Thus there is $\delta > 0$ so that for all x ,

$$\text{if } |x - a| < \delta, \text{ then } |f(x) - f(a)| < f(a),$$

and this last inequality implies $f(x) > 0$.

二、计算与计量常常涉及到简字缩语和常用的符号语言,熟悉这类符号语言的表达形式有利于顺利获取所需信息。

1. 几种主要计量单位的缩写及换算

1 mil(密耳) \approx 0.025mm

1 in(inch)(英寸) \approx 25.4mm

1 ft(foot)(英尺) \approx 0.30m

1 yd (yard)(码) \approx 0.91m

1 mi(mile)(哩) \approx 1609.3m

1 oz(ounce)(盎司) \approx 28.35g

1 lb(pound)(磅) \approx 0.45kg

1 ltn(long ton)(长吨) \approx 1016.05kg

1 gal (gallon)(加仑) \approx 4.51(升)

1 BTU(British thermal unit)(英热单位) \approx 0.25kcal(大卡)

2. 常用符号读法和用法

1) “&”读法与用法与 and 相似

e. g. Frequent application makes your skin soft, fresh & smooth.

常用(某种脂膏)可使肌肤柔软、细嫩、洁白。

2) “et al.” [et'ɔl] = and others

The article was written by Mr. Wang et al.

本文是由王先生等人写的。

3) “eg”(or e. g.) [i:dʒi:] = for example

4) “vs” [vi:es] “对”, “与 …相关”

e. g. vibration amplitude vs frequency

振幅与频率的关系

5) “/”该斜线号一般不必读出, 主要用法如下:

用于 and 和 or 之间 e. g. the inlet and /or outlet

入口和(或)出口

用于名词之间 e. g. Temperature / Viscosity Diagram

温度-粘度曲线图

carbon/graphite products

碳-石墨制品

用于略语之间 e. g. A/A = air-to-air

空对空

N/C lathe = numerical control lathe

数控车床

用于计量单位 e. g. 5kg/cm² = 5kg per square centimeter

6) () 读作 parenthese (or open interval)

[] 读作 bracket (or closed interval)

{ } 读作 brace (or set notation)

3. 常用数学符号及算式读法

$a=b$ a equals b ; a is equal to b

$a\approx b$ a approximately equals b

$a:b$ the ratio of a to b

$a>b$ a is greater than b

$a<b$ a is less than b

$a+b$ a plus b

$a-b$ a minus b

$a\times b$ a times b ; a multiplied by b

$a\div b$ a divided by b

a^2 a square(d)

a^3 a cube(d)

a^4	a (raised) to the fourth (power)
a^{-1}	a to the minus one
\sqrt{a}	the square root of a
$\sqrt[3]{a}$	the cube root of a
$\sqrt[5]{a^2}$	the fifth root of a square
a'	a prime
a''	a second prime
a'''	a triple prime
dz/dx	first derivative of z with respect to x
$y=f(x)$	y is a function of x
\int_n^m	integral of ... from n to m
$AB \parallel CD$	AB is parallel to CD
$AB \perp CD$	AB is perpendicular to CD
$1/3$	one-third
$4\frac{2}{3}$	four and two-thirds
0.51	point five one
10%	ten percent

Sample A

The Interior of the Earth

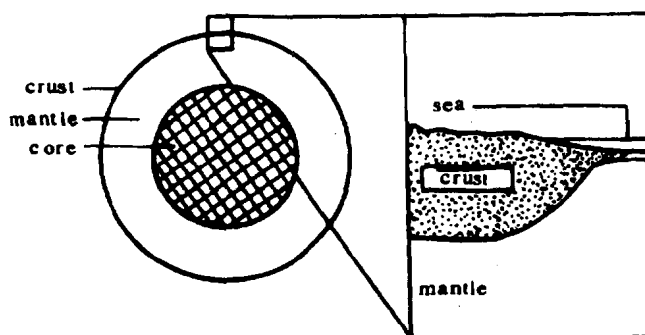
The planet we live on is not just a ball of inert material. During past ages dramatic changes have taken place inside the earth. Indeed, it is likely that without these changes life could never have originated on the earth. And changes are still going on today. They show themselves in the occurrence of earthquakes, in the outbursts of volcanoes, and in the uplift of mountain ranges.

In outward appearance, the earth is a nearly spherical ball with a radius of 6,350 kilometres. Internally the earth consists of two parts, a core and a mantle. An essential difference is that the core consists mainly of liquid and the mantle mainly of solid rock. The core extends outwards from the centre to a distance of some 3,450 kilometres. The mantle, as its name shows, is an outer covering extending from the core to the surface of the earth.

Judged by ordinary standards, the core is made of rather dense stuff. The material at the centre of the earth is at least thirteen times as heavy as ordinary water, while in the outer parts of the core the material is about ten times as heavy as ordinary water.

The mantle possesses a thin outer crust that is exceptional in being composed of a par-

ticularly light kind of rock, with a density about 2.7 times that of water. (Compare this with a density of 13 at the centre of the earth.) Over the continents of the world this crustal rock is about thirty-five kilometres thick, while over the oceans it is at most only two or three kilometres thick. Below the crustal layer comes a different, denser rock, probably of a basic silicate variety. Indeed it seems likely that, apart from the thin outer crust, the rocks of the whole mantle are of a basic silicate variety right down to the junction with the core, at a depth below the surface of about 2,900 kilometres.



Cross-section of the earth

We must now introduce the idea that pressures occurring inside the earth are very considerable. It is well known that at sea level our atmosphere exerts a pressure of about fifteen pounds per square inch. This in itself is no mean pressure, as we all soon come to realize if we have to pump up an automobile tyre. But the pressure inside the earth is vastly greater than this, amounting to tens of millions of pounds per square inch. At such enormous pressure, ordinary rock becomes appreciably squashed. Therefore, as we go inwards to greater and greater depths, the density of the rocks of the earth's mantle increases. The density immediately below the outer crust is about 3.3 times that of water, We may compare this with a density of 4.0 at a depth of 500 kilometres, 4.5 at 1,000 kilometres, about 5.0 at 2,000 kilometres, and with about 5.6 at the surface of the core, which is at a depth of 2,900 kilometres.

The last of these values is important. We are now saying that in the part of the mantle immediately outside the core, the density is about 5.6 times that of water. On the other hand immediately inside the core the density is about 9.7. This means that at the surface of the core there is not only a change from liquid on the inside to solid on the outside, but there is also a very considerable change in the density of the material, from 9.7 on the inside to 5.6 on the outside. This change gives an important clue to the nature of the material in the core.

New Words and Expressions

△ originate (from)	[ə'ridʒineɪt] v.	起源
inert	[i'nɜ:t] a.	惰性的
△ originate (from)	[ə'ridʒineɪt] v.	起源
△ volcano	[vɒl'keɪnəu] n.	火山
△ spherical	['sferikəl] a.	球形的
mantle	['mæntl] n.	地幔
silicate	['silikit] n.	硅酸盐
△ junction	['dʒʌŋkʃən] n.	连接
△ appreciably	[ə'pri:ʃiəbli] ad.	可察觉地
squash	[skwɒʃ] v.	压碎

* * * * *

apart from	除...外
come to (+不定式)	渐渐

Exercises

1. Comprehension

1. Which statement expresses the main idea of paragraph one?
 - A. The inside of the earth keeps changing.
 - B. Changes taking place inside the earth are exciting.
 - C. The earth is a big ball consisting of inert material.
 - D. Man should take advantage of the dramatic changes.
2. Earthquakes and volcanoes are mentioned in the first paragraph in order to emphasize that _____.
 - A. they are disastrous events
 - B. they are good examples of dramatic changes inside the earth
 - C. they can do anything harmful to human beings
 - D. man will be able to control them in the future
3. Which is not true according to the reading passage?
 - A. The core is chiefly made up of liquid rock.
 - B. The core is the inner part while the mantle is the outer layer.
 - C. The earth is not a complete ball indeed.
 - D. The core has a diameter of some 3,450 kilometers.
4. Which statment is true?

- A. The mantle has a thick crust consisting of a kind of light rock.
 - B. The thickness of the crustal rock is almost the same all over the world.
 - C. The deeper the material, the heavier it is.
 - D. The core consists mainly of the liquid water.
5. In paragraph 5, the sentence "We must now introduce the idea that the pressures occurring inside the earth are very considerable" means that _____.
- A. pressure inside the earth should be taken into consideration
 - B. the earth has quite high inside pressure
 - C. we must consider that pressures inside the earth are very critical
 - D. we must take it as a new idea that the earth has a high pressure
6. In the sentence "The density immediately below the outer crust is about 3.3 times that of water." The word "immediately" can be paraphrased as _____.
- A. just directly
 - B. without delay
 - C. at once
 - D. so far
7. In the first sentence of the last paragraph, "the last of these values" refers to _____.
- A. 5.0
 - B. 4.5
 - C. 2,900
 - D. 5.6
8. At the surface of the core, a critical change occurs because of _____.
- A. a change from liquid on the inside to solid on the outside
 - B. a considerable change in the density of the materials
 - C. the considerable depth
 - D. both A and B
9. The sentence "This change gives an important clue to the nature of the material in the core" means that _____.
- A. this change is essential to the earth's existence
 - B. this change will help us to understand the unique properties of the core
 - C. the answer can be found in the book "Nature of the Material"
 - D. up to now nobody has found a key to the question
10. Which word is the most suitable for the style of the article?
- A. Descriptive
 - B. Argumentative
 - C. Narrative
 - D. Expositive

I. Fill in each blank with a proper figure.

- 1) The diameter of the earth is roughly _____ kilometers.
- 2) The core is an inner part of the earth with a radius of some _____ kilometers.
- 3) The thickness of the mantle is about _____ kilometers.
- 4) The material at the center of the earth is approximately _____ times as heavy as the material in the outer parts of the core.
- 5) Suppose a certain volume of a kind of material on the earth's surface weighs 2 kilograms, the same volume of the material at the center of the earth has a weight of _____.

_____ kilograms.

III. Fill in the blanks with the words given.

1. originate origin original originally

- A. The _____ of the flood was three weeks of heavy rains.
- B. His _____ intention was to become a scientist.
- C. Mr. Lee is a brilliant and _____ teacher.
- D. This is not what we _____ set out to do.
- E. The quarrel _____ in a misunderstanding.

2. exceptional exception except exceptionally

- A. The room was never much used, _____ for occasional visitors.
- B. All men between 18 and 45 without _____ are expected to serve in the army during a war.
- C. The boss treated his employees with _____ kindness.
- D. This radio has an _____ good tone.

3. various variable variety variously variation

- A. People of _____ backgrounds applied for the job offered by the company.
- B. The height of this mountain has been _____ calculated at from 500 meters to 1000 meters.
- C. Most _____ of steel contain elements such as carbon, silicon and phosphorus.
- D. Changing weather conditions are usually the result of _____ in air pressure.
- E. The amount of heat produced by this electrical apparatus is _____ at will by turning a small handle.

4. dense densely density

- A. The _____ of the woods prevented us from seeing more than a little way ahead.
- B. The crowd was so _____ that we could hardly move.
- C. As we know, China is a _____ populated country.

5. extend extension extensive extent extensively

- A. The land _____ for three miles in that direction.
- B. They made _____ friendly contact with the Chinese people.
- C. To what _____ are you willing to help us?
- D. You should use dialogues _____ for question-and-answer practice.
- E. They provided valuable data for the _____ of our foreign trade.

6. consider considering considerate considerable consideration

- A. All things _____, you did very well.
- B. He went to a _____ amount of trouble.

- C. Your teacher will take your recent illness into _____ when judging your exam.
- D. That was very _____ of you.
- E. _____ the distance, he arrived very quickly.

Sample B

THE GROWTH OF POPULATION

The founding fathers of the United States of America apparently felt that our continent could not be crowded for a very long time. In 1751, in *Observations Concerning the Increase of Mankind, Peopling of Countries, etc.* Benjamin Franklin had written, "So vast is the territory of North America that it will require many ages to settle it fully." As the United States approaches its two-hundredth anniversary, however, there is a growing sentiment that we are already too crowded and many Americans are working for "zero population growth." Paul Ehrlich has written that "Too many cars, too many factories, too much detergent, too much pesticide, multiplying contrails, inadequate sewage treatment plants, too little water, too much carbon dioxide—all can be traced easily to too many people".

In this chapter we shall look at world and United States population and living standards in order to demonstrate their effects on the growth of environmental problems and on the consumption of natural resources.

World population growth during the past millennium has been startling. Although exact figures do not exist even for today, and population figures for several centuries ago in some countries may only be accurate to within a factor of two, it is clear that world population growth has been accelerating. Figure 2—1 plots world population data from the United Nations in three different ways. Figure 2—1(a) plots the population on an ordinary arithmetic graph, on which a straight line would represent a constant annual increase; the dotted line shows how the world's population would have increased if it had continued to grow from 1800 at the rate of 5 million persons a year characteristic of the early 1800's. Figure 2—1(b) shows the population growth on a logarithmic graph, on which a straight line would indicate a constant percentage growth rate and thus larger and larger annual population increases; the dotted line plots a constant 0.5% annual increase beginning in 1800. In fact, world population is rising sharply even on a logarithmic scale, which means that the growth rate is increasing or that the time between successive doublings of the population is decreasing. Figure 2—1(c), which is included only for curiosity's sake, shows a plot of the reciprocal of world population; the plot approximately follows a straight line which has been drawn in for comparison and which predicts zero reciprocal population, or infinite population, about

a quarter of the way into the 21st century. The fact that world population follows a curve of this sort was pointed out in 1960 by von. Foerster, *et al.*, who pinpointed Doomsday as Friday, November 13, 2026 A.D.^①.

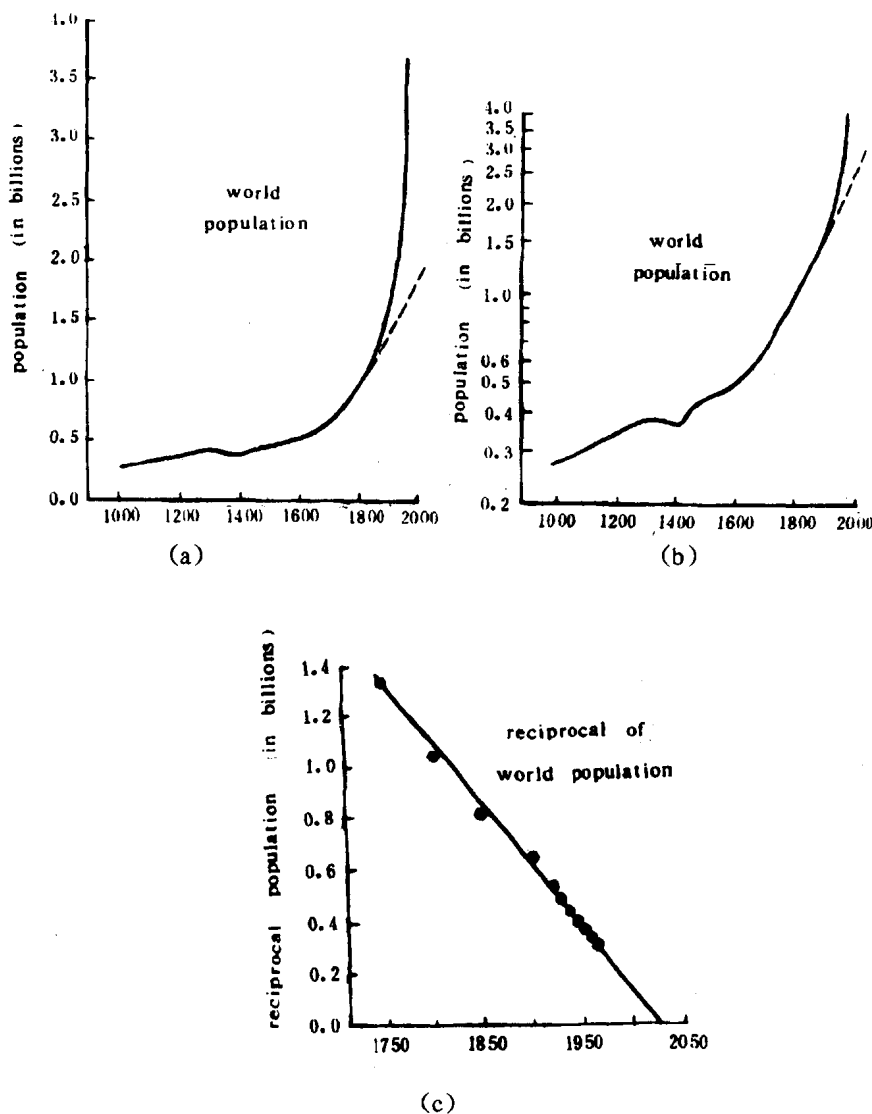


FIG. 2—1 World population plotted on three different scales. (a) Arithmetic scale; the dotted line corresponds to a constant annual increase of 5 million persons beginning in 1800. (b) Logarithmic scale; the dotted line corresponds to a constant annual growth rate of 0.5% beginning in 1800. (c) Reciprocal scale; the straight line is an approximate fit to the data that extrapolates to zero reciprocal population (infinite population) about 2026 A.D.