World Heritage and the environment

‘Nature may be interpreted in various ways – as a basis for scientific business endeavours; as a resource; something to look at, experience and enjoy; or as an artistic inspiration.’

President Nelson Mandela, October 1994
World Heritage and the environment

Objectives
Knowledge
Attitudes
Skills

Young people and World Heritage conservation
Student Activity 29: Ecosystems and land forms

International environmental conservation
Student Activity 30: Environmental degradation

Conserving biological diversity through
World Heritage conservation
Student Activity 31: Pressures on biological diversity
Cultural diversity and biological diversity
Species evolution and extinction
Vallée de Mai Nature Reserve, Seychelles
Manas Wildlife Sanctuary, India
Te Wahipunamu, New Zealand

**Student Activity 32:** Jigsaw puzzle of Gondwanaland

**Student Activity Sheet:** Jigsaw puzzle of Gondwanaland

**Student Activity 33:** Matching World Heritage natural sites with the corresponding criteria

**Ecologically and culturally sustainable development**

Banc d’Arguin National Park, Mauritania

**Student Activity 34:** Protecting the environment

**Student Activity 35:** Actions for ecologically sustainable development

Local support for sustainability

**Student Activity 36:** Heritage trails

**The future of our planet**

**Across the curriculum:**

World Heritage and the environment
Objectives

Knowledge
To help students develop knowledge and understanding of:

• the natural and cultural environment and the interactions between people and the environment
• World Heritage sites as protected areas, essential for the conservation of biodiversity and of threatened plant and animal species
• the World Heritage Convention as an important contributor to collective international environmental conservation action

Attitudes
To encourage students to:

• develop a strong conservation ethic and responsibility for the environment
• approach their life on the planet in a sustainable way to protect species and ecosystem diversity (biodiversity) and to ensure that the ability of future generations to meet their needs will not be jeopardized.

Skills
To help students develop their ability to:

• participate in environmental protection, particularly World Heritage conservation
• participate in the process of ecologically sustainable development for the future health of the planet and its peoples
• provide leadership in World Heritage conservation.
Conserving the World Heritage can make a significant contribution to the protection of the environment, its cultural and natural diversity and the interactions between people and the environment.
World Heritage conservation is helping to address some of today’s key environmental concerns, notably the increasing number of threatened and extinct plant and animal species and the resultant decline in biodiversity. Equally importantly, the conservation of World Heritage sites is being undertaken within the international context of ecologically sustainable development where, for example, the protected area status of World Heritage sites is balanced with local community needs for resource use and economic survival. In addition, the Convention recognizes the cultural and natural heritage and outstanding interactions between the two.

For these reasons, the Convention provides unique opportunities for a holistic approach to environmental conservation encompassing the protection of the full diversity of natural and cultural values of a site.

The 166 natural sites included on the World Heritage List as of June 2008, protect plant and animal species, ecosystems, geological sites, ecological and biological processes, and natural habitats, as well as areas of exceptional beauty and aesthetic importance. With 177,4 million hectares, these sites cover 7,8 % of the total protected area worldwide. In particular, marine natural World Heritage sites cover 20,9 % of the total area of marine protected arrears (MPAs) listed in the World Database On Protected Areas (WDPA).

In order that young people may participate effectively in environmental conservation, they need to be aware of the issues and challenges at stake, and have the means to act accordingly. Knowing about the important role of the World Heritage Convention for environmental conservation can
help to achieve this. Some of the major issues in environmental conservation, and their significance to World Heritage conservation, are presented in this section of the Kit.

• **Student Activity 29**

**Ecosystems and land forms**

**Objective:** to become more aware of different types of ecosystems and World Heritage natural sites
Faced with a general deterioration of the environment – polluted air, water and soil, global warming, the hole in the ozone layer, the depletion of natural and non-renewable resources, extinction of species, and a decline in biodiversity – we must all act urgently in order to repair the damage already caused, to conserve the natural and cultural diversity of the world and to ensure sustainable development for present and future generations.

Conserving World Heritage, particularly World Heritage natural sites, can make a valuable contribution to improving and safeguarding our environment. In addition to the World Heritage Convention, there are several international treaties concerning the conservation of the environment. Further information on these treaties and their secretariats can be accessed via the UNESCO World Heritage Centre’s website (http://whc.unesco.org/)

The World Heritage Convention was signed two months after the first United Nations World Conference on the Environment held in Stockholm, Sweden, in September 1972. Twenty years after Stockholm, world leaders met in June 1992 at the UN Conference on Environment and Development in Rio de Janeiro (Brazil). The so-called Rio Earth Summit was convened to assess the alarming deterioration of the natural environment and to elaborate a strategy to improve it. The Summit led to the adoption of Agenda 21, a set of proposals to help save the Earth, of which Chapter 36 underlines the instrumental role of education and young people.
In addition, 181 countries and the European Community signed a *Convention on Biological Diversity*, which calls for concerted action to conserve biodiversity. Two other international conventions, plus a statement on forest conservation, derived from the Rio Earth Summit.

The *Convention on Climate Change* came into effect on 21 March 1994 and has been ratified so far by 186 countries. It aims to stabilize the concentration of greenhouse gases in the atmosphere and so fight against global warming.

The *United Nations Convention to combat Desertification in those countries experiencing serious drought and/or desertification, particularly in Africa* came into effect on 26 December 1996. It aims to eliminate the threat of human suffering and ecological disaster from drought and desertification.
The Non-Legally Binding Authoritative Statement of Principles for a General Consensus on the Management, Conservation and Sustainable Development of all Types of Forests was also adopted at the Rio Earth Summit. This aims to encourage all countries to work towards the re-greening of the world, notably by reforestation and conservation of the natural resources.

In addition, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was adopted in 1975. CITES establishes worldwide controls on the international trade in threatened species of animals and plants. In the case of species threatened with extinction, CITES prohibits all commercial trade in wild specimens.
The 1971 *Ramsar Convention on Wetlands of International Importance*, (more commonly known as the Ramsar Convention on Wetlands) is an intergovernmental treaty which provides the framework for international co-operation for the conservation and wise use of wetlands and their resources.

There are at present, 1759 wetland sites, totalling more than 161 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance.

Thirty-six sites included on the Ramsar List of Wetlands of International Importance are also World Heritage sites. These are:

<table>
<thead>
<tr>
<th>State Party</th>
<th>World Heritage Site Name</th>
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<tbody>
<tr>
<td>Albania</td>
<td>Butrin</td>
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<td>Algeria</td>
<td>Tassili n'AJjer</td>
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<td>Australia</td>
<td>Fraser Island</td>
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<td>Australia</td>
<td>Kakadu National Park</td>
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<td>Bangladesh</td>
<td>The Sundarbans</td>
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<td>Bulgaria</td>
<td>Srebarna Nature Reserve</td>
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<td>Canada</td>
<td>Wood Buffalo National Park</td>
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<td>Costa Rica</td>
<td>Cocos Island National Park</td>
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<td>Democratic Republic of the Congo</td>
<td>Virunga National Park</td>
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<td>France</td>
<td>Mont-Saint-Michel and its Bay</td>
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<tr>
<td>Hungary / Slovak Republic</td>
<td>Caves of Aggtelek Karst and Slovak Karst</td>
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<td>Hungary</td>
<td>Hortobágy National Park - the Puszta</td>
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<td>India</td>
<td>Keoladeo National Park</td>
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<td>Japan</td>
<td>Yakushima</td>
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<tr>
<td>Kazakhstan</td>
<td>Saryarka - Steppe and Lakes of Northern Kazakhstan</td>
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<tr>
<td>Lebanon</td>
<td>Tyre</td>
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In addition, UNESCO's Man and the Biosphere Programme (MAB) is working to address conflicts between environment and development issues which involve natural resources, studying the impact of people's activities on the environment and society's responses to the resulting changes. Biosphere Reserves help conserve *biological diversity*, maintain healthy ecosystems, help us learn about traditional forms of land use, disseminate information on sustainable natural resource management and co-operate in solving natural resource problems.

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<thead>
<tr>
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<tr>
<td>Mauritania</td>
<td>Banc d'Arguin National Park</td>
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<td>Mexico</td>
<td>Islands and Protected Areas of the Gulf of California</td>
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<td>Sian Ka'an</td>
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<td>Historic Centre of Mexico City and Xochimilco</td>
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<td>Mongolia</td>
<td>Uvs Nuur Basin</td>
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<td>Nepal</td>
<td>Royal Chitwan National Park</td>
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<td>Sagarmatha National Park</td>
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<td>Niger</td>
<td>W National Park of Niger</td>
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<td>Philippines</td>
<td>Tubbataha Reef Marine Park</td>
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<td>Romania</td>
<td>Danube Delta</td>
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<td>Russian Federation</td>
<td>Lake Baikal</td>
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<td>Senegal</td>
<td>Djoudj National Bird Sanctuary</td>
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<td>Slovak Republic / Hungary</td>
<td>Caves of Aggtelek Karst and Slovak Karst</td>
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<td>Slovenia</td>
<td>Skocjan Caves</td>
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<td>Spain</td>
<td>Doñana National Park</td>
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<td>Sweden</td>
<td>Laponian Area</td>
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<td>Tunisia</td>
<td>Ichkeul National Park</td>
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<td>United States of America</td>
<td>Everglades National Park</td>
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<td>Yemen</td>
<td>Socotra Archipelago</td>
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Websites for other Conventions

**Natural Heritage**

Convention on Biological Diversity

[http://www.biodiv.org](http://www.biodiv.org)

Convention on International Trade in Endangered Species of Fauna and Flora (CITES)

[http://www.cites.org](http://www.cites.org)

Convention on Migratory Species


Ramsar Convention on Wetlands

[http://www.ramsar.org](http://www.ramsar.org)

United Nations Framework Convention on Climate Change

[http://www.unfccc.de](http://www.unfccc.de)
United Nations Convention to Combat Desertification
http://www.unccd.int

International Treaty on Plant Genetic Resources for Food and Agriculture
http://www.planttreaty.org

International Plant Protection Convention
https://www.ippc.int

http://www.un.org/Depts/los

**Cultural Heritage**

http://unesdoc.unesco.org/images/0013/001386/138645F.pdf


Convention concerning the Protection of the World Cultural and Natural Heritage (1972)

Convention on Stolen or Illegally Exported Cultural Objects (1995)

Convention on the Protection of the Underwater Cultural Heritage (2001)
Member countries of the Council of Europe have also established international legal agreements. These include:

- European Cultural Convention

- European Convention on the Protection of the Archaeological Heritage

- Convention for the Protection of the Architectural Heritage of Europe

- European Convention on the Protection of the Archaeological Heritage (Revised)

- European Landscape Convention:
  http://www.nature.coe.int/english/main/landscape/conv.htm

The full list of Council of Europe treaties may be found at:
http://conventions.coe.int/Treaty/EN/CadreListeTraites.htm
Student Activity 30

Environmental degradation

Objective: to identify existing or potential environmental issues in your country and their relationships to World Heritage natural sites

Indications of global environmental stress

More than two-thirds of the world’s bird species are in decline, vulnerable or threatened with extinction.

In the last two hundred years, a quarter of the world's bird species have become extinct, particularly on ocean islands.

Frog populations appear to be declining, although it is uncertain why this is happening. Coral reefs appear to be reducing in size.
Biodiversity, or biological diversity, is a term used to refer to the variety of all life forms, and includes the different plants, animals and micro-organisms, their genes and the ecosystems of which they are a part.

The conservation of the Earth’s biodiversity is a huge task as it involves the conservation of all life on Earth. This includes the conservation of aquatic, marine and temperate environments and of micro-organisms.

World Heritage conservation is an important component in the global effort to conserve the Earth's biodiversity and is heavily reliant on collective international action.

The Okapi Wildlife Reserve in the Democratic Republic of the Congo was included on the World Heritage List as it contains one of the world's most important and significant natural habitats for in situ conservation of biological diversity, including those containing threatened species. The Reserve contains threatened species of primates and birds and about 5,000 of the estimated 30,000 okapi surviving in the world.
Ecosystem conservation is also an important component of World Heritage conservation.

For example, the Belize Barrier- Reef Reserve System, inscribed on the World Heritage List in 1996, protects an outstanding natural system consisting of offshore atolls, sand keys, mangrove forests, coastal lagoons and estuaries extending over a total area of 93,400 hectares. Other extensive World Heritage sites protect forest ecosystems (e.g. the Sinharaja Forest Reserve in Sri Lanka) and wetlands (e.g. the Doñana National Park in Spain).
Loss of biodiversity, particularly for threatened ecosystems (e.g. islands and wetlands) is usually irreversible, so there is ample reason to be concerned about threats to biodiversity and to act immediately to reduce them. In addition to protecting individual threatened species, it is generally more effective to ensure long-term conservation of ecosystems, natural plant and animal communities and landscapes as a whole.
Objective: to identify possible threats to biological diversity

Cultural diversity and biological diversity

World Heritage cultural and natural sites are often expressions of both cultural and biological diversity.

*Cultural diversity and biological diversity need to be conserved together if either is to prosper; the local knowledge that people have about their resources and how they should be managed provides a critical resource for all of humanity.*


Species evolution and extinction

Evolution of species is a continuing natural process. New species are created through genetic changes thus leading to increased biodiversity.

One of the aims of World Heritage conservation is to protect natural sites which provide a record of species evolution. Natural heritage criterion (vii), one of the four criteria used for the selection of natural sites for inclusion on the World Heritage List, refers to
outstanding examples representing major stages of earth’s history, including the record of life, significant on-going geological processes in the development of land forms, or significant geomorphic or physiographic features.

The Messel Pit Fossil site in Germany is an example of a site inscribed on the World Heritage List on the basis of natural heritage criterion (vii). The Messel Pit is particularly rich in fossils from the Eocene era, between 57 million and 36 million years B.C. It provides unique information about the early stages of the evolution of mammals.

At the Australian Fossil Mammal Sites of Riversleigh and Naracoorte the stages of evolution of Australia's unique fauna (for example, marsupial moles and feather-tailed possums, as well as many other unique and now extinct Australian mammals such as marsupial lions) are superbly conserved. This site was included on the World Heritage List on the basis of natural heritage criterion (vii), and also criterion (viii).
In December 1994, a new tree species was discovered near Sydney, Australia. The Wollemi pine (Wollemi nobilis) grows to a height of 35 metres. Its main trunk is up to 1 metre in diameter. The discovery of a new species of tree, especially one that grows to such an impressive height, is extremely unusual. The habitat of the Wollemi pines – a protected, steep-sided canyon north-west of Sydney, which acted as refuge from fires that frequently burn the adjacent plateaux – has contributed to their continued existence. The discovery of this new tree species is a dramatic demonstration that parts of our biological heritage remain unknown.

State of the Environment Australia 1996 Executive Summary, Commonwealth of Australia

Virunga National Park, Democratic Republic of the Congo ©JP Moreiras
Biodiversity is lost as particular plant and animal species that are less suited to new environmental conditions (such as rainfall or temperature change) are less successful at reproduction and survival. They thus become extinct. The fossil record indicates that most plant and animal species will eventually become extinct. However, today it is generally thought that species extinction is more rapid than the emergence of new species. This represents a wholly irreversible global change.
• **In the last 500 years, human activity is known to have forced 869 species to extinction (or extinction in the wild).**

• **One of four mammals and one in eight birds face a high risk of extinction in the near future.**

• **One in three amphibians and almost half of all tortoises and freshwater turtles are threatened.**

• **The total number of known threatened animal species has increased from 5205 to 8462 since 1996.**

Source: International Union for Conservation of Nature (IUCN)

Many World Heritage sites have been established to ensure the protection from extinction of threatened plant and animal species.

Vallée de Mai Nature Reserve
©UNESCO/Marc Patry
Vallée de Mai Nature Reserve, Seychelles

The Vallée de Mai Nature Reserve in the heart of the small island of Praslin in the Seychelles was included on the World Heritage List in 1983. The valley shelters a palm forest in close to its original state. Here grow the world's largest coconuts, weighing up to 20 kilograms.

In the past the entire island was covered with many varieties of coconut, but overexploitation has reduced the area of the original richly biodiverse palm forests to the small valley. The valley and its precious palm-tree forest are threatened by exotic species brought from other places, by continuous harvesting of the coconuts, and by fire.

• Student Activity 32

Jigsaw puzzle of Gondwanaland

Objective: to learn about the formation of continents and how isolation can help to protect natural heritage
Te Wahipounamu is located on the South Island of New Zealand. Much of the land (about 2.6 million hectares, or 10 per cent of New Zealand) in Te Wahipounamu consists of marshy wetlands, huge towering mountains or sheer cliffs falling straight into the ocean. The site shows distinct signs of huge glaciers which have carved out valleys, gorges and fjords and immense Ice Age landscapes.

New Zealand’s remoteness has resulted in the majority of its bird, animal and plant species being unique. Many of the birds became flightless and trees and plants adapted to the rainfall in remarkable ways.

For example, the giant kahikatea (white pine) trees grow up to 30 metres high. Such forests are often known as ‘Dinosaur Forests’ as they now appear much as they did at the time of the dinosaurs, some 65 million years ago.

With the arrival of European settlers, however, came many predators and pests and the local flora and fauna
A consequence of isolation, geological and climatic change, has been the evolution of species of plants and animals in New Zealand which are found nowhere else. However, the same forces that have made New Zealand’s environment, plants and animals so special have, unfortunately, left them exceptionally vulnerable. The Polynesians, the first immigrants to New Zealand who arrived some 1,000 years ago, initiated large-scale species and habitat destruction.

When the Europeans arrived and colonized New Zealand, the country had already lost about 23 per cent of its forests and 30 per cent of its bird life, the most notable loss being the moa (a large flightless bird). With the arrival of more people and predators, there are now 503 threatened and endangered New Zealand plants and animals in addition to the forty-four on the presumed extinct list.
Manas Wildlife Sanctuary, India

The Manas Wildlife Sanctuary in India, located in the foothills of the Himalayas, where wooded hills give way to alluvial grasslands and tropical forests, is home to many endangered animal species. Included on the World Heritage List in 1985, and on the List of World Heritage in Danger in 1992, Manas includes endangered populations of tiger, the pygmy hog, the Indian rhinoceros and elephant. One of the major threats to these animals is poaching. There were 80 rhinoceros recorded in Manas in 1990 and the population declined to 37 in 1997. The one-horned rhinoceros in Manas have since been lost to poaching and no rhinoceros had been officially recorded in the park in the past ten years. Through a rehabilitation program, efforts are being made to reintroduce rhinoceros species in Manas.

**Student Activity 33**

Matching world heritage natural sites with the corresponding criteria

**Objective:** to better understand the criteria for the selection of World Heritage natural sites
Video Clip

Towering Pinnacles:
Tsingy de Bemaraha
Ecologically and culturally sustainable development

Development must become sustainable to ensure that it meets the needs of the present generation without jeopardizing the ability of future generations to meet their own.


The need to preserve the balance between humanity and the environment is captured in the World Heritage Convention. The definition of World Heritage, considered as both cultural and natural, reminds the international community of the interactions of people with the natural environment, which are so fundamental to ecologically sustainable development.

Within the process of development, room must be found for nature, which is both a spiritual enrichment and in a very practical sense the foundation of our lives.


Pantanal Conservation Area, Brazil
©Therin&Weise
The many threats (e.g. the clearing of forests for agriculture, fishing, pollution) to the environment created by on-going development and population growth must be managed to conserve the biological (and cultural) diversity of the world. Conservation and resource use (e.g. agriculture, mining, forestry) are often interpreted as mutually exclusive. For this reason, resource use is often prohibited in protected areas such as World Heritage sites. In some carefully managed cases, however, a more effective approach is to balance the conservation of natural and cultural heritage and the restrictions for use that may be involved, with opportunities for sustainable use or other economic activities so that local populations have a direct interest in conservation efforts.
Banc d'Arguin National Park, Mauritania

This Park in Western Africa is the habitat of millions of birds. Fringing the Atlantic coast, it is made up of sand dunes, coastal swamps, small islands and shallow coastal waters representing a land- and seascape of exceptional contrasting scenery and of high biodiversity. The Park is host to a wide variety of migrating birds and several species of sea turtle and dolphin.

Banc d'Arguin has great importance for the economy of the local area: seven fishing villages rely on its rich natural resources and it provides a basis for ecologically sensitive tourism. The traditional fishing methods used by local people have not made a significant impact on the natural resources in the Park. However, if motor boats were introduced and if the number of fish taken was to increase, there could be significant negative effects on the bird life of the area.

• Student Activity 34

Protecting the environment

Objective: to understand the importance of good management of World Heritage natural sites
Student Activity 35

Actions for ecologically sustainable development

Objective: to encourage students to be waste-conscious
Local support for sustainability

Local support for conservation could be increased if people were able to use protected areas, such as World Heritage sites, in a sustainable way. Conservation and development projects are increasingly being integrated and supported at or near protected areas.

Local participation in the design and management of conservation projects is very important if these projects are in fact to provide for sustainable use.
Video Clip

Breaking of a 20,000 year Silence:
Los Glaciares
Heritage trails

Objective: to provide students with an opportunity to be adventurous, creative and more aware of the environment.

The future of our planet

Since the Rio Earth Summit in 1992, a total of 500 natural, cultural and mixed sites have been inscribed on the World Heritage List, ninety of these being natural sites.

In the developed countries there have definitely been changes in the use of natural resources – a better use of energy, water and land. . . . Air, water and soil pollution has also improved. However, in the developing countries, we are seeing much more pollution. The one positive achievement is that they have realized that their problems are critical and there is no way of separating economic and social development from environmental protection.

Mostafa Tolba, Chairman of the Commission for Sustainable Development, UNESCO Sources, No. 92, July-August 1997
This represents a significant contribution to global and environmental conservation.
Because World Heritage sites are internationally recognized as being ‘of outstanding universal value’, they should be models of effective management.

Bernd von Droste, Director, UNESCO World Heritage Centre, Paris, and Jeffrey A. McNeely, IUCN, World Heritage, Twenty Years Later, IUCN, 1992
Video Clip

The Last European Sanctuary: Danube Delta
Select students’ favourite World Heritage natural site and ask them to paint or draw it

Biology
Select a World Heritage natural site in your region and make a list of its plants, trees, animals, etc.
Compare the list with plants, trees and animals in your locality
Undertake on-site study of plants, animals and geological features with your students

Foreign language
Establish a link with a school abroad (possibly through the Associated Schools Project Network) and exchange your views on an environmental issue of common concern and its possible effects on World Heritage conservation

History
Select a natural site and ask the students to reflect on its land form in the past and the present, and on eventual future threats to its conservation
Geography

Select a World Heritage natural site such as one including glaciers (see Los Glaciares, Argentina, Brief Descriptions) and discuss consequences of global warming
Select a geological or fossil site for study

Language

Select a World Heritage site which students feel is or could be threatened by pollution and prepare an advertising campaign to avoid or eliminate pollution and to start or reinforce conservation measures

Mathematics

Conduct a survey of species (plants, trees, birds, mammals, fish) threatened with reduction or extinction in your area and calculate percentages

Science

Take water samples from local lakes or rivers to check for signs of pollution
Examine the facades of building for air pollution
Discuss how human behaviour could be changed to protect heritage sites