# 物理专业英语

主编　王志文

北京理工大学出版社
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## 内 容 简 介

本书根据高校物理类专业学生对物理专业英语知识的需求编写，包含科技英语的特点介绍、英语写作和翻译技巧、例文翻译、英文文献阅读、前沿科技文献阅读等内容，力求翔实地阐述物理专业英语的构词和语法特点、翻译和写作技巧等知识，使读者在学习物理专业英语语法和翻译技巧的同时，了解各科学领域的研究方法和研究进展，也有助于提高读者的英文文献阅读能力和英文论文写作能力。本书层次清晰、布局合理，可作为高校物理类专业的教材或参考书，特别适合物理学基础人才培养和创新型人才培养。对于其他理工科专业，本书也可作教师备课时的参考书和学生的辅助读物。

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# 前　言

物理学是科学技术发展的基础，每一次物理学的重大成果的取得都会推动社会科技的迅猛发展，几次工业革命都与物理学的基础作用分不开。中华人民共和国成立以来，尤其是1978年全国科技大会召开后，我国高度重视物理及其他各科技领域优秀人才培养以及不断加深国际交流合作，使我国科技不断地发展，社会生产力水平得到了飞跃式提高。

目前，国际学术交流以英语为通用语言，国外有很多经典物理教材以英文撰写，且各类顶级期刊大部分为英文期刊。因此要培养我国物理学人才的国际视野，必须进一步加强物理学人才的英语水平，尤其是物理专业英语水平。这关系到“我们要读懂世界”，也关系到“让世界读懂我们”。本书以此为目标，力求翔实地阐述物理专业英语的语法特点和构词、翻译和写作技巧等知识。让学生掌握方法，从而能融会贯通。同时，本书引用了大量英文文献，涵盖多个科学领域，旨在培养学生的科学精神和素养，拓宽学生视野。

本书共包含三章和两个附录。第一章主要讲述了科技英语的特点；第二章重点讲述了科技英语写作及翻译技巧；第三章以英文短文阅读的方式讲述了物理学中重要物理概念的英文表述，引用了多种英文文献资料，以及科学前沿研究论文和研究动态。附录分别列出了物理学各学科方向分类以及部分物理专业英语缩略词表。王志文负责该书框架的构建，第一、二章的编译，以及第三章的部分材料的收集；陈战东、莫晓华负责第三章的编译；陈战东还负责全书的审阅和校对。

本书讲义在广西民族大学物理专业已试用十多年，其前两章也被电子类专业的专业英语课程教师选作参考。本书在编写过程中，参考了大量国内外近几年出版的专著、文献和教材，在此向前辈和同行们表示衷心的感谢！

因编著者水平有限，书中难免存在疏漏和错误之处，恳请读者指正。

编　者

# 目 录

# 第一章

# 科技英语

## 一、The concept of EST（科技英语概念）

1. English for special purpose, ESP（专用英语）

1）English for academic purpose, EAP（学术英语）.

EAP is defined as the study skills necessary for some academic or professional course of study. It may be necessary for a student to follow scientific courses and lectures through the medium of English, practise in note-taking and master the language appropriate to seminar discussion. EAP is used by overseas students, researchers and visiting scholars at schools and universities in Britain and America or in other countries where English is also used in courses and lectures.

学术英语的定义：为学习学术性或专业性课程而必备的学习技巧。它可能对一个以英语为媒介修习科学类课程或讲座，训练记笔记和学术讨论而掌握这门语言的学生是必需的。海外学子运用学术英语，英国和美国或者其他国家的一些综合大学的研究员和访问学者们在上课和演讲时也用英语。

2）English for vocational or occupational purpose, EOP（职业英语）.

EOP (or English for Careers) is defined as the skills necessary for some occupational requirements, e.g., for international telephone operators, international air-traffic controllers, international commerce, international railways, computer programming, tourism, or vocational training programs, e.g., for hotel and catering staff, technical trades.

职业英语是从事某些职业所必需的技能，如国际话务员、国际空中交通管制人员、国际商贸、国际铁路、计算机程序设计和旅游观光，或者为某些职业训练项目所必需的，如酒店及餐饮服务人员，技术贸易。

3）English for science and technology, EST（科技英语）.

Our era is the age of machines, electronics and computers. Only by obtaining a good knowledge of science, can one live successfully in modern society.

我们进入了机械、电子、计算机的时代。只有当人们很好地掌握了科学知识，才能成功地立足于现代社会。

With the development of science and technology, scientists and engineers strive to exchange their ideas, discoveries and inventions, collect information and data, interpret concepts and theories, comment on the latest scientific advances and write reports based on experimental procedures, etc. The need increases day by day for scientists and engineers to have a swift (快速), economical, efficient, impersonal and sometimes international means of communication.

随着科学技术的发展，科学家和工程师们积极地交流他们的思想、发现和发明，奋力地收集信息和资料，力图阐释概念和理论以及评论最新的科学前沿并根据实验过程写报告等。科学家和工程师们日益需要一个快速简练、有效客观，有时还需要国际化的交流工具。

When language teachers first used the phrase "EST," they were content to deal superficially with scientific discourse. Instead of investigating the authentic language of science, they relied on popularized accounts of technical subjects as are found in encyclopedias or books intended for general readers. Lately, however, textbooks have been appearing that attempt to reflect the nature of the language actually used by scientists and the function it serves.

语言老师们第一次用"EST"这个短语时，他们满足于肤浅地对待科学性论述。他们没有调查研究权威的科学用语，而是依赖技术领域的流行用语，而这些都来自百科全书或者普通读者所写的书。然而，近来，教科书正显示出一种趋势，其力图反映科学家所运用的科学语言的本质和它的功能。

However, some people still ignore the existence of EST by simply knowing grammatical rules in addition to some technical words. Unfortunately, this judgment gives no fruitful comprehension about the nature of EST. They do not seem to be aware that EST presents linguistic varieties with its own characteristic features.

然而，有些人仍然会忽视科技英语的存在，他们只是简单地知道一些语法规则和专业术语。不幸的是，这无法卓有成效地理解科技英语的本质。他们似乎没有意识到科技英语表现出的独具特性的语言多样性。

Since scientists and engineers try to be impersonal in narrating the natural phenomena and facts, their processes, properties and characteristics, English for science and technology must be evidently precise, concise, clear and restricted and include many mathematical equations, formulas, diagrams, tables, etc. Scientists also prefer some typical sentence patterns and a large number of technical and semi-technical terms which make English for science and technology different to a

very wide extent from ordinary English.

因为科学家和工程师们试图客观地叙述自然现象和事实的过程、属性及特征，所以科技英语必须十分的精确简洁、清晰严格，以及包括许多数学方程、公式、图表和表格等。科学家们也喜欢运用一些典型的句型和大量的专业和半专业的术语，这些使科技英语在很大程度上不同于普通英语。

It can be categorized as spoken and written forms according to its form and content.

根据形式和内容的不同，科技英语可以分为口语和书面语。

Like many other natural unscripted speeches, spoken EST has many features (hesitation, pauses, incomplete utterances, sudden changes of direction, encouraging noises from the listener and repetitions). The words and phrases used are to some extent informal and colloquial. In addition to all of these, spoken EST consists obviously of a number of technical and semi-technical terms. You may find spoken EST when you listen to a lecture, a radio or television program or a film on scientific or technical subject. Sometimes you will have the chance to hear people speaking scientifically face to face.

像其他许多自然而发的即兴演讲一样，科技英语口语有许多特征（不流利、停顿、话语不完整、方向突变、听众的鼓励以及重复）。在一定程度上，词和短语的运用一般是非正式的、口语化的。除此之外，科技英语口语明显地由专业术语和非专业术语组成。当你听演讲、广播，看电视节目和有关科学技术主题类的电影时，你会听到科技英语口语。有时你也会有机会面对面听到科技英语会话。

Written EST is used in technical books, journals or other kinds of written passages. It is expressed in the most formal way, both in the choice of words and sentences, far more formal than spoken EST.

科技英语书面语运用于专业书、杂志和其他的书面段落中。在措辞和句式的选择上是最正式的，远远超过科技英语口语。

In content, we can distinguish English for Specialized Science and Technology (ESST) from English for Common Science and Technology (ECST). ESST is applied to specific subjects in various fields. It is purposely written for scientists and specialists engaged in any speciality. It normally focuses on only some of the principles or processes involved therein. Its contents are generally so specialized that even the native speakers of English who are not specialists in such fields may not be able to understand. This is not surprising at all, for it is not a problem of language ability but one of the subject matters. ECST is widely used in nearly all areas covering various subjects. The contents of this category of EST are less specific and its vocabulary used less technical. It deals mainly with the common, basic, elementary, essential knowledge of science and technology. Science and engineering students should have no difficulty in understanding its contents.

The objective of the ECST course designers is to popularize science and technology for non-specialists or children, so the contents are often interesting and instructive. ECST is closely linked with every person's activities in modern society. This book is prepared to lay emphasis on this particular aspect.

我们可以从内容上区分专门的科技英语（专业科技英语 ESST）和普通的科技英语（科普科技英语 ECST）。ESST 运用于不同领域的特定科目。它是为从事于任何专业的科学家和专家而写的。它通常仅仅集中在一些相关的原理或过程之中。它的内容一般很专业，以至于那些不是此领域专家的以英语为母语的人可能也无法理解。这一点也不令人惊奇，因为它不是语言能力的问题而主要是学科问题。ECST 几乎广泛运用于各个领域各个科目。ECST 的内容针对性不是那么的强，词汇也不是那么的专业。它主要涉及科学技术的最普遍、最基本、最本质的知识。从事科学技术的学生应该要毫无困难地理解它的内容。ECST 设计家的目的是给非专业人员和小孩普及科学和技术知识，因此这内容常常是有趣的和有益的。在当今社会，ECST 与每个人的行为活动紧密相连。这本书准备侧重于这一方面。

## 二、Scientific statements（科技陈述）

Scientific statements are usually in an impersonal, formal style, and a scientist accepts as facts only impersonal and objective statements. Most sentences in a scientific or technical passage are statements. A scientist is interested in objective description of things. In technical writing, a scientist tries to make true generalizations on the basis of his observation and experiments. By generalizations we mean general statements about what the scientist has observed or made by experiments. As far as scientific and technical literature is concerned, it is very important to find out the main statement made by a writer. Those statements that convey the most important information or represent the main idea in an argument are called the main statements. A main statement may be a general or universal statement. It may also be a particular or specific statement. A general statement or generalization attempts to cover a wide range of events and times. It is believed to be true at all times and in all places. A particular statement is only true under certain conditions. Of course, particular statements may support or justify generalizations. For example, general statements: when anything is heated, it expands. It grows bigger than it was before; particular statements: this piece of metal expanded when it is heated. It expands a lot.

科技陈述通常用客观的、正式的形式，而且科学家们对所承认的事实仅是客观地陈述。许多科学或技术文章中的句子大多是陈述性的。科学家只对客观描述的东西感兴趣。在专门的写作中，科学家们试图以自己的观测和实验为基础来求证事物的普遍性。我们所说的普遍性也就综述那些科学家们已经观测或通过实验得到的结果。就科学技术作品而言，找到作者的中心意思是非常重要的。那些传达着最重要的信息或在争论中表达主要观点的陈述即为主要陈述。一个主要的陈述可能是普遍性陈述或通用性陈述，也可能是详细陈述或特定陈述。通用陈述或普遍化力图涵盖广泛的事件和时间，这种陈述被认为是放之四海而皆准的。而一个特定陈述仅仅在某种情况下是正确的。当然，特定陈述可能支撑或证明通用陈述。例如，



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通用陈述：任何东西受热时，都会膨胀，会变得比之前大；具体陈述：金属片受热时会膨胀，且膨胀得很多。

Scientific statements contain five kinds of statements (main statement, evidence, illustrations, repetition and conclusion) which may be divided into three classes as follows: ① main statement; ② secondary statement (evidence, illustrations, repetition); ③ conclusion. A scientific or technical passage always contains one or more main statements, but it does not necessarily contain a final belief or opinion—a conclusion. A scientific or technical paragraph contains at least one main statement, but it does not always contain secondary statement.

科技陈述包含五种形式（主要陈述、论证、例证、重复和结论），可以分成以下三部分：① 主要陈述；② 次要陈述（论证、例证、重复）；③ 结论。一篇科技文章总含有一个或多个的主要陈述，但不一定含有一个最终观点——结论。一个科技文章段落中至少包含一个主要陈述，但并非总是包含次要陈述。

### 1. Main statement（主要陈述）

A main statement may contain a description, a definition, a classification, a hypothesis and so on.

一个主要陈述可能包括描述、定义、分类、假设等。

The structure of definition:

A real definition: concept＝class+characteristics. For example, a lever (杠杆) is a basic machine consisting of a rigid piece or bar that turns on a point.

A nominal definition: class+characteristics＝name of concept. For example, rays with very short wavelength or particles of subatomic matter that are given off by unstable elements are known as radiation.

定义的结构如下。

真正意义上的定义：概念=种类+特征。例如，杠杆是由能绕支点转动的块状或棒状刚体构成的机械结构。

名义上的定义：种类+特征=概念名称。例如，不稳定元素放射出的超短波射线或者亚原子粒子被称为辐射。

A classification usually includes such information as entity (实体), criteria and groups. In technical writing, when it is necessary to divide groups into sub-groups, we may use the so-called tree-diagrams.

分类常常包括实体信息、标准和组（群）。在科技写作中，当需要把组（群）分成小组（子群）时，我们可以采用所谓的树形图。

A hypothesis is something that is assumed to be true for the sake of argument. Hypotheses are

assumptions or ideas going to be proved and experimented, or are working suggestions and work-ground for exposition and explanation. Sometimes we assume something to be true or real for a certain limited purpose, or we take something as granted for the sake of simplicity, e.g., the heat loss is taken to be negligible, and is disregarded.

假设是为了论点而设的假定。假设是将要进行实验和论证的设想或想法，或者是可行的建议以及阐述和解释的根据。有时我们为了某一特定有限的目的而认为某些事情是真实的，或者为了简化问题，我们认为某些事情是理所当然的，如热量损失忽略不计。

### 2. Evidence, illustration and repetition（论证、图表和重复）

In order to support or prove his main statement or to show that it is true, a writer usually uses some facts that make the statement understandable and meaningful, this is called evidence.

为了支持和证明他的主要陈述或为了证明它是对的，作者通常用一些实际例子来让陈述变得可以理解且具有意义，这被称为论证。

He also uses a particular example of his general idea—an illustration which explains or shows just one of the items in the whole set of items to which the general idea refers. An illustrating example helps to describe or make clear a main statement. It is intended to attract the reader's attention and enable him to grasp the main statement easily. Illustrations are commonly used when the writer is telling the reader to set up an experiment. In EST writing, there are so-called expanded definitions which consist of definitions plus illustrations. In scientific and technical passages, illustration may also consist of various kinds of tables, symbols, pictures, diagrams, sketches, drawings, photographs, technical sheets, scales for graphs.

作者也会采用能支持他的观点的一种特别的实例——例证。例证仅仅可以解释或显示作者的观点所涉及的所有条目中的一个，其有助于描述或阐明主要陈述。目的在于吸引读者的注意力并使他们能轻松地理解主要陈述。当作者告诉读者设计一个实验时，例证是经常用的。在科技英语写作中，定义加例证组成了所谓的扩展定义，在科技文章中，例证也由不同种类的制表，如符号、图片、图表、草图、图画、照片、技术片、曲线图组成。

In addition to evidence and illustrations, the writer often applies repetition to his main statement in order to help the reader understand the emphasis of what he is talking about. That's to say, the main statement is repeated, usually in different words, or expressed in detail.

除了论证和例证外，为了帮助读者理解作者所谈论的重点，作者常常重复他的主要陈述。也就是说，通常采用不同的词语或者描述方式重复表达主要陈述。

### 3. Conclusion（结论）

It is the final belief or opinion to which the writer comes, it is very important. A conclusion is a judgment or opinion which is the result of reasoning, thought or discussion. It can also summarize the writer's findings and inferences. In a scientific report or passage, a conclusion must be brief but

sufficient to cover the area and depth of the study.

结论是作者得出的最终观点，是非常重要的。结论是经过推理、思考、讨论后的一种判断或者观点。它也可以总结作者的发现和推论依据。在科学报告或者文章中，一个结论必须简短但又能覆盖研究的广度和深度。

## 三、Meaning relationships and meaning link（科技英语的意义关联及手段）

### 1. Meaning relationships（意义关联）

In any well-written scientific or technical passages in English, the main sentence connected to show the meaning relationship between them. When two sentence clauses in a passage narrate the same thing or related things, there exists a meaning relationship between them.

在写得好的英文科技文章中，主句所连接的各部分能显示出它们之间的关系。当文章中的两个句子叙述同一或相关的事物时，那么这两个句子之间存在着意义关联。

When writing a scientific passage or technical report, if you do not end a paragraph with a concluding sentence, you should be particularly careful. When you begin the next paragraph, it is a must to show its meaning relationship to the preceding one. In other words, there also exists a meaning relationship between successive paragraphs.

当你写一篇科学论文或科技报告时，如果你不是以结论性句子结束的话，你就要特别小心。当你开始写下一段时，你必须表明前后意义关系。换句话说，在连续的段落中依然存在着意义关联。

### 2. Meaning link（关联手段）

Meaning relationship may be expressed not only with conjunctions but also with meaning links. A meaning links is a word, word group, phrase or any other feature which helps to connect two or more main sentences or clauses. Meaning links are not always necessary, but they are useful in making meaning relationships clearer and stronger. The most commonly used examples of meaning links are pronoun reference (it, they and so on), article links (a, the), summarizing nouns (refer to a previous statement, idea, fact, evidence, belief, process, effect, action, theory, knowledge, etc.), sequence signals (also called a thought-connective, is a word or word group which help to show the meaning relationship between the main sentence or clauses). It often tells us what is coming next and what to be expect. Sequence signals are usually coordinating (并列) conjunctions or conjunctive adverbs, especially "but."

意义关联不仅可以用连接词表达，还可以采用起关联作用的其他关联手段。一个词、一个词组、一个短语，或者任何帮助两个或更多的主句、从句的起连接作用的特点的都是关联手段。关联手段并非总是必要的，但它们能让意义更清楚、更强烈。通常用的关联手段的例子有人称代词（它，他们等），冠词（a，the），总结名词（提及之前的陈述、想法、事实、证据、信仰、方法、结果、动作、理论、知识等），次序（序列）信号（也叫想法连接，是

一个帮助表示主要描述或条款之间的意义关联的一个词或词组)。它常常告诉我们下一个将要到来的是什么，被期待的是什么。次序信号通常是并列连接词或是连接副词，尤其是 but（但是）。

## 四、Features of EST in style and structure（科技英语的文体结构特点）

EST writings have nothing to do with the personal feelings of writers or speakers. They differ from literary writings in style and structure. There are no rhetorical expressions such as metaphors, figures of speech, implied meanings, exaggeration, personification, irony and humor in EST writings. EST writings aim for a plain, clear, concise and accurate style and structure. EST sentences are logical in their meanings and in their relationships to each other. Two main features of EST in style and structure are as follows: conciseness (精练), condition (restrictive) (条件或限制).

科技英语写作不掺有任何作者或说话者的个人情感。它的文体和结构不同于文学创作。科技英语写作中没有任何修辞的表达，如隐喻、比喻、寓意、夸张、拟人、讽刺和幽默。它的文体和结构具有平实明了、精确简洁的特点。科技英语文中的句子在含义和关系上彼此是合乎逻辑的。科技英语文体结构的两个主要特点如下：精练、条件（限制）。

### 1. The use of non-finite verbs不定动词（非谓语动词的运用）

1）The use of the gerund（动名词 verb+ing）(动名词的运用).

(1) They are used when the subjects of the main clause and the time clause are the same. For example, after it is boiled, water readily gives off water vapor.=After being boiled, water readily gives off water vapor.

当主句和时间状语从句的主语相同时使用。例如：水沸腾后，水容易释放出水蒸气。=沸腾后，水容易释放出水蒸气。

(2) They are not normally used when the subjects are different. But one other type of statement can be expressed in the same way. For example, when we remove the impurities, the water can be passed back to the boiler.=On removing the impurities, the water can passed back to the boiler.

当主语不一致时它是不常用的。但另一类型句子可以用相同的方式表达。例如：当我们去除杂质，水将流回到蒸馏器中。=去除杂质，水将流回到蒸馏器中。

(3) The gerund (preposition+V-ing) can also be used to show the correct sequence of two instructions. For example, ① Switch off the main supply. ② Remove the fuses.

动名词（介词+动名词）也可以用来表达两个指令的正确次序。例如：① 切断主要来源；② 移除保险丝。

(4) Replacing an "if" clause. For example, if machines are tested by this method, there will be some loss of power.=The testing of machines by this method entails some loss of power.

代替 if 从句。例如：如果用这种方法检测机器，将会损失一些功率。=用这种方法测试机器会导致一些功率损失。

2）The use of the participle（分词）分词的运用.

(1) The past participle contracted attributive: passive. They are usually shortened by leaving out the words "which is" and "which was." Shorten the relative clause by using when, once, if, as, etc.+past participle.

过去分词作定语表被动。常常通过省略单词"which is"和"which was"来简化句子。用 when, once, if, as，等等+past participle 来简化关系从句。

(2) The present relative clauses. The clause is a defining one or the verb is a verb of state. Some of the most common verbs of state in engineering are measure, consist, hold, carry, weigh, contain, form, etc.

现在关系从句。句子是定义的或动词是表状态的。一些在工程中最常用的状态动词有测量、组成、保持、携带、衡量、包含、形成，等等。

3）The use of the infinitive（不定式的运用）.

(1) The use of the infinitive in the expression of purpose.

运用不定式表述目的。

(2) The use of "in order+the infinitive" and "so as+the infinitive" in the expression of purpose.

运用"in order+the infinitive"和"so as+the infinitive"表述目的。

(3) The statement of purpose in the first part of a sentence.

句子开头的目的陈述。

(4) The use of the infinitive in the expression of function.

运用不定式表述功能。

4）Other contractions 其他缩写形式的运用.

(1) Typical noun constructions. For example, discharge of the content of the tank is performed by a pump.

典型的名词构造。例如：水池里水的排放是由水泵完成的。

(2) Noun-statements instead of introduced questions. For example, it is necessary to…

名词陈述代替问题导入。例如，……是必需的。

(3) Noun-statements (名词陈述). For example, information is needed as to…

对于……信息是必需的。

(4) Short-form relative clauses—with+n. "which is …" clauses=with "which is …" =with+n.

(5) Short-form relative clause—when, if, once, while+adjective (形容词).

(6) Others. For example, as above (同上) =as mentioned (提及) above, as before (如以前) =as mentioned before, as follows (如下) =as it follows.

### 2. Condition（restrictive）（限制性条件）

The restriction reflects another important feature of EST in style and structure. It makes the meaning more accurate. Here we present a commonly used way of obtaining restriction. In addition

to the ordinary "if" clause, we can express conditions in a more restrictive way.

限制性是反映科技英语风格和结构的另一个重要特点。它使意思更加准确。这里我们介绍一种产生限制性的常用方法。除了常见的"if"从句外，我们介绍更多的限制性方式。

(1) I will make the experiment providing (provided, or on condition) that you make it by demonstration for me.只要你给我示范，我将会做实验。

（2）I will make the experiment only if you make it by demonstration for me.只有你给我示范，我才会做实验。

(3) Given, compared, granted, etc.+noun. (=if allowed or provided with). For example, given plenty of labor, the job will be completed on schedule. Given sufficient supply of electricity, the manufacturing in the auto-factory is certain to increase.

Given, compared, granted 等+名词（意思等同于"如果条件允许或如果提供"）。例如：只要劳动力充足，工作就能按时完成。只要有足够的电量供给，汽车制造业肯定会增长。

### 3. Definitions and definition formulas（定义和定义规则）

Definitions occur frequently in many types of scientific English because it is often necessary for scientists to define ideas, concepts, laws, natures, certain operations, substances, objects or machines.

对于科学家来说，经常需要对想法、概念、规律、性质、特定操作、物质、物体或者机器下定义，因此定义频繁出现在各种科技英语中。

Types of real definitions（定义的种类）:

（1）General definitions and definition formulas（通用定义和定义公式）.

① An *x*/*y* is + a general class word + wh-word (*x* is countable noun, *y* is uncountable noun). *x*/*y* 是+一种常见的种类词+ wh-word (*x* 是可数名词, *y* 是不可数名词) 。

② An *x*/*y* is + a class word + which is v-ed. *x*/*y* 是 + 种类词 + which is v-ed.

③ An *x*/*y* is + a class word + v-ed. *x*/*y* 是 + 种类词 + v-ed.

④ An *x*/*y* is + a class word + for + v-ing. *x*/*y* 是 + 种类词 + for + v-ing.

⑤ An *x*/*y* is + a class word + wh-word + v-s. *x*/*y* 是 + 种类词 + wh-word + v-s.

⑥ An *x*/*y* is + a class word + v-ing. *x*/*y* 是 + 种类词 + v-ing.

⑦ An *x*/*y* is + a class word + preposition + wh-word. *x*/*y* 是 + 种类词 + wh-word.

⑧ An *x*/*y* is + a class word + with n-phrase. *x*/*y* 是 + 种类词 + with n-phrase.

⑨ An *x*/*y* is + a class word + with the property of v-ing. *x*/*y* 是 + 种类词 + with the property of v-ing.

⑩ Definition formulas:

$s = vt$[distance traveled (位移 $s$) = average velocity (平均速度 $v$)]×时间 $t$

$P = Fv$[power equals $F$ multiplied 乘 by (times) $v$]功率 $P$ 等于力 $F$×速度

（2）Specific definitions（特殊的定义）.

In writing specific definitions we are interested in defining a specific type of thing rather than

defining things in general. The nouns are repeated in specific definition. For example, a key-hole saw is a saw with a narrow blade, used for cutting holes in wood.

在写特殊定义时，我们更倾向于定义某种具体的而非泛化的东西。在特殊定义中，名词会重复使用。例如：匙孔锯是由狭窄刀刃做成的用在木头中凿孔的锯子。

（3）Expanded definitions（扩展定义）.

Expanded definitions are two-sentence definition. Very often there are definitions consisting of more than two sentences, even a whole paragraph. This kind of definitions may be expanded with descriptions, generalizations, examples, uses and main parts.

扩展定义是由两个句子组成的定义。通常有定义不止两个句子，甚至整个段落。这种类型的定义可能用描写、概括、实例、用途及其主体部分来扩展。

### 4. Notes on definition（定义注释）

Firstly, a definition is not an example. Secondly, the first part of a definition should be general. The detail should be left until later. Thirdly, "the" is not used with the subject because definitions are general statements. Fourthly, the main verb in definitions is the linking verb "is" (mainly).

第一，定义不是举例。第二，定义的第一部分必须具有概括性，细节描述应该放在后面。第三，由于定义是一般陈述，因此主语前不能用定冠词"the"。第四，定义中主动词采用系动词"is"。

### 5. Experimental and explanatory descriptions（实验叙述和解释叙述）

Descriptive work plays a large part in most kinds of scientific writing. Scientific description can be classified into two categories: "description of change" and "description of state." "Description of change" is also called "experiment and explanatory description" which are the most common types of scientific description. There are various types of experimental and explanatory descriptions. Among them the following four are the most important: description of experiments, how things work, how things are produced, how things are discovered or invented.

描述性工作在大多数科技文的写作中占很大的比重。科学性描述可以分成两类：变化描述和状态描述。变化描写也称为实验和解释性描述，它是最常见的科学性描述。在多种多样的实验和解释性描述中，以下四种最为重要：① 实验描述；② 事物如何工作；③ 事物怎么生产；④ 事物怎么被发现或发明。

Experiment descriptions: ① The subject-form should not be changed; ② The narrate tense (叙述时态) should never be changed unless necessary.

实验描述：① 主语形式不能改变；② 除非有必要，否则时态不能变。

Description of how things work. It refers to structure (a system consists of a number of parts) and function (the parts of a system have different functions, which make possible and satisfactory



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