

Unit 2: Understanding the Principles of Wildlife Populations, Ecology and Conservation

Unit code:	J/601/0106
QCF Level 3:	BTEC National
Credit value:	10
Guided learning hours:	60

● Aim and purpose

This unit aims to introduce learners to the skills and knowledge associated with wildlife populations, ecology and conservation and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

● Unit introduction

Awareness and understanding of the importance of ecology and conservation has increased in recent times due to the promotion of causes and campaigns to slow down climate change for the benefit of humans and the animals we share the planet with. This unit introduces learners to a variety of subjects directly related to ecosystems, wildlife and their habitats, and gives them the skills needed to measure populations and wildlife habitats.

● Learning outcomes

On completion of this unit a learner should:

- 1 Understand changes in global ecosystems
- 2 Understand national and international conservation strategies for wildlife and their habitats
- 3 Understand population dynamics
- 4 Be able to conduct a field study of habitats and wildlife populations.

Unit content

1 Understand changes in global ecosystems

Global ecosystems: definitions (ecosystem, habitats); energy flow; trophic levels; biogeochemical cycles (carbon, nitrogen, water, phosphorous, oxygen); niches (carnivore, herbivore, omnivore, generalist, specialist); food chains; food webs; ecological pyramids

Changes: shifts in abundance and distribution of species; introduction of non- native species; increasing CO₂ levels; climate change; human impact; interspecies competition

2 Understand national and international conservation strategies for wildlife and their habitats

Conservation strategies: creation, maintenance and restoration of functional combinations of habitats; reducing the vulnerability of isolated habitats and species populations; making sites more robust for populations; wildlife action planning; comprehensive wildlife conservation strategies

3 Understand population dynamics

Population dynamics: fecundity; natality; mortality; immigration; emigration; basic breeding strategies (r and K); concepts of carrying capacity, density dependent population control, boom and bust cycling, life tables and survivorship; predator/prey relationships; age classes

4 Be able to conduct field studies of habitats and wildlife populations

Conduct a field study: objective setting; survey planning eg timing, equipment requirements, staff requirements; methods eg assessment of animal population by mark recapture methods, quadrat and transect surveys of plant species in a given habitat, kick sampling; assumptions inherent in such surveys; sources of error; record keeping methods; methods used to analyse data; health and safety; risk assessment; relevant current legislation and codes of practice

Basic habitat surveys: Phase I habitat survey techniques eg deciduous woodland, semi-natural coniferous woodland, semi-natural grassland, river corridors, lowland heaths, heather moorland, chalk/limestone grassland, sand-dune/saltmarsh Assessment and grading criteria

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 explain global changes in ecosystems [IE, CT, SM]		D1 examine in detail methods and reasons for protecting ecosystems
P2 illustrate wildlife population changes in ecosystems [CT, EP, IE]		
P3 assess reasons for global wildlife population fluctuations [CT, IE, EP]		
P4 review national conservation strategies for wildlife and their habitats [CT, RL, SM]	M1 examine in detail conservation strategy for a given wildlife species	D2 explain in detail changes to the past and present population of a given wildlife species.
P5 discuss international conservation strategies for wildlife and their habitats [IE, CT, SM, RL]		
P6 explain predator prey interactions within wildlife populations [IE, CT, SM, RL]	M2 analyse a population boom or bust for a given wildlife species, suggesting reasons for the change in population	
P7 discuss types of evolution within animal populations [CT, RL, SM]		
P8 plan ecological surveys of habitats [EP, TW]	M3 summarise the results of wildlife and habitat surveys suggesting potential improvements to the habitats to stabilise wildlife populations.	D2 explain in detail changes to the past and present population of a given wildlife species.
P9 carry out ecological surveys of habitats [EP, TW]		
P10 carry out wildlife population surveys. [EP, TW]		

PLTS: This summary references where applicable in the pass criteria, in the square brackets, the elements of the personal, learning and thinking skills. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Delivery of this unit will involve practical and written assessments, visits to suitable wildlife habitats and may link to work experience placements.

To successfully complete this unit, learners should be given opportunities for practical field work, to include carrying out surveys and assessing wildlife habitats and populations.

All learners should have access to animals with the emphasis being on health and safety and animal welfare at all times.

Centres should be encouraged to give learners appropriate access to a variety of wildlife animals and habitats, but animal welfare is of paramount importance, and this needs to be planned carefully to prevent the stress or suffering of animals, or the disturbance of their habitats.

Learners should be encouraged to carry out independent research for this unit, to allow for guided development of research and independent thinking skills.

Tutors should be encouraged to formulate links with external wildlife organisations to provide a 'real' view of wildlife ecology and conservation. This could be through visits to establishments and guest lectures from organisational professionals such as animal experts, representatives from wildlife rescue centres, charities and organisations.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction to the unit and tour of the estate to observe wildlife populations and habitats.
Global ecosystems: changes in systems, wildlife populations and reasons for changes.
Assignment 1: Changes to Ecosystems (P1, P2, P3, P4, P5, M1, D1) Introduction to the assignment and learner-centred research.
National conservation strategies: how they work and success/failure rates for given species.
Evolution of populations of wildlife, predator/prey relationships and examples.
Assignment 2: Evolution of Populations (P6, P7, M2, D2) Introduction to the assignment and learner-centred research.
Planning ecological and habitat surveys: what to look for, how to carry them out, when to carry them out, etc.
Current wildlife and ecological surveys: analysis of results and reasons for results.
Assignment 3: Surveying Wildlife and Habitats (P8, P9, P10, M3) Ecological and wildlife surveys.
Carrying out ecological and wildlife population surveys: practical examples and assessments.
Unit review.

Assessment

For P1, P2, P3, P4 and P5, learners are required to investigate global ecosystems, how they have changed, reasons for the changes, wildlife population fluctuations and national and international conservation strategies. Evidence could be a written assignment based around a case study chosen by the tutor, for example a particular population decline related to a change in an ecosystem, the reasons for the population decline, and the national and international conservation strategies in place to halt this decline. The global nature of P2, P3, P4 and P5 should be interpreted through a case study related to one plant or animal species. Learners should all be given the same case study, and they should be encouraged to carry out background research and analysis at this level.

For M1, learners need to focus on a given wildlife species and strategy used to conserve it. This could be evidenced through a presentation or written assignment.

For D1, learners need to offer an enhanced explanation of the detail provided at pass grade. Evidence could be in the form of a report or presentation.

For P6, learners should investigate predator prey relationships, giving at least two examples and examining how both parties are affected. Evidence could be a poster presentation, and learners should focus on both the positive and negative impact of the relationships. Learners should then, for P7, link this to the evolution of animal populations, giving specific examples of species and how and why their populations have evolved over time. For M2, learners should be given an example of a species and a time when that species experienced a population 'boom or bust', and analyse the factors that contributed to this and reasons for the changes. This could be presented in a written report.

For P8, P9 and P10, learners should be assessed carrying out both ecological surveys of habitats, and wildlife population surveys. They should show evidence of planning the surveys including methods, potential hazards or risk assessment, and equipment needed. This could be carried out as a small-group exercise to avoid too much disturbance of habitats or wildlife. For M3, learners could summarise their results and suggest improvements for the habitats they have surveyed to stabilise or improve wildlife populations. This could be evidenced through an individual report. Finally, for D2, learners should interpret and compare the results of past and present population and ecological surveys for a given area, possibly the one they have surveyed themselves for P9 and P10. Learners could look at a particular wildlife species whose population has changed and then evaluate the reasons for the changes. This will encourage learners to think both long term and 'outside of the box' when it comes to the impact of population changes on wildlife and habitats.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, P5, M1, D1	Changes to Ecosystems	You work for an environmental research department. You need to examine how ecosystems can be protected and why this is important. You need to examine conservation strategy that has been employed to protect a given wildlife species and expand this to consider national and international wildlife conservation strategies.	Assignment. Report. Presentation.

Criteria covered	Assignment title	Scenario	Assessment method
P6, P7, M2, D2	Evolution of Populations	You have been asked to explain wildlife population changes over time using relevant examples. You need to collect information on how and why populations change. You must include information on predator and prey interactions and the types of evolution within animal populations.	Essay/written report.
P8, P9, P10, M3	Surveying Wildlife and Habitats	You need to plan and carry out a wildlife population and an ecological survey on a given area as part of a group. You should summarise your own results and interpretation and use this to suggest potential habitat improvements for the benefit of wildlife species.	Practical research and data collection and written report/presentation.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Understand the Principles and Practices of Animal Establishments	Element EC2.1 Collect and record data on the natural environment Element EC2.2 Report on the condition of the natural environment
Understanding Ecology of Trees, Woods and Forests	Element EC6.1 Communicate environmental information
	Element EC23.1 Prepare for field surveys Element EC23.2 Collect and record data through field surveys

Employer engagement and vocational contexts

Learners could be introduced to a variety of professionals such as vets, RSPCA officers, animal care representatives, breeders etc to broaden their depth of knowledge and make the learning experience interesting and contextualised. This could be through either guest lectures or off-site visits to different establishments.

Indicative reading for learners

Textbooks

Chapman J and Reiss M – *Ecology: Principles and Applications* (Cambridge University Press, 1998)
ISBN 9780521588027

Gurnell J and Flowerdew J – *Live Trapping Small Mammals* (Mammal Society, 2006) ISBN 9780906282540

JNCC – *Handbook for Phase I Habitat Survey: A Technique for Environmental Audit: Field Manual* (Joint Nature Conservation Committee, 1990) ISBN 9780861396375

Sutherland W (ed) – *Ecological Census Techniques: A Handbook, 2nd Edition* (Cambridge University Press, 2006) ISBN 9780521606363

Townsend C, Begon M and Harper J – *Essentials of Ecology, 3rd Edition* (Wiley-Blackwell, 2008) ISBN 9781405156585

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
Independent enquirers	<ul style="list-style-type: none"> explaining changes in ecosystems illustrating population changes assessing reasons for change reviewing national and international strategies for conservation examining predator/prey relationships
Creative thinkers	<ul style="list-style-type: none"> explaining changes in ecosystems illustrating population changes assessing reasons for change, reviewing national and international strategies for conservation, examining predator/prey relationships discussing evolution of animal populations
Reflective learners	<ul style="list-style-type: none"> reviewing national and international strategies for conservation, discussing evolution of animal populations
Team workers	<ul style="list-style-type: none"> planning and carrying out ecological and wildlife habitat and population surveys
Self-managers	<ul style="list-style-type: none"> explaining changes in ecosystems reviewing national and international strategies for conservation examining predator/prey relationships discussing evolution of animal populations
Effective participators	<ul style="list-style-type: none"> illustrating population changes assessing reasons for change planning and carrying out ecological and wildlife habitat and population surveys.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	<ul style="list-style-type: none"> planning and carrying out research activities related to the unit evaluating and carrying out extended thinking
Creative thinkers	<ul style="list-style-type: none"> asking questions to extend their thinking during lectures and practical sessions trying out alternatives or new solutions to wildlife and conservation adapting ideas as circumstances change eg changes to animal welfare legislation
Reflective learners	<ul style="list-style-type: none"> identifying opportunities for their own achievements setting goals for themselves eg conquering a fear of handling an animal reviewing progress in practical tasks and coursework

Skill	When learners are ...
Team workers	<p>working with others to carry out planning and monitoring of wildlife in their habitats and group activities in class</p> <p>reaching clear agreements regarding who is carrying out which tasks during practicals</p> <p>working together when working on habitat and population surveys or on work experience</p>
Self-managers	<p>showing initiative and commitment with animals and their healthcare</p> <p>dealing with pressures in an emergency animal situation</p> <p>managing emotions when it comes to animal welfare and healthcare</p>
Effective participators	<p>discussing issues of concern when finding an animal in a less than ideal welfare situation</p> <p>identifying improvements to current habitats and conservation programmes.</p>

● Functional Skills – Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	completing their course work using ICT facilities using Smartboards and PCs in class
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	using interactive materials for teaching and learning researching subjects on the internet
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> • text and tables • images • numbers • records 	
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	calculating habitat sizes and measurements and recording these.
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	presenting information to a group of people ideally in a classroom situation with their peers
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	reading material on the subject from a variety of sources for their assignment work reading around subjects and producing clear and concise documents using correct animal health terminology.
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	