

高等教育（矿业）“十三五”规划教材
中国矿业大学教学名师培育工程资助项目
国家留学基金委青年骨干教师出国访学项目
大学英语ESP系列教材



环境科学概况

A Guide to Environmental Science

沈丛 朱哲 主编

A Guide to Environmental Science

中国矿业大学出版社

China University of Mining and Technology Press

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A Guide to Environmental Science

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图书在版编目(CIP)数据

环境科学概况 = A Guide to Environmental
Science / 沈丛, 朱哲主编. — 徐州: 中国矿业大学出版
社, 2017.9

ISBN 978 - 7 - 5646 - 3580 - 0

I. ①环… II. ①沈… ②朱… III. ①环境科学—英
语—高等学校—教材 IV. ①X

中国版本图书馆 CIP 数据核字(2017)第 143742 号

书 名 环境科学概况
主 编 沈 丛 朱 哲
责任编辑 万士才
出版发行 中国矿业大学出版社有限责任公司
(江苏省徐州市解放南路 邮编 221008)
营销热线 (0516)83885307 83884995
出版服务 (0516)83885767 83884920
网 址 <http://www.cumtp.com> E-mail: cumtpvip@cumtp.com
印 刷 徐州中矿大印发科技有限公司
开 本 787×960 1/16 印张 9.5 字数 179 千字
版次印次 2017 年 9 月第 1 版 2017 年 9 月第 1 次印刷
定 价 16.00 元

(图书出现印装质量问题, 本社负责调换)

前 言

2007 年教育部正式发布了《大学英语课程教学要求》(以下简称《课程要求》),对大学英语教学的目标进行了清楚地界定:大学英语的教学目标是培养学生的英语综合应用能力,特别是听说能力,使他们在今后学习、工作和社会交往中能用英语有效地进行交际,同时增强其自主学习能力,提高综合文化素养,以适应我国社会发展和国际交流的需要。《课程要求》对英语综合应用能力进行了清楚地阐释,即学生在学习、工作和社会交往中用英语进行交际的能力。由此可见大学公共英语教学的方向最终还是朝着实用性迈进。

如何结合学校的优势学科,为社会提供实用型语言人才,不仅是学生生存的需求,也是高校在竞争中获胜的需求。为此,我们组织教师编写了大学英语 ESP 系列教材之《环境科学概况》,为进一步推进大学英语教学改革提供重要内容和保证。教材的指导思想和特点主要体现在以下几点:

首先,在探索语言知识与专业学科结合的语言教学的过程中,强调内容与语言整合型的语言教学方法,希望将目前通用英语导向的大学英语教学转变为培养学生用英语从事专业学习或是应对未来职业的专门用途英语,拓展学生的国际视野,提升专业领域内的跨文化交流能力、学术沟通和合作的能力以及参与国际竞争的能力。

其次,突出行业特色和优势学科,结合中国矿业大学的行业特色和优势学科,本教材选取环境科学相关内容,作为教材编写内容,帮助我校学生在大学期间最大限度地获取胜任将来工作的需要,提高其综合素质。

第三,本教材以实用为导向,与学生专业紧密结合,提出整个英语教学要以学生需要,尤其是专业需求为中心,即把英语作为手段或工具来学习运用,而不只是作为一门语言学科。因此在设计 ESP 系列教材时,并不是强调由低到高的英语基础知识、能力的渐进式培养,而是首先分析不同学习者的需要,提炼出与使用英语达到目的相适应的能力类别及水平程度,并以此为依据,结合学习者的基础,确立相应的教学目标,编制教材以及确定测试方法等,以保证学生获取胜任将来工作所需的英语能力。

第四,以学习者为中心的编写理念。教材的编写是建立在对我校国际化的办学目标,以及结合优势学科,满足学生需求,以学习者为中心的理念上,强调

把学习和技能的提高放在首位,充分考虑到我校的专业特色、学生本身的英语能力及其语言学习需求,在课文内容的选择、课堂教学方式、练习的设计等环节充分考虑到能够满足学生的学习需求。

第五,本教材主题内容的制定经与我校环境科学与工程老师审定后确定,涵盖了环境科学的基本概念和一些基础知识,内容专业性强,权威性较高。此外,所有的语料都是来自我校环境专业教师的教学资料,很多都是教师在出国学习期间获得的宝贵的专业资料,编者从语言教学角度进行改写,这就避免了传统大学英语讲授的“是一种看来并不会出现在外语课堂之外的学校英语”。尤其是一些专业术语的出现是建立在高频统计的基础上,强调以实证为依据,而非以直觉为基础来指导安排教学内容。

本教材的使用对象是高等院校的非英语专业学生。全书总计 12 个单元,包括环境科学的基本概念、可持续性发展、环境系统、生态系统、碳循环、氮循环、食物链和能量流等内容,每个单元分为课文部分、单词短语和阅读写作三个板块,其中练习以课文部分为基础,涵盖了听、说、读、写、译等多种练习方式,使学生进一步熟悉专业方面的典型词汇和表达方式,既能够提高语言水平,丰富语言知识,又能够增强对英语国家社会、文化的了解。

本系列教材编写获得了 2016 年国家留学基金委青年骨干教师出国访学项目和 2013 年中国矿业大学教学名师培育工程项目资助。本书具体编写分工如下:沈丛负责编写第 1 单元,朱哲负责编写第 2 单元,杨紫瑜负责编写第 3、4 单元,龚琪峰负责编写第 5、6 单元,郑伟负责编写第 7、8 单元,马宝鹏负责编写第 9 单元,孙晓菲负责编写第 10 单元,王翔敏、李嫣分别负责编写第 11 和第 12 单元。

沈 丛 朱 哲

2017 年 7 月

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Unit One An Introduction to Environmental Science

Section A Passages

Passage One An Environmental Concept

One of the concepts in this class is environmental wisdom, in ways you can use it. As we know, the world is an incredibly interconnected place, both by its **inherent** nature and by human construct. You can't separate humans from nature, and all of our concepts of the environment for this class are formed in our human minds. I don't want to **dwell** on this too much, but my primary goal in this course is to allow you to approach environmental information with some useful **skepticism** and knowledge. Environmental "information" is constantly bombarding us, and is often used to try and **manipulate** us into buying something, supporting an issue, or taking a political stand. For instance, promoting certain kinds of coffee (such as shade-grown, versus sun-grown), driving an SUV through a creek to show how it can get you close to "nature," buying bamboo versus hardwood flooring, supporting the defunct Seattle Monorail, advertising investments as "green" . . . the list goes on. What I hope most is that after you take this course you will have some of the tools to understand the basics . . . if not all . . . of the actual implications of environmental information you receive.

Learn about how small this world really is and how we depend on **disparate** parts for our lives. We can use the quintessential Seattle treat, coffee, as an example of understanding the connectedness of the world. Visit the Wikipedia article on coffee to read about all you want to know about coffee as a plant, world commodity and product much of this class drinks regularly.

You are expected to visit *Coffeeresearch.org* to understand just how

coffee is produced. Getting a cup of this drink we take for granted is actually a very complicated process, and greatly impacts people all over the world.

Another key environmental concept you should bear in mind is that the basic source of all human environmental problems is the increasing human population on earth. As more people are added to the total, the finite resources of the earth become accessible to a larger number of people, who then must either use more resources or reduce their per-person use. The U. S. census Bureau site (<http://www.census.org>) includes current data on the U. S. and world population. Take a bit of time to visit the site listed and explore it.

Passage Two A Scientific Perspective of the World

In order to understand our environment, we need to study it from a scientific **perspective**; that is, to apply scientific principles to our study. Only in this way can we advance our knowledge of environmental science. Science deals with things that can be disproven; ideas are scientific only if it is possible to disprove them. The most effective scientists rely on **critical** and disciplined thinking using intellectual standards, effective communication, **clarity**, and commitment to developing scientific knowledge and skills. These are skills that can be taught and learned.

It is unfair to define good scientists any further than this. For instance, it is often said that environmental scientists should reduce their own impact on the environment. That is a worthy goal for anyone, but someone can be an excellent environmental scientist even if they use far more than their share of the Earth's resources.

From the perspective of academic term, environmental science is a multidisciplinary academic field that **integrates** physical, biological and information sciences to the study of the environment, and the solution of environmental problems. Today it provides an integrated, **quantitative**, and interdisciplinary approach to the study of environmental systems. Environmental science came alive as a **substantive**, active field of scientific investigation in the 1960s and 1970s driven by (a) the need for a multi-disciplinary approach to analyze complex environmental problems, (b) the arrival of substantive environmental laws requiring specific environmental

protocols of investigation and (c) the growing public awareness of a need for action in addressing environmental problems.

However, this is not how the term is commonly used by ordinary people. Society often links nonscientific fields and values with the term “environmental science,” probably because the topics of environmental science have deep emotional impacts on many people, often akin to religious thought. A good example is the *Deep Ecology Movement*, and *Biodynamic Farming* is another example; this includes very effective farming techniques, such as re-use of organic waste material through composting, with such ineffectual practices as burying silica-filled cow horns in the middle of fields during the spring **equinox** and taking them out at the fall equinox.

It's easy to understand the attraction behind many of these non-scientific ideas that are melded into environmental science. It is also important, as you study environmental science, that you be able to separate what is supported by science from what is not.

Section B Words and phrases

I. Word bank

Directions: Fill in the blanks with the words below and change the form if necessary.

inherent	dwelt	skepticism	manipulate
disparate	perspective	critical	clarity
integrate	substantive	equinox	quantitative

1. The _____ agenda item which had been set for discussion and was discussed was non-fossil energy.
2. That was another way men betrayed themselves, by not examining their own motives with the same cold _____ they turned on others.
3. It's like standing at the top of a mountain, which gives you enormous _____ back.
4. The club makes a cherished collector's item, but unfortunately, the club will not be readily available, due to the _____ constraints in producing hand-crafted persimmon heads.

5. Among the many other books tucked away inside this big one is a _____ assessment of the works themselves.
6. It was an overwhelming need to _____ her personal life, political activity and work, she says, which made her finally abandon a conventional career.
7. In other words, she didn't destroy her confidence by _____ on the bad.
8. During the second session, George expressed his _____ about therapy.
9. In February and at the spring _____, as the new growth begins, the celebrations are of birth, nest-building and the inspiration of the poet.
10. Children learn from the consistency of the parents' reactions how to _____ their parents, and so gain attention.
11. The natural differences between Arnie and Jack have long been reflected in their _____ to the sport. To Jack, golf has been his means to an end; to Arnie, golf in his impassioned universe.

II. Suffix and prefix

Directions: Fill in the following incomplete sentences with the words in the box. Change the forms where necessary.

disapprove	disagree	disorder	disappear	discourage
dispassionate	disseminate	disperse	discard	dispatch

1. The workers strongly _____ of the company's new methods on the assembly line.
2. National public housing authorities _____ with this reading of the law.
3. There are other forms of civil _____ — most notoriously, football hooliganism.
4. His apparent unwillingness would _____ if we paid him enough money.
5. His parents tried to _____ his interest in racing car, but he persisted.
6. We are supposed to look at executive bonus with a slightly _____ approach.
7. It took years to _____ information about Ebola in Africa.

8. Because the village sits in a dome-shaped valley, air pollution is not easily _____.
9. We will be able to _____ those that seem totally irrelevant to our lives.
10. The victory inspired him to _____ a gleeful telegram to Roosevelt.

III. Phrases

Directions: Fill in the blanks with the phrases below and change the form if necessary.

when it comes to	separate from	dwell on
manipulate into	take a stand	commit to
take for granted	akin to	meld into
from the perspective of	disparate for	rely on

1. High achievers _____ what they do well and spend very little time evaluating themselves and their performances.
2. _____ classical music, we think of Beethoven or Mozart first.
3. If he wants my vote he'll have to _____ on the question of free trade.
4. The sea and the sky seem to _____ one another.
5. They managed to _____ us _____ agreeing to help.
6. The ability to _____ out recyclable elements _____ other waste is crucial.
7. Listening to his life story is _____ reading a good adventure novel.
8. _____ industrial development, we must explore the establishment of the industrial common market.
9. All details should be carefully checked and verified; nothing should be _____.
10. China will _____ the principle of pollution reduction targets without ruining its economies.

Section C Reading and writing

IV. Reading skills

Directions: In the following section, you will read about and practice using each type. The practices will sharpen your skills in recognizing and using

context clues. They will also help you add new words to your vocabulary. Examples may suggest the meaning of an **unknown** word. To understand how this type of clue works, read the sentences below. On the answer line, write the letter of each meaning you think is correct.

1. Instances of common **euphemisms** include “final resting place” (for grave), “intoxicated” (for drunk), and “restroom” (for toilet).
A. unpleasant means B. answers C. substitutes for offensive terms
2. Today was a day of **turmoil** at work. The phones were constantly ringing, people were running back and forth, and several offices were being painted.
A. discussion B. confusion C. harmony
3. Some animals have remarkable **longevity**. For example, the giant land tortoise can live several hundred years.
A. appearance B. length of life C. habits
4. Before the invention of television, people spent more time on **diversions** such as going to town concerts and ball games, visiting neighborhood friends, and playing board games.
A. amusements B. differences C. chores
5. Changes in such abilities as learning, reasoning, thinking, and language are aspects of **cognitive** development.
A. physical B. mental C. spiritual

V. Translation

词义选择

英汉两种语言都有一词多类、一词多义的现象。一词多类就是指一个词往往属于几个词类,具有几个不同的意义。一词多义就是说同一个词在同一个词类中,又往往有几个不同的词义。在英汉翻译过程中,我们在弄清原句结构后就要善于选择和确定原句中关键词的词义。1) 根据词在句中的词类来选择和确定词义,根据上下文联系以及词在句子中的搭配关系来选择和确定词义;2) 词义的引申是指在一个词所具有的原始意义的基础上,根据上下文和逻辑关系进一步加以引申,选择适当确切的目标语词语来表达,避免生搬硬套地逐句死译,使译文更加通顺流畅。下列示例对词义选择进行了不同处理,请讨论各自利弊并完成翻译习题。

1. The primary goal in this course is to allow you to approach environmental information with some useful skepticism and knowledge.

- a) 本课程的主要目标是允许你在探讨环境信息相关话题时,持有有用的怀疑和知识。
- b) 本课程的主要目标:丰富学生探讨环境信息话题所需的知识储备,并培养相应的批判性思维。
- 2. Environmental “information” is constantly bombarding us, and is often used to try and manipulate us into buying something, supporting an issue, or taking a political stand.
- a) “环境信息”正在不断地轰炸我们,并经常被用来尝试和操纵我们购买东西,支持一个话题或者采取一个政治立场。
- b) 我们的日常生活充斥着各种所谓的“环境信息”,这些信息常被用来操纵我们去购物,支持某个观点或者采取某个政治立场。
- c) 各种所谓的“环境信息”充斥着我们的日常生活,由于我们常常盲从于其说辞,从而引发盲目的购买行为,无端地支持某个观点,或者随波逐流地采取某个政治立场。

Exercises: *Translate the following sentences from English into Chinese.*

- 1. Recent space travels have shown that the body needs special exercise in a spaceship to suit the weightless conditions.
- 2. Just as the sun is the central body of solar system, so the nucleus is the core of the atom.
- 3. As we all know, alloys belong to a half-way house between mixture and compounds.
- 4. It is impossible to predict in detail the shape and mechanism of the robot slave. It might carry its computer and response mechanism around with it and also its source of power.

5. Metallic iron contents were determined by electrochemical solution of the iron with copper bitrate solution.

VI. Writing skills

A general-specific writing paragraph is quite common in English writing. As the name implies, it move from a broad statement (topic sentence) to narrower ones (supporting sentences). However, they often widen out again in the final sentence.

Exercises

1. What is the topic sentence for the second paragraph of passage B?

The topic sentence is then further illustrated by the following details (fill in the missing details):

- a. First, learn about how small this world really is and how we depend on disparate parts for our lives.

b. _____

c. _____

2. Providing some supporting sentences for the following topic sentence:

Private cars are becoming a problem in many cities.

a. _____

b. _____

c. _____

VII. Further discussion

1. Name a few environmental problems that human beings are facing.
2. Some people think technology, such as nuclear power, is destroying the environment while others think otherwise. What's your opinion on this?
3. What do you think of the environment situation in China?

Unit Two Capacity, System and Sustainability

Section A Passages

Passage One Sustainability

One of the primary issues of Environmental Science is **sustainability**, which has been adopted by some scholars as a primary theme. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations.

For humans to live sustainably, the Earth's resources must be used at a rate at which they can be **replenished**. In the past 35 years, the number of people in the world more than doubled, from 2.5 billion to over 6.6 billion. The rapidly increasing population, underlying all environmental problems, has **exponentially** increased the consumption of natural resources.

When will the resources that **sustain** the over-consumption of industrialized nations be **exhausted**? Some resources are inherently sustainable because they are continuously produced by nature. For instance, forest products can be produced continuously as long as the soil resource that supports them is maintained. Other resources, such as oil, take very long time periods to produce naturally. If the rate of consumption of resources exceeds the rate of replenishment/recovery, these resources are susceptible to depletion by overuse. Unfortunately, in order to satisfy the unprecedented need for goods and services, more and more nations **indiscriminate** the distinctions when overtaxing the environmental systems and natural resources, which would lead to unsustainable human living, thus overloading the Earth's capacity and disturbing the whole systems.

Passage Two The Earth's Population Carrying Capacity

How many people can Earth sustain? Before we answer this question, we have to know about a major principle of sustainability of Earth, i. e. the carrying capacity of the system. "Carrying capacity" is defined as the maximum number of individuals of a species that can be sustained by an environment over the long term — that is, not **depleted**; for example, in a fishery, if we don't harvest more than the carrying capacity, the fishery should be sustainable. Of course, changing parts of the system can change its carrying capacity. The carrying capacity of humans on the Earth depends in part on how we want to live, and how we want those who follow us to be able to live.

In the case of the Earth's population carrying capacity, the arithmetic is much, much more complicated. Our meta-population is diverse, widespread, and affected by a large multitude of unique variables including technological advancement, disease, and energy consumption. According to the data we know, the world population has experienced continuous growth since the end of the Great Famine and the Black Death in 1350, when it was near 370 million. The highest growth rates — global population increases above 1.8% per year — occurred briefly during the 1950s, and for longer during the 1960s and 1970s. The global growth rate peaked at 2.2% in 1963, and has **declined** to 1.1% as of 2012. Total annual births were highest in the late 1980s at about 138 million, and are now expected to remain essentially constant at their 2011 level of 134 million, while deaths number 56 million per year, and are expected to increase to 80 million per year by 2040.

Then what about the earth's population carrying capacity today? The United States Census Bureau estimated that the world population **exceeded** 7 billion on March 12, 2012. "We are beyond Earth's Carrying Capacity now", said Professor Robert Engelman, Yale University.

Sometime over the next millennium — a relatively short time when you consider the age of the Earth — the human population's carrying capacity will be realized. Assuming space as the limiting factor, and a population growth rate of 1% (It's currently 1.14%), the population density of Earth will equal one human being per square meter of land in a little over 1,000 years. That's