

# Unit title: **Biodiversity, Conservation and Threats**

Unit code: **A/601/0295**

Level: **5**

Credit value: **15**

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## **Aim**

This unit provides learners with an understanding of the phenomenon of biodiversity, and an opportunity to investigate the factors that promote and threaten it.

## **Unit abstract**

The concept of biodiversity and its importance in maintaining a sustainable global environment gained prominence as a result of the 1992 Rio Conference. As the implications of global warming have become better understood, the importance of maintaining biodiversity and reducing our impact on the planet have come to the forefront of both scientific and political thinking.

This unit explores the mechanisms by which biotic diversity is generated and the benefits associated with biodiversity. Learners will discuss the threats facing biodiversity, and will explore practical measures to ensure the maintenance and enhancement of this resource for future generations.

Learners will initially study biodiversity in relation to their immediate environment. They will be expected to apply their knowledge and understanding at a national and international level. In doing this, an appreciation of the conflicting demands made on the planet's resources should emerge along with ideas on how they can be met without sacrificing the planet's wellbeing.

## **Learning outcomes**

### **On successful completion of this unit a learner will:**

- 1 Understand the mechanisms that result in biodiversity
- 2 Understand the value of biodiversity as a resource
- 3 Understand the factors that threaten global biodiversity
- 4 Be able to investigate the efficacy of practical measures to conserve biodiversity.

## Unit content

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### 1 Understand the mechanisms that result in biodiversity

*Factors:* continuous and discontinuous variation; random and induced mutation; natural selection through competition; selection pressure; mechanisms and examples of parallel, divergent and convergent evolution

*Adaptation:* plant and animal species adaptations, (anatomical, morphological, physiological, behavioural); adaptation to environments e.g. extremes of temperature ranges, water/desert, wind, food availability; advantages to animals/plants of developing diversity

*Abiotic factors:* climate e.g. temperature, solar radiation, availability of oxygen and carbon dioxide, air/water pressure, water potential, mineral availability, water and air movement; promotion/inhibition relating to diversity and types of habitats

### 2 Understand the value of biodiversity as a resource

*Utilitarian uses:* agriculture e.g. development of new crops; breeding programmes e.g. disease resistance, productivity, resistance to harsh climate conditions, sustainable harvesting of natural products; medicine; pharmaceutical products e.g. drugs from plants/animals; industry e.g. new product developments, ethnobotanical products; tourism

*Global wellbeing:* effects of ecological factors e.g. life support systems, ecological cycles, environmental stability

*Biodiversity:* values e.g. conservation, costs/benefits, exploitation, contingency, economic

### 3 Understand the factors that threaten global biodiversity

*Direct factors:* atmospheric pollution e.g. carbon dioxide, sulfur dioxide, particulate matter, metals such as lead and mercury; land and water pollution e.g. heavy metals, pesticides, fungicides, sewage, oil spillage; land use change e.g. deforestation, mining, enclosure of land by fences, slash and burn, hunting; effect of changes e.g. desertification, loss of amenities, loss of special/rare habitats

*Indirect factors:* global climate change and human population growth e.g. increase demand for land, buildings, farming land, encroachment on wildlife habitat, development and loss of indigenous knowledge

### 4 Be able to investigate the efficacy of practical measures to conserve biodiversity

*Measures to conserve biodiversity:* conservation scheme e.g. conservation/management of natural/semi-natural ecosystems, living captive collections, captive breeding and release, seed banks, cryopreservation; role of data banks and databases in directing conservation activities

*Local conservation activities:* locations e.g. wetlands, community woodlands, nature reserves, zoological gardens, wildlife centres, land reclamation sites (brown sites, ex-industrial, disused canals, water filled excavation pits)

*National conservation activities:* measures e.g. red data books, Wildlife and Countryside Act (1985), This Common Inheritance, Environmental Protection Act (1990), Countryside and Right of Way Act (2000), Environmental Damage (Prevention and Remediation) Regulations (2009, S1 153), Natural Environment and Rural Communities Act (2006), mandatory Environmental Impact Assessment, local agenda 21 (environmental protection, economic prosperity, community wellbeing)

*Global conservation activities:* international summits e.g. UN World Conservation Strategy, Earth Summits (Stockholm and Rio), Convention on International Trade in Endangered Species (CITES), EU Habitats Directive

## Learning outcomes and assessment criteria

<b>Learning outcomes</b> On successful completion of this unit a learner will:	<b>Assessment criteria for pass</b> The learner can:
LO1 Understand the mechanisms that result in biodiversity	1.1 discuss factors within an ecosystem which result in biodiversity 1.2 explain how adaptation and speciation give rise to increased biodiversity within an ecosystem 1.3 discuss the abiotic factors which can be a factor in biodiversity
LO2 Understand the value of biodiversity as a resource	2.1 discuss the utilitarian uses made of a global biodiverse environment 2.2 explain the value of ecology to global well being 2.3 assess how values are placed on biodiversity
LO3 Understand the factors that threaten global biodiversity	3.1 assess the direct factors that are threats to global biodiversity 3.2 explain the relative severity of indirect factors which threaten global biodiversity
LO4 Be able to investigate the efficacy of practical measures to conserve biodiversity	4.1 discuss biodiversity conservancy measures in a local practical conservation scheme 4.2 carry out an analysis of the measures to enhance biodiversity nationally 4.3 report on the effects of international conservation summits on global diversity.

## Guidance

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### Links

This unit has particular links with the following units within this qualification:

- *Unit reference number Y/601/0238: Environmental Monitoring and Analysis*
- *Unit reference number D/601/0239: Ecological Principles and their Application*
- *Unit reference number K/601/0289: Environmental Management and Conservation*
- *Unit reference number R/601/0299: Plant Physiology and Environmental Adaptation.*

### Essential requirements

#### Delivery

Part of the unit delivery will be theoretical in nature but site visits must be incorporated to enable learners to recognise the differing levels of biodiversity found within UK habitats.

It is important that learners are made aware of the range of phyla that exist in any given habitat, and do not focus on a single kingdom.

Tutors should provide a range of case studies to explore high and low diversity habitats (for example woodland versus moorland) so that learners can recognise the values associated with each, and recognise that more is not necessarily better.

Learners must be familiar with local and national conservation and biodiversity issues and use these to understand the global situation. They should also be encouraged to use their knowledge to debate the different ways in which maintaining biodiversity is tackled by different countries.

#### Assessment

Evidence for learning outcome 1 can be integrated with evidence for learning outcomes 2 or 4 to form a detailed analysis of a chosen ecosystem/biome.

For learning outcome 2, learners need to synthesise their own opinions through research and discussion. Their opinions should be backed up by facts.

Learning outcome 3 is intended to develop learners' skills in researching and evaluating complex information from a range of differing sources.

Learning outcome 4 could be achieved by learners visiting a local practical conservation scheme, and producing a report or critique of the scheme. Learners need to then look at, and analyse, the national picture regarding the measures taken to enhance biodiversity. Finally, learners must report on the effects that global summits have on conservation and their success or otherwise. Case material using international examples such as whales, tigers and rainforests can be used to illustrate the effects of global conferences on conservation.

#### Resources

Library, laboratory and internet facilities should be available to learners. Links with local conservation groups and specialist lecturers/research staff will help learners appreciate the conservation work being carried out.

## **Employer engagement and vocational contexts**

Visits to conservation sites and engagement with local conservationists are vital for effective delivery of this unit.

Contact with employers such as the Royal Society for the Protection of Birds (RSPB), local wildlife centres, zoological gardens (animal breeding programmes), the Royal Horticultural Society (seed banks, plant breeding programmes) and farm rare breeds programmes will help learners place the unit in a vocational context.