

高等学校试用教材

# 英语

第三册 (物理类)

# ENGLISH

南开大学 钱建业 (主编) 蒋增光 汪士彬 阮佩菊

高等教育出版社

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## 前 言

本书为高等学校理科英语教材第三册(物理类),适用于理科物理类专业学生作为基础阶段英语教材,也可以作为阅读阶段教材。

本书共 18 课,除精读课文外,每课还配有泛读材料一篇,书后附补充读物 20 篇,共计单词 1,500 个左右。全书教学共需 88 学时,平均每课 5 学时左右。

课文内容侧重物理专业的基础知识。大部分课文选自近几年国外出版的书刊。选材力求行文流畅、语言生动、结构严谨、内容新颖。课文编排顺序原则上由易到难,并适当考虑专业知识的系统性。

课文中的难句附有译文,新的语言现象有注释,部分语法重点和习惯用法配有少量练习。

练习包括一些词语的用法、课文理解、语法分析和英译汉等内容。英译汉练习中有少量生词,要求学生运用词典,独立完成。

单词注音主要参照《牛津现代高级英语词典》第三版(1974 年)。凡该词典未收入的专业词汇,则参照其他词典注音。

本书承南京大学华服远、孙大坤两位同志审稿,他们对本书提出了许多宝贵意见,我们谨表感谢。

编者水平有限,书中疏漏不妥之处在所难免,希望同志们批评指正。

编 者

一九八三年二月于天津

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## Lesson One

# MEASUREMENT

### WHY MEASUREMENT?

Measurement is the comparison of a physical quantity of a sample with a selected standard. The length of a table, for example, is determined by selecting a suitable  
5 reference standard and laying it end to end until the comparison is completed. The measurement is expressed as the number of units it takes to equal the length of the table, e. g., 1.38 meters. This determination of 'how many' is the process of measurement.

- 10     Precise measurement lies at the very heart of the scientific enterprise. When we express concepts with words alone, they may lead to confusion. How big is 'big' ... or 'small?' How hot is 'hot?' What is 'heavy?' Words often convey different meanings to different people. Even  
15 in everyday life we express concepts more meaningfully in numbers. We speak of a 3"  $\times$  5" file card, a length of 2"  $\times$  4" lumber, a car which averages 16 miles to the gallon, a temperature of 72° F, a relative humidity of 65 per cent, a batter's average of 0.279. Here we consider  
20 standards of measurement and some elementary mathematical techniques which enable us to express measurements in the most convenient form.

### THE METRIC SYSTEM

When the metric system came into existence in the  
25 1790's, standards were important for only a few kinds of  
measuring units, primarily length and mass. Today we  
must also have standards for the accurate measurement  
of temperature, color, electric current, sound and light  
intensity, and many other phenomena. Virtually all,  
30 however, can be derived from four fundamental standards:  
the meter for length, the kilogram for mass, the second  
for time, and the kelvin for temperature.

The standard for length, the meter, is equal to 39.37  
inches — just a little longer than a yard. It was origi-  
35 nally defined as one ten-millionth of the distance between  
the equator and the North pole — a quadrant of the  
earth's meridian. The section of the quadrant lying be-  
tween Dunkirk, France, and a point near Barcelona, Spain,  
was measured by a surveying team and extrapolated by  
40 astronomical observations to the entire quadrant.

There were problems with the metric system as origi-  
nally conceived. The French government therefore  
arranged a conference in 1870 to work out standards for  
a unified measurement system, and in 1875 the Treaty of  
45 the Meter was signed in Paris.

The treaty established an International Bureau of  
Weights and Measures which was to be the custodian of  
the standards for an international system of measurement  
at a facility at Sevres, near Paris. It also established a  
50 General Conference on Weights and Measures, which was  
to meet periodically. Commissions were appointed to

design prototype standards of length and mass — the meter and the kilogram — and copies were furnished to the nations adhering to the treaty.

- 55 The American copy of the international standard of mass, known as Prototype Kilogram No. 20, is kept in a vault at the Gaithersburg Laboratory of the National Bureau of Standards. It is removed not more than once a year for checking the values of other standards with a precision balance. Twice since 1889 it has been taken to  
60 France for comparison with the master kilogram. In practice, we use secondary working standards of length and mass, which have a high degree of accuracy.

— Adapted from *Physical Science with Modern Applications* by Melvin Merken (W. B. SAUNDERS CO., Philadelphia, U. S. A., 1976)

## NEW WORDS

- |  |  |
|--|--|
| <b>measurement</b> ['meʒəmənt] <i>n.</i>   | 输; 传播  |
| 度量衡制; 计量                                   | <b>meaningfully</b> ['mi:niŋfuli] <i>ad.</i> |
| <b>select</b> [si'lekt] <i>vt.</i> 选择      | 有意义地   |
| <b>standard</b> ['stændəd] <i>n.</i> 标准    | <b>image</b> ['imidʒ] <i>n.</i> 形象; 图象;      |
| <b>reference</b> ['refrns] <i>n.</i> 参考; 参 | 象  |
| 比; 基准                                      | 10 <b>conjure</b> ['kandʒə] <i>vi.</i> 唤起; 想 |
| 5 <b>enterprise</b> ['entəpraiz] <i>n.</i> | 象出   |
| 事业; 企业                                     | <b>vital</b> ['vaitl] <i>a.</i> 重要的          |
| <b>confusion</b> [kən'fju:ʒn] <i>n.</i>    | <b>statistics</b> [stə'tistiks] <i>n.</i>    |
| 混乱; 混淆                                     | 统计数字   |
| <b>convey</b> [kən'vei] <i>vt.</i> 表达; 传   | <b>file</b> [fail] <i>n.</i> 档案; 文件          |

- card [kɑ:d] *n.* 卡片
- 15 lumber ['lambə] *n.* 木材; 木料
- gallon ['gælən] *n.* 加仑 (液量单位)
- humidity [hju:'midəti] *n.* 湿度
- batter ['bætə] *n.* 倾斜度; 坡度
- elementary [,eli'mentri] *a.* 初等的; 基本的
- 20 convenient [kən'vi:njənt] *a.* 方便的
- metric ['metrik] *a.* 米制的; 公制的
- existence [ig'zistəns] *n.* 存在
- primarily ['praɪmrɪli] *ad.* 主要地
- virtually ['vɜ:tʃuəli] *ad.* 实际上; 事实上
- 25 fundamental [,fʌndə'mentl] *a.* 基本的
- kilogram ['kɪləgræm] *n.* 公斤, 千克
- kelvin ['kelvin] *n.* 开尔文 (开尔文温标, 又称绝对温标, 以  $-273.15^{\circ}\text{C}$  为零点)
- yard [jɑ:d] *n.* 码 (英制长度单位)
- define [di'fain] *vt.* 规定; 给... 下定义
- 30 pole [pəʊl] *n.* 极
- quadrant ['kwɒdrənt] *n.* 四分之一圆; 九十度弧
- meridian [mə'riðiən] *n.* 子午线; 经线
- France [frɑ:ns] *n.* 法国
- Spain [speɪn] *n.* 西班牙
- 35 extrapolate [eks'trəpəleɪt] *vt.* 外推; 用外推法求
- astronomical [,æstrə'nɒmɪkl] *a.* 天文学的
- conceive [kən'si:v] *vt.* 设想; 想象
- government ['gʌvnmənt] *n.* 政府
- conference ['kɒnfrəns] *n.* 会议
- 40 unify ['ju:nɪfaɪ] *vt.* 统一
- treaty ['tri:tɪ] *n.* 条约
- sign [saɪn] *vt.* 签字; 签订
- bureau [bjʊə'reu/'bjʊərəu] *n.* 局; 处
- custodian [kəs'təʊdiən] *n.* 保管人; 看守人
- 45 facility [fə'sɪləti] *n.* 研究所; 机构; 设备
- periodically [,piəri'ɒdɪk'li] *ad.* 定期地; 周期性地
- commission [kə'mɪʃn] *n.* 委员会
- appoint [ə'pɔɪnt] *vt.* 指定
- prototype ['prəʊtətaɪp] *n.* 原型; 原器
- 50 furnish ['fɜ:nɪʃ] *vt.* 提供
- adhere [əd'hɪə] *vi.* 遵守 (to)

**vault** [vɔ:lt] *n.* 地下室; 拱顶地  
地下室

**precision** [pri'siʒən] *n.*  
精密; 精确

**master** ['ma:stə] *a.* 主要的; 标  
准的

55 **secondary** ['sekəndri] *a.*  
派生的; 次要的; 辅助的

## PHRASES AND EXPRESSIONS

1. reference standard 参考基准; 标准衡器
2. lead to confusion 导致混乱; 引起混乱
3. everyday life 日常生活
4. file card 卡片
5. the metric system 米制; 公制
6. come into existence 出现
7. measuring units 计量单位
8. light intensity 光强
9. Dunkirk [dʌn'kɜ:k] 敦刻尔克(法国地名)
10. Barcelona [ˌbɑ:si'ləʊnə] 巴塞罗那(西班牙地名)
11. surveying team 勘探队
12. unified measurement system 统一的计量制
13. Treaty of the Meter 关于米制的条约
14. Paris ['pæris] 巴黎
15. International Bureau of Weights and Measures 国际计量局
16. Sevres ['seivə/se:vɜ] 塞夫勒(法国地名)
17. General Conference on Weights and Measures 国际计量会议
18. prototype standards of length and mass 长度和质量的标准量具
19. Prototype Kilogram No. 20 第二十号标准公斤
20. Gaithersburg Laboratory ['geiðəzbu:g] 盖萨斯贝格实验室
21. National Bureau of Standards (美国) 国家标准局
22. master kilogram 标准公斤

## NOTES TO THE TEXT

- 3 The length of a table, for example, is determined by selecting a

suitable reference standard and laying it end to end until the comparison is completed.

例如要想测量一张桌子的长度,就要选定一个适当的标准作为基准,并将其一端与桌子的一端对齐,然后量到量完桌子长度为止。

end to end 在句中作状语,是“将两端对齐”的意思,其中一个 end 指桌子的 end, 另一个 end 指量具的 end。英语中用名词词组作状语的现象是很常见的。例如:

We were walking *side by side*.

我们并肩走着。

The railway station is only *a short bus ride* away.

火车站离这里只有几站地。

He stood, *sailor fashion*, on the deck.

他以海员的姿势站在甲板上。

- 10 Precise measurement lies at the very heart of the scientific enterprise.

精确的计量是科学事业的关键。

- 16 We speak of a  $3' \times 5'$  file card, a length of  $2' \times 4'$  lumber, a car which averages 16 miles to the gallon, a temperature of  $72^\circ\text{F}$ , a relative humidity of 65 per cent, a batter's average of 0.279.

我们常说一张  $3' \times 5'$  的卡片, 一根  $2' \times 4'$  的木料, 一辆平均 16 英里耗油一加仑的小轿车,  $72^\circ\text{F}$  的温度, 65% 的相对湿度, 0.279 的平均斜率等等。

- 41 There were problems with the metric system as originally conceived.

原先设想的米制有一些问题。

本句中 as originally conceived 是定语从句 as was originally conceived 的省略形式, as 是关系代词, 引出定语从句, 并在从句中作主语。注意此句中的关系代词 as 也可改为 that, 但用 that 时从句中的 was 不能省略。

Physical knowledge *as accepted today* (= that is accepted today) has the form of a description of the world.

人们今天所公认的物理知识的表现形式是描述世界。

51 Commissions were appointed to design prototype standards of length and mass — the meter and the kilogram — and copies were furnished to the nations adhering to the treaty.

当时指定了一个委员会，负责设计长度和质量——即米和公斤——的标准量具，并向遵守该条约的各国提供这些标准量具的复制品。

58 It is removed not more than once a year for checking the values of other standards with a precision balance.

每年至多将其从地下室取出一一次，并用它在精密天平上校验其他标准量具。

## EXERCISES

### I. Match the following words with their proper definitions:

- |                |   |
|----------------|---|
| 1. measurement | a. something used as a test or measure for weights, lengths, qualities or for the required degree of excellence |
| 2. quantity    | b. transport, carry; transmit (sound, smell, etc.)  |
| 3. standard    | c. act or result of measuring   |
| 4. convey      | d. state or fact of existing; being   |
| 5. statistics  | e. the property of things which can be measured, e.g. size, weight, number                                      |
| 6. existence   | f. formal agreement made and signed between nation;   |
| 7. fundamental | g. first or original example from which others have been or will be copied or developed                         |
| 8. treaty      | h. accuracy; degree of refinement in measurement, etc.  |
| 9. prototype   | i. serving as, or being a component part of, a foundation or basis; basic                                       |
| 10. precision  | j. collected numbers which represent facts or measurements  |

### II. From the two words indicated, choose the right one and insert it

1. His mistake is a great extent due to carelessness.

- III. Write T for True in the brackets after each statement that is true according to the text. Write F for False if the statement is not true:

- 8 •



and light intensity, and many other phenomena. ( )

5. The Treaty of the Meter was signed in London in 1875. ( )

6. Copies of the prototype standards of length and mass were furnished to the nations adhering to the treaty. ( )

IV. Point out the syntactic function of the words in italics and translate the sentences into Chinese:

1. The sea went *mountains* high.

2. We have been doing our experiment in physics *all day long*.

3. They were standing *shoulder to shoulder*.

4. The French devised the metric system *a long time ago*.

5. Come *this way*, please.

6. We always travel *third class*.

7. She lives *next door*.

8. They went out *arm in arm*.

V. Translate the following into Chinese:

In the vast majority of measurements in everyday life, we use the foot-pound-quart system for length, mass, and capacity. These standards are known as the English, Imperial, or U. S. Customary system of weights and measures. Many were originally derived from a crude but convenient source — the human anatomy. Thus, the inch was the length of the thumb from tip to knuckle; the palm, the width of four fingers; the foot, four palms, later standardized to 36 barleycorns; a yard, the distance from the tip of the nose to the tip of the middle finger of the outstretched arm; a fathom, the distance between the two outstretched arms. The mile was taken from an earlier system; it was based on a number (*mille*, one thousand) of strides taken by a Roman soldier. Anatomically based units not only are cumbersome to work with but the conversion factors among them are arbitrary: There are 12 inches in a foot; 3 feet in a yard;  $5\frac{1}{2}$