College Scientific-technological Practical English

大学科技实用英语

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序

为适应国家发展的需要，为迎接人才市场的竞争，学校决定要进一步提高大学生的外语水平。如何提高，有什么措施？有三条：一曰“加粗一条线”，即大学四年必须年年学外语、用外语、四年不断线，这一条线要加粗。基础外语两年，要进一步提高教学水平，提高课堂效率，改进教学效果；通过四级水平考试以后，三、四年级的学生还须继续学好“专业外语”，最后一学期则应该结合毕业论文与设计查阅和利用外文文献，边用边学，边巩固边提高；第二条措施叫“把好两道关”，第一关即基础外语四级水平考试关，不通过这一关不能学习后续的外语课，不通过这一关拿不到毕业证；第二关，是专业外语关，专业外语也要在毕业前进行校内统考，这一关过不了的也不能算是合格的大学生。学专业外语就是为了更快更好更有针对性地掌握和运用外语工具，真正做到有的放矢，学以致用。第三条措施是搞好“三结合”：即外语课、专业基础与专业课以及创造学用外语的环境和气氛，三方面紧密结合。我们坚持提倡有条件的专业课或专业基础课尽量使用部份或全部的外文教材，尽量全部或部份地用外语讲授。

目前，在执行这三条措施中急待改革和加强的是“专业外语”课的教学。各专业都有各自的做法和经验，但总结交流不够，从学校乃至全国范围来说，对本课程的设置缺乏明确具体的要求和有效的办法，在教学内容上，对这种特殊用途的外语的意念表达，结构特点，惯用文体以及专业词汇等方面都缺乏明确具体的设计目标，因而影响了教学效果和效率。

这套专业英语教材就是适应改革与加强的要求，聘请了外语教授、留学回国又有专业英语教学经验的有关专家们共同合作，经过较长时

间的研讨和准备，并经过试用与修订，才正式出版的，我们希望全体任课教师与学习者共同参与这项改革与探索，通过大家的共同努力，使我校学生的整体外语水平有一个较大的提高。

副校长、教授：梅　炽

一九九四年一月二十八日

前 言

《大学科技实用英语》是供大学文、理、工科本科学生在第五学期进入专业英语阅读阶段而编写的。

搞好专业英语的教学是提高学生英语整体素质的重要一环。为了适应市场经济发展的需要，根据多年来的教学实践，我们编写了这本具有实用和科技特色的教材。本教材把文、理、工科本科学生常遇到的共同的科技问题集中在一起，英语语法深度接近五级左右。全书共15个单元，分为实用和科技两部分。实用部分的课文内容有保险公司的保险条款，外资合同的订立，银行信用卡，旅行支票和旅行信用证，各种涉外信函，专利代理机构，关贸总协定，管理科学以及联合国教科文组织等。科技部分的课文内容有数学、科学研究的本质、宇宙旅行、激光和全息照相技术，未来计算机趋势与预测、遥感以及环境与卫生等。为帮助学生参加全国英语六级统考和研究生考试，本教材除与课文内容有关的问答题、理解题、中译英和英译中等外，还编写了选择填空、改错、综合填空和阅读材料。另配有教师参考用书和课文录音磁带。通过这本书的学习，不但对英语知识有巩固提高的作用，而且对读者又有扩大科技知识面的作用。

参加本教材编写的有殷志云(第一单元)、杨松青(第二、五、六单元)、罗英豪(第三、四、八单元以及第二、五、六、九单元的练习V、VI、VII)、吴慰先(第七、十三单元)、赵显富(第九单元)、张从益(第十、十一单元)、梁奕昌(第十二、十四单元)、盛之(第十五单元)。本教材实用部分由罗英审稿，科技部分由杨松青审稿。罗英豪负责全书编辑。

中南工业大学教务处、校专业外语建设委员会领导整个编写工作。梅炽副校长对本教材给予了高度的支持和关注并写"序"。教材科为本书的印刷装订作了大量工作。

对所有支持和帮助本书编写的人员和单位，我们在此特表示衷心的感谢。

编　　者

一九九三年八月

CONTENTS

Unit One

Before Reading

1. Look up the following words in your dictionary:
   descriptive, explanatory, qualitative, quantitative, postulates, deductions
2. Read the passage again and underline the following information in the text:
   (1) In what sense mathematics is called the language of science?
   (2) What is the difference between a scientific theory and its correlated mathematical system?
   (3) "Discoveries in science sometimes advance so rapidly that an adequate mathematical system lags behind." What is your understanding of the sentence? Cite an example in point.

Text

MATHEMATICS AS A LANGUAGE OF SCIENCE

A branch of science deals with a class of things, the changes in the members of the class, and the relations between these members. Thus the ideal form of a natural science is the same as that of mathematics. The objective in natural science is to discover relations which assert that when an event p is present in a situation, then the event Q also present. As a branch of science advances from a descriptive and qualitative stage to one where the relations can be expressed in a quantitative and explanatory manner, the science assumes a mathematical form. Astronomy at one time was a descriptive science, but work of Kepler and Newton established foundations, by means of which the laws of the motions of the heavenly bodies could be expressed mathematically. It is in this sense that mathematics is sometimes called the language of science. When the postulates of a branch of science satisfy the requirements of the postulates of a branch of mathematics, then the hypothetical propositions of that branch and the deductions from them can be used in the verification of prediction of the propositions of the corresponding branch of science.

One difference between a scientific theory and its correlated mathematical system is that, if the mathematical deductions predict phenomena which conflict with experiment, then some or all of the initial postulates of the scientific theory must be modified or discarded; but though the physical theory has failed, the mathematical system is not discredited, remaining as consistent as ever. It has served one of its purposes in bringing to light the inadequacy of the scientific hypotheses.

At times, developments in mathematics have far exceeded the needs of any concrete science, properties of conic sections discovered by Appollonius, a Greek mathematician, were not applied until Kepler made use of ellipses to describe the motions of the planets around the sun. On the other hand, discoveries in science sometimes advance so rapidly that an adequate mathematical system lags behind. Important mathematical theories, developed as abstract sciences from apparently quite arbitrary sets of postulates, have later proved to be useful tools in applications of mathematics. It was from a study of algebraic equations that mathematician was led to predict that only 32 types of crystals would be found in mineralogy. Conical refraction of light was predicted by Hamilton from his mathematical study, before it was observed in the laboratory.

Mathematical deductions suggest experiments and also mathematical tools developed for the purposes of science have turned out to be powerful stimulus for growth in pure mathematics. The study of the flow of heat in a metal plate led the physicist Fourier to the invention of a series which not only solved complicated problems in the study of heat but slso gave great impetus to the development of pure mathematics.

Science and mathematics advance in paralleled columns each assisting and stimulating the other — the hypothetical propositions of mathematics are called into play when the generalizations of science take on a quantitative form and frequently suggest new experiments; while, on the other hand, complexities in observed data of science stimulate the development of mathematics and broaden its foundation.

New Words and Phrases

objective n. 目的；任务
assert v. 断言；主张
astronomy n. 天文学
at one time 曾经；从前有个时期
heavenly body 天体
postulate n. & v. 公设，假设；假定
hypothetical a. 假说的
proposition n. 定理
verification n. 证明，证实
correlate v. 使互相关系
conflict (with) v. 抵触
modify v. 变更；限制
discard v. 丢弃，废除
discredite v. 怀疑
consistent a.始终如一的
as ever 仍旧，照常
hypothesis (pl. hypotheses) n. 假设；臆说
at times 时时
bring sth. to light 使某事显露出来；揭露某事

conic section　n.　圆锥曲线；二次曲线
ellipses (pl. ellipses)　n.　椭圆
arbitrary　a.　任意的
crystal　n.　结晶体，水晶
mineralogy　n.　矿物学
conical　a.　圆锥(体、形)的
refraction　n.　折射
stimulus　n.　刺激
impetus　n.　推动力
call into play　使动作，使活动//发挥，发扬；调动，发动
take on　呈现(新面貌等)；具有(特征等)
datum (pl. data)　n.　数据

Notes to the Text

1. As a branch of science advances from a descriptive and qualitative stage to one where the relations can be expressed in a quantitative and explanatory manner.

Where clause 是关系从句。where 是关系副词，含义相当于in which。除 where, 还有when 和 why。这些关系副词在意义上都相当于一定的"介词+which"结构。

2.……but work of Kepler and Newton established foundation, *by mean of which* the laws of the motions of the heavenly bodies ……

科技文章的特点之一是使用关系从句较多。关系代词(主要是 which)可以与介词或复合介词(如 by means of, as a result of 等)搭配。介词的选择既要注意与其后的词，也要注意与其前的词的搭配关系，如

The material *of which* the apparatus is made is a good non—conductor of heat.

The speed *at which* the coding can be done depends on the speed at which the operator can work.

上述第一例用 of，是与后面的 is made 有关；第二例用 at，是与其前的the speed 有关。

3. It is (was) …that 系强调句型。被强调的成分除谓语动词外，还可以是名词、形容词、副词等，也可以是介词短语或从句。如

It is *in this sense* that mathematics is sometimes called the language of science. (正是在这种意义上，数学有时被称为科学的语言。)

It was *from a study of algebraic equations* that mathematician was led to predict that ……

It was *when she was about to go to bed* that the telephone rang.

必须区别分裂句主语it 和为形式主语的先行词it。试比较：

It is surprising that Mary should have won the first place.(形式主语)

It is Mary that has won the first place.(分裂句主语it)

还要区别分裂句中的that—分句和用作关系分句的that—分句。试比较：

It is money *that is most needed.* (分裂句中的that 分句)

This is the money *that is most needed.* (关系分句)

4. … then some or all of the initial postulates of the scientific theory ***must be modified*** or ***discarded***;…

科技文章一般描述客观事物，不宜以人为主语。因此在科技文章里，被动语态使用得较多。这又是科技文章的特点之一。

5. … remaining as consistent as ever (分词短语作状语，表示伴随动作)

科技文章的又一特点是大量使用非谓语动词(动名词、分词、不定式)，作主语、表语、宾语、定语、状语、宾语补语等。

to be powerful stimulus (不定式短语，作表语)

each assisting and stimulating the other (独立主格分词结构，作状语)

Exercises:

Ⅰ. Answer the following questions:

1. Why is mathematics called the language of science?
2. What is the ideal form of a natural science? why?
3. What is the objective in natural science?
4. What does the science assume?
5. What do mathematical deductions suggest? Why?
6. Why do science and mathematics advance in paralleled columns?

Ⅱ. True or False? If you think a statement is false, correct it and make it a true one.

1. As a branch of science advances from a descriptive and qualitative stage to explanatory and quantitative one, the science assumes a mathematical form.

2. The law of the motions of the heavenly bodies could be expressed mathematically.

3. If the postulates of a branch of science fulfil the requirements of the postulates of a branch of mathematics, the hypothetical propositions of that branch and the deductions from them can be used in the verification of prediction of the propositions of the corresponding branch of science.

4. If the mathemaical deductions predict phenomena which conflict with experiment, some or all of the initial postulates of the scientific theory must be changed and get rid of.

5. Properties of conic sections were discovered by Appollonius and were not applied when Kepler made use of ellipses to describe the motions of the planets around the sun.

Ⅲ. Translate the following into English:

1、我们花了不止一个小时看完这本数学书。这本书不但是某些知识的积累，而且也提供了一种观察和解决问题的方法。

2、有些推理显得很简单，另一些属于预言，但行星的轨道必定是个椭圆这个事实早已用数学证明了。

3、数学是一门自然科学，许多数学原理和体系在大多数场合下已远远超过它们的实际应用和任何一门具体科学的需要。

4、解一个方程式(equation)就是求出未知项的值。要做到这一点，我们当然必须移项(term)，直到该未知项单独在方程式的一边，从而使这未知项等于方程式另一边的数值。

Ⅳ. Translate the following into Chinese:

Mathematics Comes from Practice

Engels said, "Like all other science, mathematics arose out of the needs of men." From the very beginning, mathematics was the direct or indirect attempt to satisfy a definite need in production.

In his social practice, man began to feel the need of counting things and calculating the volume of a container. From this early need came the concepts of number and shape. Then, geometry developed out of problems of measuring land, and trigonometry came from problems of surveying. To make calculation simpler, man learned to use symbols too, and algebra came into being as a result.

In elementary mathematics, we deal with constants only. With the rapid development of industry in 17th century, calculating with constants could on longer satisfy the needs of production. Many new problems in production called for a solution. To solve these problems, man began studying variable quantities and motion. This leap from constants to variable quantities brought about a new branch of mathematics — calculus.

In a word, mathematics comes from man's social practice. In studying mathematics, we must combine theory with practice. We must make mathematics servesocialist construction of our country.

Ⅴ. In each sentence, decide which of the four choices given will most suitably complete the sentence if inserted at the place marked.

1. The Millers live ______ 1614 Maple Street.
   A. on B. at C. in D. of
2. I don't know what I'd have done if I ______ to make that decision.
   A. would have B. had had C. have had D. did have
3. I wish that I ______ to the concert last Friday.
   A. could go B. could have gone C. have gone D. went
4. I helped with the Johnson report because I was in charge of the work ______ on it.
   A. did B. doing C. being done D. that did
5. The examination wasn't very difficult, but it was ______ long.
   A. too much B. so much C. very much D. much too
6. That house was expensive. It cost ______.
   A. a fortune B. expensive C. expensively D. highly
7. The day's work ______, Mary and Mable are playing cards.
   A. are done B. doing C. done D. did
8. My wife bought the blue rug, but I ______ bought the brown one.

A. will rather have B. rather had

C. would rather have D. would have rather

9. The Roxy Theater is ______ Fourth Avenue.

A. at B. on C. down from D. across

10. He tried many times to sneak across the border to a neighbouring country, ______ each time.

A. having been caught B. only to be caught

C. always being caught D. unfortunately caught

11. Fred seems very clever. His ideas led to ______ a pay raise.

A. his awarded B. his being awarded

C. him to award D. him to be awarded

12. Someone will have to teach Helga ______ tennis.

A. how to play B. how play C. play D. plays

13. I'll walk ______ the corner with you.

A. until B. at C. as far D. as far as

14. It ______ everyday so far this month.

A. is raining B. rained C. rains D. has rained

15. The kerosene lamp, ______ its chimney to help control air currents, was a big improvement over the candle.

A. but B. which C. with D. has

Ⅵ. Each of the following sentences has four parts. These parts are lablled A,B,C and D. Identify the part of the sentence that is incorrect and then, without altering the meaning of the sentence, write down your correction.

1. Rumor(A) has this(B) that(C) there will be a(D) strong earthquake.

2. Upon(A) a receipt(B) of your reply(C) we will forward(D) the package.

3. Our country is quite fortunate of having(A) very large potential(B) energy reserves(C) in(D) coal and uranium.

4. People will be able to fly from one planet to another(A) in nasty little(B) arrow—shaped tubes. I say(C) "people" because I have no intention to be(D) one of them.

5. The more subtle(A) message is that the president has succeeded in guaranteeing(B) a smooth transfer of power to his equal pragmatic(C) chosen(D) successors.

6. Rumors that(A) the First Lady is(B) ill have circulated(C) since she had begun(D) to lose weight noticeably last year.

7. He told me that he had been lame ever since he had been knocked off his bicycle fifteen years ago.
A: had been B: lame C: had been D: ago

8. Compared with coal burners, nuclear power plants generate fewer waste.
A: Compared B: with C: burners D: fewer

9. The public chief concern about nuclear energy revolves around the waste problem.
A: public B: concern C: about D: revolves

10. There were probably as many facts known about Reagan's life and career when he took office than any recent President's.
A: known B: when C: than D: any recent President's

Ⅵ. Cloze Test

Nearly three—quarters of the Earth is covered with water. Water heats up more slowly than land, but once it has become warm it takes longer to (1) down. If the Earth's surface were entirely land, the temperature at night would (2) quite quickly and night would be much colder than day, as it is on the moon. This does (3) happen in inland deserts, hundreds of miles from any sea. The climate of the continents, especially in the temperate (4) , is very much affected by the oceans around them. The areas close to the sea have a 'maritime climate', (5) rather cool summers and warm winters. The interiors, far from the sea, have a ' (6) climate' with extremely hot summers and cold winters.

Rain (7) from the evaporation of rivers, seas and lakes. Even after heavy rain, the pavements in a city do not take long to dry (8) the rainwater evaporates into the air. On a warm dry day it evaporates very rapidly, (9) warm air can absorb more moisture than cold air. But at any particular temperature, the (10) can hold only a certain maximum amount of water vapour. The air is then saturated (饱和), like a sponge that can not hold (11) more water. The lower the temperature, the (12) water vapour is required to saturate the air.

All over the surface of the Earth, millions of tons of water are (13) every second, condensing in the air into drops so small (14) it takes thousands of them to make a single raindrop. It is these (15) droplets that make clouds. When clouds roll in from the sea over the warmer land, they are forced to (16) and become cooler in the colder upper atmosphere. As the air cools down it may pass through its saturation point and (17) some of its water vapour turns to rain. Day in, day out, the (18) water circulates between the air and the land: rivers (19) to make clouds, clouds make rain, rain makes rivers which in turn run into the sea. This is called the rain (20).

1. A) cool	B) balance	C) keep	D) condense
2. A) rise	B) loose	C) miss	D) fall
3. A) indeed	B) not	C) however	D) just
4. A) centres	B) moisture	C) fields	D) zones

5. A) with	B) instead of	C) within	D) owing to
6. A) maritime	B) continental	C) conventional	D) normal
7. A) evaporates	B) results	C) comes	D) restrains
8. A) though	B) because	C) while	D) so that
9. A) where	B) now that	C) as	D) so long as
10. A) climate	B) atmosphere	C) weather	D) rivers
11. A) no	B) some	C) any	D) much
12. A) more	B) less	C) fewer	D) greater
13. A) beating up	B) flowing	C) evaporating	D) moving
14. A) for	B) that	C) then	D) yet
15. A) big	B) enough	C) tiny	D) circulating
16. A) raise	B) drop	C) be cold	D) rise
17. A) then	B) already	C) merely	D) soon
18. A) running	B) vapour	C) evaporated	D) same
19. A) evaporate	B) try	C) cool	D) tend
20. A) saturation	B) effect	C) system	D) cycle

Reading Materials

Ⅰ. MEASUREMENT

In the development of the physical sciences, we observed a rapid increase in scientific achievements after man began basing his conclusions upon experimental facts instead of upon inference. Experimantation, however, shows a quantitative study of some aspect nature, and the important part of such a study is the measurement of the things with which it deals. Measuring any quantity means comparing it with an accepted unit as a standard, and finding out how many times larger or smaller it is than the standard unit. The length of an object is measured by finding how many times longer it is than some standard unit of length. For example, if this book were taken as a standard, and laid end to end five times along a desk surface, we know that the desk is 5 book–lengths long. If this book is laid down end to end five times and it does not quite reach the other end of the desk, we say that its length is a little over 5 books. In scientific work this "little over" part is not accurate enough. To be more accurate, we must measure what fractional part of the book the desk exceeds 5 book–lengths. If we measure the desk to be 1/5 of a book longer than the 5 book–lengths, we say its length as $5\frac{1}{5}$ or 5.2 book–lengths. A more accurate measurement could be made by subdividing the book into ten equal parts. We would measure the desk to be a little more than 5.2 books long. Again we would have to measure the fractional part of the subdivision by which the desk is longer than 5.2 book–lengths. If we found the fractional part as 1/2 a subdivision, we would write down a length of 5.25 books. The last measurement is obviously far more accurate than those for the larger units. The greater the accuracy needed, the smaller the subdivision must be.

The weight of an object is similarly determined by finding how much heavier it is than some accepted standard weight unit. For example, if a piece of copper is four times as heavy as a standard pound, its weight is 4 pounds. Also, the smaller the subdivisions we have for the standard weight, the more accurate the weighing can be made.

Answer the following questions:

1. What does man base his conclusions upon?
2. What does measuring any quantity mean?
3. How is the length of an object measured? Cite an example in point.
4. How is the weight of an object determined? Cite an example in point.

II. WHY DO WE COUNT THINGS IN GROUPS OF TEN

Why do we count things in groups of ten? The reason is that we have ten fingers. Long ago, when people had to count many things, they matched them against their fingers. First they counted out enough things to match the fingers of both hands. Then they put these things aside in one group. If there were more than ten things to count. they formed more groups. We smight call our numbers two-handed numbers, because they grew out of counting things on two hands.

Some people had one-handed numbers, too. Because there are five fingers on one hand, they counted things out in groups of five. One-handed numbers were used by the people who lived in Italy over two thousand years ago. We call their written numbers Roman numerals, which we use even today. In Roman numerals, I stands for one, and V stands for five . To write six, the Romans wrote VI, which means five and one. A long time ago, when people did not wear shoes, they could use their toes for counting, too. So some people had a barefoot arithmetic. They counted things out in groups of twenty.

Sometimes people counted things in groups of twelve. We still use the twelve-in-one-group system for some purposes. When we measure time with a clock, we count the hours from one to twelve, and then start with one all over again. The twelve-in-one-group system has left its mark on the English number-names, too. In English there is a word for each number from one to twelve. To name higher numbers above twelve, ten-in-one-group system is used.

Thousands of years ago there was a tribe who used to count things in groups of sixty. And we still use the sixty-in-one-group system when we measure time. There are sixty seconds in a minute, and there are sixty minutes in an hour.