

## INFORMATION FOR TEACHERS

### UNIT 1: THE ECOLOGY OF THE NATURAL ENVIRONMENT AND THE IMPORTANCE OF BIODIVERSITY



# Level 3 Unit 1: The ecology of the natural environment and the importance of biodiversity

## Sample assessment material - information for teachers

This assignment is provided as an example only. Consortia should produce their own assessments in line with the assessment section of the unit, based on their local delivery circumstances.

### Overview

Two sites should be selected in order to give learners an opportunity to base a comparison of habitats and/or ecosystems. One of these sites will be investigated in detail through the use of scientific techniques within the locality. Teachers should select a local site to give learners an opportunity to review ecosystems which are managed, or are natural and have a contrast in species or biodiversity.

The second ecosystem will require secondary research to determine the key characteristics and the level of biodiversity of an environment or habitat that is natural and from another country, for the purpose of comparison.

Learners should gain as much practical application within the assignment as possible to give them opportunities of working in a real environment and helping them to appreciate the challenges of gaining valuable field work and its relevance to Environmental and Land-based industries.

The specific PLTS targeted in this assignment are Team Working, Independent Enquirer, Creative Thinking.

### Time

Learners will have a total of 6 hours to complete this assignment.

Practical research 3 hours

Preparation of formal scientific report 3 hours

### Resources

The range of resources for monitoring will be dependant on the habitats/ecosystems selected.

There is guidance in the specification for sampling and measuring plants and animals related to different sampling techniques and species, but this is not exhaustive. If facilities can be accessed, there may be opportunities for the use of GPS (Geographical Positioning System) and GIS (Geographical Information System) for mapping of species and habitats, which would enable the learners to present their information using the technology appropriate to consultancy research organisations.

For measuring the environment access to resources to measure the following would be required:

- soil sampling and soil tests: water content, pH, organic matter, soil composition, seasonal temperature
- weather data collection: sunshine hours, minimum/maximum temperatures, rainfall, annual rainfall. Data such as annual rainfall can be collected from local meteorological records.
- water sampling: speed of flow, current, oxygen levels, temperature, pH, sampling of water, invertebrates

The second ecosystem (Ethiopian) will require secondary research data from appropriate sources.

### **Supervision**

Collecting of data – should be carried out under direct supervision of the teacher.

Preparation of report – should be carried out in the presence of teaching staff.

### **Collaboration**

Selection of the monitoring methods for the survey will be planned by the learners which will enable them to select appropriate techniques and record data for preliminary studies. Data collection for local surveys will be carried out as a team activity (shared as appropriate to all members of the group) but analysis and conclusions must be produced independently.

### **Roles**

In this assignment, learners will assume the role of water research consultant. A director from a water company will be coming in to provide feedback on their proposals.

## Marking

The marking grid for this unit can be found on page 22 of the specification. Please note that the descriptions in this marking grid relate to the top of each band. Further guidance on using marking grids is available in the assessment section of the specification.

Learning outcomes	Band 1	Band 2	Band 3
	The learner has:		
	0 to 7 marks	8 to 14 marks	15 to 21 marks
1 Understand the principles of ecology and ecosystems	<p>Explained some aspects of the concept of ecology.</p> <p>Explained in modest detail how animal and plant communities develop and interact.</p> <p>Interpreted with limited accuracy the interrelationship between some of the abiotic and some of biotic elements and charted with limited accuracy some aspects of the energy flow within an ecosystem.</p>	<p>Explained most aspects of the concept of ecology.</p> <p>Explained in some detail how animal and plant communities develop and interact.</p> <p>Interpreted with some accuracy the interrelationship between the abiotic and biotic elements and charted the energy flow within an ecosystem.</p>	<p>Explained in detail most aspects of the concept of ecology.</p> <p>Explained in comprehensive detail how animal and plant communities develop and interact.</p> <p>Interpreted in detail the interrelationship between all the abiotic and biotic elements and charted accurately all required aspects of the energy flow within an ecosystem.</p>
	0 to 7 marks	8 to 14 marks	15 to 21 marks
2 Understand the importance of biodiversity	<p>Explained with limited detail the importance of biodiversity in ecosystems.</p> <p>Explained with limited detail and accuracy the effects of natural and managed influences on soil, water and biodiversity in an environment.</p> <p>Explained in limited detail how most animal and plant characteristics fit and are influenced by some environmental conditions.</p>	<p>Explained with some detail the importance of biodiversity in ecosystems.</p> <p>Explained the effects of natural and managed influences on soil, water and biodiversity in an environment.</p> <p>Explained how most animal and plant characteristics fit and are influenced by some environmental conditions.</p>	<p>Explained in detail the importance of biodiversity in ecosystems.</p> <p>Explained in detail the effects of natural and managed influences on soil, water and biodiversity in an environment.</p> <p>Explained in detail how most animal and plant characteristics fit and are influenced by some environmental conditions.</p>
	0 to 6 marks	7 to 12 marks	13 to 18 marks
3 Know the principles of surveying techniques used to analyse habitats	<p>Outlined a limited selection of the range of scientific techniques used to survey habitats.</p> <p>Described in limited detail how data can be used to influence the use of a habitat by an Environmental and Land-based enterprise.</p>	<p>Outlined some of the range of scientific techniques used to survey habitats.</p> <p>Described in some detail how data can be used to influence the use of a habitat by an Environmental and Land-based enterprise.</p>	<p>Outlined a wide range of scientific techniques used to survey habitats.</p> <p>Described in comprehensive detail how data can be used to influence the use of a habitat by an Environmental and Land-based enterprise.</p>

## Assessment Grid (continued)

Learning outcomes	Band 1	Band 2	Band 3
	The learner has:		
	0 to 10 marks	11 to 20 marks	21 to 30 marks
4 Be able to assess the viability of a habitat for different uses	<p>Used a few appropriate scientific techniques, working with particular colleagues, to survey some aspects of the ecological characteristics of a habitat.</p> <p>Analysed a limited selection of data to identify the ecology of a habitat.</p> <p>Generated a limited set of ideas for the use of a habitat by an Environmental and Land-based enterprise.</p> <p>Drew a few conclusions, using limited selection of reasoned arguments, on the use of habitat by an Environmental and Land-based enterprise.</p>	<p>Used appropriate scientific techniques, working with colleagues, to survey some aspects of the ecological characteristics of a habitat.</p> <p>Analysed some of the data to identify the ecology of a habitat.</p> <p>Generated some ideas for the use of a habitat by an Environmental and Land-based enterprise.</p> <p>Drew conclusions, using some reasoned arguments, on the use of habitat by an Environmental and Land-based enterprise.</p>	<p>Used a wide range of appropriate scientific techniques, working with all colleagues, to survey all aspects of the ecological characteristics of a habitat.</p> <p>Analysed in detail the data to identify the ecology of a habitat.</p> <p>Generated a wide range of ideas for the use of a habitat by an Environmental and Land-based enterprise.</p> <p>Drew detailed conclusions, using all reasoned arguments, on the use of habitat by an Environmental and Land-based enterprise.</p>



### **Assignment Brief**

Water is a resource which is in increasing demand both in the developing world and in the UK. Water companies have to decide whether to increase their storage capacity in the southwest region or plan alternative strategies for water usage as part of their business proposals. The addition of another reservoir will give opportunities for business enterprises in the area and the possibility of energy generation. In contrast, in Ethiopia, a reservoir for the production of electricity is under way, which will have far reaching effects for biodiversity and the ecology of the environment and is affecting local communities livelihoods.

Assume the role of a water research consultant responsible for the management of water resources. You are working for a company who require you to produce a report giving a comparison of a UK site and a site in Ethiopia.

You are asked to survey the UK site, collecting detailed information from the site relevant to its suitability for water storage. You will need to find relevant data from the Ethiopian site to enable you to make a comparison between the two sites, review the impact upon communities and propose alternative land uses.

### **Task 1**

You are required to carry out practical research in order to review the current use of a local habitat and recommend possible alternative uses to the owner. In order to reach your conclusions you will need to carry out the following activities:

- using appropriately chosen scientific techniques, survey the ecological aspects of the habitat that are affected by the proposed development and analyse the data to identify the ecology.
- using data from your research, discuss a range of alternative land uses for the habitat and reach a conclusion regarding the two most appropriate.

### **Task 2**

In order to compare the local habitat with a similar habitat in Ethiopia, a scientific report is required which:

- explains ecological concepts.
- explains how animal and plant communities develop and interact using the following principles:
  - succession
  - food webs
  - interspecific and intraspecific competition.
- interprets how living organisms inter-relate to abiotic and biotic factors within their environment and illustrates an energy flow for an environment, identifying the interactions of the ecosystem and charting the flow of energy.
- explains the importance of biodiversity to the development of plant and animal communities.
- explains the effects of natural and managed influences on soil, water and biodiversity in an environment.
- explains the important ecological characteristics and adaptations to the plants and animals within the habitats as a result of environmental change.