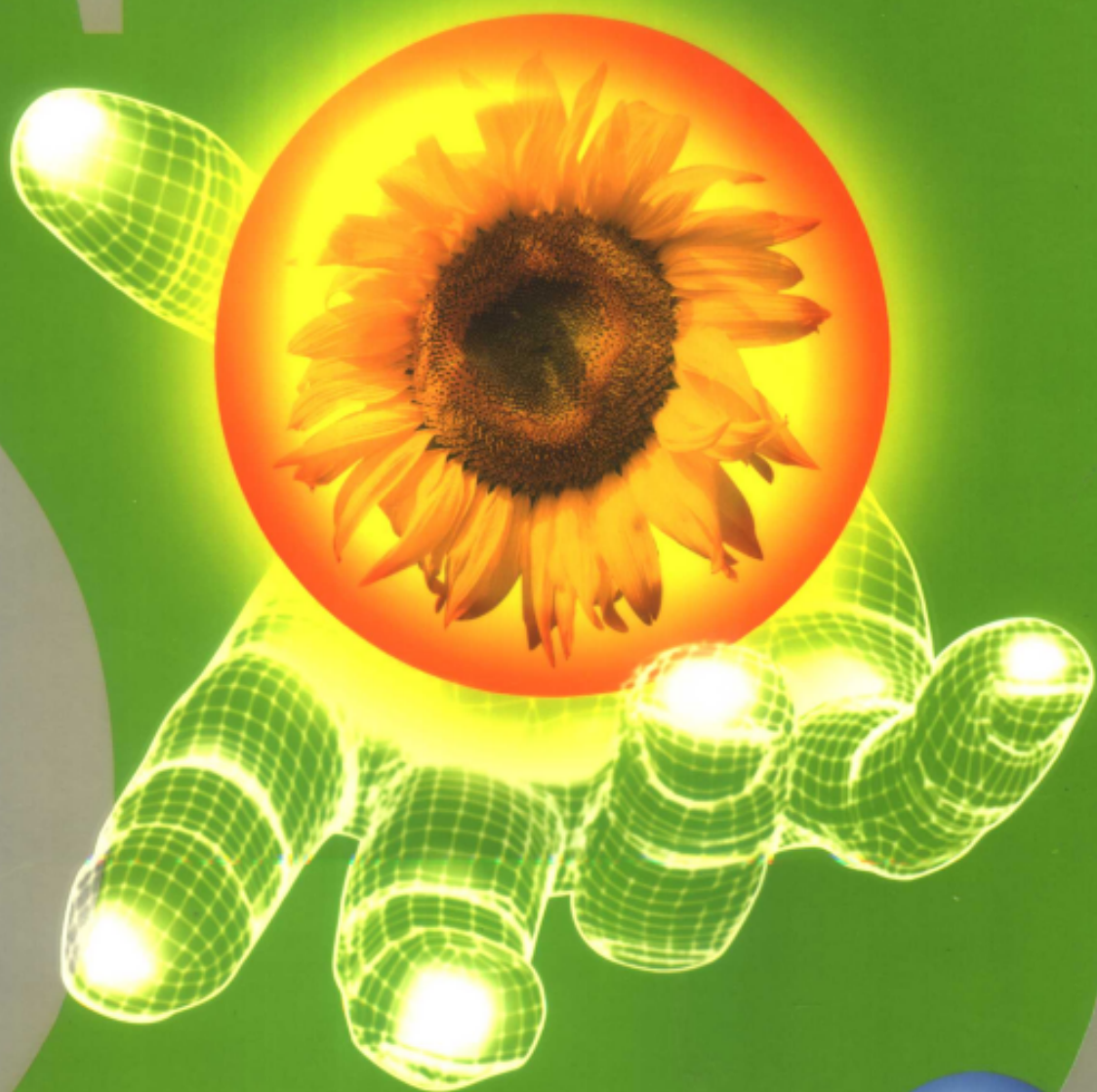


# 小学生活与科学

小学科学双语选修教材

PRIMARY

LIVING SCIENCE



教师用书  
TEACHER'S BOOK

外语教学与研究出版社 FOREIGN LANGUAGE TEACHING AND RESEARCH PRESS

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# 小学**生活与科学**

## PRIMARY LIVING SCIENCE

教师用书

TEACHER'S BOOK

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## 出版说明

在科技日新月异的21世纪,社会的发展对人才的要求越来越高,具备良好的科学素养已成为当今中小学生面临的一项重要的学习任务。为了帮助同学们达到相应的学科要求,并且能够在认识身边的科学、用科学的态度去解决自身学习和实际生活中所遇到的问题,逐步培养起用英语进行思维的能力,我们推出了《生活与科学》(Living Science)。

《生活与科学》中小学系列双语教材的推出,前后经历了近两年的时间。我们在全中国率先开设了双语课程的地区进行了多次调研、座谈,并与境外的多家出版机构进行联系,以期寻找到最适合我国中小学课堂教学实际的双语教材。我们最终决定引进这套教材,因为其内容非常贴近中小学生的日常生活,强调激发和培养学生的科学探究能力,与教育部颁布的《科学课程标准》提倡的诸多理念相吻合。

为了使教材更易操作,我们对其进行了精心的改编。在小学学生用书中仅增加了部分单词的中文注释,以最大限度地保持英文的原汁原味。教师用书除了保留原书的内容外,还增添了Lead-in(导学)、Translation(课文译文)、Words and Expressions(词汇短语)、Background(背景知识)等部分。Lead-in部分以中英文双语的形式呈现,富有启发性、趣味性,能够有效地激发学生的求知欲。Translation部分则为教师授课提供了参考。Words and Expressions部分将学生用书、教师用书、活动用书中出现的部分单词和短语列举出来,并采用了最新的国际音标,给出了中文释义。Background部分的英文材料与文章密切相关,如学生用书第一册第六章提到了后羿射日、嫦娥奔月的故事,Background部分分别以中英文双语的形式给以呈现,供教师备课参考。

参与改编工作的有英语教学和科学学科两方面的专家、沿海地区在双语教学方面有经验的教研员和一线骨干教师。本书编写期间,得到了全国各地专家、学者的大力支持,特别是上海市教委的沃振华老师、朱浦老师为本套教材付出了大量的心血,我们在此谨表谢意。诚挚地希望我们的努力能够为我国方兴未艾的双语教学实验注入新的活力;更希望这套教材能为同学们开启一扇了解科学的窗口,使同学们在英语的语境下领悟更多自然界的奥秘,逐步树立起科学的世界观。21世纪需要具备创新意识、较高科学素养和熟练运用英语开展国际交往与合作的复合型人才,我们愿将这套教材奉献给那些勇于承担这一重任的广大师生。

外语教学与研究出版社  
基础英语教育事业部

# 前言

积极推进中小学双语教学实验旨在更广阔的学科领域中、更丰富的语言层面上扩大学习者的英语实践空间、拓展英语教学的外延、深化英语教学的内涵、优化英语习得环境、培养学生英语思维的基本能力、提高学生的英语应用水平和能力。

目前,双语教学在我国的部分省市正在如火如荼地进行。现阶段的双语教学是以学科英语为主,在双语教学中扩大英语输入、促进英语的运用、在确保学科目标基本达到的基础上,以努力培养学生英语思维的习惯为重点任务,提倡培养学习者高效、优质地进行研究性学习,实现英语教学和学科教学的有机整合。但是,在双语教学的开展过程中也出现了一些问题,制约其发展的瓶颈问题就是缺乏适合于不同年级、不同学科、不同层次学习者的双语教材。

外研社组织了有关学科及英语教育专家、学者,根据中小学目前的教学实际,参考和借鉴了国内外先进教材的精髓,权衡各地开展双语教学试点工作的得失,博采众长,群策群力,引进、改编了这套《生活与科学》(Living Science)系列双语教材。这套教材重视学科定位,在语言难度、科学性等方面把握正确,具有鲜明的特色:

首先,它贴近学生的生活与学习实际,着重培养学生学以致用能力,从而实现学生从科学世界向生活世界的回归。第二,文章内容充实,深入浅出。教材中出现的概念多以形象化、通俗化的词语来表述,较少出现专业术语。第三,它强调科学学习过程中激发学生的探究能力,既重结论更重过程。小学教材以活动贯穿内容始终,中学教材从一开始就引入科学的概念及科学探究的步骤,引导学生学科学、用科学,培养学生的观察能力、实验能力、思维能力及自学能力。第四,以知识宽度代替深度。在知识内容方面,本套教材主要涉及生命科学、物质科学与宇宙科学三大领域。在系统地讲解这三大领域的基础知识的前提下,它侧重从更广泛的范围内对课程进行整体构思,学科内容交叉渗透。第五,版面活泼,图文并茂。配备大量精美的插图是本套教材的一大特色,特别是小学教材充分考虑到学生的认知规律,以实物照片和卡通图片相结合,充分调动学生的创造力和想象力。第六,具有开放性。本套教材在学习内容、活动安排、作业与练习、评价等方面给师生提供了选择的机会和创新的空间,同时它还引导学生利用广泛存在于学校、家庭、社会、大自然、网络和各种媒体中的多种资源进行探究性学习,使学生在科学学习的过程中潜移默化地掌握英语、从而达到双语教学的目的。

在此我们衷心希望这套教材中力求体现和贯彻的一些教学理念和实践经验,能对我国蓬勃发展的双语教学起到推动作用,也希望教师们能在教学中结合本校双语教学的客观情况,勤于钻研,敢于实践,为双语教学贡献出自己的力量。

《生活与科学》系列教材编委会



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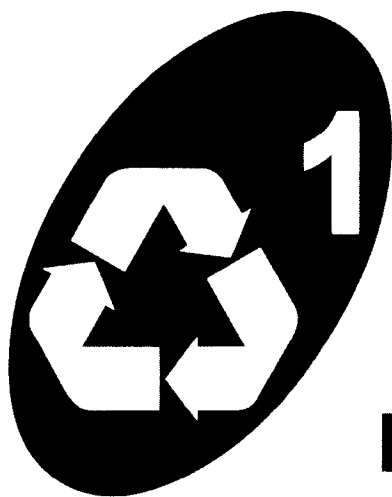
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# Natural resources

## 自然资源

### Lead-in 导学

We can't live without natural resources. We breathe and drink every day, so we need air and water; we cook food with a gas cooker, so we need gas; we turn on the light in the evening, so we need electricity. All these come from natural resources. Do you want to learn more about natural resources?

我们的生活离不开自然资源。我们每天都要呼吸、喝水，所以我们需要空气和水；我们用煤气灶具烹饪，所以我们需要煤气；每到晚上我们会打开电灯，所以我们需要电。所有这些都来自于自然资源。你想学习有关自然资源的更多知识吗？

### Objectives 教学目标

Let pupils:

1. list different kinds of natural resources; (列举不同类型的自然资源)
2. understand that using natural resources can satisfy our basic needs. (了解利用自然资源可以满足我们的基本需求)



## **Introduction 介绍**

Where does wood come from? What is it used for? 木材是从哪里来的? 它可以用来做什么?

Wood comes from forests. It is used to make furniture and paper. It is also used as fuel and as a building material.

## **Activities 活动**

- 1 Here are some photos of natural resources. Can you give some more examples? 这是一些自然资源的图片, 你能给出更多的例子吗?

Soil, air, water, etc.

- 2 Do you know how coal is extracted? 你知道煤是怎样被开采出来的吗?

Using an electric motor to obtain coal underground.

- 3 What are the uses of coal? 煤有哪些用途?

Coal is used to generate electricity, make steel, supply gas and petrol. During treatment, by-products of oil, such as detergent, soap and plastic are produced.

- 4 Do you know how oil is extracted? 你知道石油是怎样被开采出来的吗?

Drilling for oil under the sea.

- 5 (a) What are the uses of oil? 石油有哪些用途?

It is mainly used as fuel for cars, planes, engines and household consumption. It is also used as lubricant for engines and asphalt for building.

- (b) What by-products are made from oil? 石油提炼后能制成哪些副产品?

All kinds of plastics, synthetic rubber, man-made fibres, cosmetics, paints, fertilisers, medicine, etc.

- 6 If we didn't have gas or LP gas at home, how would this affect our lives? 如果家里没有煤气或液化气, 我们的生活将会受到怎样的影响?

Cookers and water heaters powered by gas and LP gas would not work. This would cause us a lot of inconveniences.

- 7 Why does man cut down trees? 人类为什么要砍伐树木?

To get wood which can be used in different ways to satisfy our needs.

- 8 List some natural resources that you used last week. 列举你上周使用过的一些自然资源。

Pupils can give their own answers.



## Translation 课文译文

自然资源是指那些自然存在的物质。除了土壤、空气和水，它还包括像铜、铁、煤、石油之类的矿物质以及动物和植物等生物。

煤有很多用途，它主要可以用来发电、炼钢和制气。石油主要用做汽车和飞机的燃料。经过处理，煤和石油可以成为生产沥青、医药、洗涤剂和塑料等副产品的化学制品。

人类需要木材作为燃料。我们还需要用木材来造纸、建房和制作家具。树木被砍伐后，土地可用于耕作和建房。

开采并利用自然资源是为了满足我们的基本需求，改善我们的生活环境。然而，我们的自然资源是有限的，我们必须加以珍惜。

## Application 学以致用

Collect photos which show damage to the environment due to extracting natural resources. 收集一些表现由于开采自然资源而导致环境破坏的图片。

Pupils can give their own answers.

## Key to the Exercises in Activity Book 《活动用书》参考答案

1

seafood oil soil plants coal  
animals minerals natural gas (accept any reasonable answers)

2

(1) C (2) A (3) B (4) A (5) B (6) C

3

(1) LP gas (2) Coal (3) Oil (4) Wood  
(5) No. (6) Inconvenient or bad living standard. (suggested answers only)

4

(1) Natural resources are the materials that exist naturally. Besides soil, air and water, there are also minerals like copper, iron, coal, oil and living things like animals and plants.

(2) Because we have to satisfy our basic needs and improve our living environment.

(3) As fuel and material for building.



## Words and Expressions 词汇短语

**natural** /'nætʃərəl/ *adj.* 自然的

**coal** /kəʊl/ *n.* 煤

**extract** /ɪk'strækt/ *v.* 开采

**diesel** /'di:zəl/ *oil* 柴油

**medicine** /'medɪsən/ *n.* 药

**plastic** /'plæstɪk/ *n.* 塑料

**value** /'vælju:/ *v.* 珍惜

**resource** /rɪ'sɔ:s/ *n.* 资源

**mineral** /'mɪnərəl/ *n.* 矿物

**petrol** /'petrəl/ *n.* 汽油

**asphalt** /'æsfælt/ *n.* 沥青

**detergent** /drɪ'tɜ:dʒənt/ *n.* 洗涤剂

**limited** /'lɪmɪtɪd/ *adj.* 有限的

## Background 背景知识

### Natural resources

**G**enerally speaking, when we talk about natural resources, we refer to plants, animals, mineral deposits, soil, clean water, clean air, and fossil fuels such as coal, petroleum, and natural gas. Natural resources are grouped into two categories, renewable and nonrenewable. A renewable resource is one that may be replaced over time by natural processes, such as fish populations or natural vegetation, or is inexhaustible, such as solar energy. Nonrenewable resources are those in limited supply that cannot be replaced or can be replaced only over extremely long periods of time. Nonrenewable resources include fossil fuels and mineral deposits, such as iron ore and gold ore.

Fossil fuels were formed from plants and/or animals buried underground for millions of years. Fossil fuels include coal, crude oil and natural gas.

Coal is a black or brownish black organic sedimentary rock. It can be burnt and is a major energy resource on earth. Coal's role in energy use worldwide has shifted substantially over the decades, from a fuel used extensively in all sectors of the economy, to one that is now used primarily for electricity generation. It is also used prominently in a few industrial sectors, such as steel, cement, and chemicals. Because of its continued importance, the environmental effects of coal mining, processing and utilisation are of particular concern.

Coal is called a fossil fuel because it is derived from plants that grew in vast swamps 300 million years ago. Over vast periods of time, the plant matter was compressed and changed by geological processes, including pressure and temperature. This process created coal.

Coal is one of the world's major energy resources. According to the US Energy Information Administration, reserves of coal that can be mined using existing technology total 1.14 trillion tons worldwide. Although coal is widely distributed around the globe, three regions — the United States, China, and Russia — account for 57 percent of the world recoverable reserves. It is estimated that world reserves of coal will last twice as long as the combined reserves of oil and natural gas.

Although petroleum was discovered in the mid-nineteenth century, its use grew slowly until the introduction of the automobile in the early 20th century. Crude petroleum is a mixture of compounds containing hydrogen and carbon. These range from heavy tars and asphalts to lighter gases such as butane, propane,



ethane, and methane. Refining technology allows the separation of crude oils into a variety of products. These include industrial fuels, gasoline, diesel fuel, heating oil, and raw materials for manufacturing chemicals. Modern industrial societies use petroleum primarily to achieve a degree of mobility — on land, at sea, and in the air — that was barely imaginable less than 100 years ago. In addition, petroleum and its derivatives are used in the manufacture of medicines and fertilisers, foodstuffs, plastics, building materials, paints and cloth and to generate electricity.

Along with coal and petroleum, natural gas is a fossil fuel. It is usually found together with petroleum deposits in earth's crust. Natural gas currently accounts for less than 2 percent of China's primary energy consumption, but government planners project domestic production of natural gas to triple by 2010, rising from the current level of roughly 22 billion cubic metres ( $\text{m}^3$ ) to 60 billion  $\text{m}^3$  per year.

Natural gas is used both as a fuel and as a raw material in the manufacture of chemicals. As a residential fuel, it is burnt in furnaces, water heaters, cooking stoves, and clothes dryers. As an industrial fuel, it is burnt in kilns (special furnaces) to bake bricks and ceramic tiles and to produce cement. Natural gas is also used for generating steam in water boilers and as a source of heat in glass making and food processing. In addition, natural gas serves as a raw material for creating petrochemicals, which are used as a base product for making fertilisers, detergents, pharmaceuticals, plastics, and numerous other goods.

Fossil fuels are the major energy resources of our world. There are also many alternative fuels and energy sources found in nature. These include energy from running water, wind power, nuclear power and solar energy.



# Conserving the environment

## 保护环境

### Lead-in 导学

While taking a stroll by the river one day, you find some dead fish floating on the water. What's wrong with these fish? Can they be served in our dishes? What shall we do to prevent things like this from happening?

某天当你在河边散步时，发现河面上漂浮着一些死鱼。这些鱼怎么了？还能端上我们的饭桌吗？我们该做些什么来阻止此类事情的发生？

### Objectives 教学目标

Let pupils:

1. name some problems caused by extracting natural resources; (列举一些由于开采自然资源不当而引发的问题)
2. point out that the supply of coal and oil is limited; (指出煤和石油的供应是有限的)
3. point out the importance of saving energy and conserving the environment; (指出节约能源和保护环境的重要性)
4. name some new energy sources that can replace coal and oil. (列举一些能够取代煤和石油的新能源)



## Introduction 介绍

Ads like these are a common sight in Beijing's streets. Do they tell you anything? 诸如此类的广告在北京街头很常见。它们向人们传递了什么信息?

Conserving environment brings benefit to mankind and it is our duty to protect nature.

## Activities 活动

- ① What will happen if too many trees are cut down? 滥伐树木会有什么后果?

The beautiful environment will be damaged; ecological balance will be destroyed; large amounts of soil will be washed away by rain.

- ② The world population is rising quickly, so we need to make use of more resources. How does this affect man and the environment? 世界人口在快速增长, 需要消耗更多的资源。这会对人类和环境有何影响?

Energy and resources will be used up, the natural environment will be damaged and polluted, and eventually the lives of humans and animals will be endangered.

- ③ How does excessive killing of animals affect man and other living things? 过度捕杀动物对人类和其他生物会有怎样的影响?

Some animals will become extinct. The ecological balance will be lost which in turn will affect the lives of other animals.

- ④ (a) Do you know what an energy crisis is? 你知道什么是能源危机吗?

It refers to the situation when an energy shortage causes international tension. Sometimes it even leads to war.

- (b) If there were no coal or oil on the earth, how would this affect our lives? 如果地球上没有煤, 也没有原油, 我们的生活会受到什么样的影响?

This would cause us a lot of inconvenience.

- ⑤ Why do we need to save energy? 为什么我们要节约能源?

To avoid using up the energy.

- ⑥ Do you know any other kinds of energy apart from coal and oil? 除了煤和石油, 你还知道其他类型的能源吗?

Solar power, nuclear power, wind power and hydroelectric power.



### Translation 课文译文

地球是动植物的栖息地。世界人口在持续增长,当代社会迅猛发展,因此我们需要消耗更多的资源。但是,如果我们草率地开采资源,我们就会面对一系列问题,比如资源短缺、环境遭到破坏和污染。

- 1 资源短缺:森林、煤、石油和矿物是有限的,最终会被耗尽。
- 2 环境破坏:人类通过开垦草原和填海以获取田地。美丽的森林正被高楼取代。滥伐树木会使土质变松,导致山体滑坡。
- 3 动植物灭绝:如果自然环境被破坏,野生动物将失去它们的家园。由于过度捕猎和滥砍滥伐,一些动植物正处于灭绝的边缘。
- 4 环境污染:来自汽车、农场和工厂的废物导致了空气、土壤和水的污染。  
我们不愿地球遭到破坏,因此我们必须珍惜自然资源。

### Application 学以致用

- 1 Collect some information or photos about new forms of energy (for example: nuclear power, solar power...). Put them on the notice board in the classroom. 收集一些有关新能源(如:核能、太阳能……)的信息或照片。贴在教室的布告栏里。
- 2 (a) Look at the pictures and tell the story. 看图讲故事。  
Pupils can give their own answers.  
  
(b) What can we learn from the above story? Discuss with your partners why we should protect wild animals. 从上面的故事中我们可以学到什么?与伙伴讨论为什么我们要保护野生动物。  
To maintain the ecological balance.

### Key to the Exercises in Activity Book 《活动用书》参考答案

1

(1) ✓      (3) ✓      (4) ✓      (5) ✓      (6) ✓

2

(1) coal, oil, minerals    (2) loosen, landslides  
(3) hunting, homes

3

(1) Because there are fewer eagles.  
(2) There is a lack of food and some hares have died of hunger.  
(3) The ecological balance will be damaged.



4

- |                  |                         |
|------------------|-------------------------|
| (1) solar energy | (2) nuclear power       |
| (3) wind power   | (4) hydroelectric power |

## Words and Expressions 词汇短语

**ecological** /ˌɪkəˈlɒdʒɪkəl/ **adj.** 生态上的

**crisis** /ˈkraɪsɪs/ **n.** 危机

**solar** /ˈsəʊlə(r)/ **adj.** 太阳的

**hydroelectric** /ˌhaɪdrəʊ-ɪˈlektɪk/ **adj.** 水力发电的

**expand** /ɪkˈspænd/ **v.** 扩大

**reclaim** /rɪˈkleɪm/ **v.** 开拓, 开垦

**destroy** /dɪˈstrɔɪ/ **v.** 破坏, 毁坏

**excessive** /ɪkˈsesɪv/ **adj.** 过度的

**nuclear** /ˈnjuːkliə(r)/ **adj.** 原子能的, 核动力的

**shortage** /ˈʃɔːtɪdʒ/ **n.** 短缺, 不足

**loosen** /ˈluːsən/ **v.** (使) 变松

## Background 背景知识

### Earth Day

**T**he social activism of the 1960s gave rise to the first Earth Day on April 22, 1970. The goal was to increase public awareness and citizen participation in environmental policy-making.

Although Earth Day has been observed annually since 1970, it was not until the twentieth anniversary of the original event that it received worldwide attention. By 1990, it had become a truly global event, with 200 million people in 140 nations participating in various activities. From China to Kenya, festivals, tree plantings, conferences, theatre productions, and concerts took place that year. In Kenya, 1.5 million trees were planted, and on Vancouver Island, Canada, Boy Scouts replanted trees from an old forest scheduled to be cut down. In the Philippines, the government stopped vehicles on Manila streets to confiscate the license plates of those that were violating air pollution laws. In Verona, Italy, members of Friends of the Earth took banners, posters, and leaflets to a local soccer game, where they told fans that an area of tropical rain forest the size of seven soccer fields is cut down every minute. At McMurdo Sound in Antarctica, volunteers braved the -65°F (-54°C) temperature to pick up fifteen truckloads of trash.

People all over the world know that there are problems we need to work on and Earth Day is our special day to look at the planet and see what needs changing.

### Endangered species

**E**ndangered species are species that scientists have classified as likely to become extinct in the near future. Every year, although new species come into being, others die out, reducing the diversity of life on the planet. To a certain extent this is quite natural: it is an essential part of Darwin's theories that species develop and disappear. There have been periods of mass extinction in the past, in which vast numbers of organisms died out. However, the activities of humans, especially over the past 250 years, are leading to the extinction of



species across the globe, a process that worries and frightens many observers.

Most endangered species have a declining population that is found over an area much smaller than its original range. The population becomes broken up into small fragments, which become isolated from one another. These small isolated populations are more vulnerable than large ones. They tend to become inbred, losing their genetic diversity; any catastrophe, such as a disease, epidemic, or flash flood, is likely to kill a large proportion of the species; when a population falls to ten or twenty individuals, animals may have trouble finding mates and plants may have difficulty in becoming pollinated. When all the small population fragments collapse, the species becomes extinct.

Some species, for example, have always been rare and can be found only in a specific area. They are very vulnerable to changes such as the arrival of agriculture or the development of land for building. Other species, some of which may be very numerous and widespread, may become classified as endangered for a number of reasons. Destruction of habitats is probably the most significant factor, but for widespread species, this alone is rarely responsible for their extinction. Sometimes the population number of a particular species is dramatically reduced by sport hunting, poaching, or direct persecution. The introduction of a new predator or competitor, an alien or exotic species, into the same habitat can also threaten a species.

Most endangered species become endangered for a number of reasons, and often it is the interaction of factors that can push a vulnerable species into the endangered category. The best way to understand how this happens is to study case histories of endangered species. Sea turtles are endangered for many reasons: their nests are threatened by coastal development and they are hunted for their shells to be made into jewellery.

Efforts have been made to recover the endangered species. In the international arena, over one hundred countries have signed the Convention on the International Trade of Endangered Species of Wild and Flora (CITES, 1973) to limit international trade in products made from endangered species. Many regional and national governments publish red lists of threatened species. People all over the world are encouraged to get involved and do something in this regard. (Excerpts from *The Environment Encyclopedia*® 2001 Marshall Cavendish Corporation)