

21 世纪专业英语系列教程



# 环境科学与工程 专业英语

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English Course for  
Environmental Science and Engineering

Series of  
English Course  
of 21st Century



哈尔滨工程大学出版社

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# 环境科学与工程专业英语

**English Course for Environmental Science  
and Engineering**

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## 内 容 简 介

本书围绕环境科学和环境工程两方面组织材料。全书分为 15 个单元,每个单元分为 A、B 两个部分,A 部分为精读,B 部分为泛读。其中第 1~2 单元介绍环境科学概述和环境问题;第 3 单元介绍生态系统;第 4~6 单元分别介绍环境影响评价、环境管理系统(ISO14000)和可持续发展;第 7~9 单元介绍水污染及废水处理技术;第 10~12 单元介绍大气污染及其防治;第 13 单元介绍固体废物处理方法;第 14 单元介绍土壤污染治理技术;第 15 单元介绍噪声污染。每个单元均配有与课文相对应的练习,供读者进行自我测试使用。

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在跨入 21 世纪之际,面临不断恶化的生存环境,人类清醒地认识到要走可持续发展之路,发展环境教育是解决环境问题和实施可持续发展战略的根本。高等院校的环境教育,是提高新世纪建设者的环境意识,向社会输送环境保护专业人才的重要途径。为了反映当前国际环境发展的最新内容和成果,同时也为了提高学生阅读专业文献和获取信息的能力,组织编写出版环境专业英语系列教材,是许多院校多年来共同的愿望。在高等教育面向 21 世纪的改革中,学生基本素质和实际工作能力的培养受到了空前重视。对非英语专业的学生而言,英语水平和能力的培养不仅是文化素质的重要部分,在很大程度上也是能力的补充和延伸。当前,尽管大学生的基础英语水平普遍较高,英语四、六级成绩不断攀升,但是对专业英语仍比较陌生,对英语的应用,特别是专业领域的应用能力较差。具体表现为说专业英语困难,写科技论文更困难。如何改革现有教学模式,提高高等院校的教学质量和双语教学水平,从而提高学生对英语的应用能力,是当前高等教育教学改革中的一个重要任务。

当前,可持续发展已经成为时代发展的主题,而资源和环境又是可持续发展的基础,可持续发展的实现更要求全人类行动起来,保护人类赖以生存的环境。因此,为了使环境科学专业以及非环境科学专业的学生都能掌握环境保护的一些基础知识和基本原理,熟悉科技交流英语的表达方式,以便能顺利阅读英文版环境科技读物,更大程度地丰富专业知识,多层次多角度了解全球环境科学信息,把握国内外科技进展动态,我们组织编写了这本环境方面的双语教材,力求给读者提供一本体系完整、知识全面、通俗易

懂的环境科学方面阅读材料。本书适合具有一定英语基础的高等院校学生使用。

本书共分为3个部分,共15个单元,每个单元均由Part A和Part B两部分组成,Part A为精读部分,重点介绍环境科学方面的基础知识和基本原理,Part B提供与Part A相应的背景知识或是Part A的续篇,以进一步拓宽课文内容。根据Part A与Part B的内容,配有注释、词汇和短语、练习题。Part A与Part B均选自原版英文教材、科技报告、著作、专业期刊等。体裁较广,从纵横两个方面覆盖环境科学与工程专业的相关内容。

由于时间、编者水平的限制,加之篇幅的限制,本书不能涵盖环境科学和工程的所有内容,难免出现疏漏和以偏概全的问题,希望读者在使用本教材时,不吝赐教,使本书在使用过程中不断得到改进。

本书由李佳新负责编写第1~4单元,王旭梅负责第5~8单元,王晓冬负责第9~11单元,善德鑫负责第12~14单元,朱频频负责第15单元。

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# Unit 1

## ... Part A ...

### **Introduction to Environmental Science**

#### **1** What is Environmental Science?

Environmental science is the discipline that is concerned with identifying and diagnosing environmental impacts. Environmental scientists first try to understand the patterns or impact or change in the natural environment caused by various human activities. Once, they understand what is occurring, environmental scientists then search for the specific cause or causes. Often, they can also get involved in seeking solutions as well.

#### **2** Solutions to Environmental Problems

While environmental science is critical to understanding the impact of human activities on the natural environment, societies often turn to environmental policy, environmental education, and environmental technology for implementing solutions. Both environmental policy and education are concerned with changing human behavior. Environmental policy does so in a more direct, or controlling, manner. The Clean Air Act, for example, specifies the allowable levels of certain kinds of gases, which can be released by industrial facilities.



Environmental education, on the other hand, seeks to change human behavior in more subtle ways. Educating the average consumer about the effects of air pollution from automobiles, for example, may lead some individuals to change their behavior and using less polluting forms of transportation such as walking, bicycle, or public transportation.

Lastly, environmental technology refers to solving environmental problems by using or substituting tools, techniques, or processes that have less environmental impact. For example, probably the most well known type of environmental technology is the catalytic converter, which is attached to the exhaust system and neutralizes the gases that are emitted by the engine when gasoline is burned or combusted. To solve a specific environmental problem, societies often turn to environmental policy, education or technology, or a combination of any or all of the three.

### 3 The Environment as a System

To better understand the natural environment, the impacts that humans are having on the environment, and ways in which humans can alter their behavior and technologies to reduce environmental impact, it is useful to think of nature or natural environment from a “systems” perspective. A system can be viewed as a group of interacting, interrelated, or interdependent elements forming or regarded as forming a collective entity.

Think of the natural environment as a system, which is composed of four parts or components, each with its own unique form, arrangement, characteristics and dynamic. These five subsystems include:

- Atmosphere—blanket of gases that surrounds the earth or the gaseous earth;
- Lithosphere—the solid earth, composed of rocks and minerals;
- Hydrosphere—waters of the earth or liquid earth;
- Biosphere—living earth, composed of plants, animals, insects, and all living things except humans.

Remember we said that our language suggests that humans are not part of the natural environment? Humans make up their own subsystem, known as the sociosphere, which includes all people on the earth and all human activity. Kenneth Boulding, a well-known economist described the sociosphere as “The social system consists of all human beings on the planet and all their interrelationships, such as kinship, friendship, hostility, status,

exchange, money flows, conversations, information, outputs and inputs, and so on. It includes likewise the contents of every person's mind and the physical surroundings, both natural and artificial, to which he relates. This social system clings to the surface of the earth, so that it may appropriately be called the biosphere, even though small fragments of it are now going out into space. The sociosphere thus takes its place with the lithosphere, the hydrosphere, the atmosphere, the sociosphere, and so on as one of the systems which enwrap this little globe. It has strong inter-relationships with the other spheres with which it is mingled and without which it could not survive. Nevertheless, it has a dynamic and an integrity of its own. It is rather thin in Antarctica, although present there; it is very dense in New York. It is a network rather than a solid sphere or shelf, yet no part of the earth's surface is very far from it. It is a system of enormous complexity, yet not wholly beyond our comprehension."

#### 4 Important Environmental System Characteristics

First, the four environmental subsystems—atmosphere, lithosphere, hydrosphere and biosphere—together with the sociosphere, are part of a large, interconnected, inextricably linked system called the earth. Anything that happens in one of these systems affects some other elements or phenomena in another system.

Second, these subsystems are anything but static. There are continual interactions and transfers of energy, chemicals, and materials among these five subsystems. Some of these transfers, such as rain, are visible to humans. Others, such as the breakdown of chemicals from former living organisms as they decompose are not.

Third, there is continual change throughout the subsystems. In fact, the only constant is change. Some of these changes are natural. Some of these changes are caused by human activities.

#### 5 Environmental Impact

Humans have impacted the environment for a long time. Some of this impact is deliberate. Clearing a grassland to plant crops is a deliberate alteration of the environment and if the decision is whether to have food to eat or starve, or alter the natural environment,

this is a pretty easy decision for most, if not all, humans to make. However, at the same time, there may be unintended environmental impacts with clearing fields. Depending on the slope of the ground, valuable topsoil may run off into nearby waterways, thereby over time making the field less productive for food and possibly choking waterways with sediment.

## 6 Environmental Science Emerged Historically

Humans have been altering nature or the natural environment for a long, long time. Prehistoric hunters used fire to clear fields to attract wild animals to the young and tender shoots of grass and other types of vegetation. Human interaction with, and deliberate use, of the natural environment goes back a long way. At some point, though concerns about the indirect or unintended impacts of human use of or interaction with the environment began to emerge.

In the thirteenth century, we began to see concern expressed in England about the unintended impacts of using wood and coal to heat homes. This smoke from wood and coal fires, both within and outside the house, is perhaps the earliest recorded example of pollution. Over the next several hundred years, legislation, parliamentary studies, and literary comments appeared sporadically in England. By the early 1800s the smoke nuisance in London and other English cities was of sufficient public concern to prompt the appointment in 1819 of a Select Committee of the British Parliament to study and report upon smoke abatement.

Nonetheless, the number of air pollution incidents continued to increase. In 1873 an air pollution episode occurred in London where several thousand people died and in the autumn of 1909 in Glasgow, Scotland it was estimated that 1,063 deaths were attributed to noxious air conditions. Concern about air pollution culminated in December 1952 in London, when the deaths of some 4,000 people were attributed to an air pollution incident.

## 7 Sustainable Development

To respond to the various impacts that environmental change and pollution have had on the natural environment at local, urban, regional, national and global scales, a new mode of

human existence has been suggested. This new mode seeks to provide for the needs of the current generation of humans without compromising the ability of future generations to meet their own needs and is known as sustainable development. As described in the 1987 publication "Our Common Future", sustainable development is "a process of change in which policy and institutional adjustments, technological development, and the direction of investments are harmonized with the exploitation of resources".

Sustainable development is based upon the following set of assumptions:

- Environmental stresses are interconnected—deforestation not only destroys natural habitats, but threatens the global atmosphere and increases runoff and accelerates soil erosion and siltation of rivers and lakes;
- Ecological and economic concerns are interdependent, therefore environment and economics must be integrated from the start;
- Environmental and economic problems are linked to many social and political factors, and ...;
- Ecological impacts do not respect political boundaries.

## 8 When Is, and When Isn't, Sustainable Development?

Activities are sustainable when they:

- use materials in continuous cycles;
- use continuously reliable sources of energy, and ...;
- come mainly from the potential of human-communication, creativity, coordination, appreciation, spiritual and intellectual development.

Activities are not sustainable when they:

- require continual input of non-renewable resources;
- use renewable resources faster than their rate of renewal;
- cause cumulative degradation of the environment;
- require resources in quantities that could never be available for people everywhere, and ...;
- lead to the extinction of other life forms.

Sustainable development is difficult to fully conceptualize, understand and be put into everyday practice. It may help to think of sustainable development as a direction, like north,

for example. You can point to it, there may be many ways to get there, you can see how far you've come, and you have some idea of how far you've got to go.

## New Words

dynamic <i>n.</i>	动力, 动态; <i>adj.</i> 动力学的
atmosphere <i>n.</i>	大气圈, 空气; 气氛
lithosphere <i>n.</i>	岩石圈
hydrosphere <i>n.</i>	水圈
biosphere <i>n.</i>	生物圈
sociosphere <i>n.</i>	社会圈
kinship <i>n.</i>	亲属关系
hostility <i>n.</i>	敌意
artificial <i>adj.</i>	人造的, 人工的
cling <i>v.</i>	附着, 黏紧
integrity <i>n.</i>	完整, 完整性
Antarctica <i>n.</i>	南极洲
impact <i>n.</i>	影响; 冲突, 冲击; <i>vt.</i> 对……发生影响
catalytic <i>adj.</i>	接触反应的
converter <i>n.</i>	转炉
interdependent <i>adj.</i>	相互依赖的, 互助的
collective entity	集合体
noxious <i>adj.</i>	有害的
air conditions	大气环境
tender shoots	嫩芽
abatement <i>n.</i>	消除
sediment <i>n.</i>	残(沉)渣; 沉淀(物)
sustainable <i>adj.</i>	可持续的
harmonize <i>v.</i>	协调
deforestation <i>n.</i>	采伐森林

## Notes

1. Environmental science is the discipline that is concerned with identifying and diagnosing environmental impacts. 环境科学是研究和评价环境影响的一门学科。
2. While environmental science is critical to understanding the impact of human activities on the natural environment, societies often turn to environmental policy, environmental education, and environmental technology for implementing solutions. 鉴于环境科学对理解人类对自然环境影响的重要性, 社会通常依靠环境政策、环境教育以及环境技术来解决环境问题。
3. It includes likewise the contents of every person's mind and the physical surroundings, both natural and artificial, to which he relates. This social system clings to the surface of the earth, so that it may appropriately be called the *sociosphere*, even though small fragments of it are now going out into space.  
“both natural and artificial”是插入语, “to which”引导定语从句, 修饰“physical surroundings”。  
它同样包括每个人的内心世界和与其相关的物质环境(不管是自然的还是人造的)。社会系统是和地球表面紧密联系在一起, 所以将之称为社会圈更为贴切, 尽管它的一小部分正逐渐进入太空。
4. ... it is useful to think of nature or natural environment from a “systems” perspective.  
从“系统”方面来认识自然或自然环境是有用的。
5. Some of this impact is deliberate. 某些环境影响是人为造成的。
6. This new mode seeks to provide for the needs of the current generation of humans without compromising the ability of future generations to meet their own needs and is known as sustainable development. 这种新的模式既试图满足当代人的需要, 同时又不损害子孙后代自给自足的能力, 这种模式被称为可持续发展。

## Exercises

- I. Fill in the blanks with the words given below. Change the forms if necessary.  
harmonize, environment, implement, attach, hostility, cling, integrity, sustainable, solution,

visible, atmosphere

1. The \_\_\_\_\_ is seriously threatened by pollution.
2. There is a (n) \_\_\_\_\_ of peace and calm in the country quite different from the atmosphere of a big city.
3. I felt his feelings of \_\_\_\_\_, when I saw him.
4. They \_\_\_\_\_ together when the time came to part.
5. The old Roman walls may still be seen, but not in their \_\_\_\_\_.
6. The pilot \_\_\_\_\_ severe injuries when his plane crashed.
7. Recourse to arms is not the best \_\_\_\_\_ to a quarrel between two countries.
8. She is deeply \_\_\_\_\_ to her young brother.
9. The aircraft turned back because of poor \_\_\_\_\_.
10. The singers began to \_\_\_\_\_ the new song.
11. The committee's decisions will be \_\_\_\_\_ immediately.

**II . Choose the best answer according to the article.**

1. Environmental impacts was caused by \_\_\_\_\_.  
A. various human activities                      B. environmental science  
C. environmental scientists                      D. seeking solutions
2. Which is not mentioned to solve the environmental problems?  
A. environmental education                      B. environmental policy  
C. environmental scientist                      D. environmental technology
3. \_\_\_\_\_ can directly change human behavior.  
A. Environmental policy and education  
B. Environmental policy  
C. Environmental education  
D. Environmental technology
4. \_\_\_\_\_ produces more air pollution relatively.  
A. Walking    B. Bicycle  
C. Public transportation                      D. Automobile
5. Catalytic converter is \_\_\_\_\_.  
A. a type of environmental technology  
B. a kind of exhaust system  
C. the gas as emitted by the engine  
D. combusted or burned gasoline

6. Which word can best explain "implementing" used in paragraph 2?
- A. solving  
B. carrying out  
C. carrying on  
D. dealing with
7. \_\_\_\_\_ consists of all people on the earth and all human activity.
- A. Sociosphere  
B. Biosphere  
C. Atmosphere  
D. Hydrosphere
8. Which statement is true according to the passage?
- A. All these transfers in environmental system are visible to the naked eye.  
B. Environmental system is a dynamic system.  
C. Environmental subsystems are static.  
D. Environmental system is static.
9. Which one impacted the environment on purpose?
- A. Choking waterways with sediment.  
B. Making the field less productive for food.  
C. Soil running off into water.  
D. Clearing a grassland to plant crops.
10. Sustainable development is concerned with \_\_\_\_\_.
- A. the current generation.  
B. the future generations.  
C. both A and B.  
D. political boundaries.



## ... Part B ...

### Introduction to Environmental Impact

#### 1 Introduction

This course is concerned with the interactions between the biosphere and the earth's four natural systems. These interactions frequently result in impacts of the earth's natural physical environment. We know that humans have impacted the environment for a long time. Some of this impact is deliberate. Clearing a grassland to plant crops is a deliberate alteration of the environment and if the decision is whether to have food to eat or starve, or alter the natural environment, this is a pretty easy decision for most, if not all, humans to make. However, at the same time, there may be unintended environmental impacts with clearing fields. Depending on the slope of the ground, valuable topsoil may run off into nearby waterways, thereby over time making the field less productive for food and possibly choking waterways with sediment.

#### 2 The Formula for Environmental Impact

There is a formula used for estimating or calculating the level of environmental impact. Environmental impact is a function of three things:

- Number One—The population or number of people utilizing the natural environment or resources. The more people there are in a place, the more likely that environmental impact will occur.
- Number Two—The greater the level of consumption of natural resources—such as