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# Edexcel BTEC Levels 4 and 5 Higher Nationals units in Environmental Conservation

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## Unit 1: Research Project

Unit code: K/601/0941

Level: 5

Credit value: 20

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- Aim

This unit aims to develop learners' skills of independent enquiry and critical analysis through undertaking a sustained research investigation of direct relevance to their higher education programme and professional development.

- Unit abstract

In this unit learners will conduct an in-depth investigation into an aspect of their programme of study. This research may be developed from elements of the programme linked to the learner's individual interests or to areas where they may wish to seek future employment.

Completion of this unit will enhance learners' understanding of the techniques used in the formulation of research projects, typical research methodologies and formats of presentation. Whether the methodology is experimental, observational and/or involves the collection of data from other sources, it will enable the production of significant primary data and encourage learners to be innovative.

This unit will also develop transferable skills in areas such as planning, data collation and handling, data analysis, working safely and communication skills in aspects such as report writing and data presentation.

- Learning outcomes

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

- 1 Understand how to formulate a research specification
- 2 Be able to implement the research project within agreed procedures and to specification
- 3 Be able to evaluate the research outcomes
- 4 Be able to present the research outcomes.

## Unit content

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### 1 Understand how to formulate a research specification

*Formulate research specifications:* rationale for project selection; aims and objectives; research questions and formulation of hypotheses; limitations

*Factors affecting selection:* methodology for data collection and analysis; literature review; critique of references from primary sources eg pilot studies, questionnaires, interviews; secondary sources eg books, journals, internet; scope and limitations; implications eg equipment and resources, health and safety considerations in practical work – potential hazards, assessment of risk, procedures for minimisation of risk

*Critical review:* access to key secondary texts, websites and other information sources

*Project specification:* suitability; skills and knowledge to be gained; aims and objectives; terms of reference; duration; ethical issues; type of research eg qualitative, quantitative, systematic, original; methodology; resources; statistical analyses; validity; reliability; control of variables; sources of error

*Research plan:* rationale for research questions or hypotheses; milestones; task dates; review dates; monitoring/reviewing process; strategy

### 2 Be able to implement the research project within agreed procedures and to specification

*Implement:* according to research design and method; health and safety equipment and procedures; test research hypotheses; consider test validity; reliability

*Data collection:* selection of appropriate tools for data collection; types eg qualitative, quantitative; systematic recording; methodological problems eg bias, variables and control of variables; required repetitions, if appropriate, to establish reproducibility; reliability and validity; correct use of appropriate units

*Data analysis and interpretation:* qualitative and quantitative data analysis – interpreting transcripts; coding techniques; specialist software; statistical tables; comparison of variable; trends; forecasting

### 3 Be able to evaluate the research outcomes

*Results:* establish validity; use of correct statistical techniques; sources of error identified

*Evaluation of outcomes:* overview of the successes and failings of the research project's processes and findings eg planning, aims and objectives, evidence and findings, validity, reliability, benefits, difficulties, conclusion(s)

*Implications for future research:* significance of research investigation; application of research results; implications; limitations of the investigation; improvements; recommendations and suggested areas for future research

**4 Be able to present the research outcomes**

*Format:* professional delivery format appropriate to the audience; use of appropriate media

*Written structure:* report conforms to appropriate academic format eg includes an abstract, introduction, literature review, methodology, results, discussion, conclusion; references in appropriate format

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand how to formulate a research specification	1.1 formulate and record possible research project outline specifications  1.2 identify the factors that contribute to the process of research project selection  1.3 undertake a critical review of key references  1.4 produce a research project specification  1.5 provide an appropriate plan and procedures for the agreed research specification
LO2  Be able to implement the research project within agreed procedures and to specification	2.1 match resources efficiently to the research question or hypothesis  2.2 undertake the proposed research investigation in accordance with the agreed specification and procedures.  2.3 record and collate relevant data where appropriate
LO3  Be able to evaluate the research outcomes	3.1 use appropriate research evaluation techniques  3.2 interpret and analyse the results in terms of the original research specification  3.3 make recommendations and justify areas for further consideration
LO4  Be able to present the research outcomes	4.1 use an agreed format and appropriate media to present the outcomes of the research to an audience

## Guidance

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### Links

This unit offers links with several other units from the programme area depending on the research project carried out and the learner's individual interests. *Unit 16: Research Methods for Land-based Industries* is not an essential pre-requisite for undertaking this core unit, but learners may benefit from having completed this unit first. To further enhance learner employability, linking the research project to *Unit 44: Work-based Experience*, may be desirable.

### Essential requirements

Access to library resources appropriate to independent academic research at this level is essential. Learners will also need access to the internet and ICT facilities, complete with statistical and presentational software packages.

Learners must agree the use of resources with their supervisors to ensure that appropriate apparatus/equipment, training, health and safety considerations and permissions are all in place before beginning any practical activities.

### Employer engagement and vocational contexts

Depending on the individual learner's interests and choice of research project, it may be possible for them to undertake research in conjunction with a business, organisation and/or work experience provider. This could enhance the learning experience by increasing the relevance of the research and improving a learner's employability skills.



## Unit 2: Project Management for Land-based Industries

Unit code: K/503/1052

Level: 4

Credit value: 15

- Aim

The aim of this unit is to equip learners with the understanding and practical experience to identify, develop and contribute to the management of projects developed to support organisational and commercial initiatives, by planning, recording and monitoring all aspects of projects.

- Unit abstract

At this level, it is imperative that learners are able to successfully manage projects within their chosen land based sector or industry. Not only does this prepare learners for management level employment, but it also enables learners to gain necessary skills that will equip them for future employment such as planning, overseeing, recording, analysing and monitoring projects, all of which can be used as transferable skills.

- Learning outcomes

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

- 1 Understand the appropriate characteristics of projects that can be applied to land-based industries
- 2 Be able to generate project plans that can be applied to identified requirements and needs
- 3 Be able to implement planning, recording and reporting strategies
- 4 Understand approaches to monitoring activities that ensure effective delivery.

## Unit content

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### 1 Understand the appropriate characteristics of projects that can be applied to land-based industries

*Characteristics:* organisational needs and abilities; goals; determining appropriate goals for the organisational needs; functions of the project; how to assess the functions; products of the project; essential personnel involved in the project; land based organisations and their values and how these are achieved; organisational staffing; selection of group to be involved in the project

*Features:* features of the project environment (audience, market, compatibility with local environment, effect on habitats and species, stakeholders, affected personnel); baseline assessment of attributes of features; relationships between internal and external stakeholders eg partners, steering groups, project team, volunteers, contractors; organisational structures for managing a project

*Influencing factors:* social; financial; environmental; political; factors affecting target condition; ability to influence factors; identification and qualification of project activity

### 2 Be able to generate project plans that can be applied to identified requirements and needs

*Objectives:* developing and determining objectives appropriate to the project; local and environmental factors; generating work programmes and the influences on this; sequencing project activities; techniques for identifying essential activities.

*Resource acquisition:* cost estimation; financial breakdown of project; funding/finance (sources, procurement); cost cutting; influences on cost of project; contingencies; how to propose cost estimation to personnel involved with funding (stakeholders, audience and organisations); methods of acquiring funding for the project

### 3 Be able to implement planning, recording and reporting strategies

*Planning activities:* breakdown of project into sections; storage and retrieval systems; identifying and analysing existing work methods; specifying new methods and their validity; resource requirements; accessing resources; operational/organisational guidelines

*Recording systems:* techniques for recording activities and outcomes; assessing and evaluating activities (qualitative and quantitative)

*Reporting information:* internal and external reporting of outcomes and progress; communication and disseminating successful and unsuccessful outcomes; methods of communication appropriate to audience; (wider audience, iterative/summative, various media)

#### 4 Understand approaches to monitoring activities that ensure effective delivery

*Adaptive management:* learning culture; planning and reviewing; feedback from activities; from feature attributes

*Performance and target condition indicators:* key indicators; concepts; target condition indicators; selection criteria for identification and use of indicators

*Protocols:* monitoring performance (technical, social, economic); monitoring target conditions (socio-economic, ecological); assessment; analysis and interpretation of activity performance and impact; trend analysis

*Risk management:* robust risk management implementation; risk register; effective prioritisation of tasks

## Learning outcomes and assessment criteria

<p>Learning outcomes</p> <p><b>On successful completion of this unit a learner will:</b></p>	<p>Assessment criteria for pass</p> <p><b>The learner can:</b></p>
<p>LO1</p> <p>Understand the appropriate characteristics of projects that can be applied to land-based industries</p>	<p>1.1 explain the relationship between organisational needs and abilities, and project goal(s), functions and products</p> <p>1.2 determine appropriate features of the project environment</p> <p>1.3 analyse a project's ability to influence factors affecting a target condition</p> <p>1.4 explain the relationships between internal and external stakeholders for project management</p>
<p>LO2</p> <p>Be able to generate project plans that can be applied to identified requirements and needs</p>	<p>2.1 generate an appropriate objective and work programme to meet a specified target condition</p> <p>2.2 propose an appropriate cost estimate for conducting a programme of work</p>
<p>LO3</p> <p>Be able to implement planning, recording and reporting strategies</p>	<p>3.1 assemble an effective specification for a practical work activity</p> <p>3.2 record the outcomes of a completed work activity</p> <p>3.3 interpret the outcomes of a completed work activity</p> <p>3.4 present valid information regarding the outcomes of successful and unsuccessful project activities</p>
<p>LO4</p> <p>Understand approaches to monitoring activities that ensure effective delivery</p>	<p>4.1 examine the importance of robust risk management for projects</p> <p>4.2 explain the process of adaptive management</p> <p>4.3 justify the selection of performance and target condition indicators</p> <p>4.4 evaluate activities selected to monitor performance and target indicators</p>

## Guidance

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### Links

This unit introduces learners to managing projects in the land based industries, and therefore has links to the following units in this qualification:

- *Unit 1: Research Project*
- *Unit 7: Employability Skills*
- *Unit 42: Business Environment*
- *Unit 44: Work-based Experience*
- *Unit 45: Small Business Enterprise.*

### Essential requirements

Learners must have access to the internet, spreadsheet and word processing facilities. Access to well stocked, recent literature on project management must be made available.

### Employer engagement and vocational contexts

Learners should discuss their work with real project managers to enhance their understanding of the methods and techniques necessary for managing a land based project.

The learners would benefit from being involved in running an actual or simulated project, for example a fund raising event for a charity or for the centre. This could involve the learners planning and pitching the project to the centre's staff or personnel, achieving funding for the project, carrying it out and then analysing the final project.

It would also benefit the learners if they had opportunity to evaluate and analyse other projects, whether carried out in the centre or at a different location, and then feed this information back to others.

Visiting speakers from charities and companies in the land based sector would benefit the unit, with a participative input from the learners on their own projects and how they are managing them.



## Unit 3: Principles of Ecology

Unit code: M/503/1215

Level: 4

Credit value: 15

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- Aim

The aim of this unit is for learners to understand concepts that underpin all aspects of environmental work, from the commercial exploitation of individual species to the management of whole habitats. The mechanisms of evolution and the implications of this are considered and applied throughout delivery of the unit.

- Unit abstract

In this unit learners will develop an understanding of the essential background of evolution that forms the framework for all modern biology. Learners can apply their understanding to the interrelationships between living organisms and their environments. The factors controlling the distribution of and changes in populations are also considered and related to habitat formation and management.

Learners will have the opportunity to investigate a range of different habitat types practically and use their understanding to predict how these may change. They will also evaluate the techniques used to manage a range of ecosystems.

- Learning outcomes

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

- 1 Understand the mechanisms and ecological implications of evolution
- 2 Understand factors affecting the distribution of populations
- 3 Understand mechanisms governing fluctuations and stability within populations
- 4 Be able to predict temporal changes in plant and animal communities in named terrestrial and aquatic ecosystems.

## Unit content

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### 1 Understand the mechanisms and ecological implications of evolution

*Mechanisms:* natural selection (progressive/directional); stabilising; selection pressure; other kinds of selection eg species, group, kin, sexual, individual, artificial; alternative explanations of the evidence for evolution eg punctuated equilibrium, selfish gene theory

*Ecological implications:* adaptations (anatomical, physiological, morphological and behavioural); speciation; optimality and evolutionary stable strategies; coevolution; symbiotic relationships; species extinction; genetic extinction; population genetics; biodiversity; symbiotic relationships (parasitism, commensalism, mutualism)

### 2 Understand factors affecting the distribution of populations

*Distribution:* geographic; zonation; regular; random; clumped; temporal eg diurnal, crepuscular and nocturnal communities

*Factors:* competition; predation; tolerance of abiotic environments eg stenotopic and eurytopic organisms; acclimation; dormancy; adaptation; physiological and behavioural homeostasis; historical eg evidence of geographical changes – pollen record, geology, fossil record; human eg disruption of migratory paths, culling, hunting, breeding programmes, predator control, introductions; dispersal eg limited or developed powers of dispersal

### 3 Understand mechanisms governing fluctuations and stability within populations

*Dynamics:* life tables; age distributions; demographics; geometric and logistic growth curves; carrying capacity;  $r$  selection;  $K$  selection

*Mechanisms:* climate and seasonality; productivity and energy relationships; biological rhythms; symbiosis; predation; competition; reproductive value; natural regulation eg density dependent and independent factors

### 4 Be able to predict temporal changes in plant and animal communities in named terrestrial and aquatic ecosystems

*Temporal changes:* investigation of a range of communities and the successional stages observed; primary and secondary succession; late successional; arrested; sub-climax; climax

*Explanatory mechanisms for temporal changes:* facilitation model; inhibition model; tolerance model

*Manipulation of ecosystems:* drainage; flooding; burning; grazing; species introduction

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand the mechanisms and ecological implications of evolution	1.1 explain the mechanisms of evolution in a given context  1.2 evaluate how organisms adapt to their environment  1.3 evaluate the importance of population genetics in the conservation of biodiversity
LO2  Understand factors affecting the distribution of populations	2.1 explain the distribution of named plant and animal species and populations  2.2 explain the factors influencing the distribution of named plant and animal species
LO3  Understand mechanisms governing fluctuations and stability within populations	3.1 examine the population dynamics of named populations  3.2 analyse the factors influencing the numbers and demographics of named populations
LO4  Be able to predict temporal changes in plant and animal communities in named terrestrial and aquatic ecosystems	4.1 examine climax and sub-climax communities in given terrestrial and aquatic ecosystems  4.2 predict temporal changes in named communities  4.3 recommend valid strategies to manage named sub-climax communities

## Guidance

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### Links

An understanding and appreciation of ecology is key to recognising why governments need to follow a more sustainable path to development, and as such this unit links not only with *Unit 15: Sustainable Development*, but also with broader government and international policies and protocols.

### Essential requirements

Learners must have access to a range of habitats to investigate and contrast, in particular, study visits will enable more detailed investigations.

In addition, equipment for monitoring populations of both plants and animals should be available for learners to use.

Learners will need access to library resources, and a number of multimedia resources should be available to support ecological study.

### Employer engagement and vocational contexts

Learners could be introduced to a variety of professionals for example ecologists, country and park rangers, gamekeepers etc, either as guest speakers or on off-site visits to different establishments. This will broaden their depth of knowledge, enhance and contextualise their learning experience. Relating the unit content to the work of organisations such as wildlife trusts (the County Trusts in England and Wales and the Scottish Wildlife Trust), the Royal Society for the Protection of Birds (RSPB) and the Worldwide Fund for Nature (WWF) will strengthen the vocational relevance.

Visits to museums with a broad range of natural history specimens would promote a greater understanding of evolution and biodiversity and would introduce learners to heritage-based professions.

## Unit 4: Biological Principles

Unit code: J/503/1057

Level: 5

Credit value: 15

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- Aim

This unit aims to develop learners' understanding of the biological principles that underpin the management of biological systems. Learners will improve their scientific understanding of the fundamental processes within living organisms and familiarise themselves with basic cell structures and function intrinsic to the existence of living organisms.

- Unit abstract

Biological principles are the key to an understanding of the basis of life and are core to learners' exploration of living organisms they work with. This will enable learners to understand and interpret a wide range of biological evidence essential to making informed scientific decisions.

- Learning outcomes

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

- 1 Understand the relationship between the structure and function of plant and/or animal cells and tissues
- 2 Understand the organisation of cells and tissues into organ systems in plants and/or animals
- 3 Understand the importance and role of homeostasis in plants and/or animals
- 4 Be able to investigate fundamental biological principles in plants and/or animals
- 5 Understand basic biochemical principles in plant and/or animals.

## Unit content

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### 1 Understand the relationship between the structure and function of plant and/or animal cells and tissues

*Cellular structure and functions:* eukaryotic cell structures (plasma membrane, centrosome, cytoskeleton, peroxisome, mitochondria, lysosome, golgi apparatus, ribosomes, nucleus, rough and smooth endoplasmic reticulum), specialist eukaryotic structures (chloroplasts, cell wall, vacuole, plasmodesmata, cilia, microvilli, flagella) prokaryotic cell structures (nucleoid, ribosomes, plasma membrane, flagella, cell wall, capsule, fimbriae); process of protein production

*Tissue structure:* key cell and tissue types in plants (eg parenchyma, collenchymas, sclerenchyma, xylem, phloem, dermal tissue, epidermis, cuticle, cork cambium, periderm) and/or animals (eg simple, stratified and pseudostratified epithelial tissue, fluid, dense, irregular and regular connective tissue, smooth, cardiac and skeletal muscle tissue, nervous tissue)

### 2 Understand the organisation of cells and tissues into organs systems in plants and/or animals

*Organs and organ systems:* key systems in plants (eg stems, meristems, roots, shoots, leaves, reproductive organs) and/or animals (eg peripheral, central, somatic and sympathetic and parasympathetic nervous systems, endocrine, autocrine and paracrine, respiratory and circulatory, digestive system, urinary, musculoskeletal, reproductive, immune, integumentary)

### 3 Understand the importance and role of homeostasis in plants and/or animals

*Changing environments:* oxygen, carbon dioxide, pH, waste products, temperature, osmolarity, energy source (eg blood glucose and dietary availability), macro and micronutrients (eg lipids, vitamins, minerals)

*Mechanisms:* feedback loops (negative, positive; set points, acclimatisation; sensors, stimulus, response; end product inhibition; alterations in enzyme activity, gene transcription, intracellular (cascades, second messengers eg calcium, cyclic AMP, cyclic GMP, protein kinases, IP3) and extracellular signalling (hormonal and nervous)

### 4 Be able to investigate fundamental biological principles in plants and/or animals

*Planning and carrying out investigations:* null hypotheses, predictions based on previous knowledge and observation; selection and competent use of appropriate techniques, randomisation; independent, dependent and confounding variables, use of controls, sampling

*Analyses of investigation results:* application of relevant statistical tests, potential sources of experimental error, accuracy and validity of experiments; drawing relevant conclusions from data

**5 Understand basic biochemical principles in plants and/or animals**

*Chemical structure:* functional groups (hydroxyl, carbonyl, carboxyl, amino, sulfhydryl, phosphate, methyl); acids and bases; structures of carbohydrates (monosaccharides, disaccharides, polysaccharides); lipids; proteins (primary, secondary, tertiary, quaternary); nucleic acids

*Biochemical reactions:* chemical bonding (ionic, covalent, hydrogen, van der Waals); properties of water (polarity, specific heat capacity, solvency, insulation, evaporative cooling); free energy, equilibrium constant, activation energy; catalysts, enzymes; oxidation and reduction; strength, pH and buffering of acids and bases

*Transport into and out of cells:* diffusion, osmosis, passive and active transport, transporter types (symport, uniport, antiport); vesicle-mediated transport; endocytosis and exocytosis

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand the relationship between the structure and function of plant and/or animal cells and tissues	1.1 examine the structure and function of major cell organelles  1.2 explain the differences between prokaryote and eukaryote cells  1.3 explain the process of protein production in the cell  1.4 evaluate the structure of cells as related to their function and arrangement within various tissues
LO2  Understand the organisation of cells and tissues into organ systems in plants and/or animals	2.1 discuss the co-ordination of tissues to form organs  2.2 examine the structure and function of two organ systems in plants and/or animals
LO3  Understand the importance and role of homeostasis in plants and/or animals	3.1 discuss the homeostatic control of major body systems  3.2 explain the mechanisms of action of homeostasis
LO4  Be able to investigate fundamental biological principles in plants and/or animals	4.1 plan practical experiments to investigate a given proposal  4.2 use appropriate techniques to investigate a given proposal  4.3 make appropriate recommendations, based on findings, to inform decisions  4.4 justify recommendations made based on findings
LO5  Understand basic biochemical principles in plants and/or animals	5.1 examine the basic chemical structure of different molecules  5.2 explain basic chemical reactions relevant to biology  5.3 explain the transport of molecules into and out of cells

## Guidance

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### Links

This unit links with other units in the qualification for example:

- *Unit 3: Principles of Ecology*
- *Unit 11: Environmental Systems*
- *Unit 14: Principles of Plant and Soil Science.*

### Essential requirements

A well-equipped science laboratory is essential in which learners can plan and carry out practical experiments. Learners must have access to supporting materials including higher level biology and chemistry textbooks.

### Employer engagement and vocational contexts

Organisations involved in scientific research, such as industrial or academic laboratories, could enable learners to experience scientific investigation in a range of contexts.

Producers of feed products may be able to provide an industrial context for determining the nutritional content of feed stuffs using chemical methods, which would be valuable for all learners.

Links with producers and retailers may also provide useful experience for learners as well as a source of material for examination. Visits to abattoirs or butchers may help learners to learn the form and function of organ systems in animals.



## Unit 5: Enterprise and Financial Management for Land-based Industries

Unit code: M/503/1053

Level: 5

Credit value: 15

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- Aim

This unit aims to develop understanding of the management of land-based industries, as learners plan and evaluate business performance.

- Unit abstract

This unit allows learners to understand concepts of the management of the land-based business, from the performance at enterprise level through to overall financial performance and stability of an entire business.

Learners will identify sources of finance and learn how management principles can be used to analyse, organise, plan and control the business. The techniques used will be referred to in the context of the latest business and environmental initiatives.

- Learning outcomes

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

- 1 Understand sources of finance available for land-based businesses
- 2 Understand principles of land-based business and resource management
- 3 Understand the management of physical and financial information in order to control the performance of a land-based business
- 4 Be able to plan and evaluate the performance of a land-based business.

## Unit content

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### 1 Understand sources of finance available for land-based businesses

*Sources:* proprietor's capital; retention of profits; creditors; grants and loans; the use of different sources to meet business needs; membership subscriptions; charitable donations

*Capital cycle:* retained profit; allowance for finance charges; capital repayments; taxation, drawings; repayment of creditors' capital; relationships between the trading profit, net profit, continued growth in capital

*Sources of credit:* long-term, medium-term, short-term finance; purpose of loans; criteria for each loan type; repayment terms; security; relevant finance organisations eg Agricultural Mortgage Corporation (AMC) ; Leasing; Eurocurrency; Syndicate Credit Schemes

*Interest rate protection:* hedging; level of protection; risk analysis; fixed interest rate products; option-based products; cost of protection

### 2 Understand principles of land-based business and resource management

*Resources:* land; labour; capital and finance

*Principles:* effective use of the resources; identification and application of good husbandry; best practice

*Environmental issues:* sustainability; waste disposal; energy use; recycling; welfare and traceability

*Objectives:* strategic, eg longer term, vision/mission; business structure, future direction

*Planning cycles:* making plans, making decisions, monitoring and controlling, evaluation of plans against objectives set for the business, SMART targets

### 3 Understand the management of physical and financial information in order to control the performance of a land-based business

*Physical information:* performance records; employee records; health and safety records, legal and statutory records, visual records eg maps, plans etc, maintenance records

*Financial information:* sales and purchase records; quotes; financial monitoring records

*Procedure:* office; storage and retrieval; accuracy; legal constraints; Data Protection Act 1998; role of computers and available software

*Performance factors:* physical eg quality, growth rates, response to treatments; quality factors eg weights, food conversion ratio, mortality, birth data, feeding rates, feed inputs

*Financial indicators:* eg added value, quality and value, market, subsidies, replacement costs, cost of inputs, quality of inputs, variable cost analysis and comparison

*Analysis and evaluation:* enterprise studies; gross margins; comparative analysis; bench marking

**4 Be able to plan and evaluate the performance of a land-based business**

*Performance:* physical and financial

*Factors affecting viability:* tax status; profitability; feasibility; competitors; consumer demands; economic climate

*Future planning:* SWOT analysis; resource limitations; competencies and capabilities; institutional limits and financial restrictions

*Planning methods:* core competency analysis; cash flow; variance analysis; capital investment; appraisal methods; labour and machinery planning methods; succession planning

*Evaluate financial structure:* balance sheet analysis; stability; viability; ratios; liquidity; gearing; landlord and tenant's capital; rate of return

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand sources of finance available for land-based businesses	1.1 evaluate different sources and uses of business capital 1.2 assess how the capital cycle operates in two land-based businesses 1.3 examine sources of credit in relation to a given business 1.4 assess methods available to provide a business with interest rate protection
LO2  Understand principles of land-based business and resource management	2.1 examine resources available to a given land-based business 2.2 explain environmental issues surrounding the use of resources in a business 2.3 define the role of objectives in the strategic development of a business 2.4 evaluate the objective planning cycle for a given business
LO3  Understand the management of physical and financial information in order to control the performance of land-based businesses	3.1 evaluate physical and financial information 3.2 examine the management of information utilised within a business 3.3 evaluate the performance factors which highlight the efficiency of an enterprise 3.4 critically evaluate the performance of a business: <ul style="list-style-type: none"> <li>• physical information</li> <li>• quality processes</li> <li>• financial indicators</li> </ul>
LO4  Be able to plan and evaluate the performance of a land-based business	4.1 assess factors affecting the viability of a business 4.2 relate past business performance to future planning 4.3 use planning methods to establish resources and develop business opportunities 4.4 evaluate the financial structure of the business

## Guidance

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### Essential requirements

Resources should include visits and case studies based on a variety of businesses, appropriate management software, industrial representatives for additional input and access to the internet.

Guest speakers from the land-based Industry could offer an insight into relevant business practices. This would help to contextualise the unit and current issues facing the industry.

Learners must keep up to date with any current issues that influence business management within land-based industries. They must be encouraged to engage in regular research through a variety of sources, eg reading quality newspapers and industry specific journals, watching TV news and current affairs programmes.

### Employer engagement and vocational contexts

A team of employers could be identified to help to support delivery of this unit. Employers could help tutors with, for example, the planning of programmes of learning, visits, guest speakers and mentors. They could also help to design assessment activities

The delivery of this unit would be enhanced by employer engagement involving, for example, employers with knowledge of business management (eg relating to a real organisation that the learner may research/visit where they carry out work experience).

The learning experience would be enhanced if theory is applied to a local business with which the learner can engage. For example the learner can complete a SWOT analysis for this business to help them inform future decisions.



## Unit 6: Human Resource Management

Unit code: K/601/1264

Level: 4

Credit value: 15

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- Aim

The aim of the unit is to provide an understanding of the personnel function of management through the consideration of systems and frameworks which create and sustain the employment relationship within the organisation.

- Unit abstract

Human resources are the most important investment any business or organisation can make. The efficient and effective management of these resources is therefore vital to the success of any enterprise. This unit will enable learners to understand the principles and practices of modern human resource management including the recruitment, selection and retention of staff. Through the study of local land-based enterprises, learners will also be able to appreciate the impact of human resource management on workplace culture and practices.

- Learning outcomes

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

- 1 Understand the difference between personnel management and human resource management
- 2 Understand how to recruit employees
- 3 Understand how to reward employees in order to motivate and retain them
- 4 Know the mechanisms for the cessation of employment.

## Unit content

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### 1 Understand the difference between personnel management and human resource management

*The role and function of human resource management:* models of personnel management (Tyson and Fell); personnel as a specialist function; personnel policies, strategies and operating plans; personnel roles and responsibilities (manager, supervisor, worker); contribution to organisational purposes

*Legal and regulatory framework:* the influence of relevant national and international legislation; the influence of relevant codes of practice

### 2 Understand how to recruit employees

*Human resource planning:* definition; reasons for; processes; limiting factors in the land-based sector; stages of planning human resources

*Recruitment and selection:* legislative framework; recruitment policy; recruitment procedure; job analysis and description; personnel specification; recruitment methods and media; selection methods and procedures; offers of employment; evaluation and comparison of processes

### 3 Understand how to reward employees in order to motivate and retain them

*Performance appraisal:* purpose of appraisal; team appraisal; individual appraisal; appraisal procedures and techniques; the appraisal interview; following up appraisals; influence on remuneration

*Reward management:* motivational and reward theory; purpose and methods within a land-based enterprise; factors determining pay; payment system; incentive schemes; legislative framework on pay and benefits; effectiveness of different reward systems

*Discipline and grievance procedures:* definition; model disciplinary procedure; ACAS code of practice; disciplinary interviews; grievance procedures; evaluating effectiveness of procedures

*Human resource management information systems:* personnel records and statistics; the use of statistics; computerised systems; legislative framework eg Data Protection Act (1984)

### 4 Know the mechanisms for the cessation of employment

*The legal framework on employment protection:* dismissal – wrongful, unfair and justified; role of industrial tribunals; impact of legal and regulatory framework

*Termination of employment:* reasons eg retirement, resignation, termination of contract

*Exit procedures in land-based enterprises:* procedure for dismissal; notice of dismissal; exit interviews; counselling and re-training; evaluation and comparison of procedures

*Redundancy:* definition; legislative framework; selection for redundancy; procedures for handling redundancy; dealing with redundancy – outplacement, redeployment, retraining

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand the difference between personnel management and human resource management	1.1 distinguish between personnel management and human resource management  1.2 assess the function of human resource management in contributing to organisational purposes  1.3 evaluate the role and responsibilities of line managers in human resource management  1.4 analyse the impact of the legal and regulatory framework on human resource management
LO2  Understand how to recruit employees	2.1 analyse the reasons for human resource planning in organisations  2.2 outline the stages involved in planning human resource requirements  2.3 compare the recruitment and selection process in two organisations  2.4 evaluate the effectiveness of the recruitment and selection techniques in two organisations
LO3  Understand how to reward employees in order to motivate and retain them	3.1 assess the link between motivational theory and reward  3.2 evaluate the process of job evaluation and other factors determining pay  3.3 assess the effectiveness of reward systems in different contexts  3.4 examine the methods organisations use to monitor employee performance
LO4  Know the mechanisms for the cessation of employment	4.1 identify the reasons for cessation of employment with an organisation  4.2 describe the employee exit procedures used by two organisations  4.3 consider the impact of the legal and regulatory framework on employment cessation arrangements

## Guidance

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### Links

This unit links with the following units:

- *Unit 5: Enterprise and Financial Management for Land-based Industries*
- *Unit 42: Business Environment*
- *Unit 45: Small Business Enterprise.*

### Essential requirements

In order to fulfil the assessment criteria, the learners will require access to a variety of up-to-date texts, journals and papers on the principles and practices of human resource management. Learners will also require access to the current national and international legislation and codes of practice relating to all aspects of human resource management. Learners must undertake study of at least one land-based enterprise when fulfilling the assessment criteria.

### Employer engagement and vocational contexts

Centres delivering this unit will need firm links with local land-based industries. Such links will enable learners to experience the working culture and practices within the sector and to identify and evaluate specific recruitment and retention issues in their local area.

Links with national and international professional bodies such as the Society of Human Resource Management and the Chartered Institute of Personnel and Development will also help learners to access current developments within the profession.

## Unit 7: Employability Skills

Unit code: A/601/0992

Level: 5

Credit value: 15

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- **Aim**

The unit aims to develop the skills and understanding relevant to learners preparing to enter the work place.

- **Unit abstract**

Learners at all levels of education and experience require honed employability skills as a prerequisite to entering the job market. This unit gives learners an opportunity to assess and develop understanding of their own responsibilities and performance in, or when entering, the workplace.

It considers the skills required for general employment, such as interpersonal and transferable skills, and the dynamics of working with others in teams or groups, including leadership and communication skills.

It also deals with the everyday working requirement of problem solving which includes the identification or specification of the 'problem' strategies for its solution. Learners will be able to explore what motivates people at work and how this can improve the quality of their performance.

- **Learning outcomes**

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

- 1 Be able to determine own responsibilities and performance
- 2 Be able to develop interpersonal and transferable skills
- 3 Understand the dynamics of working with others
- 4 Be able to develop strategies for problem solving.

## Unit content

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### 1 Be able to determine own responsibilities and performance

*Own responsibilities:* personal responsibility; direct and indirect relationships and adaptability; decision-making processes and skills; ability to learn and develop within the work role; employment legislation, ethics, employment rights and responsibilities

*Performance objectives:* setting and monitoring performance objectives, SMART targets for own effectiveness against set objectives

*Improvement:* review own performance against set objectives; action plan areas to be developed; recommendations for improvement of own performance

*Motivation and performance:* application and appraisal of motivational theories and techniques eg Maslow, Herzberg; rewards and incentives; manager's role and leadership style; self-motivational factors; performance feedback, positive praise, meeting of targets

### 2 Be able to develop interpersonal and transferable skills

*Problem solving:* problem analysis; researching changes in the workplace; generating solutions; choosing a solution

*Effective communication:* verbal and non-verbal – awareness and use of body language, openness and responsiveness, formal and informal feedback to and from colleagues; ICT as an effective communication medium; team meetings; appropriate communication for various levels

*Time management:* prioritising workload; setting work objectives; making and keeping appointments; time for learning; reliable estimate of task time; strategies eg Gantt chart, action planning, involvement of others – their availability

### 3 Understand the dynamics of working with others

*Working with others:* roles of individuals within a team; nature and dynamics of teamwork and group work; informal and formal settings, purpose of teams and groups eg long-term corporate objectives/strategy; problem solving and short-term development projects; flexibility/adaptability; team player; shared goals

*Team dynamics:* Analysis model eg Tuckman, Belbin, Adair; core competencies of team, individual skills and strengths used for maximum benefit of team, leadership styles; identification of team/work group roles; stages in team development eg team building, identity, loyalty, commitment to shared beliefs

*Task and team goals:* selecting team members eg specialist roles, skill and style/approach mixes; action planning; monitoring and feedback; effective leadership skills, eg setting direction, setting standards, motivating, innovative, responsive, effective, communicator, reliability, consistency; focus on efficiency to achieve team goals

#### 4 Be able to develop strategies for problem solving

*Tools and methods:* problem-solving methods and tools eg brainstorming, performance evaluation, 5 whys, cost-benefit analysis, force field analysis, route cause analysis; identification of multiple solutions, selecting best possible solution, justify why alternative solutions are not selected

*Strategy formation:* identification and definition of the problem; analysis and clarification eg scope, size, impact of problem; factors for strategy development eg timescale, resources, finances, roles and responsibilities, barriers, aims and objectives; develop appropriate strategy

*Impact of implementation:* impacts positive and negative, efficiency, cost-effectiveness, performance measures eg customer satisfaction, employee motivation; competitiveness; quality assessments; evaluation of the resolution of the problem, emergent problems, measuring and monitoring of solution against objectives and desired outcomes; sustainability

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1.  Be able to determine own responsibilities and performance	1.1 develop a set of own responsibilities and performance objectives 1.2 evaluate own effectiveness against defined objectives 1.3 make recommendations for improvement 1.4 review how motivational techniques can be used to improve quality of performance
LO2  Be able to develop interpersonal and transferable skills	2.1 develop solutions to work-based problems 2.2 communicate in a variety of styles and appropriate manner at various levels 2.3 identify effective time management strategies
LO3  Understand the dynamics of working with others	3.1 explain the roles people play in a team and how they can work together to achieve shared goals 3.2 analyse team dynamics 3.3 suggest alternative ways to complete tasks and achieve team goals
LO4  Be able to develop strategies for problem solving	4.1 evaluate tools and methods for developing solutions to problems 4.2 develop an appropriate strategy for resolving a particular problem 4.3 evaluate the potential impact on the business of implementing the strategy

## Guidance

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### Links

This unit links with *Unit 44: Work-based Experience* and *Unit 1: Research Project*.

### Essential requirements

Access to a range of work-related examples (for example development systems, team health checks, job descriptions, action plans, communication strategies) will be required when delivering this unit. Case studies based on relevant sectors, workshops, career talks or work based mentors will also be useful in the teaching and learning aspect of the unit.

Learners must generate assessment evidence through a range of possible activities such as individual work placements, project management, research reports, development of case studies, working with others (for example employee-supervisor roles, teamwork, groupwork) and everyday communication within the workplace.

### Employer engagement and vocational contexts

Due to the nature of the unit, employer engagement should be actively encouraged within the delivery of the content. Where possible, learners should be able to contextualise their learning within a realistic work environment. Projects or problem-solving activities could be undertaken within local businesses with the support of employers. Clear outcomes should be discussed and agreed, with learners developing an understanding of problems within a business, and potential barriers to overcome when finding a solution.

Guest speakers could be scheduled into delivery of the unit to enhance the vocational context. Case studies could be substituted for real-life work problems. With employer involvement, various assessment criteria could be covered in a real business situation. This needs to be negotiated by the tutor.



## Unit 8: Genetics and their Application

Unit code: L/503/1559

Level: 5

Credit value: 15

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- Aim

This unit aims to give learners understanding of the structure, transmission and function of genetic material and opportunities to research the principles and implications of biotechnology.

- Unit abstract

Genetics is one of the fastest developing areas of science. The associated emerging techniques and technologies continue to offer benefits but are not without potential risk. In this unit learners will gain a fundamental understanding of the principles behind genetics, and the application of a range of genetic manipulation techniques. This understanding is essential for people producing and monitoring successful breeding programmes, as well as to the evaluation of emerging technologies. Learners will research the use of these techniques and review the range of opinions that surround their use.

- Learning outcomes

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

- 1 Understand the structure of genetic material and the cellular mechanism of heredity
- 2 Understand the mechanism of heredity at the organism, population and species level
- 3 Understand a variety of genetic manipulation techniques and their application to industry
- 4 Understand the potential impacts of biotechnology.

## Unit content

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### 1 Understand the structure of genetic material and the cellular mechanism of heredity

*Structure of genetic material:* DNA, double helix, major and minor grooves, sugar-phosphate backbone, base pairing including differentiating between purines and pyrimidines, nucleosomes, looped domains, chromosomes; RNA, mRNA, rRNA, tRNA; Genome size and organisation, transposable elements

*Cellular mechanism of heredity:* semiconservative mechanism of DNA replication, components of the replication fork and their function, antiparallel elongation, proofreading and repairing, telomeres; transcription initiation, elongation, termination and post-transcriptional modification; splicing of mRNA, translation initiation, elongation, termination; protein folding and post translational modifications; stages of meiosis and mitosis, including events that result in non-Mendelian inheritance (eg crossing over) and epigenetics

### 2 Understand the mechanism of heredity at the organism, population and species level

*Organism level:* monohybrid and dihybrid, crosses; sex determination; dominance, co-dominance; pleiotrophy; epistasis; multifactorial traits; imprinting; hybridisation

*Population and species level:* Pedigree analysis, including dominant, recessive and sex-linked inheritance; gene pools, allele frequencies, Hardy-Weinburg equilibrium (principle and application); effects of genetic drift, gene flow, mutation (missense, nonsense, samesence and frameshift mutations), migration and selection; founder and bottleneck effects

### 3 Understand a variety of genetic manipulation techniques and their application to industry

*Techniques:* bacterial transfection and cloning; PCR; genomic sequencing; cloning higher organisms; stem cell technologies; gene therapy; genetic screening; synthesis of pharmaceutical products in model organisms; 'knock-out' and 'knock-in' models

*Application:* to include disease treatment, genetic screening, synthesis of pharmaceutical products, traceability of inputs and outputs, design and monitoring of breeding programmes, production of resistant organisms. The use of additional subject-specific examples (eg pedigree disputes, disease resistant organisms, tracing feedstuffs)

### 4 Understand the potential impacts of biotechnology

*Impacts:* positive and negative impacts eg health, welfare, diversity, environmental, economic, social; public opinion including the influence of a range of organisations eg academia, industry, government agencies, NGOs, charities and consumer groups

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand the structure of genetic material and the cellular mechanism of heredity	1.1 examine the structure of genetic material 1.2 explain the mechanism of replication and protein synthesis 1.3 explain the main stages of meiosis and mitosis
LO2  Understand the mechanism of heredity at the organism, population and species level	2.1 analyse the results of monohybrid and dihybrid crosses including gene linkage 2.2 analyse the results of crosses involving sex linkage 2.3 analyse the effects of family pedigrees on inheritance 2.4 discuss the factors affecting gene frequency
LO3  Understand a variety of genetic manipulation techniques and their application to industry	3.1 explain the use of molecular biology techniques for important DNA manipulations 3.2 review the use of gene cloning in land-based industries
LO4  Understand the potential impacts of biotechnology	4.1 compare the positive aspects of new genetic technologies 4.2 assess the potentially harmful aspects of new genetic technologies 4.3 evaluate public opinion, nationally and internationally to new genetic technologies

## Guidance

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### Links

This unit links with other units in this specification:

- *Unit 4: Biological Principles*
- *Unit 14: Principles of Plant and Soil Science*
- *Unit 30: Biodiversity and Conservation.*

### Essential requirements

Learners will need access to a range of media to enable them to review and research the application of genetic manipulation techniques, including textbooks, newspapers, websites and scientific journals.

### Employer engagement and vocational contexts

Centres would benefit from links with organisations which research, evaluate and/or use genetic technologies. These may include universities, research institutes, pharmaceutical companies and/or biotechnology companies.

Commercial animal or plant breeders would be useful contacts as would producers and organisations using genetic techniques to support conservation or environmental monitoring programmes.

## Unit 9: Land Use Issues and Regulation

Unit code: D/503/1095

Level: 5

Credit value: 15

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- **Aim**

This unit aims to develop a coherent understanding of land management issues including the juxtaposition of competing land uses and the strengths and weaknesses of different land management approaches.

- **Unit abstract**

This unit aims to develop learners' knowledge and understanding of contemporary land use and land management. It focuses on the types and current systems of land use and how these are affected by a range of factors. Land-use patterns, practices and problems are a key feature of understanding how land is managed. The learner will also develop an understanding of the need for land-use regulation and how this is managed. The state role in managing land use will be evaluated, along with contemporary changes to the regulatory system. Why might these be happening? How much of our land use is dictated by state involvement? The concept of integrated land use will also be considered. Land use is closely linked with sustainability – how do these tie together? Is the current system of land use sustainable and could changes be made to improve land-use sustainability?

- **Learning outcomes**

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

- 1 Understand current land management
- 2 Understand the nature and extent of current land use regulation
- 3 Understand the success of contemporary adjustments to land use regulation
- 4 Understand sustainable land use management.

## Unit content

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### 1 Understand current land management

*Land management types:* exploitative, protective, productive

*Land-use patterns:* factors affecting land use eg climate, topography, soils, population, infrastructure, historical/cultural

*Land use practices and problems:* factors affecting land-use practices eg legislation, financial; problems eg pollution, waste, noise, conflicts with other land uses, effects on habitats/wildlife, effects on people

### 2 Understand the nature and extent of current land use regulation

*Regulation:* structure of system; bodies involved in regulation; need for regulation; types of regulation affecting land use eg planning laws and guidance, protective designations (National Park, SSSI, AONB etc)

*State intervention:* reasons for state intervention in land use; current policies regarding reduction or increase in state intervention; impact of state intervention

### 3 Understanding the success of contemporary adjustments to land use regulation

*Contemporary adjustments:* current adjustments being considered or enacted; predicted success or otherwise of adjustments; reasons for adjustments

*Integrated land-use regulation/strategy:* definition; key features; factors leading to success; possible problems

### 4 Understand sustainable land use management

*Sustainable development:* definition; key principles; relation to land management;

*Sustainability of current land-use management:* case for/against the sustainability of current land use; changes to land-use systems to improve sustainability

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand current land management	1.1 explain factors influencing management of given exploited, protected and productive land uses  1.2 analyse current practices and problems related to a specific land use
LO2  Understand the nature and extent of current land use regulation	2.1 evaluate the need for land-use regulation  2.2 examine the need for state intervention in land use  2.3 analyse the impact of state intervention
LO3  Understand the success of contemporary adjustments to land use regulation	3.1 justify the rationale behind contemporary adjustments to land use planning  3.2 discuss the concept of integrated land use  3.3 evaluate the success of given integrated land use strategies
LO4  Understand sustainable land use management	4.1 explain how the principles of sustainable development can relate to land use management  4.2 critically evaluate the sustainability of current land use management  4.3 suggest adjustments to given land use systems to improve sustainability

## Guidance

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### Links

This unit builds upon knowledge gained in *Unit 11 Understanding Land Use and Environmental Issues* of the BTEC Level 3 Diploma in Countryside Management. It will also build upon underpinning knowledge in the L3 Work-based Diploma in Environmental Conservation.

### Essential requirements

Access to internet resources, in addition to written texts and journals. The use of 'real' sites, either as remote or direct access for case studies will be invaluable.

### Employer engagement and vocational contexts

Delivery of the unit would be greatly enhanced by links with professionals engaged in 'land management' of any type eg farmers, developers, foresters, conservation site managers.

## Unit 10: Environmental Management

Unit code: F/503/1056

Level: 5

Credit value: 15

- Aim

This unit aims to provide an understanding of how an organisation's commercial activities will impact on the environment, how these activities might be altered in order to minimise their impact on the environment and how this can be done in a manner that ensures the continued profitability of the organisation.

- Unit abstract

Our natural environments face threats from both an increased demand for its resources from a growing human population and from the impact of the waste generated to meet these requirements. By undertaking this unit, the learner will gain an increased understanding of several of the key aspects relating to recognising, and dealing with, these threats.

The necessity of developing sustainable methods for meeting our needs is a key concept in this unit. Learners will also gain an understanding of how our activities impact upon the natural environment and how this can be monitored and reduced. Environmental management policies, legislation and techniques are considered alongside the roles of organisations involved in this area. The learner will also understand the need for effective waste management and reduction and the various approaches used to achieve these outcomes.

- Learning outcomes

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

- 1 Understand the concept of sustainability in a land-based sector
- 2 Understand the impact of land-based activities on the environment
- 3 Understand the need for environmental management
- 4 Understand the need for waste management in a land-based sector
- 5 Be able to devise environmental policy in a land-based sector.

## Unit content

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### 1 Understand the concept of sustainability in a land-based sector

*Sustainability:* conservation of the natural environment; renewable and non-renewable resources; biodiversity; the Earth's life support systems and processes; the depletion of finite resources; the Earth's carrying capacity; duty of care; the quality of human life

*Factors:* commercial decision-making; economic; socio-political; legal; codes of practice; ecological; scientific and technological information

*Sustainable practice:* changes to existing practice; use of alternative technology and resources; legislation and regulation; commitment; corporate policy

### 2 Understand the impact of land-based activities on the environment

*Direct:* pollution (atmosphere, water and soil); acid deposition; food contamination; soil exhaustion; waste; loss of visual amenity; animal and human health disorders; transport; increased population; global warming; ozone layer depletion; depletion of natural resources; loss of biodiversity and habitats

*Indirect:* customer pressure; social change and environmental awareness; insurance industry and lenders changing policies of property and land ownership issues; employees' raised awareness and concerns about health; EU and UK legislation; markets; prices

*Monitoring and assessment:* self-regulation; non-government organisations (NGO's); independent environmental consultants; legislation; field surveys; literature reviews; collection; storage; analysis and presentation of information; local information sources

*Environmental performance:* Environmental Impact Assessment (EIA); management systems; organisational design and decision-making cultures; monitoring change; reaching environmental targets; required investment; savings to organisations and the environment; quality systems

### 3 Understand the need for environmental management

*Approaches:* objectives; policies; strategies; operational; legal requirements; organisational commitment

*Organisational culture:* corporate responsibility/values; environmental values and attitudes; education and training for staff; contribution of the individual; community at large; public information

*Environmental policy:* allocation of responsibility; record keeping; targets; waste minimisation and recycling; energy use and conservation; reduction in costs; environmental sensitivity; environmental audits; health and safety legislation; technological efficiency; public information

*Legislation:* self-regulation; UK legislation and EU directives; enforcement agencies eg DEFRA, Environment Agency; pressure groups eg Greenpeace, Friends of the Earth

**4 Understand the need for waste management in a land-based sector**

*Factors:* training; implementation; monitoring use of energy and waste; purchase of specific equipment and plant; cost benefits to the organisation

*Benefits of waste reduction:* conservation of energy; use of by-products; on-selling of waste products; increased sales from greening of products/processes; cost reduction; increased market share; customer retention; increased loyalty and image

*Methods of reduction:* initial product design; natural methods versus chemical treatment; recyclable material; use of biodegradable materials; reparability versus replacement; benefits of design to meet legislation; 'technofix' solutions

**5 Be able to devise environmental policy in a land-based sector**

*Factors:* training; implementation; monitoring use of energy and waste; purchase of specific equipment and plant; cost benefits to the organisation

*Methods of reduction:* initial product design; natural methods versus chemical treatment; recyclable material; use of biodegradable materials; reparability versus replacement; benefits of design to meet legislation; 'technofix' solutions

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand the concept of sustainability in a land-based sector	1.1 analyse factors that affect the sustainability of a land-based organisation/enterprise's activities  1.2 explain how a selected organisation/enterprise might improve sustainable practice on a local and national scale
LO2  Understand the impact of land-based activities on the environment	2.1 evaluate direct and indirect impacts of current environmental issues on industry, organisations and stakeholders  2.2 explain how environmental performance is monitored in a land-based organisation/enterprise  2.3 assess the environmental impacts of a selected land-based organisation/enterprise  2.4 explain how environmental performance can be improved in a land-based organisation/enterprise
LO3  Understand the need for environmental management	3.1 examine different approaches to environmental management within organisations in a relevant land-based sector  3.2 examine how organisations in a relevant land-based sector can be more environmentally aware  3.3 explain the impact of UK and EU environmental legislation with which organisations in a relevant land-based sector must comply
LO4  Understand the need for waste management in a land-based sector	4.1 examine different approaches to waste management in organisations in a relevant land-based sector  4.2 examine the different types of waste that are produced by organisations in a relevant land-based sector  4.3 justify ways in which land-based organisations in a relevant sector could reduce waste  4.4 evaluate the environmental and commercial benefits of reducing waste for a chosen land-based organisation
LO5  Be able to devise environmental policy in a land-based sector	5.1 devise appropriate environmental policy for a selected land-based organisation/enterprise  5.2 recommend suitable ways to reduce waste and recycle in a selected land-based organisation/enterprise

## Guidance

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### Links

This unit considers aspects of sustainability, the impact of human activities upon the environment and environmental and waste management. It therefore has very clear links to several other units including *Unit 9: Land Use Issues and Regulation*; *Unit 15: Sustainable Development* and *Unit 27: Waste Management*.

It can also serve to support various issues covered in more detail in specialist units such as *Unit 11: Environmental Systems* and *Unit 17: Environmental Health Hazards*.

### Essential requirements

A diverse library resource and access to the internet will increase opportunities for learner-centred research and numerous websites dealing with environmentalism and environmental management are freely available online. The use of audio-visual materials such as slides, documentaries and debates, etc would also further engage learners in the learning experience.

### Employer engagement and vocational contexts

Learners would benefit from visits to organisations and businesses such as water treatment works, waste management sites, power stations and sources of renewable energy. Lectures from appropriate guest speakers would further enhance and contextualise their learning experience and introduce learners to a broader range of professionals and career opportunities available in this subject area. Relating the unit content to the work of organisations such as The Institute of Environmental Management and Assessment (IEMA), Natural England, The Scottish Environment Protection Agency (SEPA) and the Centre for Alternative Technology (CAT) will also strengthen the vocational context.



## Unit 11: Environmental Systems

Unit code: R/503/1563

Level: 4

Credit value: 15

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- Aim

This unit aims to develop learners understanding of natural systems key to land management. Learners will understand the characteristics, distribution and interdependence of different environmental systems and research the relationship between global climate and local habitats.

- Unit abstract

This unit ensures that learners have a broad understanding of the natural systems that are key to land management. An understanding of soil and water resources is essential to the sustainable management of the countryside. This unit provides learners with practical skills to assess environmental systems.

- Learning outcomes

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

- 1 Understand characteristics of edaphic systems
- 2 Understand characteristics of water within hydrological systems
- 3 Be able to research the relationship between global climate and habitats
- 4 Understand the interdependence of environmental systems and the human influences on these systems.

## Unit content

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### 1 Understand characteristics of edaphic systems

*Geographical influences:* rock cycle, igneous, sedimentary, metamorphic, chemical weathering, formation of clay minerals and sesquioxides, physical weathering, formation of regolith

*Soil formation:* pedogenesis, biotic processes, erosion, topographical influences on soil formation, regional differences in soil composition, relief, aspect, altitude

*Soil classification:* international, national, local, land class, profiles, horizons

*Physical characteristics:* texture, structure, porosity, load bearing, pH;

*Biological characteristics:* nutrient cycles, carbon cycles, phosphorous cycle, plant nutrition, fertility, biotic communities

### 2 Understand characteristics of water within hydrological systems

*Characteristics:* physical characteristics (stream flow, discharge, depth, hydrographs, deposition, erosion, colour, turbidity, infiltration, percolation, interception); chemical characteristics (dissolved oxygen, inorganic chemical load, leaching, pH); hydrological systems (hydrological cycle, precipitation, interception, infiltration, utilisation, transpiration, evaporation, surface run-off, through flow, groundwater and water storage, soil water, aquifers, raised water tables, drainage basin, watershed, flood plain); problems associated with agriculture and industry pollution eg eutrophication, increased biological oxygen demand, direct toxicity

### 3 Be able to research the relationship between global climate and habitats

*Atmospheric structure:* troposphere, tropopause, stratosphere

*Energy in the atmosphere:* insolation, terrestrial radiation, infra-red, visible light, global energy budget, ozone, ultra-violet; *Climatic condition:* environmental lapse rate, air stability, condensation, precipitation, temperature, air pressure and winds, insolation, humidity, relative humidity seasonality

*Global circulation:* coriolis force, jet streams, depressions, anticycles, Hadley cell, ocean currents, intertropical convergence zone

*Climate:* temperature, tropical, subtropical, monsoon, semi-arid, boreal, montane, alpine

*Global habitat:* world biomes, temperate forest, boreal forest, savanna, prairie, steppe, tundra, equatorial rainforest, cloud forest, tropical deciduous forest, desert

**4 Understand the interdependence of environmental systems and the human influences on these systems**

*Environmental systems:* edaphic, hydrological, climatic

*Interdependence of the environmental systems:* edaphic/hydrological, edaphic/climatic, hydrological/climatic, hydrological/climatic/edaphic

*Influences:* political eg policy, taxation, regulation, development: sociological eg population demographics, cultural expectation, education, economic eg poverty, debt, technology, deforestation, afforestation, cash crop, import-export

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand characteristics of edaphic systems	1.1 examine the process of pedogenesis 2.1 classify soil according to recognised classification systems 3.1 compare the physical characteristics of given soils 4.1 explain the biological processes required to maintain soil fertility
LO2  Understand characteristics of water within hydrological systems	2.1 explain different hydrological systems 2.2 assess key physical and chemical characteristics of water in given systems 2.3 explain the use of hydrographs for a given river system 2.4 accurately interpret a hydrograph produced for a given river system
LO3  Be able to research the relationship between global climate and habitats	3.1 explain global climatic processes 3.2 accurately map the range of global climates 3.3 accurately interpret global climate mapping carried out 3.3 compare the global habitats associated with a range of global climate types
LO4  Understand the interdependence of environmental systems and the human influences on these systems	4.1 examine the interdependence of edaphic, hydrological and climatic systems 4.2 analyse human factors that influence environmental degradation 4.3 explain appropriate methods by which environmental degradation may be mitigated

## Guidance

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### Links

The unit links with all core units and provides a framework from which an understanding of various optional units may be developed. This unit has strong links with *Unit 3: Principles of Ecology*, *Unit 14: Principles of Plant and Soil Science*, *Unit 43: Global Food Production* and *Unit 15: Sustainable Development*.

### Essential requirements

Learners must be involved in a range of field and laboratory work in order to access natural resources and practical investigations of both soil and water. Standard laboratory equipment will be needed to support these investigations. Some specialist equipment may be required to support fieldwork investigations.

Case studies should be used to explore global climatic systems, meteorological records, either researched by learners or provided by the tutor.

Access to daily newspapers and relevant journals will provide learners with an insight into current issues in resource exploitation. Access to the internet will be essential to support these investigations.

### Employer engagement and vocational contexts

The delivery of this unit would be enhanced by employer engagement involving local organisations, for example environmental consultants. Learners could meet with employers from the industry to learn about current issues and trends in the sector. Sustained links with the groups may support further units as well as work placement opportunities. A talk by a representative of the Environment Agency would help learners understand how the sector responds to change and the impact of changes on the sector.



## Unit 12: Farmland Habitat Management

Unit code: Y/503/1564

Level: 5

Credit value: 15

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- Aim

This unit promotes a comprehensive understanding of UK farmland habitats. Learners will research the complex interactions between agricultural activities and ecosystems.

- Unit abstract

In this unit learners will develop their understanding of key ecological considerations in relation to farmland habitats. Learners will investigate the effects of local, national and international regulation on habitat management. Learners will evaluate ecological components within agricultural systems and consider adjustments that enhance farmland biodiversity and ecological integrity, promoting sustainable agricultural practices. The integrative nature of this unit is designed to encourage the learner to utilise the knowledge and understanding gained throughout other units, particularly ecology-based units.

- Learning outcomes

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

- 1 Be able to survey important farm habitats
- 2 Understand ecological dynamics of farm habitats
- 3 Understand the value of farm habitats
- 4 Understand management practices that enhance the value of farm habitats.

# Unit content

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## 1 Be able to survey important farm habitats

*Phase 1 habitat survey of farm habitats:* deciduous woodland, semi-natural coniferous woodland, semi-natural grassland, river corridors, lowland heaths, heather moorland, chalk/limestone grassland, sand-dune/saltmarsh

*Description of farm habitats to include:* important arable and grassland flora and fauna; copses and small woodlands; hedgerows (with trees); roadside verges; disused railway lines; streams, rivers, canals, ditches, ponds (including dew); set-aside; conservation headlands, unsprayed margins and beetle banks; farm buildings; drystone walls

*Determination of key farm flora and fauna:* on-line, computer based or hard copy text, glossaries and keys; use of Latin as international language; identification using visual characteristics

## 2 Understand ecological dynamics of farm habitats

*Biotic and abiotic components of agro-ecosystems to include the role of:* water, solar radiation, temperature, soil texture, structure, nutrient status, pH, drainage

*Resources, competition and the dynamics of agro-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

*Energy flows and plant and animal population dynamics:* energy flows and pyramids; fecundity; natality; mortality; immigration; emigration; basic breeding strategies; concepts of carrying capacity, density dependent population control, boom and bust cycling, life tables and survivorship; predator/prey relationships; age classes

*Impact of a range of agricultural activities on agro-ecosystems:* extensive and intensive farming; ploughing and cultivations; cropping and grazing; fertilizer and chemical application; rotations and mono cropping; set aside, beetle banks, pathways, hedges and hedgerows

## 3 Understand the value of farm habitats

*Ecological value of farm habitats to include:* ecological integrity, biodiversity value

*Commercial agricultural value of farm habitats to include:* nutrient cycling, biological control, micro-climate enhancement, prevention of soil erosion, environmental pollution

*Landscape and aesthetic/cultural value of farm habitats to include:* scenery, cosmetic value, amenity, screening, and community use

#### 4 Understand management practices that enhance the value of farm habitats

*Impact of intensive agricultural management on agro-ecosystems to include:* the removal of key biological components such as hedges, dew ponds, ditches, copses, woodlands, farm buildings and drystone walls; the grading of watercourses; use of pesticides and inorganic fertilisers; silting of water courses via soil erosion

*Alternative management practices:* potential to improve the ecological, landscape and agricultural value of farm habitats; low input farming; integrated crop management; integrated farming systems; precision farming techniques; organic agriculture

*Role of EU and UK conservation initiatives:* improving the ecological, landscape and agricultural value of commercial agricultural production systems; Sites of Special Scientific Interest (SSSI), Nitrate Sensitive Areas (NSA), Environmentally Sensitive Areas (ESA), the Countryside Stewardship Scheme (CSS), Arable Stewardship Scheme (ASS), Biodiversity Action Plans (BAP), Species Action Plans (SAP), Environment Agency

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Be able to survey important farm habitats	1.1 plan practical surveying to investigate valuable farm habitats  1.2 use appropriate techniques to investigate farm habitat enhancement  1.3 make appropriate farm habitat enhancement recommendations based on findings to inform decisions  1.4 justify farm habitat enhancement recommendations made related to survey findings
LO2  Understand ecological dynamics of farm habitats	2.1 examine key biotic and abiotic components of agro-ecosystems  2.2 explain agro-ecosystem dynamics  2.3 evaluate how agricultural management influences agro-ecosystems
LO3  Understand the value of farm habitats	3.1 assess the ecological value of farm habitats  3.2 examine the commercial agricultural benefits of farm habitats  3.3 evaluate the landscape and cultural value of farm habitats
LO4  Understand management practices that enhance the value of farm habitats	4.1 evaluate the impacts of intensive agricultural management on agro-ecosystems  4.2 examine alternative management practices able to enhance biodiversity and landscape value  4.3 evaluate the role of agri-environmental initiatives in agricultural management

## Guidance

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### Links

This unit is multi-disciplinary and integrative in nature and therefore has links with many of the other units in the programme for example *Unit 11: Environmental Systems*, *Unit 3: Principles of Ecology*, *Unit 45: Small Business Enterprise* and *Unit 15: Sustainable Development*.

### Essential requirements

In order to successfully complete this unit, learners must have opportunities for practical fieldwork, to include carrying out surveys and assessing wildlife habitats and populations.

Access to appropriate sources of information, including the internet, and a range of farm habitats, are essential. Equipment needed will include tapes, plans, maps, soil testing kits, augers, quadrats and flora/fauna identification keys.

Centres must facilitate appropriate access to a variety of wildlife animals and habitats: this must be planned carefully to prevent any stress or suffering of flora and fauna, or disturbance of natural habitats. Tutors will need to be knowledgeable about the latest developments in habitat management.

### Employer engagement and vocational contexts

Centres should use links with external wildlife organisations to provide a 'real' view of habitat management. This could be through both visits to establishments and guest lectures from organisational professionals such as representatives from Wildlife Trusts, FWAG (farming and wildlife advisory groups), exemplar farmers and LEAF advisers.



## Unit 13: Animal Health and Welfare

Unit code: D/503/1565

Level: 5

Credit value: 15

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- Aim

This unit aims to develop learner understanding of animal health and welfare. Learners will explore the factors which can affect the health of animals, the causal agents of animal disease and disease transmission and the measures which can be adopted to minimise the risks of disease and/or injury.

- Unit abstract

With an increasing emphasis on animal welfare and health, it is important that learners develop the ability to analyse the clear link between how animals are kept and maintained and the effects this may have on their health. This unit explores common animal diseases, and gives learners the opportunity to research and evaluate the effects, causal agents and aetiology of these diseases. Learners will investigate the importance of reviewing animal welfare conditions and how this impacts on animal health.

- Learning outcomes

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

- 1 Understand the effect of husbandry on animal health
- 2 Understand causative agents and routes of transmission for disease
- 3 Understand methods for the control and prevention of common diseases
- 4 Be able to assess welfare conditions for animals.

## Unit content

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### 1 Understand the effect of husbandry on animal health

*Husbandry:* feeding correct type, quality and quantity of food; cleaning and disinfection routines; providing exercise and enrichment; minimisation of stress; social interaction with other animals; provision of prophylaxis and preventative care; staff training; codes of practice for the animals and husbandry routines

*Health and disease:* examples of common animal diseases and ill health (definition, identification, treatment, prevention) eg worms; clinical terminology used; significance of health in relation to animal management; production; economics; current relevant legislation eg Animal Welfare Act, Zoo Animals Act, Animal Health Act, Public Health (control of disease) Act; practitioners' roles and responsibilities; zoonoses; notifiable diseases

*Health monitoring:* invasive and non-invasive techniques for monitoring; observation and frequency of monitoring; signs of health-normal and abnormal for species; information source; stock knowledge; health recording; diagnostic techniques

### 2 Understand causative agents and routes of transmission for disease

*Causative agents:* micro-organisms; bacteria; fungi; viruses; spread; structure and replication

*Helminths and protozoa:* cestodes; nematodes; trematodes; structure; life cycle; symptoms

*Ectoparasites:* insects; lice; fleas; dipteran flies; arachnids; mites; ticks; importance of veterinary work

*Routes of transmission:* direct; indirect; horizontal; vertical; sites of entry; sites of exit

### 3 Understand methods for the control and prevention of common diseases

*Hygiene and housing in disease control and prevention:* use of chemical disinfectants and antiseptics; effectiveness; environmental awareness; pollution control; isolation and quarantine; disease prevalence of area and animal unit

*Vaccination:* live vaccines; attenuated; killed; effectiveness; current vaccines; adjuvants; passive immunity

*Chemotherapy:* selective toxicity; spectrum of activity; adverse reactions; drug metabolism; administration; modes of action; drug resistance and toxicity

**4 Be able to assess welfare conditions for animals**

*Animal welfare assessment:* factors affecting welfare; limitations of assessment practices; invasive and non-invasive techniques and effects on results; controlled environment experiments; range of viewpoints; public perception; producer and consumer conflicts

*Environmental appraisal:* environmental conditions; specific purpose and keeping requirements/restraints for different groups of animals; public health and safety; economics; accommodation and agriculture appraisal; potential improvements; behavioural and environmental enrichment

*Regulation and related organisations:* relevant UK, international and European welfare legislation; codes of practice and conduct; related guidelines, legal enforcement procedures and penalties eg animal passports, horse passports; relevant governmental and non-governmental animal health and welfare organisations

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand the effect of husbandry on animal health	1.1 evaluate the factors that contribute to good husbandry practice  1.2 explain techniques available for monitoring the health of animals  1.3 assess the suitability of animal husbandry techniques in relation to animal health
LO2  Understand causative agents and routes of transmission for disease	2.1 explain the structure and replication of bacteria, viruses and fungi  2.2 assess the importance of helminth and protozoa life cycles to veterinary practice  2.3 examine the veterinary importance of ectoparasites  2.4 explain the importance of different routes of disease transmission
LO3  Understand methods for the control and prevention of common diseases	3.1 evaluate the disease potential of a named animal facility  3.2 recommend valid measures that could be taken to prevent disease transmission  3.3 explain the role of vaccination and chemotherapy in disease prevention
LO4  Be able to assess welfare conditions for animals	4.1 undertake a valid animal welfare assessment for given animal units  4.2 undertake a valid environmental appraisal for given animal units  4.3 recommend animal enrichment improvements for given animal units  4.4 review animal welfare regulations relevant to given animals

## Guidance

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### Links

This unit links to many units in the qualification such as:

- *Unit 3: Principles of Ecology*
- *Unit 8: Genetics and their Application*
- *Unit 25: Fish, Game and Wildlife Management.*

### Essential requirements

Learners must assess the condition of a minimum of two animal units, such as kennels, stud yards, veterinary facilities and/or research facilities. Learners must have access to the internet as well as to up-to-date literature on animal health and welfare. Laboratory equipment should be made available for learners to analyse animal health, for example access to equipment to carry out faecal egg counts and parasite analysis. Microscopes are essential items of equipment for this unit.

Animal welfare requirements must be paramount at all times. Animals must not be subjected to stress or overuse during delivery of this unit.

### Employer engagement and vocational contexts

Delivery of this unit would be enhanced by the visits from relevant experts such as veterinary professionals and/or personnel from agencies such as Defra and environmental health departments. Learners would benefit from off-site visits to, for example, the Veterinary Laboratories agency (VLA), as well as animal rescue centres, boarding establishments and/or animal testing laboratories to evaluate different types of husbandry and welfare of animals kept in controlled situations. Discussion on how learners' own animals are kept could also be a starting point for the evaluation and analysis of animal health and welfare. Vaccinations and potential alternatives could be discussed and personnel from animal medical companies could be a useful source of information.

Learners could also benefit from carrying out practical activities such as analysing faeces for parasite infestations, analysing skin scrapes and hair/fur samples for signs of abnormalities. It may be useful for a veterinary professional, for example a veterinary nurse, to lead these exercises.



## Unit 14: Principles of Plant and Soil Science

Unit code: H/503/1051

Level: 5

Credit value: 15

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- Aim

This unit will develop learners' understanding of plant and soil science, including how plant cells, tissues and organs are organised and their function and the processes involved. Learners will develop their understanding of soil and other media and how they relate to plant production and management.

- Unit abstract

This unit covers key ideas and concepts that are essential for a career in environmental conservation or the related sectors. Learners will develop their understanding of plant biology and the soil requirements needed for plant growth. They will explore the essential ideas needed in understanding plants and plant growth. They will undertake laboratory work to investigate plant physiology.

Learners will research the different media available and the requirements of each plant and the develop the ability to make educated decisions on plant feeding, mulching and specific mineral requirements at different times of the year.

- Learning outcomes

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

- 1 Understand plant structures in terms of their functional significance
- 2 Understand physiological processes in plants
- 3 Understand the relationship between plant growth and the properties of soil and growing media
- 4 Understand the properties of soil and growing media.

## Unit content

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### 1 Understand plant structures in terms of their functional significance

*Structure and function:* anatomy; morphology; growth and function of plant cells, tissue and organs; root/shoot relationships; hormonal control of whole plant growth and development; identification features; exploitation of natural growth and development in industry

### 2 Understand physiological processes in plants

*Physiological processes:* cell division; photosynthesis; respiration; tropisms; water relations eg transpiration, osmosis; nutrient function in plants and their absorption; short- and long-distance transport systems within plants

*Processes:* experimentation and evaluation of the results eg nitrogen fixation experiments, photosynthesis measurements using an O<sub>2</sub> sensor, respiration measurements using an O<sub>2</sub> sensor, Mitosis observation using garlic root and a microscope, various data logging experiments

### 3 Understand the relationship between plant growth and the properties of soil and growing media

*Soil:* formation; biological properties eg micro flora and macro fauna; chemical properties eg mineral matter, colour; profiles, soil and land classification and mapping, soil as a rooting medium, colloids and their effects on the properties of soils and other rooting media; nutrient holding capacity; ease of cultivation

### 4 Understand the properties of soil and growing media

*Management:* properties (soil water management; principles of irrigation and drainage; colloids and plant nutrient availability, soil structure)

*Alternative media:* growing media other than soils eg hydroponics, nutrient film technique, open systems, closed systems; ingredients of soil-based and soil-less mixes, their physical and chemical properties, water and mineral nutrient management

## Learning outcomes and assessment criteria

<b>Learning outcomes</b>  <b>On successful completion of this unit a learner will:</b>	<b>Assessment criteria for pass</b>  <b>The learner can:</b>
LO1  Understand plant structures in terms of their functional significance	1.1 examine the structure, morphology and main identification features of key plants  1.2 explain the significance of plant structures from cell to whole plant level in relation to their use in a selected land-based industry  1.3 relate plant development to key factors of importance in plant production for a selected land-based industry
LO2  Understand physiological processes in plants	2.1 perform suitable laboratory experiments to investigate the principles of plant physiology  2.2 evaluate the results of laboratory experiments with accuracy  2.3 explain the fundamental processes by which plants acquire energy and mass  2.4 relate physiological processes to the practice of plant production
LO3  Understand the relationship between plant growth and the properties of soil and growing media	3.1 examine the major physical, chemical and biological properties of soil which influence plant growth  3.2 analyse processes of soil formation and landform development  3.3 examine the mechanisms by which soils retain and release nutrients to plants
LO4  Understand the properties of soil and growing media	4.1 relate the properties of soils to their management for plant production and/or habitat management  4.2 critically evaluate the physical and chemical properties of soil-less growing media for use in plant production

## Guidance

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### Links

This unit links to other units in the specification for example *Unit 2: Project Management for Land based Industries*, *Unit 3: Principles of Ecology*, *Unit 4: Biological Principles*, *Unit 8: Genetics and their Application* and *Unit 44: Work-based Experience*.

### Essential requirements

Library resources such as plant and soil science textbooks should be available to enable learners to achieve this unit. It is essential that the learner is able to relate the concepts learnt in the field. Therefore theory sessions must be backed up by a minimum of 20 hours' practical work in laboratory and field and, where appropriate, greenhouse or nursery situations. Plant and soil analyses facilities should be available for the duration of the study period. Practical work must be carried out in appropriately equipped laboratories and in field situations where plants are produced for different purposes.

### Employer engagement and vocational contexts

Learners would benefit from having access to a working environment. Often this is achieved through creating links with local businesses or charitable organisations who may benefit from taking on learners. Local nurseries and plant associations are a great source of information and are often very keen to share knowledge with learners. Business education alliances can also prove useful. Charitable organisations can often provide guest speakers to give lectures and demonstrations.

## Unit 15: Sustainable Development

Unit code: M/503/1148

Level: 5

Credit value: 15

- Aim

This unit aims to raise awareness of sustainable development issues, to encourage a sense of responsibility and citizenship, an appreciation of the needs of others both now and in the future, and respect and value for the diversity of life.

- Unit abstract

It is now commonly accepted that there is great need to ensure that human activities do not cause permanent damage to the environment and that future generations should not be denied resources. It is believed that economic and social goals should be achieved in ways that can be supported for the long term by conserving resources, protecting the environment and ensuring human health and welfare.

Those employed in the land-based sector should have an understanding of the concept of sustainable development, and an appreciation of the main mechanisms for its implementation.

This unit enable learners to study the core themes and issues of sustainable development. It raises awareness of: sustainability issues; responsibility and citizenship; the needs of others now and in the future; and the requirement to respect and value the diversity of life.

- Learning outcomes

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

- 1 Understand principles of sustainable development
- 2 Understand the impact of production, trade and biotechnology on diversity
- 3 Understand the concept of citizenship and individual responsibility in the promotion of sustainable development
- 4 Understand the impact of changes towards sustainability.

## Unit content

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### 1 Understand principles of sustainable development

*Principles:* concept of sustainable development (to include the different contexts in which sustainable development can be placed)

*Earth and man:* Gaia evolution; human demographics; agricultural development; the industrial revolution; resource consumption and pollution; development of global and local transport systems

*Inter-dependence:* dynamic nature of generation relationships (with examples to illustrate changes over time and space)

*Values and beliefs:* examples to illustrate different attitudes towards sustainable development and values between cultural and income groups (to include an examination of the balance of power and vested interests)

*Needs and rights:* present imbalance of population and resource usage, locally and globally, the wealth gap between and within countries; measures of standard of living (eg Gross National Product) and the developing measures of quality of life; the concept of social justice

### 2 Understand the impact of production, trade biotechnology on diversity

*Evidence:* qualitative and quantitative evidence as indicators of the changes in biological, cultural and economic diversity, local, global

*Impacts:* examples to illustrate the impacts on biological, cultural and economic diversity of globalisation of production; trade and consumption; the dominance of multinational enterprises in decision making

*Technological developments:* the effects of changes in transport and telecommunications on trade and production; impacts on cultural and economic diversity; developments in biotechnology and genetic engineering; impacts on bio-diversity; genetically modified organism (GMO) debate

*Recent changes:* application of appropriate technology (eg wood-burning stoves and mini-hydro electric power schemes), promotion of local trade (eg 'farmers' markets' in the UK)

### 3 Understand the concept of citizenship and individual responsibility in the promotion of sustainable development

*Stewardship*: illustrative examples to promote an understanding of the term, the need for individual as well as collective responsibility; Local Agenda 21 and the development of the slogan 'think global act local'

*Active citizenship*: need for individual participation, the contribution of voluntary personal controls; use of resources towards sustainable development; the value and process of collective decision making; ecological footprints

*Social justice and equity*: contrasting examples of different values and beliefs on behaviour and lifestyles; the need to promote sustainable lifestyles; the need for personal changes in lifestyles and habits to promote sustainable behaviour in the home/workplace/centre; the ethical arguments for promoting sustainable development

### 4 Understand the impact of changes towards sustainability

*Pressure groups*: the role of pressure groups in promoting change (eg Greenpeace); the use of renewable materials; ethical investments and fair trade

*Sustainable production*: sustainable production methods in forestry and woodland products; less intensive agricultural systems; organic production; resource minimisation in industry and commerce

*Legislation and policies*: regulations to promote waste minimisation and a more sustainable use of resources eg packaging regulations, the landfill tax, environmental taxation, eco-labelling, incentives to reuse and recycle, Local Agenda 21

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand principles of sustainable development	1.1 examine the main sustainable development principles  1.2 summarise the different interpretations of the concept of sustainable development  1.3 evaluate the need to address both inter-generational and intra-generational equity  1.4 discuss the debate between individual and collective interests
LO2  Understand the impact of production, trade and biotechnology on diversity	2.1 evaluate the evidence that indicates global production and trade has had an impact on biological, cultural and economic diversity  2.2 evaluate the impact of the globalisation of production and consumption on biological, cultural and economic diversity  2.3 evaluate the implications of recent trends towards localisation of economic activity in the promotion of diversity  2.4 assess the impact of biotechnology on bio-diversity
LO3  Understand the concept of citizenship and individual responsibility in the promotion of sustainable development	3.1 examine the concept of stewardship relating this to selected examples  3.2 compare values on ethical issues related to sustainable development  3.3 evaluate the policies and attitudes of a local authority or place of work/study to citizenship and individual responsibility
LO4  Understand the impact of changes towards sustainability	4.1 assess the importance of pressure groups in promoting sustainable change  4.2 discuss the effectiveness of recent legislation introduced to promote a more sustainable use of resources  4.3 evaluate recent changes to a production system to promote sustainable development  4.4 critically assess lifestyle and behaviour in relation to own eco-footprint

## Guidance

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### Essential requirements

Access to a well-resourced library, the internet and quality newspapers are essential. Sustainable development is topical and therefore newspaper articles and radio/television items provide interesting and related information. Information from a local authority, local groups involved in sustainable development activities and Local Agenda 21 will be invaluable.

### Employer engagement and vocational contexts

The delivery of this unit would be enhanced by employer engagement involving, for example, local organisations, for example environmental consultants. Learners could, for example, meet with employers from the industry to learn about current issues and trends in the sector. Sustained links with the groups may support further units as well as work placement opportunities. A talk by a representative of the Environment Agency would help learners understanding of how the Environmental sector responds to change and the impacts of changes on the sector.



## Unit 16: Research Methods for Land-based Industries

Unit code: A/503/1153

Level: 4

Credit value: 15

### ● Aim

This unit introduces learners to methodologies employed when carrying out research. It develops learners' knowledge of the range of information sources available and should equip them with practical skills in planning a piece of research.

### ● Unit abstract

The ability to successfully formulate research questions, and gain data for analysis in an attempt to answer them, are vital skills for learners working in this programme area. Understanding the concepts considered in this unit will greatly assist the learner with these skills.

Learners will be introduced to different forms of data and how it can be both generated by them and accessed from existing sources. Several of the major analytical and descriptive techniques used to interpret the resulting data are then utilised to help in its interpretation. Once learners have gained these skills, research topics applicable to their subject area and interests can be considered in more detail.

How to plan, conduct, interpret and present the resulting findings (together with their significance), from research projects are all addressed in this unit. Learners will gain vital preparation to assist them in undertaking their own research in their studies or future careers by completing this unit.

### ● Learning outcomes

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

- 1 Be able to collect and interpret data and information in a land-based industry
- 2 Be able to plan research in a land-based industry
- 3 Be able to review data from a range of sources in a land-based industry
- 4 Be able to present findings appropriately.

## Unit content

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### 1 Be able to collect and interpret data and information in a land-based industry

*Nature of data:* primary and secondary data; qualitative; quantitative; objective; subjective; accuracy; precision; errors; significance; reliability

*Data collection:* probability sampling – eg random, systematic, stratified, clustered; non-probability sampling – eg convenience, voluntary, quota; purpose – eg event sampling, time sampling

*Data analysis:* descriptive statistics eg proportions, percentages, ratios, range; inferential statistics to assess the significance of results using chi-squared and Student's t-Tests

*Simple interrelationships:* correlation

*Complex relationships:* multivariate analysis

### 2 Be able to plan research in a land-based industry

*Research a subject specific research title:* preliminary review of sources of information; discussions with tutors; agreement of research aims; research objectives; hypotheses and research title; appropriate size and nature of research

*Programme of work:* outline of methodology and resources; proposed analysis and interpretation; regular reviews of progress; appropriate and achievable target dates set; flexible approach within framework

### 3 Be able to review data from a range of sources in a land-based industry

*Existing data:* literature; accessing professional expertise via eg verbal questioning, email, letters; related studies; historical data; current data; introductory texts; published and unpublished work; popular media eg television, radio, newspapers; computer-based sources eg CD-Rom, Internet; multimedia eg DVD, video, slides, audio tape; abstracts; reports; journals

### 4 Be able to present findings appropriately

*Critical review:* discussion of opposing views in an informed and balanced manner; all views are accurately referenced; discussion of methodologies and content; suggested sources of error and improvement of methodology

*Suitable format:* oral; visual and written; professional presentation; appropriate level for audience eg peer group, tutors; style appropriate to audience and research; scientific conventions followed

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to collect and interpret data and information in a land-based industry	1.1 explain the nature of research data 1.2 determine sources of error in data collection 1.3 carry out a range of data collection techniques 1.4 analyse simple data using descriptive and inferential statistical techniques
LO2  Be able to plan research in a land-based industry	2.1 determine appropriate sources of information and advice 2.2 plan realistic resource requirements, methodology and analysis 2.3 agree research aims, objectives and title with an appropriate authority 2.4 submit work proposals with appropriate and achievable target dates
LO3  Be able to review data from a range of sources in a land-based industry	3.1 critically review appropriate existing data from a range of sources
LO4  Be able to present findings appropriately	4.1 present report findings using appropriate media 4.2 prepare a summary of findings suitable for display to a given audience

## Guidance

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### Links

This unit serves as a valuable introduction to several major aspects of research, and also common pitfalls, and would therefore benefit the delivery of *Unit 1: Research Project*. The knowledge and skills contained within it would also be of value to learners wishing to continue their higher education and those seeking to progress onto a managerial-level career.

This unit links with all units that require any degree of literature review, data handling or presentation skills. It may therefore be considered as a means of developing learners' study skills at an early stage in the programme.

### Essential requirements

As this unit has a high degree of directed study, a well-resourced library or learning resource centre is essential. Access to multimedia provision and to the internet enables learners to access diverse information sources, and should allow learners to recognise the strengths and weaknesses of all data sources.

Learners will require access to suitably qualified staff which may necessitate cross-curricular tutoring. Tutor time is therefore an essential resource. It is not anticipated, or expected, that learners have unlimited access to tutor support, but sufficient timetable allocation should be made to ensure that learners receive support in developing their skill base.

### Employer engagement and vocational contexts

The data collection, analysis and presentation skills gained from this unit will benefit the learner in their studies and future careers. The skills and knowledge acquired through this unit will enable the learner to successfully undertake future research in subject-specific areas.

## Unit 17: Environmental Health Hazards

Unit code: K/503/1567

Level: 5

Credit value: 15

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- Aim

The unit aims to give learners the opportunity to understand the range of methods used for, and issues concerned with, the testing of potentially toxic substances in order to estimate their effects on organisms and ecosystems.

- Unit abstract

When working in the land-based and environmental sector, it is of paramount importance that learners are able to analyse the potential risks to health that exist in the everyday environment; physically, chemically and biologically. This is so that learners are able to work within their limitations of health and safety in accordance with legislation, protect others and recognise potential toxic conditions and substances that may have an adverse effect on health, the environment, organisms and ecosystems. Learners will also learn to work towards minimising these negative conditions.

- Learning outcomes

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

- 1 Understand chemical environmental hazards to health
- 2 Understand biological environmental hazards to health
- 3 Understand physical environmental hazards to health
- 4 Understand methods used in toxicity testing.

## Unit content

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### 1 Understand chemical environmental hazards to health

*Heavy metals:* mercury; lead; cadmium; uses of heavy metals in society and industries; penetration of the metals into soil, watercourses and plants; ecotoxicological effects on the environment; pathways into the human body and effects on human health; effects on plant and animal ecosystems

*Substances found in water:* phosphates; nitrates; pesticides; ecological effects of these substances on the ecosystems; reasons for use of nitrogen-based fertilisers and alternatives; organochlorides and organophosphates; human and ecological effects of nitrates in water courses and drinking water; use of substances likely to affect species and their specific effects; entry of substances into drinking water through the treatment process; chemical effects of haloforms and their production as a result of water treatment; possible carcinogenic effects of haloforms on humans; fluoridation effects and benefits

### 2 Understand biological environmental hazards to health

*Diseases spread in water:* typhoid; cholera; other waterborne diseases; water treatment process to prevent disease outbreak; treatment; symptoms; prevention of waterborne diseases

*Micro-organisms in food:* salmonella; campylobacter; cholera; roles of these in food poisoning; incubation periods; prevention; treatment; symptoms; natural distribution of micro-organisms in food; transmission of disease from meat and animal products to humans; prevalence of these diseases; aetiology; prevention; symptoms; treatments; variant strains of animal-based diseases to humans

*Control of waterborne and food borne organisms:* water treatment methods; food handling and hygiene (including legislation); role of organisations in controlling food and water treatment; public perception of health hazards in food and water; current controversial issues surrounding food and water treatment, production and handling

### 3 Understand physical environmental hazards to health

*Physical environmental hazards:* ionising radiation; radionuclide contamination within organisms and ecosystems; pathways of radionuclide; ecological effects of a large-scale hazardous nuclear event eg Chernobyl, Hiroshima; soil, water and plant contamination; therapeutic and hazardous uses of radiation; accidental irradiation of humans; dose-dependent health effects and their treatment; uses of radiation in medicine and its associated risks; ecological problems and hazards in the disposal of medical isotopes

*Environmental noise:* sources of noise; the nature of noise; effects of noise on humans and animals in the environment; noise-related hearing loss and associated problems; transmission and absorption of noise; control of noise; acceptable noise levels and associated legislation; hearing protection types and uses

#### 4 Understand methods used in toxicity testing

*Testing of chemical substances in animals:* dose-response relationship, LD<sub>50</sub>, LC<sub>50</sub>, ED<sub>50</sub> and EC<sub>50</sub> testing in order to estimate 'safe' doses of potential toxins to humans and other animals, practical and ethical advantages and disadvantages of animal testing, alternatives to animal testing; Ames test; computer modelling

*Ecotoxicological testing:* toxicity tests used to predict toxic effects of potential pollutants on organisms, algal, daphnia and vertebrate toxicity tests, modelling of bioaccumulation, biotransformation, detoxification and biodegradation of toxins in ecosystems, the use of this information and toxicity data in ecological risk assessment

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand chemical environmental hazards to health	1.1 explain how heavy metals are used in modern life  1.2 explain the health effects of heavy elements  1.3 evaluate the health hazards associated with substances found in water as a result of human activities  1.4 evaluate the potential health hazards of substances found in drinking water as a result of water treatment
LO2  Understand biological environmental hazards to health	2.1 explain how micro-organisms in food cause disease  2.2 explain how diseases can be spread in water  2.3 assess the controls adopted to minimise biological hazards  2.4 discuss biosecurity procedures relating to a given land-based site
LO3  Understand physical environmental hazards to health	3.1 examine the pathways of radionuclides within organisms and ecosystems  3.2 explain the health effects of ionising radiation  3.3 discriminate between therapeutic and hazardous effects of radiation  3.4 explain how environmental noise can be hazardous  3.5 evaluate the ways in which hazards due to noise can be minimised
LO4  Understand methods used in toxicity testing	4.1 examine the dose-response relationship  4.2 assess the value of the results of toxicity tests  4.3 compare the methods used in toxicity testing  4.4 explain the ways in which ecological risk assessment may be carried out

## Guidance

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### Links

This unit introduces learners to environmental health hazards, and therefore links to the following units:

- *Unit 10: Environmental Management*
- *Unit 14: Principles of Plant and Soil Science*
- *Unit 33: Environmental Education and Interpretation.*

### Essential requirements

Learners must have access to the internet, be able to participate in case and field studies off site and have access to ICT facilities. Access to well stocked, recent literature on environmental health must be made available, as well as access to a laboratory.

### Employer engagement and vocational contexts

This unit would benefit from the use of guest speakers regularly to the scheme of work. Suggested speakers would be environmental health officers, food preparation personnel, laboratory officials, for example from animal-testing facilities, radiologists and water board scientists and officials.

Learners would benefit from being able to carry out case studies and field studies/tests on local and national water sources and analysing the chemical balance within them. Access to a laboratory with the necessary equipment is therefore a vital part of this unit.

Off-site visits to local and national food preparation/testing laboratories would also benefit learners, or visits to local environmental health offices to observe the work that is carried out there are also helpful. An understanding of the paperwork and processes used throughout food and water testing and preparation is important for this unit.



## Unit 18: Habitat Management

Unit code: T/503/1569

Level: 5

Credit value: 15

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- **Aim**

This unit aims to give learners the skills and understanding necessary to successfully manage habitats. Learners will develop their understanding of the principles of sustainable management of habitats.

- **Unit abstract**

Learners will research different habitats, their characteristic flora and fauna communities and the significance of the ecology, biological adaptation and environmental systems of a given habitat. They will also research sustainable management issues and the needs of different natural and semi-natural habitats and the most relevant management practices for each.

On completion of the unit, learners will have a thorough understanding of sustainable habitat management.

- **Learning outcomes**

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

- 1 Understand habitats and their characteristic plant and animal communities
- 2 Understand the ecology of a range of British habitats
- 3 Understand sustainable management strategies for a range of British habitats
- 4 Be able to improve/maintain management of a given habitat.

## Unit content

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### 1 Understand habitats and their characteristic plant and animal communities

*Woodland habitats:* eg semi-ancient woodland, wildwood, secondary woodland, plantation, woodland stratification with canopy; woodland structure (ground layer, shrub layer, understorey, canopy)

*Grassland habitats:* eg acid, Mesotrophic, calcareous, heathland, grass, ley hay meadow, white moor; wetland (fen, reedbeds, flood meadow, acid bogs, raised bogs)

*Aquatic habitats:* eg pond, stream, river, reservoir, lake, ditch, canals

*Upland habitats:* eg montane, heather moorland, upland heath, mires, bog

*Lowland habitats:* heathland (wet and dry heath); species diversity (local, regional and national extinctions, fragmentation of habitats); flora and fauna communities within British habitats

*Farmland habitats:* eg game crops, set-aside, farm woods, ditches, dykes

*Coastal habitats:* eg mudflat, salt marsh, sand dunes, shingle, rocky shore, lagoons, sea walls, open sea, sub-tidal, sandy shores, estuary

*Boundaries:* eg hedgerows, ditches, embankments, drystone walls, shelter belt, field margins, and conservation headlands

### 2 Understand the ecology of a range of British habitats

*Ecological terms:* ecosystems, communities, populations, micro-habitat, niche

*Abiotic factors:* soil factors eg pH, nutrient status, moisture content, structure, texture, biota

*Climatic factors:* temperature range; precipitation; wind; humidity; daylight hours; *Geographical factors:* altitude; slope; aspect

*Hydrographical factors:* current; depth; salinity; substrate; oxygen

*Biotic factors:* seed dispersal, symbiotic relationships, mutualism, parasitism, disease, protection, competition, defence

*Vulnerability to damage:* pollution, effects of changes in agriculture, draining, drought, flooding, erosion, over- and under-grazing, climate change, deforestation

### 3 Understand sustainable management strategies for a range of British habitats

*General objectives:* eg habitat and species diversity, public recreation, commercial production, game industry, maintenance of successional stage, prevention of erosion/trampling/vandalism/pollution; influence of national environmental designations eg Area of Outstanding Natural Beauty, Site of Special Scientific Interest

*Woodland:* coppice-with-standards, (tree/shrub species/timing/rotation), non-intervention, high forest, ride management, thinning and beating up, clear-felling, pollarding, shelter wood system, group-fell systems, selection systems, woodland structure

*Wetland:* hydrological control, mowing, reed cutting, grazing, regeneration, rehabilitation

*Grassland:* hay meadow, scrub control, maintenance of low nutrient status, grazing (livestock type, stocking density, water supply, fencing, danger to public), mowing and removal of cuttings, burning, seeding (seed mixes, nurture, timing, aftercare) non-intervention;

*Upland:* burning, mowing, grazing, predator control, bracken control

*Coastal:* protection of breeding sites, control of pollution, litter, storm damage

*Water bodies:* weed-cutting, bank and floodbank maintenance, dredging, planting

*Lowland heath:* bracken control, scrub control, grazing, burning, cutting, recreation

### 4 Be able to improve/maintain management of a given habitat

*Case study site:* management plans, management objectives, practical management techniques used, basic wildlife survey techniques, habitat monitoring, evaluation of success methods in the context of the management objectives

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
<p>LO1</p> <p>Understand habitats and their characteristic plant and animal communities</p>	<p>1.1 assess a range of habitat types and their typical flora and fauna communities</p> <p>1.2 explain the importance of rare plant and animal species in the habitats</p> <p>1.3 discuss the importance of species diversity in a range of habitats</p> <p>1.4 explain the impact of local area extinctions</p>
<p>LO2</p> <p>Understand the ecology of a range of British habitats</p>	<p>2.1 examine the ecology of a range of habitats</p> <p>2.2 analyse plant and animal adaptations to the environmental conditions within these habitats</p> <p>2.3 assess the vulnerability of the habitats to both natural threats and damage caused by human activities</p>
<p>LO3</p> <p>Understand sustainable management strategies for a range of British habitats</p>	<p>3.1 summarise the principles of habitat management</p> <p>3.2 review the principles of sustainable management of a range of British habitats</p> <p>3.2 review management strategies for a range of British habitats</p>
<p>LO4</p> <p>Be able to improve/maintain management of a given habitat</p>	<p>4.1 use appropriate techniques to research habitat management employed at a given site</p> <p>4.2 recommend appropriate actions to improve habitat management at a given site</p> <p>4.3 justify habitat management recommendations made related to survey findings</p>

## Guidance

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### Links

This unit links with many other units. It develops the environmental understanding gained in *Unit 3: Principles of Ecology* and *Unit 11: Environmental Systems*, and can itself be developed further in the specialist units for example *Unit 28: Further Habitat Management*, *Unit 12: Farmland Habitat Management* and *Unit 31: Biological Survey Techniques*.

### Essential requirements

This unit must be based around a series of field visits, followed by workshops to ensure that learners have understood the ecology of the habitat visited and the principles of its management. Learners must evaluate the particular management regime practised at the site, and contrast it with that used elsewhere.

There are advantages to delivering this unit during the spring and summer months to facilitate the wildlife identification skills on which habitat recognition is based. There may be a regional significance for the habitats selected for study.

Emphasis must be placed on the need for sustainability in considering management options for different sites, the unit should aim to develop key analytical skills in a work-based environment.

### Employer engagement and vocational contexts

A team of employers could be identified to support the different units. They could help tutors, with, for example, the planning of programmes of learning, or offering visits, guest speakers and mentors. They could also help to design assessment activities.

The delivery of this unit would be enhanced by involving local organisations, such as The National Trust, Woodland Trust, local conservation groups.

Learners could meet with employers from The National Trust, for example, to learn about current issues and trends in the conservation and habitat management sector. Sustained links with conservation groups may provide further support.



## Unit 19: Habitat Restoration and Repair

Unit code: K/503/1570

Level: 4

Credit value: 15

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- Aim

This unit aims to give learners understanding of, and practical skills in planning for, semi-natural habitat creation, restoration and repair. The unit explores the options available to habitat managers wishing to create and maintain semi-natural habitats within the countryside.

- Unit abstract

The survival of specialist species depends upon the provision of high-quality habitats. Habitats that have become degraded need to be restored. In some cases new habitats have to be created. The purpose of this unit is to enable learners to know how to restore and create a variety of habitats in the United Kingdom.

The content of this unit explores the rationale for restoring and creating habitats and provides a thorough overview of the techniques available. Considerable emphasis is placed upon the selection of appropriate species for habitat creation programmes. Too much for the introduction of species or genetic material that could be harmful to the surrounding populations. By the end of this unit, the learner will be able to assess habitats and make recommendations for their improvement to meet biodiversity objectives.

- Learning outcomes

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

- 1 Understand the strategic importance of habitat restoration and repair
- 2 Understand the underlying principles involved in the creation and restoration of habitats
- 3 Be able to select appropriate species for habitat creation and restoration
- 4 Understand land use options for a range of habitat types.

## Unit content

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### 1 Understand the strategic importance of habitat restoration and repair

*UK habitats:* overview; geographical influences; plagioclimax communities

*Human influences:* establishment of semi-natural habitats; neglect of habitats; habitat degradation and fragmentation

*Habitat restoration:* reasons for habitat restoration; assessing potential for restoration

### 2 Understand the underlying principles involved in the creation and restoration of habitats

*Natural habitat creation and restoration:* role of succession; regeneration

*Human-induced habitat creation and restoration:* habitat management hierarchy (management, restoration, creation); habitat restoration techniques; habitat creation techniques

*Management planning and project design:* consideration of adjacent habitats; project design eg pond creation, wildflower meadow creation, heathland creation on former landfill site; legislation and planning permission; methods; personnel and site management; health and safety

*Management of new habitats:* challenges and difficulties eg invasion of unwanted species, unsuitable weather resulting in poor establishment of desired species, grazing, predator/prey imbalances

### 3 Be able to select appropriate species for habitat creation and restoration

*Biotic and abiotic systems:* assessment of major components

*Choosing species:* consideration of species provenance; matching species with a site's abiotic and biotic features including population interactions

### 4 Understand land use options for a range of habitat types

*Semi-natural habitats:* management methods post-restoration/creation eg burning, cutting, grazing, chemical methods; health and safety considerations

*Impacts of management and monitoring:* methods; recording systems; analysis of data; importance of long-term management

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand the strategic importance of habitat restoration and repair	1.1 examine the variety of habitats present within the UK  1.2 explain the role of human management in the establishment of semi-natural habitats  1.3 assess the degree of fragmentation of semi-natural habitats  1.4 explain the need and potential for restoration management
LO2  Understand the underlying principles involved in the creation and restoration of habitats	2.1 justify the need for human-induced restoration and creation techniques  2.2 explain the role that succession has within plagioclimax community maintenance  2.3 discuss the difficulties associated with managing new habitats
LO3  Be able to select appropriate species for habitat creation and restoration	3.1 undertake a pre-management survey of the main abiotic and biotic components of a site  3.2 specify appropriate species required for habitat restoration  3.3 explain individual species and population interactions with one another and with the abiotic environment
LO4  Understand land use options for a range of habitat types	4.1 implement the correct after-care management of a site (post-restoration/creation)  4.2 evaluate the potential impacts of a management technique on a given habitat  4.3 discuss the need for long-term management in the maintenance of semi-natural habitats

## Guidance

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### Links

This unit builds on *Unit 3: Principles of Ecology*, so it could be taken before or in conjunction with that unit. It also links with *Unit 18: Habitat Management*, *Unit 23: Urban Habitat Management*, *Unit 36: Develop a Wild Game Management Plan for a Wildlife Management Area* and *Unit 37: Monitor and Maintain Game Management Plans*.

### Essential requirements

Learners will need access to standard textbooks and web-based resources, including e-journals, on biological conservation and management techniques. To complete some of the learning outcomes, learners will also need access to some land materials, tools and equipment to be able to implement habitat creation and restoration methods. For this, centres will need to consider how to provide such project work, this could range from the creation of a small pond to a new wildflower meadow covering several hectares.

### Employer engagement and vocational contexts

Learners would benefit from visits to reclaimed quarries and landfill sites to see the implementation and management of newly-created habitats. Guest lectures by an environmental contractor and conversationalists could be useful to show the range of modern methods and equipment available for large-scale habitat restoration/creation projects.

## Unit 20: Countryside Recreation and Visitor Management

Unit code: M/503/1571

Level: 4

Credit value: 15

- Aim

This unit aims to develop the learner's ability to research the opportunities for, and conflicts associated with, recreation in the rural environment.

- Unit abstract

The countryside is a well-used resource by both residents and visitors alike. Of 29.9 million visits to Britain by overseas residents in 2009, 4.7 million included visits to villages and 5.4 million the countryside (Foresight Issue 85, VisitBritain, November 2010). Those employed in countryside management need to have the knowledge and skills to enable them to understand the processes of tourism and its benefits and constraints. The Countryside Management Association says: 'The role of the countryside manager is to balance the potentially conflicting demands of conservation, recreation and the needs of local communities. Our countryside is a major tourist destination and brings much-needed revenue into rural communities. However, it is essential that recreation and tourism are managed in a sustainable way to ensure that the very things people come to enjoy are not destroyed. Balancing these complex relationships is one of the key roles of countryside professionals.' (<http://www.countryside-management.org.uk>)

- Learning outcomes

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

- 1 Understand the value of sites in the context of countryside recreation and visitor use
- 2 Be able to plan the development of countryside recreational/visitor sites
- 3 Be able to recognise the implications of managing countryside recreational activities
- 4 Understand interpretative resources relating to countryside sites/activities.

## Unit content

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### 1 Understand the value of sites in the context of countryside recreation and visitor use

*Potential of physical resources:* land location, suitability, topography, climate, water (static water bodies, natural/artificial, rivers, sea), vegetation cover, infrastructure links and services, current land use, statutory designations

*Potential conflicts:* agricultural land needs, livestock, disturbance, forestry, commercial production and extraction, wildlife/conservation, development, urban expansion, industry mineral extraction, MOD, nature reserves, SSSIs, scenic value, visitor numbers, infrastructure developments required for recreational activity

*Site availability:* current land use, potential recreational use, developments required to meet potential recreational use

### 2 Be able to plan the development of countryside recreational/visitor sites

*Site evaluation:* baseline studies, suitability of access and creation of access, markets, proximity of suitable clients, assess the viability of a site for recreational use

*Development implications:* impact assessment of the proposed activity: ecological, pollution, cultural, noise, traffic, disturbance

*Development plan:* acquiring planning consent, sources of finance, design and development of facilities, carrying capacity of the site, financial evaluation of development

### 3 Be able to recognise the implications of managing countryside recreational activities

*Legislation:* current legislation relevant to recreation management, eg Countryside and Rights of Way Act 2000; duty of care, eg site repair and maintenance plans

*Risk assessment:* definition of hazard and risk, identify significant hazards, allocate level of risk, identify current and desired precautions

*Site policy and effective use:* zoning of activities to avoid conflict (both temporal and spatial), use of sacrificial areas where maintenance is easy, sustainable management of the site

### 4 Understand interpretative resources relating to countryside sites/activities

*Interpretative media:* signs; leaflets; posters; boards; audio; visual media; interactive media

*Media accessibility:* media availability; format needed; methods of determining accessibility eg surveys, questionnaires

*Interpretative media limitations:* limitations for the producer (material, compliance with planning restrictions, sustainability, can it be understood?), limitations for the user (cost, ease of use, accessibility, does it get the message across?)

*Planning, legal and financial requirements:* any planning, legal or financial requirements

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand the value of sites in the context of recreation and visitor use	1.1 assess the recreational value of physical resources in a given context  1.2 analyse divergences between recreational and other land uses  1.3 assess the suitability of a given site for recreation or visits
LO2  Be able to plan the development of countryside recreational/visitor sites	2.1 evaluate the implications of developing/improving a site for recreational use  2.2 plan development/improvement for a given recreational site
LO3  Be able to recognise the implications of managing countryside recreational activities	3.1 review legislation relevant to recreational sites and activities  3.2 assess risks for a recreational site and activity  3.3 devise a policy for dealing with the public on site  3.4 plan effective recreational use of a site
LO4  Understand interpretative resources relating to countryside sites/activities	4.1 evaluate the purpose and quality of interpretative media  4.2 analyse the accessibility of interpretative media on site  4.3 examine the limitations of interpretative methods  4.4 appraise planning, legal and financial requirements for the interpretative resources

## Guidance

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### Links

This unit links to those studied in the BTEC Level 3 Extended Diploma in Countryside Management, particularly *Understanding Countryside Tourism and Recreation*. It also links with the National Occupational Standards for Environmental Conservation.

### Essential requirements

Learners needed access to the internet resources and appropriate texts and journals. Learners need to use of 'real' sites remotely or directly.

### Employer engagement and vocational contexts

Delivery of the unit would be enhanced through links with site managers of recreational countryside sites.

## Unit 21: Rural Planning and Development

Unit code: T/503/1572

Level: 5

Credit value: 15

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- Aim

This unit aims to promote a comprehensive appreciation of UK planning and development in rural areas. Learners will investigate the complex links between socio-political structures that exist in both rural and urban areas and the rural economy/society.

- Unit abstract

Learners undertaking this unit will explore aspects of planning and development in rural areas, from the actual physical planning systems and regulations to the planning and development of promoting of sustainable development within the rural community.

Learners will become aware of planning apparatus and analyse and evaluate the various components that can affect planning and final development.

- Learning outcomes

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

- 1 Understand impacts of the planning system on the rural environment
- 2 Understand the social construction of power networks
- 3 Understand spatial, historical and biophysical components involved in conditioning uneven development
- 4 Understand the role of the planning system in promoting sustainable development.

## Unit content

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### 1 Understand impacts of the planning system on the rural environment

*Planning processes and the need for planning:* definition; origin; history; property rights; resource allocation; social goods

*Current planning processes:* central; regional and local planning apparatus; development control through structure and local plans; green belt areas; conservation areas and areas of outstanding natural beauty; planning policy guidance notes; public participation; appeals; planning in rural areas; impact of planning; transport; housing; rural businesses; energy; wildlife implications; access; recreational areas

### 2 Understand the social construction of power networks

*Power networks:* individual and common property rights; demographics (urbanisation and counter-urbanisation); evolution; gentrification; 'Nimbyism' and public perception; allocation of resources; exclusivity

### 3 Understand spatial, historical and biophysical components involved in conditioning uneven development

*Development:* definition; key processes involved with development

*Characteristics responsible for uneven development:* historical (socio-political and socioeconomic); biophysical (soil quality, climate, land topography and mineral wealth); external factors (spatially variable UK government and EU policy, market forces and private investment and business strategies)

*Role of power networks in conditioning uneven development:* a symmetrical distribution; monopolisation of land and resources; manipulation of the local economic, social and political infrastructure; disproportionate influence in both local and national regulatory processes

### 4 Understand the role of the planning system in promoting sustainable development

*Economic and social inequalities and related issues in rural areas of the UK:* unequal access; housing; education; transport; energy; quality; food; countryside access; employment, income

*Other issues:* rural poverty; crime and economic decline

*Local government intervention:* planning system as a possible mechanism for rebalancing the inequities of rural life; modification of local and national taxation; housing; education; transport; energy; food; access; employment policies

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1 Understand impacts of the planning system on the rural environment	1.1 explain the planning processes used for a given rural environment 1.2 justify the need for planning 1.3 evaluate the impact of planning in a rural context
LO2 Understand the social construction of power networks	2.1 examine the evolution of rural power networks 2.2 discuss the role of power networks in the socio-economic stratification of rural areas 2.3 evaluate the implications of power networks in relation to resource exploitation
LO3 Understand spatial, historical and biophysical components involved in conditioning uneven development	3.1 explain development processes in a given rural environment 3.2 examine reasons for uneven development in a given rural environment 3.3 evaluate the relationship between power networks and uneven development in a given rural environment
LO4 Understand the role of the planning system in promoting sustainable development	4.1 explain key economic and social inequalities in rural areas 4.2 explain how rural planning and development may ameliorate current inequalities 4.3 critically evaluate the efficacy of the planning system in promoting sustainable development

## Guidance

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### Essential requirements

It is essential that learners have access to the internet and to up-to-date literature on rural planning and development to allow them to fully research this unit.

### Employer engagement and vocational contexts

Centres could establish suitable links with local and national employers involved in rural planning and development. Learners should be introduced to work related experiences to provide them with an in-depth view of what rural planning involves, including the common planning and development issues faced by developers in rural areas face.

Industry links could be enhanced further although experts in the area of planning and development coming to the centre to deliver lectures and demonstrations. This could involve different views of planning and development from both a developer's point of view and the point of view of the person carrying out the planning.

## Unit 22: Working with Groups in Land-based Industries

Unit code: A/503/1573

Level: 4

Credit value: 15

- Aim

The aim of this unit is to develop understanding of work-group planning, leadership and motivation. Learners will investigate strategies involved in decision making, using theory and problem-solving analysis in related to working in groups.

- Unit abstract

The unit will enable learners to develop their understanding of the factors that affect work practices and to the practical skills needed for effective decision making to achieve project objectives. The unit complements many of the topics covered in other units, encouraging learners to reflect on how they can best deploy human resources to manage resources, meeting both the needs of the environment and the objectives of an organisation.

This unit will give learners an understanding of how to set realistic objectives for a workforce and plan how to achieve these objectives. They will examine the role of communication and leadership in the effective management of volunteer workers and explore strategies for effective decision making and problem solving, particularly in relation to practical on-site tasks.

Finally, learners will consider how they are motivated themselves and how best to motivate others in a practical situation.

- Learning outcomes

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

- 1 Understand the importance of planning and organisation for effective work project management
- 2 Understand the role of communication and leadership in the effectiveness of volunteer and other work groups
- 3 Understand strategies employed in decision making
- 4 Understand factors related to volunteer and other work-group motivation.

## Unit content

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### 1 Understand the importance of planning and organisation for effective work project management

*Levels of planning:* different types of plans – corporate, strategic, management and operational

*Human resource and volunteer planning:* assessing work project requirements; involving volunteers; policies, procedures and practices involved in volunteer recruitment and management; support, development and retention of volunteers

*Organisational structures:* types of job; structural relationships; operating mechanisms; roles and responsibilities; organisational relationships eg line, staff, committee, centralised, decentralised

*Management by objectives (MBO):* manager's job analysed to identify key areas where results are needed; advantages and disadvantages of MBO, eg planning failures, lack of commitment, resistance to change, attitudes and characteristics influencing volunteers

*Organising tasks:* principles of structure; lines of authority; responsibility; span of control; unity of objective; delegation; types of structure (formal/informal)

*Legislation:* key requirements; equal opportunities policies and practices; health and safety and risk assessments; police and criminal record checks; employment rights; benefit rules and working; employee versus volunteer eg employment rights, organisation responsibilities, insurance, health and safety in practice

### 2 Understand the role of communication and leadership in the effectiveness of volunteer and other work groups

*Supervising and communicating:* communicating; organising; motivating (Maslow's theory of hierarchical needs/Herzberg's Two Factor Theory); ways of motivating staff; leading; control; purpose of communicating; principles of good communication; communicating effectively; communication channels (formal/informal, team briefings)

*Volunteer support:* elements of good support; time-saving strategies; interface between paid and unpaid staff

*Leadership style and theories:* action-centred; autocratic; democratic; independence of subordinates; exploitative; benevolent; consultative or participative; personality traits; situational and contingency approaches to leadership

*Conflict resolution:* policies to ameliorate problems; problem-solving techniques; causes of conflict and disputes; disciplinary procedures and dismissals

### 3 Understand strategies employed in decision making

*Organisational decision making:* different theories (classical, behavioural and satisfying); steps in the decision-making process – statement of aims, examination of resources, alternatives, evaluation of alternatives, selecting the best action, implementation; decision analysis techniques

### 4 Understand factors related to volunteer and other work group motivation

*Motivation:* motives and the goals of human behaviour; mental process of human decision making; social processes and influences on motivation; behaviour modification; socialisation; personality types and traits

*Group work:* formal and informal groups; understanding group dynamics; task-oriented volunteer groups; increasing team spirit; coping with difficult group members

*Social control and group effectiveness:* group effects on individual perceptions; group effects on attitudes and behaviour; conformity; effectiveness, productivity and satisfaction; risk-taking; group cohesion

## Learning outcomes and assessment criteria

<p>Learning outcomes</p> <p><b>On successful completion of this unit a learner will:</b></p>	<p>Assessment criteria for pass</p> <p><b>The learner can:</b></p>
<p>LO1</p> <p>Understand the importance of planning and organisation for effective work project management</p>	<p>1.1 explain how planning processes and systems are agents of effective organisational management</p> <p>1.2 evaluate the appropriateness of different organisational structures</p> <p>1.3 assess strategies for evaluating projects and project requirements</p> <p>1.4 analyse the advantages and disadvantages of Management by Objectives</p>
<p>LO2</p> <p>Understand the role of communication and leadership in the effectiveness of volunteer and other work groups</p>	<p>2.1 analyse the principles of good communication</p> <p>2.2 explain the importance of effective volunteer support strategies</p> <p>2.3 summarise the different styles of effective leadership</p> <p>2.4 examine appropriate problem-solving techniques</p> <p>2.5 summarise disciplinary and dismissal procedures</p> <p>2.6 evaluate work-based conflict resolution strategies</p>
<p>LO3</p> <p>Understand strategies employed in decision making</p>	<p>3.1 examine contemporary theoretical profiles of organisational decision making</p> <p>3.2 explain the steps in problem-solving analysis and decision making</p>
<p>LO4</p> <p>Understand factors related to volunteer and other work group motivation</p>	<p>4.1 examine human motivational goals</p> <p>4.2 analyse group dynamics and strategies for increasing volunteer group-effectiveness</p> <p>4.3 analyse the effectiveness of supervisory strategies for controlling conflict within, and positively influencing, volunteer groups</p>

## Guidance

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### Essential requirements

Access to relevant literature and the internet is essential. A range of field visits will be required to endorse theoretical learning. Tutors should have good knowledge and practical experience of managing volunteers.

### Employer engagement and vocational contexts

Delivery of this unit would be enhanced through employer engagement involving, for example, local conservation organisations. Learners could act as volunteers on local conservation tasks with each learner acting as task leader.

Learners would benefit from investigating a range of work group opportunities. A selection of guest speakers would also be useful. Learners should also be encouraged to become active volunteers within their own time.



## Unit 23: Urban Habitat Management

Unit code: L/503/1576

Level: 5

Credit value: 15

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- Aim

This unit aims to give learners an understanding of the ecology of habitats within an urban setting. Learners will research the principles employed in the management of a range of urban habitats and develop related practical skills.

- Unit abstract

This unit will help learners to develop the understanding, skills and techniques needed in the management of urban habitats. The unit looks at the importance of ecological surveying, human influence and the restoration and improvement of a range of urban habitat types. The unit is designed for learners working towards a career in wildlife management and conservation, with specific relevance to management practices employed by urban local authorities, wildlife trusts and nature reserve managers.

- Learning outcomes

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

- 1 Be able to manage the assessment of a range of urban habitats
- 2 Understand the ecology of urban habitats
- 3 Understand management practices and opportunities for the restoration of urban habitats
- 4 Understand the ecological management of a case-study site.

## Unit content

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### 1 Be able to manage the assessment of a range of urban habitats

*Ecological surveys – flora:* line and belt transects; pavement plant surveys; mapping tree cover; lichen surveys; road verge surveys; vegetation regeneration/succession

*Ecological surveys – fauna:* bird surveys (following BTO guidelines); small mammal surveys (including tracks and signs); amphibian and reptile surveys; terrestrial invertebrates – butterfly transect walks, freshwater invertebrates (kick-sampling technique)

*Wildlife value:* value of urban habitats to wildlife eg golf courses, urban parkland, allotments, woods, playing fields, gardens, grass verges, churchyards, cemeteries, railway banks, walls, houses, historic buildings, sewage treatment works, gravel pits, canals, streams, ponds, lakes, reservoirs, docklands, estuarine industrial sites, refuse tips, wasteland/derelict ground, industrial sites, caravan parks, retail parks

### 2 Understand the ecology of urban habitats

*Abiotic factors:* pH; humidity; temperature; solar gain; pollution levels (sulphur dioxide, nitric oxide, nitrogen dioxide, VOC's, particulates); day length (street lighting); insecticide use; aspect; slope; habitat management; soil contamination

*Biotic factors:* dispersal; migration; regeneration; leaf function (enzyme activity); plant-herbivore interactions; rate of photosynthesis; bio-indicators; pest/host relationships; indigenous and non-indigenous species; symbiotic relationships (fungi/trees); levels of connectivity

*Human influences:* air/water pollution; habitat fragmentation; litter, fly-tipping; translocation of species; development; recreation; vandalism; noise; pesticide/herbicide application; community activities; species monitoring

### 3 Understand management practices and opportunities for the restoration of urban habitats

*Management practices:* alien species removal; tree planting; boundary maintenance; wildlife gardening; enhance biodiversity; shelter-belt creation; green infrastructure; landscape scale; monitoring; reduction of disturbance; buffer zones; ecotones; corridors; connectivity; dispersal

*Restoration/improvement:* planting native seed mixes; pond reclamation; soil and nutrient distribution; reduction of compaction; encourage natural regeneration; nesting-site creation (birds, mammals, amphibians/reptiles and invertebrates); pollution-tolerant species planting; symbiotic relationships (nitrogen-fixing bacteria); macronutrients (nitrogen, phosphorous, potassium); soil organisms

#### 4 Understand the ecological management of a case study site

*Ecology:* human population pressure; community structure; population dynamics; species diversity; alien species pressure; food supply; competition (interspecific, intraspecific); species/area relationships; fragmentation; succession; abundance and distribution; adaptation; rarity

*Management:* aims and objectives; purpose, implementation and review of management techniques

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to manage the assessment of a range of urban habitats	1.1 plan assessment of a range of urban habitats  1.2 manage a safe and appropriate investigation of key urban flora and fauna  1.3 manage appropriate assessment of different urban habitats  1.4 evaluate the wildlife value of a range of urban habitats
LO2  Understand the ecology of urban habitats	2.1 review abiotic factors that will influence the ecology of urban habitats  2.2 assess the influence of biotic factors in the development of ecosystems  2.3 evaluate how human activities have affected and influenced ecosystems within an urban setting
LO3  Understand management practices and opportunities for the restoration of urban habitats	3.1 explain principles of urban habitat management drawing on relevant case studies  3.2 examine strategies available for restoration and improvement of urban habitats
LO4  Understand the ecological management of a case-study site	4.1 evaluate the ecological management aims and objectives of the case-study site  4.2 evaluate the effectiveness of management techniques for a given site  4.3 recommend appropriate modifications to existing management techniques to incorporate new proposals for a given site

## Guidance

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### Links

This unit links with other units in the programme for example *Unit 3: Principles of Ecology*, *Unit 9: Land Use Issues and Regulation*, *Unit 12: Farmland Habitat Management*, *Unit 18: Habitat Management*, *Unit 19: Habitat Restoration and Repair* and *Unit 31: Biological Survey Techniques*.

This unit will reinforce the application of health and safety, flora and fauna surveys, habitat management practice and social and cultural issues. Links could be made with the Institute of Ecology and Environmental Management (IEEM), Natural England and The Wildlife Trusts.

### Essential requirements

Examples given to learners must always be in the context of the urban wildlife and conservation sector. Examples must be of different types of urban habitat and their management to reflect the current practice in the urban landscape.

Learners must be encouraged to become familiar with biodiversity action plans for the relevant local authority in their area. A local urban nature reserve or green space can be used as a case study, and monitoring/survey visits carried out.

### Employer engagement and vocational contexts

External speakers from local authorities, ecological consultancies and local wildlife trusts could contribute to discussions on current urban habitat management practice.

Case studies at local nature reserves should be carried out, and monitoring/surveying could be undertaken (with possible links to projects currently attracting funding).



## Unit 24: Landscape Assessment and Management

Unit code: R/503/1577

Level: 5

Credit value: 15

### ● Aim

This unit aims to give learners an understanding of the practical management of diverse landscapes. It considers the practical options available to countryside managers to manage and conserve the value of different landscapes.

### ● Unit abstract

Europe, especially Britain, has one of the most varied set of landscapes to be found anywhere in the world. The strong sense of place which people derive from these landscapes is one of the countryside's most valued assets.

Learners wishing to work in the countryside must be able to analyse the different elements of a landscape in order to be able to recommend ways in which this 'sense of place' can be conserved and enhanced.

This unit provides an introduction to landscape assessment and management for those learners addressing the subject for the first time, offering both theoretical and practical experience.

### ● Learning outcomes

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

- 1 Understand elements that give a landscape its character
- 2 Be able to create a plan to conserve the character of a landscape
- 3 Understand how to supervise contractors and/or a direct labour force undertaking landscape management tasks
- 4 Be able to design new landscape features on 'derelict sites'.

## Unit content

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### 1 Understand elements that give a landscape its character

*Surveys:* geological, geomorphological, archaeological and historical features (especially hedges); vegetation (including indicator species); wildlife (especially significant local species); land use; contemporary man-made features (such as buildings, field boundaries, roads and other communications)

*Cultural values:* landscapes that have figured in the arts eg 'Constable country', 'Wuthering Heights', features that have attracted mythology and folklore, eg the 'Major oak'

*Landscape description:* objective and subjective landscape description writing; landscape character descriptions created by the Countryside Agency

### 2 Be able to create a plan to conserve the character of a landscape

*Legal surveys and other restrictions:* easements; rights of way; wayleaves; covenants; protected areas (national parks, Areas of Outstanding Natural Beauty (AONBs)); Sites of Special Scientific Interest (SSSIs); Environmentally Sensitive Area (ESAs); Stewardship Scheme etc); European Protected Species (EPSs)

*Management plan:* management objectives; management prescriptions; preparing work programmes (including costings and estimating labour requirements); monitoring; grants and other financial support

### 3 Understand how to supervise contractors and/or a direct labour force undertaking landscape management tasks

*Labour force:* volunteers; Direct Labour Organisations (DLOs); government employment schemes eg Countryside Task Force, contractors, leadership of volunteers, health and safety

*Contracts:* Compulsory Competitive Tendering (CCT); customer/contractor relationships; specifications; penalty clauses; time clauses; monitoring procedures; the bidding process

### 4 Be able to design new landscape features on 'derelict sites'

*Historical landscape design:* knot gardens, Le Notre; the English landscape movement; Forestry Commission guidelines; native tree/shrub species; historical management practices

*Tree-planting schemes:* site preparation, planting practices, weed control, thinning and pruning, tree protection systems, soils and other physical constraints on the scheme

*Other landscaping schemes:* pond creation; herb-rich grasslands; heathlands; scent and touch gardens; garden festivals

*'Derelict' sites:* eg coal slag heaps, china clay workings, gravel pits, stone quarries, urban sites (including community parks, green spaces); Groundwork Trusts; litter clearance; anti-vandalism strategies

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1 Understand elements that give a landscape its character	1.1 examine the geomorphological and cultural character of a given landscape 1.2 assess historical features in terms of their significance to the development of a given landscape
LO2 Be able to create a plan to conserve the character of a landscape	2.1 undertake biodiversity baseline, historical and legal surveying for a given area 2.2 develop appropriate management objectives for an agreed context 2.3 produce valid management prescriptions 2.4 plan comprehensive landscape management works, costs and actions
LO3 Understand how to supervise contractors and/or a direct labour force undertaking landscape management tasks	3.1 explain how a contractor's progress should be managed 3.2 discuss the management of labour abilities and limitations
LO4 Be able to design new landscape features on 'derelict sites'	4.1 prepare planting recommendations taking into consideration physical and management constraints 4.2 design habitats of value to the landscape and wildlife 4.3 explain how to reclaim derelict sites

## Guidance

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### Links

This unit links with many of the other units in this qualification particularly *Unit 18: Habitat Management*, *Unit 28: Further Habitat Management* and *Unit 29: Landscape History and Development*.

### Essential requirements

In addition to site visits, centres must use a range of good quality audio-visual materials to illustrate the topics covered and ensure full coverage of different landscape types. In areas of the country where urban or industrial dereliction is widespread, taking the opportunity to develop familiarity with derelict land improvement schemes will enable learners to gain work-related experience of the topic.

### Employer engagement and vocational contexts

The delivery of this unit could be enhanced by employer engagement involving local organisations, for example the Countryside Agency. Learners could meet with employers from the industry to learn about current issues and trends in the sector. Sustained links with the groups may support further units as well as work placement opportunities. A talk by a representative of Natural England would help learners understand how the environmental sector responds to change.

## Unit 25: Fish, Game and Wildlife Management

Unit code: Y/503/1578

Level: 4

Credit value: 15

- **Aim**

This unit will develop learners understanding of the range of wildlife resources that are managed and exploited in Britain and the systems and dominant practices used. Learners will develop their understanding of wildlife resource management and plan the management of fish, game and wildlife to meet animal welfare and objectives.

- **Unit abstract**

In this unit learners will develop an understanding of the ecology of species that are managed for exploitation, primarily as sporting quarry and wild food produce. They will research the commercial exploitation of these wild animal species and plan for their long-term management. Learners will investigate harvesting strategies with respect to population dynamics and sustainable yields. The unit will enable learners to consider the economics and ethics of wildlife management and exploitation.

Learners will also develop the skills required to plan wildlife management within the present economic and legislative frameworks and discuss these plans, in a knowledgeable manner, with practitioners in the field.

- **Learning outcomes**

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

- 1 Understand the management of exploited wildlife species
- 2 Understand the ecology of exploited wildlife species
- 3 Be able to plan the management of a fish, game or wildlife resource
- 4 Understand harvesting strategies for the long-term economic exploitation of a species.

## Unit content

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### 1 Understand the management of exploited wildlife species

*Exploited and managed species:* game and coarse fish; wild and released gamebirds; wildfowl; deer; pest and predator species eg grey squirrels, foxes, rabbits, rodents, corvids, raptors, mustelids

*Habitat requirements:* requirements for breeding and reproduction; shelter and feeding at different stages of life cycle

*Economic potential:* direct income; by-products; indirect income; market analysis; potential scale of damage caused by pest and predator species

### 2 Understand the ecology of exploited wildlife species

*Autecology:* population dynamics; census techniques; stock assessment methods; feeding behaviour; breeding behaviour; territoriality; habitat requirements; impact of disease, parasites and predators

### 3 Be able to plan the management of a fish, game or wildlife resource

*Management:* breeding; rearing; culling; control of predation; habitat management, habitat creation; stocking densities; timespans; legal requirements; codes of practice; welfare issues; management objectives; marketing of product/service and any by-product; income and expenditure associated with management

### 4 Understand harvesting strategies for the long-term economic exploitation of a species

*Harvesting strategies:* times of year; selection of stock; gaining a good return from the harvest; culling methods; relevant legislation eg The Wildlife and Countryside Act 1981, Firearms Act, The Wild Game Meat (Hygiene and Inspection) Regulations 1995, Animal Welfare Act 2006, Deer Act 1991, Salmon and Freshwater Fisheries Act 1975; codes of practice; health and safety; animal welfare; computer software; modelling methods

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand the management of exploited wildlife species	1.1 evaluate the management of exploited wildlife species habitats  1.2 explain the economic potential of exploited wildlife species  1.3 examine how other species can affect the productivity of given exploited wildlife species
LO2  Understand the ecology of exploited wildlife species	2.1 explain times of year for breeding, rearing and/or culling wildlife species  2.2 discuss hygiene requirements and ailments of each species  2.3 examine habitat requirements of a chosen species  2.4 evaluate methods of census and cull ratio
LO3  Be able to plan the management of a fish, game or wildlife resource	3.1 plan breeding and rearing relevant to a chosen species  3.2 explain the legal requirements for management of the chosen species  3.3 assess habitat requirements for the chosen species
LO4  Understand harvesting strategies for the long-term economic exploitation of a species	4.1 explain the concept of maximum sustainable yield in relation to the management/exploitation of wildlife species  4.2 discuss how cull ratios have a direct effect on the population dynamics of exploited species  4.3 assess the potential market for animal products

## Guidance

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### Links

This unit introduces learners to the fish, game and wildlife management sector and therefore links with more specific units in this qualification list such as *Unit 34: Establish a Game Shooting Programme*, *Unit 35: Control Shoot Day Activities*, *Unit 36: Develop a Wild Game Management Plan for a Wildlife Management Area*, *Unit 37: Monitor and Maintain Game Management Plans*, *Unit 38: Build and Maintain Effective Customer Relations*, *Unit 39: Develop a Game Bird Production Programme*, *Unit 40: Develop a Wild Deer Management Plan* and *Unit 41: Manage Wild Deer Culls*.

### Essential requirements

Learners need access to relevant literature and web pages. Field visit sites must be used to support delivery. Tutors must have a good understanding of local fish, game and wildlife resources.

### Employer engagement and vocational contexts

Employer links could support delivery and assessment of this unit. Employers could help, for example, with the planning of programmes of learning, or provision of visits, guest speakers and mentors. They could also help in the design and facilitation of assessment activities.

Learners could, for example, meet with employers from an agent from a sporting estate and/or fishery to research the types of marketing used in the game, wildlife and fisheries sector.

Learners would benefit from visiting sporting estates and input from a range of guest speakers. Learners could be encouraged to become student members of relevant professional organisations.

## Unit 26: Rural Production Systems

Unit code: D/503/1579

Level: 4

Credit value: 15

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- Aim

This unit aims to give learners an understanding of the main plant and animal production systems in use in the countryside, issues around this and governmental influences.

- Unit abstract

This unit gives learners a broad understanding and appreciation of the commercial use of land in the UK and the issues that land producers face. The unit will allow learners to arrive at an informed judgements for use with policy-makers and relevant practitioners who affect the countryside and its future.

- Learning outcomes

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

- 1 Understand crop production systems and the factors that influence cropping decisions
- 2 Understand major livestock production systems with an emphasis on their importance in hill and marginal areas
- 3 Understand land use issues raised by forestry and the extractive industries
- 4 Understand support measures for rural production.

## Unit content

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### 1 Understand crop production systems and the factors that influence cropping decisions

*Cropping systems:* range of crops and crop production in the UK (eg cereals, forages, roots, grass, maize, oil-seeds, crops for bio-fuels); types of cropping system (eg conventional, organic, intensive, extensive); factors affecting choice of cropping system (eg soil, topography, climate, locality, husbandry and market requirements, economic)

*Factors influencing cropping decisions:* political and economic requirements (eg agri-environmental schemes, single farm payment requirements, sustainability, integrated crop/pest management-ICM/IPM, entry level, higher level, organic conversion, waste management requirements, market price, quality standards)

### 2 Understand major livestock production systems with an emphasis on their importance in hill and marginal areas

*Production systems:* range of livestock; main production systems (eg intensive, extensive, organic, marginal); importance of stratification in UK (eg breeds to suit the topography, inter dependence of producers, uniqueness to UK); factors affecting livestock production in marginal areas (eg profitability, subsidies, use of land, type of soil, recreation)

*Welfare and legislation:* animal welfare issues (codes of practice, transport of animals, waste management); effects of legislation on livestock production; health and safety

### 3 Understand land-use issues raised by forestry and the extractive industries

*Land-use issues:* types and scale of forestry; types and scale of extraction (eg mineral, organic, fossil fuel); contribution to the economy (eg profitability, employment, recreation); factors affecting extraction industries (eg planning and legislation, public concerns, pressure groups waste management post extraction); industry organisations; environmental policy issues (eg sustainability, leisure and recreation, soil management, bio diversity, waste management)

### 4 Understand support measures for rural production

*Government support measures:* historical perspective; effects of current UK and EU support measures (eg production quotas, environmental subsidies); issues facing the countryside (eg urban pressures, population trends and movements, employment, housing, climate change policies)

## Learning outcomes and assessment criteria

Learning outcomes  <b>On successful completion of this unit a learner will:</b>	Assessment criteria for pass  <b>The learner can:</b>
LO1  Understand crop production systems and the factors that influence cropping decisions	1.1 examine the nature and scale of UK crop production 1.2 examine the main arable cropping systems 1.3 discuss the limitations to cropping caused by land type and climate 1.4 assess the importance of integrated crop management in relation to sustainable development
LO2  Understand major livestock production systems with an emphasis on their importance in hill and marginal areas	2.1 examine the nature and scale of UK livestock production systems 2.2 differentiate between intensive and extensive enterprises 2.3 assess the importance of a stratified industry on the hills and uplands 2.4 evaluate the effects of animal welfare issues and legislation on livestock enterprises
LO3  Understand land use issues raised by forestry and the extractive industries	3.1 appraise the scale and importance of the extractive industries 3.2 assess the external pressures faced by extraction enterprises 3.3 evaluate post-extraction land use policies
LO4  Understand support measures for rural production	4.1 evaluate the current agricultural support programme 4.2 interpret the effects of any proposed changes on the structure of rural industries 4.3 evaluate the state of rural industries in relation to the principles of sustainable development

## Guidance

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### Links

No prior experience in any of these industries is necessarily required. The unit will link with directly-related farming and forestry units, but also with units relevant to the countryside and the environment such as *Unit 9: Land Use Issues and Regulation*, *Unit 10: Environmental Management*, *Unit 12: Farmland Habitat Management* and *Unit 21: Rural Planning and Development*.

### Essential requirements

A broad selection of enterprises and systems must be made available for learners to observe in a range of environments as possible. This will inevitably mean reliance on study tours further afield to enterprise locations that encompass lowland, hill or marginal systems of production.

### Employer engagement and vocational contexts

So that learners fully understand the context of rural production systems, they should be given some degree of work experience relating to any of the production systems under examination.

To this extent, centres should develop links with any relevant local enterprises, for example agriculture, forestry, quarry extraction companies, garden centres, tree nurseries, road and rail building companies. Learners should also experience relevant practitioners involved in both planning and formulation of policies, such as those working with the National Farmers Union (NFU), Forestry Commission, Natural England, The Environment Agency, local government officers, MPs, MEPs, the Highways Agency and other transport departments etc.

## Unit 27: Waste Management

Unit code: K/503/1102

Level: 5

Credit value: 15

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- Aim

This unit aims to develop learners' understanding of the growing problems associated with waste production and disposal in a developed society. Learners will be able to quantify and characterise different types of waste and be able to design and implement waste stream management systems in order to minimise the environmental impact of waste disposal.

- Unit abstract

Identification of methods of waste disposal that minimise environmental impact, and the effective management of this process, is essential within all land-based sectors. This unit will enable learners to develop an understanding of waste stream management and the effective use of this when looking at strategies to dispose of a range of different wastes, both hazardous and non-hazardous. Learners will also be able to recognise waste origins the effect of waste on the environment and methods minimising environmental impact and implementing a sustainable waste stream management policy.

Elements of this unit should be contextualised, where possible, to an appropriate setting relevant to the learners' workplace or chosen profession within the land-based sector.

- Learning outcomes

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

- 1 Understand waste origins and types
- 2 Understand the principles and components of an effective waste stream management policy
- 3 Understand the environmental and financial impacts of waste management
- 4 Understand how a sustainable waste stream management system can have minimal impact on the environment and maximise the profitability of a business
- 5 Be able to plan, implement and evaluate a waste management policy.

## Unit content

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### 1 Understand waste origins and types

*Types of waste:* hazardous; non-hazardous; biodegradable; non-biodegradable; recyclable

*Waste stream classification:* commercial and industrial; construction and demolition; municipal; solid, organic, hazardous, problematic

*Lifestyle:* population growth; disposable society (consumerism, waste production); environmental impact; changing consumer priorities; national and local government policies and strategies; industrial development and legacy, wealth; health hazards

*Industrial sources:* extraction; manufacturing; processing; power generation; cooling; machine and vehicle emissions; demolition; maintenance regimes

*Domestic sources:* household and garden waste; sewage

*Rural sources:* manure/slurry; silage effluent; pesticide and fertiliser run-off/drift; agrochemical containers; trading estates; abattoirs (organic wastes, carcasses); oil and sewage spills; emissions from smoky fires; land-based machinery and rural traffic

*Land:* toxic and persistent chemicals; organic and inorganic wastes eg heavy metals, asbestos, dioxins; non-toxic and biodegradable materials

*Water:* oil waste; sewage; floodwater risks; point and diffuse discharges; contamination of river silt; heavy metals; suspended and soluble contaminants; mining discharges

*Air:* smokestacks; particulates; carbon gases; acidic gases (oxides of sulphur and nitrogen, ozone, carcinogens, exhaust gases, open fires; propellants eg CFCs, noise and light pollution

### 2 Understand the principles and components of a waste stream management policy

*Waste stream management:* policy statement; policy objectives; application of policy; organisation and management.

*Waste Management Action Plan:* waste reduction; reuse; recycling; incentives

*Evaluation:* limits of waste disposal routines; principle of best practicable environmental option (BPEO)

*Responsibility:* eg European Union regulations and directives, The Commission's environmental Fifth action program 'Towards Sustainability' (OJC138 17.5.93), European Environmental Agency, directives on Air, Water, Land waste disposal, UK Waste Management Strategy, Central Government policy/legislation (EPA 1990, EA 1995), Dept. of Transport, local government, Environment Agency, Health and Safety Executive, waste disposal agencies, water companies, commercial operations

*Land:* landfill location and design; collection and transport; provision for gases and leachate; after use of sites

*Water:* non-solid and semi-solid collection and transport; sewerage infrastructure; separation of clean and grey water; treatment plants; limits of safe discharge; discharge pricing; marine disposal

*Air:* smokestacks and scrubbers; catalytic converters; lead-free petrol; clean air zones; onshore and offshore incineration plants

*Community involvement:* separation at collection sites; factory and household collections of hazardous materials; reduction/recycling/reusing

### 3 Understand the environmental and financial impacts of waste management

*Natural renewal:* geological and biological cycles, interruption and contamination

*Ecology:* persistent and cumulative contaminants, case studies, monitoring, toxicity levels, biological contamination and diseases

*Land:* industrial legacy of toxic materials, landfill and spoil contamination

*Water:* effects of discharge on marine and freshwater life (point and diffuse sources), eutrophication, acidification, indicator organisms, standards for surface and groundwater, thermal pollution

*Air:* standards, smog and photochemical smog, global warming and ozone depletion

*Health and safety:* respiratory illness, asbestosis, short- and long-term effects, safety of community and workforce in waste industry, carcinogenic effect, case studies, emergency procedures, compensation.

*Communication:* Written and verbal contracts, business and domestic waste management policies, marketing, training and induction.

*Financial:* profit, non-profit, publicity, incentives, grants, fines, marketing

### 4 Understand how a sustainable waste stream management system can minimise the impact on the environment and maximise the profitability of a business

*Sustainability:* reduction, prevention, re-use, energy recovery, disposal.

*Waste management:* conservation, natural resources, prevention of emission of CHG, protecting health, protecting ecosystems.

*Regulation:* statutory controls, international agreements, post-Rio and Kyoto developments, legislative protection of workers, waste taxation

*Enforcement:* government departments, Environment Agency, Health and Safety Executive, penalties for illegal waste disposal and unsafe practices, 'polluter pays' principle

*Repair:* land reclamation methods, use of tolerant plants and microbial techniques, marine and freshwater clean-up operations, removal and containment strategies, cost/benefit analysis of prevention and clean-up

*Reduction:* waste reduction culture at home and work, increased recycling/repairing/reusing, incentives and penalties, clean technologies, insulation and heat recycling, reedbed filtration

### 5 Be able to plan, implement and evaluate a waste management policy

*Establishment:* methods of implementation; roles and responsibilities

*Communication:* written and verbal contracts; business and domestic waste management policies; methods of communication to employees, stakeholders, customers (marketing, training and induction)

*Financial:* profit; non-profit; publicity; incentives; grants; fines; marketing

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1 Understand waste origins and types	1.1 examine the origin of different waste types 1.2 explain the classification of different waste types
LO2 Understand the principles and components of an effective waste stream management policy	2.1 examine the principles and components of an effective waste stream management policy 2.2 explain the laws, government directives and incentive schemes available relating to the management of waste 2.3 evaluate the economic and environmental constraints of waste disposal 2.4 discuss methods of disposal to land, water and air and how each can be reduced
LO3 Understand the environmental and financial impacts of waste management	3.1 assess the effects of waste materials on land, water and air systems and the short- term and long-term effects on health and safety 3.2 explain short-term and long-term financial implications for waste management 3.3 analyse communication methods used and their effectiveness
LO4 Understand how a sustainable waste stream management system can minimise the impact on the environment and maximise the profitability of a business.	4.1 analyse local and national issues likely to impact on sustainable waste management activities 4.2 examine sustainable waste management and assess how each element of this affects the profitability of a business 4.3 explain methods used to monitor waste stream management and ensure that relevant legislation and guidance are adhered to 4.4 summarise the role of legislation and persuasion and how waste control is enforced.
LO5 Be able to plan, implement and evaluate a waste management policy	5.1 establish a waste stream management policy 5.2 communicate policy to those involved with its implementation 5.3 advise stakeholders and customers on the benefits of the policy

## Guidance

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### Links

The learning outcomes associated with this unit are closely linked with *Unit 3: Principles of Ecology*, *Unit 9: Land Use Issues and Regulation*, *Unit 15: Sustainable Development*, *Unit 21: Rural Planning and Development* and *Unit 32: Environmental Law*.

### Essential requirements

Tutors must be conversant with the application of waste management in relevant settings. Learners must be given the opportunity to undertake a workplace waste management evaluation within the workplace. Ideally this would be in a setting relevant to their occupational sector, but if this is not possible, a simulation of the setting will suffice. Access to IT, internet facilities and library resources including occupational magazines is also required.

### Employer engagement and vocational contexts

The involvement of local authorities is required which will enable centres to arrange visits and guest speakers. Established contacts should be able to keep staff and learners in touch with new developments, particularly aspects of law and sustainability. Also, work placements within the students' chosen fields, should be encouraged them to undertake risk, allowing assessments within an industrial setting and giving them scope for further research and investigation.



## Unit 28: Further Habitat Management

Unit code: R/503/1580

Level: 5

Credit value: 15

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- Aim

This unit examines the approaches used to achieve sustainable management of habitats and associated species. It aims to give learners the ability to apply conservation approaches to appropriate habitats.

- Unit abstract

The purpose of this unit is to give learners the necessary tools and understanding to work with habitats of wild flora and fauna at supervisory level. The unit deals with issues surrounding habitat management, such as wild flora and fauna decline in the UK. Learners will study these issues and be able to deal with them through suitable planning.

Learners will be made aware of the resources needed to maintain, restore and conserve wildlife habitats, as well as the justification for the reasons behind the tasks and an ability to communicate with relevant personnel. The practical element of the unit gives learners the skills to plan and participate in surveys and to gather the relevant data from these surveys to satisfy relevant parties.

- Learning outcomes

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

- 1 Be able to research factors that affect the conservation value of habitats
- 2 Understand strategic habitat conservation mechanisms
- 3 Be able to propose appropriate mitigation and remedial activity to conserve valued habitat features
- 4 Be able to manage habitat strategy.

## Unit content

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### 1 Be able to research factors that affect the conservation value of habitats

*Research methods:* analysis of site; collection of data including land-use; scenic value; access; local ecosystems; environmental indicators of species flora and fauna; short-/long-term significance to the area and environment; impacts of site assessments; county records

*Conservation value of habitats:* attributes of particular biophysical environments; geological; edaphic; hydrological; flora; fauna; terrain; aspect; climate; sensitivity of assessment; assessment resistance and resilience; measurement of social and ecological variables

*Identification of natural resources:* indicators of wildlife value; biodiversity; ecological links and symbiosis with other habitats; local, regional, national and international endangerment; protected flora and fauna; SSSIs

### 2 Understand strategic habitat conservation mechanisms

*Resource capability:* susceptibility to flooding; weather damage; exposure to the physical elements; erosion; soil stability; drainage; hydrology; sheltered areas; foliage and arboreal covering; institutional constraints; selection of management procedures and protocols

*Habitat restoration and preservation:* relocation of flora and fauna; habitat destruction and recreation; impacts of habitat destruction and recreation on wildlife and vegetation; methods of preserving habitats; reasons for preserving or relocating habitats

### 3 Be able to propose appropriate mitigation and remedial activity to conserve valued habitat features

*Planning and design:* temporal and spatial zoning and restrictive techniques; impact relationships; identification of carrying capacities and visitor impacts; tolerance; activity-specific impacts; site-specific impacts; availability of construction materials and resources; logistical engineering impacts for habitat construction and development; project planning and design; personnel involved with planning and design; costs

*Conserving habitat features:* clearance of scrub; reseedling; planting; removal of plants and animals; control methods to include biological; mechanical; chemical; cultural; identification, selection and sourcing of appropriate flora and fauna

### 4 Be able to manage habitat strategy

*Detailed management plan:* desired conditions; management options; detection of deficiencies in the plan; flexibility of the plan; monitoring the plan via evaluation; reassessment; modification; following legislative requirements including community involvement; participatory planning and committees; shared responsibilities; effectiveness of existing plans against objectives and institutional directives; legal constraints such as land ownership; property rights and ownership; economic and financial implications; social considerations; community considerations

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to research factors that affect the conservation value of habitats	1.1 examine the attributes of the biophysical environment of a particular habitat  1.2 plan a suitable site survey for a given habitat  1.3 prepare baseline data for a particular habitat  1.4 determine habitat-specific environmental indicator species  1.5 assess the susceptibility of indicator species to the habitat's internal and external impacts  1.6 evaluate habitat resources worthy of protection
LO2  Understand strategic habitat conservation mechanisms	2.1 analyse the resource capabilities of a particular habitat  2.2 discuss specific conservation activities and methods appropriate to habitat preservation and restoration
LO3  Be able to propose appropriate mitigation and remedial activity to conserve valued habitat features	3.1 prescribe with justification, potential techniques for habitat maintenance, restoration and preservation
LO4  Be able to manage habitat strategy	4.1 prepare a detailed management plan for a particular habitat site  4.2 evaluate the effectiveness of an existing management plan against stated institutional objectives

## Guidance

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### Links

This unit covers further habitat management, and therefore has links to the following units:

- *Unit 3: Principles of Ecology*
- *Unit 9: Land-use Issues and Regulation*
- *Unit 15: Sustainable Development.*

### Essential requirements

Learners should have access to working areas for the practical application of the unit, without any restrictions or legal implications, such as part of the centres' own estates. Centres should have current up-to-date literature on environmental issues and wildlife habitats, and access to the internet and ICT facilities. Equipment required for field studies must include tapes, plans, maps, soil-testing kits, augers, quadrats and flora/fauna keys as well as appropriate habitat-specific survey gear (eg aquatic surveying equipment or woodland surveying equipment).

### Employer engagement and vocational contexts

Delivery of the unit would benefit from guest speakers, attendance at relevant seminars, and accompanying professionals in their field studies. Guest speakers could be written into the scheme of work and could include personnel from English Heritage, the National Trust, Royal Society for Protection of Birds (RSPB) and DEFRA.

There should also be the opportunity for learners to be involved with the generation of plans for habitat management and conservation, this could be done in conjunction with the above-mentioned or similar organisations, using their own plans as guidelines.

## Unit 29: Landscape History and Development

Unit code: Y/503/1581

Level: 5

Credit value: 15

- Aim

This unit aims to give the learner an understanding of the processes that have shaped the modern British landscape. Learners will consider factors influencing these processes, including underlying geology, climate, climatic implications for regional agricultural systems and historical and current human actions.

- Unit abstract

Landscapes seen in Britain today result from a broad variety of natural processes and human activities. Learners will study the underlying natural geological and climatic factors that influence the landforms found throughout the country.

The roles of human societies in shaping our landscapes, from prehistoric times until the present day, are considered. The features observed today that result from previous human activities, and the evidence indicating these uses, will be researched.

Learners will consider the legislation, protection measures and management techniques applicable to different landscapes. This will greatly enhance learners' application of countryside planning and management activities.

- Learning outcomes

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

- 1 Understand the investigation of past industrial and agricultural activity
- 2 Be able to investigate geological processes that have contributed to the modern landscape
- 3 Understand effects of early humans on the British landscape
- 4 Understand social trends and economic factors that have affected the British countryside.

## Unit content

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### 1 Understand the investigation of past industrial and agricultural activity

*Landscape features:* field shapes; parish boundaries; regional hedge and dry-stone wall types; strip lynchets; hammer ponds; dew ponds; pollards; coppice stools; wood banks; rides – considered as evidence of particular events or activities, which may be regional; records; maps; continuity of landscape

*Past regional land use:* agricultural enterprise; woodland management; mining/quarrying activity; transport systems; local rural skills; records; maps

*Historical evidence of landscape:* records and maps; aerial photographs; pollen analysis; place names

### 2 Be able to investigate geological processes that have contributed to the modern landscape

*Rock classes:* igneous; sedimentary; metamorphic

*Geological time scale:* eons, eras, periods and epochs; British stratigraphy

*Rock cycle and its processes:* physical and chemical eg erosion, transport, deposition; importance of weathering in different rock types

*Characteristic regional landscape:* national and regional geology; regional climatic variation

### 3 Understand effects of early humans on the British landscape

*Earlier civilisations and their land use:* Neolithic; Bronze Age; Iron Age; Romano-British; Saxon

*Archaeological evidence:* settlements; tracks; farming activity; burial structures; flint mines; artefacts

*Protection of archaeological sites:* statutory protection; English Heritage and other organisations

*Principles of conservation management:* effects of neglect; problems of cultivation; problems of desecration; stock type and density; scrub clearance; appropriate tools

**4 Understand social trends and economic factors that have affected the British countryside**

*Landscape change:* feudal system; forests; enclosures; industrial revolution; loss of woodland and wetland to agriculture; changes in emphasis on livestock and arable farming

*Post-war agricultural intensification:* increased mechanisation; use of agrochemicals; increase in arable production; loss of wildlife habitat; afforestation

*Environmental effects of urbanisation and counter-urbanisation:* eg green belt and brown-belt land; environmental impact of changes in land use

*Predicted impact of proposed government changes:* eg hunting with dogs controversy; Common Agricultural Policy (CAP) reform, changes to legislation regarding access to the countryside and coast

*Methods of assessment:* importance of using a variety of assessments; review of own performance and recommendations for improvement

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
<p>LO1</p> <p>Understand the investigation of past industrial and agricultural activity</p>	<p>1.1 explain landscape features identified indicative of past industrial or agricultural activity</p> <p>1.2 review valid sources of historical evidence</p> <p>1.3 judge the significance of historical landscape features in planning conservation management</p>
<p>LO2</p> <p>Be able to investigate geological processes that have contributed to the modern landscape</p>	<p>2.1 match periods in the geological timescale with major changes in British landform</p> <p>2.2 explain the effects of rock types and their properties on landform</p> <p>2.3 compare regional differences in British landscape in terms of geology and climate</p>
<p>LO3</p> <p>Understand effects of early humans on the British landscape</p>	<p>3.1 review the history of settlement and civilisation in Britain</p> <p>3.2 evaluate the impact of early humans on the British landscape</p> <p>3.3 summarise the principles of conservation management of archaeological sites</p>
<p>LO4</p> <p>Understand social trends and economic factors that have affected the British countryside</p>	<p>4.1 determine the causes of landscape change from the Dark Ages to the twentieth century</p> <p>4.2 discuss effects of post-war agricultural policy on the landscape</p> <p>4.3 evaluate the impacts on the landscape of modern social trends in work and leisure</p> <p>4.4 predict likely future changes in the British landscape</p>

## Guidance

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### Links

This unit has associations with several other units in the programme, in particular, *Unit 11: Environmental Systems*, *Unit 9: Land-use Issues and Regulation*, *Unit 10: Environmental Management* and *Unit 32: Environmental Law*. Understanding the concepts and issues considered in this unit will give learners a more objective and balanced view of the factors involved in landscape development and management.

### Essential requirements

Tutors must have good knowledge of the landscape history of their area in order to organise useful site visits. Ordnance Survey and geological maps of the area are essential.

A diverse library resource, and access to the internet will increase the opportunity for learner-centred research.

### Employer engagement and vocational contexts

Learners would benefit from visits to local museums, County Records Offices and businesses such as quarries and plantations. Lectures from appropriate guest speakers would enhance and contextualise the learning experience and introduce learners to a range of professionals and career opportunities available in landscape development.

Relating the unit content to the work of organisations such as The National Trust, Scottish National Heritage and The Landscape Institute will strengthen the vocational context.



## Unit 30: Biodiversity and Conservation

Unit code: D/503/1582

Level: 5

Credit value: 15

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- Aim

This unit aims to give learners an understanding of the phenomenon of biodiversity, and investigates the factors that promote and threaten it. The unit helps learners to develop an appreciation of biodiversity as a resource.

- Unit abstract

Biodiversity is a valuable resource to humanity across many industries, as well as providing aesthetic inspiration for the arts. This unit explores the mechanisms by which biotic diversity is generated and the benefits that are associated with increased biodiversity. This will allow learners to develop an appreciation of the value of biodiversity as a resource. It gives learners an understanding of the phenomenon of biodiversity and investigates the factors that promote and threaten it. Learners will research factors described as direct and indirect threats to biodiversity.

The unit gives learners a theoretical framework from which to assess the significance of local, national and international developments on the world's biodiversity. Practical measures to ensure the maintenance and enhancement of this resource for future generations will be investigated. Learners will be able to look at practical conservation schemes and make informed comments on the extent to which these schemes are able to meet their aims and objectives in terms of biodiversity.

- Learning outcomes

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

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

## Unit content

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### 1 Understand mechanisms that result in biodiversity

*Speciation:* continuous and discontinuous variation; random and induced mutation; natural selection; selection pressures; mechanisms and examples of parallel, divergent and convergent evolution

*Adaptation:* anatomical, morphological, physiological and behavioural adaptations (in plant and animal species); environmental adaptations; abiotic factors which prevail in a number of habitats and their effects in terms of promoting and inhibiting biodiversity

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

*Ethical:* including cultural, religious and political perspectives

*Aesthetic:* aesthetic value of organisms as inspiration for the arts and media; the role of 'nature' in human recreation and relaxation

*Utilitarian:* agriculture (eg development of new crops, introduction of disease resistance through breeding programmes, sustainable harvesting of natural products); medicine (eg development of pharmaceuticals through utilising novel plant physiology); industry (eg new product development); eco-tourism

*Ecological:* life-support systems; ecological cycles; environmental stability

*Values:* cost and benefits of conservation and exploitation considered in terms of relative values; contingency values and real economic values; merits and pitfalls of valuing a natural resource

### 3 Understand factors that may threaten global biodiversity

*Direct factors:* point source pollution; land-use change (eg influence of ranch fences on migrating species, effect of mining); loss of habitat through development; diversification; desertification; hunting; international species trade

*Indirect factors:* global climate change (including evidence for and against); diffuse source pollution; human population growth; development; loss of indigenous knowledge

#### 4 Understand the efficacy of practical measures to conserve biodiversity

*Measures to conserve biological diversity:* conservation and management of natural or semi-natural ecosystems; living captive collections; captive breeding and release programmes; seed banks, cryopreservation etc; role of databanks and databases in directing conservation activities

*Practical conservation schemes:* eg wetland conservation; community woodlands; local nature reserves; land reclamation sites; zoological gardens; comparisons of schemes to conserve individual species/groups of species (eg whales, pandas) and whole ecosystems (eg heathland, chalk grassland, tropical rainforest)

*Legislation and initiatives:* Acts of Parliament (eg Wildlife and Countryside Acts; Environmental Protection Act (1990)) Environmental Impact Assessments and planning procedures; EU Habitats Directive and resulting UK legislation; environmental strategies (eg This Common Inheritance; Earth Summits, Agenda 21; UK Biodiversity Action Plan; UN World Conservation Strategy); CITES; IUCN Red Data Books

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1 Understand mechanisms that result in biodiversity	1.1 discuss factors within an ecosystem that result in biodiversity 1.2 compare examples of adaptation and speciation giving rise to increased biodiversity within an ecosystem
LO2 Understand the value of biodiversity as a resource	2.1 compare ethical, aesthetic, utilitarian and ecological values of the biodiversity of given ecosystems
LO3 Understand factors that may threaten global biodiversity	3.1 examine direct and indirect threats to global biodiversity 3.2 evaluate the severity of threats to a named ecosystem's biodiversity
LO4 Understand the efficacy of practical measures to conserve biodiversity	4.1 evaluate a range of practical measures to conserve biological diversity 4.2 evaluate the extent to which a practical conservation scheme meets its aims and objectives with respect to biodiversity

## Guidance

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### Links

This unit builds on the learner's knowledge gained in core Unit 3: Principles of Ecology. It has links with the following optional units; *Unit 9: Land-use Issues and Regulation, Environmental Management, Unit 10: Farmland Habitat Management, Unit 18: Habitat Management, Unit 21: Rural Planning and Development, Unit 29: Waste Management, Unit 32: Environmental Law, Unit 28: Further Habitat Management and Unit 31: Biological Survey Techniques.*

### Essential requirements

Learners must be given access to conservation sites, with time available to assess biodiversity on site.

### Employer engagement and vocational contexts

Staff working for government conservation agencies or local/national/global animal and environmental conservation societies could be encouraged to come and talk to learners about the work that they do. Learners could spend time in areas where practical conservation schemes are in action such as country parks, nature reserves and wetlands. The assessment of the efficacy of practical conservation measures could be carried out as part of an official association with the conservation organisation and could give learners connections to potential employers.

Learners could put together case studies which involve direct contact with people who use biodiversity as a resource for their livelihood, eg artists, those involved in agriculture or the development of new products or medicines for industry. Specialists from the fields of industry where legislation applies to their activities could be brought in to help contextualise and enhance delivery of this unit.



## Unit 31: Biological Survey Techniques

Unit code: H/503/1583

Level: 4

Credit value: 15

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- Aim

The unit enables learners to formulate effective biological surveys of communities and organisms. It will provide the understanding needed to be able to design new survey techniques and conduct existing standard methodologies.

- Unit abstract

Before effective protective and management measures can be implemented, it is necessary to assess the condition of a habitat. Habitat surveys are required to monitor the effectiveness of management activities. An important skill required of a countryside manager is the ability to survey areas and interpret their results. By undertaking this unit, learners will discover how to design appropriate surveys for a wide range of purposes, and formulate assessments on wildlife populations and habitat quality. This will include how to categorise habitats into nationally recognised standards of vegetation communities.

- Learning outcomes

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

- 1 Understand the aims of biological surveys
- 2 Understand the factors that influence biological surveys
- 3 Be able to plan biological data collection based on ecological and operational principles.
- 4 Be able to determine the types and distribution of vegetation communities
- 5 Be able to determine the types and distribution of animal taxa.

## Unit content

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### 1 Understand the aims of biological surveys

*Aims:* general purpose eg provide required information on a site with minimum resources; species and site protection; production of baseline data; monitoring; data collection for educational/interpretative reasons; compliance with biodiversity action plans; comparison with similar sites

### 2 Understand the factors that influence biological surveys

*Factors:* seasonality and weather; animal behaviour patterns; resource considerations eg time, budget, human resources, technical ability of human resources, existing records; data and information collection; access to sites; legislation eg Wildlife and Countryside Act 1981, rights of way legislation; licence requirements from statutory authorities; health and safety considerations

*Survey error:* types and causes; techniques to reduce survey error eg calibration of equipment, standardisation of equipment and surveyors, clear methodologies

### 3 Be able to plan biological data collection based on ecological and operational principles

*Identified requirements:* broad overview of habitats and species; detailed species/habitat distribution; behavioural information; effect of abiotic gradients; seasonality; comparison of two or more similar sites

*Survey design:* specified objectives of survey; timescale including planning, implementation and report preparation; resource requirements eg human, financial, equipment; methodology employed and rationale; limitations to methodology; projected costs; ecological justification for methodology eg timing; legal constraints and statutory requirements; sources of additional information and advice; proposed analysis/interpretative techniques; format of survey results eg formal, informal, written, oral

### 4 Be able to determine the types and distribution of vegetation communities

*Vegetation communities:* grassland; standing water; running water; woodland; coastal habitats eg estuarine, littoral, salt marsh; boundary habitats eg hedgerows, field margins, walls; ecotones

*Established techniques:* Phase 1 Habitat Survey; National Vegetation Classification (NVC); River Corridor Survey; random quadrat survey; transects; freshwater macrophyte surveys

**5 Be able to determine the types and distribution of animal taxa**

*Animal taxa:* soil invertebrates; aquatic invertebrates; terrestrial invertebrates; fish; small mammals; birds; bats; badgers, deer; reptiles; amphibians

*Established techniques:* equipment eg Tullgren funnels, Baermann funnels, plankton nets, drift nets, pooters, beating trays, light traps, pitfall traps, sticky traps, water traps, malaise traps, baited funnel traps, electrofishing tools, Longworth traps, bat detectors, radio-tracking devices; methods eg sweep sampling; kick sampling, walking transects, Common Bird Census, deer census, mark-release-recapture, removal sampling; measures eg Simpson's Diversity Index, Lincoln Index, abundance scales

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1 Understand the aims of biological surveys	1.1 explain the need for biological surveying of sites
LO2 Understand the factors that influence biological surveys	2.1 examine the factors that affect biological surveys 2.2 discuss methods of minimising survey error in biological surveys
LO3 Be able to plan biological data collection based on ecological and operational principles	3.1 identify requirements of a selected site to be surveyed 3.2 produce relevant survey design proposals suitable for tender for a professional survey contract
LO4 Be able to determine the types and distribution of vegetation communities	4.1 explain the application of a range of established vegetation survey techniques 4.2 use selected survey techniques appropriately
LO5 Be able to determine the types and distribution of animal taxa	5.1 explain the application of a range of established animal taxa survey techniques 5.2 carry out an appropriate selection of established survey techniques

## Guidance

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### Links

This unit is closely linked with *Unit 3: Principles of Ecology* and can be used to prepare learners in skills required to complete *Unit 1: Research Project*. The content also provides underpinning knowledge for *Unit 18: Habitat Management*, *Unit 19: Habitat Restoration and Repair*, *Unit 23: Urban Habitat Management*, *Unit 37: Monitor and Maintain Game Management Plans*.

### Essential requirements

This is a largely practical unit and learners will need access to biological surveying equipment as outlined in the unit content. Learners will also need access to a variety of sites to enable them to practise their biological surveying skills. Current textbooks that cover standard biological surveying techniques are required.

### Employer engagement and vocational contexts

It is advised that learners develop links with local wildlife trusts, many of which employ wildlife recorders who carry out surveys on a regular basis, as well as provide useful training. Learners could volunteer with their local trusts and obtain valuable industry-related experience of biological surveying, as well as improving their wildlife identification skills. The RSPB organises regular bird surveys, while local groups affiliated to butterfly conservation often carry out regular, systematic butterfly transect surveys on a variety of sites.

Further enhancements could be provided by a guest speaker from Natural England or through a site visit to their local office to meet the ecologists who monitor protected sites. Alternatively, a visit could be made to one of the regional offices of the National Trust to observe their site-monitoring procedures.



## Unit 32: Environmental Law

Unit code: K/503/1584

Level: 5

Credit value: 15

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- Aim

This unit aims to give the learner an understanding of the history, development and application of environmental law. It develops this understanding using the theme of sustainable development and how governments can address the issue through the legislative and regulatory processes.

- Unit abstract

Environmental protection and wildlife conservation would not be possible without a well structured legislative framework. Environmental laws are required to ensure that natural resources are protected. This unit covers the key areas of legislation that have given rise to important regulations controlling pollution, protecting areas of landscape beauty and biodiversity value, and the creation of a comprehensive network of rights of way.

On completing this unit, learners will have a good understanding of laws underpinning environmental protection and their practical application in the workplace.

- Learning outcomes

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

- 1 Understand the importance of environmental law
- 2 Understand the principles and practice of pollution control
- 3 Understand issues involved in the management of wastes
- 4 Understand the processes and policies used in the conservation of nature.

## Unit content

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### 1 Understand the importance of environmental law

*Legal and environmental definitions:* environment (see EPA 1990); pollution (see EU directive on Integrated Pollution Prevention and Control); harm (see EPA 1990)

*The history and development of environmental regulation in the UK:* a brief overview of the social conditions that led to legislation; early legislation and influences eg Alkali Act 1863, the Beaver Committee, early acts for air quality; an overview of the trends prior to and after Britain joined the EU (1972)

*The principles of environmental legislation:* sustainable development; the 'preventive' principle; the 'polluter pays' principle; the 'precautionary' principle

*Sources of environmental legislation:* framework legislation; statutory instruments; bye-laws; common law eg public and private nuisance; codes of practice and policy guidance notes

*Regulatory bodies and government departments:* eg Department of the Environment, Department for Environment Food and Rural Affairs (Defra), Environment Agency, local authorities

*European Community law:* institutions; the legal basis for environmental protection legislation eg Article 130s, 100a; regulatory techniques; the effect of UK law; future trends in EU legislation

### 2 Understand the principles and practice of pollution control

*Air and water pollution:* definitions; types of control; the statutory regime; defences; recovery of clean-up costs; common law rights; EU water legislation

*IPPC:* the nature of Integrated Pollution Prevention and Control (IPPC); implementation; enforcement agencies

*The Environmental Protection Act 1990:* prescribed and non-prescribed substances; control of release of substances; BATNEEC; BPEO; authorisations

*Contaminated land:* legal definitions and historical precedents; legal control including reference to 'Rylands v Fletcher' and the uncertainty of common law; the Environment Act 1995 and its consequences; the duties of local authorities; liability issues; remediation issues/techniques; environmental issues

*Effects on UK businesses:* historic trends; measures of environmental performance

### 3 Understand issues involved in the management of wastes

*Waste management policy:* methods of waste disposal; management options eg the 'waste hierarchy'; minimisation options; recycling techniques; EU approach and influence on domestic legislation

*The UK approach to waste management:* regulatory bodies; statutory definitions of waste, controlled waste and special waste

*The mechanics of the waste management regime:* offences and meanings of the terms; licences and their conditions; public registers

*Statutory Duty of Care:* definitions and relevant legislation

*Waste recycling and the Packaging Waste Regulations:* economic instruments; current legislation; enforcement

### 4 Understand the processes and policies used in the conservation of nature

*Nature conservation bodies:* the roles of Natural England, Scottish Natural Heritage, Countryside Council for Wales and other quasi-government and voluntary bodies

*Legislation:* historical background and development of countryside legislation in the United Kingdom; key legislation eg National Parks and Access to the Countryside Act 1949, The Countryside Act 1968, Wildlife and Countryside Act 1981, Countryside and Rights of Way Act 2000, Marine and Coastal Access Act 2009; UK site designations and their effectiveness

*Nature conservation law in the EU:* rationale and approach; Special Protection Areas; Special Areas of Conservation; EU directives related to the protection of wildlife

*International nature conservation:* review of the conventions that affect individual habitats and species

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand the importance of environmental law	1.1 explain the history and development of environmental law in the UK and Europe  1.2 discuss the sources of environmental regulation and the role of the regulatory bodies  1.3 define the principles on which environmental law is founded  1.4 assess the likely future direction of environment law in the EU from current trends
LO2  Understand the principles and practice of pollution control	2.1 explain the roles of the enforcement agencies in pollution control, including IPPC  2.2 examine the environmental and legal issues associated with contaminated land  2.3 explain the legal issues relating to pollution of water and air  2.4 assess the contribution of environmental legislation to the improvement of environmental performance of businesses in the UK
LO3  Understand issues involved in the management of wastes	3.1 discuss the legal definitions of waste  3.2 explain the regulatory approaches that are adopted in the EU  3.3 explain approaches to waste management in the UK  3.4 examine the waste management options available including recycling and reuse
LO4  Understand the processes and policies used in the conservation of nature	4.1 examine the background to nature conservation legislation in the UK  4.2 evaluate the effectiveness of wildlife, habitat and landscape conservation in the UK  4.3 explain approaches to nature conservation in the EU  4.4 summarise the conventions relating to international nature conservation

## Guidance

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### Links

This unit links with *Unit 18: Habitat Management*, *Unit 19: Habitat Restoration and Repair* and *Unit 21: Rural Planning and Development*, as it provides underpinning knowledge of the legislative framework that governs the management of habitats in the United Kingdom. It also links closely with *Unit 15: Sustainable Development*.

### Essential requirements

Learners will need current textbooks on environmental law, as well as access to electronic sources of information, including journals. Subscription to a legal database is essential for access to the full text of important court decisions.

### Employer engagement and vocational contexts

Learners would benefit from visits to a waste recovery unit or landfill site to see current waste management techniques. Visits to a water supplier and sewage treatment plant would enable learners to see how legislation is implemented.

Guest speakers could include an inspector from the Environment Agency or an air pollution officer from a local authority.



## Unit 33: Environmental Education and Interpretation

Unit code: M/503/1585

Level: 5

Credit value: 15

- Aim

This unit provides the learner with a coherent understanding of the methods for providing environmental education for all sectors of society. The historical aspects of environmental education will be linked to local and wider global awareness and be related to environmental good practice and sustainability.

- Unit abstract

This unit provides the learner with a coherent understanding of the methods for providing environmental education for all sectors of society. Environmental activities suitable for implementation in schools, colleges and the community will be linked to interpretation techniques to provide a wide range of strategies for use in countryside management.

The historical aspects of environmental education will be linked to local and wider global awareness and be related to environmental good practice and sustainability.

Learners will be encouraged to communicate environmental information using a range of practical and theoretical approaches. Organisational skills, teaching methods and the implementation of safe working strategies will lead to developing leadership and teamwork skills for successfully organising programmes for educational activities.

- Learning outcomes

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

- 1 Understand the development of environmental education
- 2 Understand environmental teaching and learning opportunities
- 3 Be able to plan and evaluate environmental activities
- 4 Understand the use of interpretative media in environmental education.

## Unit content

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### 1 Understand the development of environmental education

*History of environmental education:* development of environmental awareness and education relating to important issues and their implementation at national and local levels eg the Rio Summit, Agenda 21 and the concept of sustainability

*School environmental education:* the introduction, development and links with the National Curriculum at primary and secondary levels in Britain; links to education in other countries; current global awareness; internet education links

*Further and higher education provision:* specialised studies (eg scientific, social and outdoor education); careers in environmental education and interpretation in the public and private sector

### 2 Understand environmental teaching and learning opportunities

*Outdoor education opportunities:* school grounds, habitat-based visits (eg woodland sites, farmland, wetland, coastal, grassland, urban); short visits, field trips and study tours, residential courses, scientific and other curriculum-based studies, social-based studies linked to direct appreciation and environmental awareness (eg environmental 'games'); individual and group-based studies and surveys

*Environmental awareness activities:* studies linked to environmental problems (eg 'acid rain', deforestation, energy use, changes in agriculture land use, pollution, population changes, transport, other social issues)

*Conservation and practical work:* environmental organisations and their activities; group work; surveys; wildlife trusts, societies, community projects; creation, management and reclamation work at rural and urban sites

### 3 Be able to plan and evaluate environmental activities

*Legislation for environmental education:* safety and legal guidelines (eg for local authorities, independent education centres, voluntary organisations); codes of conduct, names and contact requirements; authorisation for activities; insurance; in-service and leadership training; first-aid requirements

*Risk assessments:* site assessments; equipment safety and use; weather conditions; personal details and medical problems; specific risks (eg Weil's disease, Lyme's disease)

*Activity planning:* aims; objectives; timing of events; clothing; food; transport; routes; equipment; group organisation and management; teamwork within organisations and developing good working relationships with visitors; volunteers and others; information provision for events; courses and other activities; case studies and hypothetical programme planning; evaluation; records and modification for future events

#### 4 Understand the use of interpretative media in environmental education

*The principles and background of interpretation:* interpretative design and the development of its use in Britain; historical use and the modern media, museums, visitor centres, country parks, rural and urban opportunities

*Interpretative media:* to include themed activities, guided walks, interpretative panels, leaflets, posters, videos, computer-interactive media, sensory walks, simulations, 'living history' events and exhibitions

*Evaluation of interpretation techniques in environmental education:* critical appraisal and use of media to enhance education at events and site locations; case studies; visits; project work

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand the development of environmental education	1.1 discuss events contributing to the development of environmental education  1.2 examine contributions of environmental education to the curriculum at primary and secondary levels  1.3 explain the range of environmental studies used in the education system  1.4 compare environmental educational career opportunities in the public and private sectors
LO2  Understand environmental teaching and learning opportunities	2.1 critically evaluate the study habitats available for environmental education  2.2 justify appropriate teaching and learning activities for school grounds  2.3 explain activities linked to enhancing environmental awareness of local and global issues  2.4 evaluate the educational activities of key environmental organisations
LO3  Be able to plan and evaluate environmental activities	3.1 summarise the legal and safety aspects of planning environmental education activities  3.2 assess the risks of an environmental activity in detail  3.3 propose a comprehensive action plan for an environmental event or visit  3.4 evaluate the success of an environmental activity suggesting modifications for future use
LO4  Understand the use of interpretative media in environmental education	4.1 examine past and current use of interpretative media in environmental educational  4.2 evaluate the use of various interpretive media in a land-based sector  4.3 critically appraise an environmental education case study or site visit

## Guidance

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### Links

This unit links with application of other *Habitat* and *Ecology* units and other units such as *Unit 20: Countryside Recreation and Visitor Management* and *Unit 22: Working with Groups in Land-based Industries*.

*Unit 15: Sustainable Development* is very closely linked to this unit, especially with the appreciation in schools of the links to Agenda 21 and energy use in current society.

### Essential requirements

Learners need to have access to a well-resourced library, the internet and ICT facilities for interpretation development. Other resources could include the use of cameras, videos and other media.

### Employer engagement and vocational contexts

Learners could be given the opportunity to work with local schools, visitor groups and others, through visits to school sites and/or other educational centres/sites. Visiting speakers with current experience of education and/or community-based work would help learners to understand current issues.



## Unit 34: Establish a Game Shooting Programme

Unit code: T/503/1586

Level: 4

Credit value: 15

- Aim

This unit aims to develop learners' understanding and practical management of game shooting through the development of appropriate programme establishment techniques.

- Unit abstract

Those employed in shoot management must have knowledge and understanding of the organisational requirements for the establishment of a productive and sustainable shooting programme.

This unit gives learners the skills and knowledge they need to identify a range of essential shoot management tasks. Learners will explore the administrative requirements of a shooting enterprise and consider the physical resource requirements. They will gain an understanding of shoot management issues and the importance of habitat management and clear communication in relation to it. On completion of the unit, learners will have a broad understanding of shoot management programmes.

- Learning outcomes

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

- 1 Be able to comply with health and safety and legislation on a game shooting programme
- 2 Be able to establish a game shooting programme
- 3 Know how to establish a game shooting programme
- 4 Understand the legal requirements of a game shooting programme
- 5 Understand the main features of a game shooting programme.

## Unit content

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### 1 Be able to comply with health and safety and legislation on a game shooting programme

*Health and safety policies:* risk assessments; human influence; landowners, general public; Personal Protective Equipment (PPE); current first aid certificates; hygiene: dealing with shot game, game dealers, storage, transport, sorting for human consumption; contingency planning: factors that may disrupt a game shoot eg forestry operations, farming, changes in weather conditions that effect game movement, presence of anti-shooting campaigners

### 2 Be able to establish a game shooting programme

*Shooting operations:* number of guns which can be catered for, size of bag possible, specific quarry species to be shot, resources and facilities available to prospective clients; potential detrimental factors to a shooting enterprise eg farming, forestry, access and recreation; game bird release programme: objectives, targets, timing, resources, facilities, procedures; estate features; game requirements: habitat, feed, water, welfare; Control: monitoring records; causes and management of disruptive factors: environmental conditions, pests, predators, disease, human interruption

### 3 Know how to establish a game shooting programme

*Shooting programme:* rental agreements for land, woodland and shooting rights; game management: numbers, estimation of number of reared and released game; data-analysis techniques; finances: costs (shooting rights, rental contract prices, price establishing and managing game, cover crops, feed costs, fuel); income: sale of let days, syndicate agreements, sale of shot game, cash flow, budget preparation; implications of disease for the enterprise; transportation requirements

*Management plans:* development of targets and ideas, short-/long-term shooting potential

*Participants:* expectations of clients; beaters, pickers-up, dogs

*Procedures:* detecting injured game, humane dispatch; Presentation of shot game, storage and sale of game

*Communication:* other land users (before and during shoot days), effective methods of communication, giving instructions

**4 Understand the legal requirements of a game shooting programme**

*Restrictions:* legislative process in the UK,; common law, statutory law; current relevant legislation eg Wildlife and Countryside Act 1981 including updates and amendments, Game Act 1831, Game Licences Act 1860, Hunting Act 2004, Wild Game Meat (Hygiene and Inspection) Regulations 1995, Firearms Act 1982, Criminal Justice and Public Order Act 1994, Animal Welfare Act 2006

*General licence:* control of pest species, applications to game management, countryside protection, access and trespass, wildlife protection

*Codes of practice:* relating to good management of game in the UK eg Code of Good Shooting Practice, Fox Snaring, Trapping Pest Birds, Trapping Pest Mammals, Respect for Quarry, Code of Good Game Rearing Practice

*Record keeping and documentation:* key performance indicators; insurance cover available for shooting and estate activities

**5 Understand the main features of a game shooting programme**

*Characteristic of ground:* topography, game populations, other estate activities, public access and rights of way

*Habitat management:* creation and management of habitats that are attractive and beneficial to game eg set-a-side, beetle banks, field margins, woodland rides, ride clearance, coppicing; retention and management of semi-natural habitats in upland and lowland areas

*Likely future influences:* changes in Agri-environment Schemes, changes in land ownership, people's perceptions

*Species:* impact on other species eg control of pest and predator species, grouse moor management, benefits of cover crops for farm birds; introduction of non-native species eg American mink or the reintroduction of once native species eg wild boar, beaver, wolf, lynx; ecological detriments

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to comply with health and safety and legislation on a game shooting programme	1.1 assess risks for the safe implementation of a shooting programme  1.2 ensure planned shoot programme takes into account other estate activities  1.3 ensure planned shoot programme complies with legislation, codes of practice and additional requirements  1.4 organise contingency planning to deal with factors that may disrupt a shoot
LO2  Be able to establish a game shooting programme	2.1 establish realistic objectives for the shooting programme  2.2 oversee the attainment of necessary resources to implement the shooting programme  2.3 organise the roles and responsibilities for personnel involved in the shooting programme  2.4 organise management systems to support the implementation of shooting activities
LO3  Know how to establish a game shooting programme	3.1 describe data analysis techniques used to determine the return from game populations  3.2 explain the development of objectives to optimise sporting and economic potential  3.3 describe effective resource planning and utilisation on a game shoot  3.4 explain how the estate objectives and characteristics influence the shoot programme
LO4  Understand the legal requirements of a game shooting programme	4.1 explain the importance of contingency planning when establishing a shoot programme  4.2 specify the importance of legislation, codes of practice, guidance and additional requirements that support the implementation of shooting activities  4.3 describe the types and sources of insurance cover available for shoot activities  4.4 specify the legal status and designation of given land areas

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO5  Understand the main features of a game shooting programme	5.1 explain how given game species interact with their environment and how this could optimise shoot activities  5.2 discuss public opinion and how it can influence shooting activities  5.3 describe the characteristics of a shooting estate  5.4 analyse how the shooting programme optimises the use of the estate characteristics  5.5 specify internal and external sources of information and how to efficiently utilise them  5.6 explain how to establish effective management systems

## Guidance

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### Links

This unit focuses on the practical and administrative aspects of shoot management. Centres are encouraged to develop links with local sporting estates which will allow learners to be actively involved in the running of shoot days. Other units that link with this unit include *Unit 35: Control Shoot Day Activities*, *Unit 36: Develop a Wild Game Management Plan for a Wildlife Management Area*, *Unit 37: Monitor and Maintain Game Management Plans*, *Unit 38: Build and Maintain Effective Customer Relations*, *Unit 39: Develop a Game Bird Production Programme*, *Unit 40: Develop a Wild Deer Management Plan* and *Unit 41: Manage Wild Deer Culls*.

### Essential requirements

Learners will need access to an area of land on which driven shoot days take place; ideally this would be a sporting estate. Supervised access to sites for game management and contact with experts are required. This will give learners the opportunity to evaluate the particular management regime practised at a site, and to contrast it with that used elsewhere. Alternatively, a more structured approach could be used, with an emphasis on visual aids. Emphasis should be placed on the need for sustainability in considering management options for different sites and should aim to develop key analytical skills in a work-based environment.

### Employer engagement and vocational contexts

The delivery of this unit would be enhanced by employer engagement involving, for example, local organisations such as Game and Wildlife Conservation Trust. Learners could meet with employers from sporting estates to investigate current issues and trends in the game management sector and gain an understanding of how the game management sector responds to changes in industry guidelines. Sustained links with the groups may support further units as well as work placement opportunities.

## Unit 35: Control Shoot Day Activities

Unit code: A/503/1587

Level: 4

Credit value: 15

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- Aim

The unit aims to develop the management skills and understanding for learners who have responsibilities in managing shoot days.

- Unit abstract

Those employed in running shoot days must be able to meet their clients' and employers' expectations as well as organising all the logistics and managing staff to make the days successful.

This unit gives learners with the skills, techniques and background knowledge to control shoot day activities. Administrative and practical tasks are covered, as well as the legal and health and safety considerations. Also, as part of the running of a successful shoot, the evaluation of shoot days will be covered to enable planning for future days.

- Learning outcomes

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

- 1 Be able to control shoot day activities
- 2 Be able to evaluate shoot day activities
- 3 Understand how to control a game shooting programme
- 4 Know the legal requirements for controlling a game shooting programme.

## Unit content

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### 1 Be able to control shoot day activities

*Drives:* showing quality sporting birds; flushing points; choice and order of drives; positioning of beating lines in regard to eg wind and bird movements; placement of flankers, flags and stops; placement of gun stands/shooting positions

*Communication:* between guns, shoot captain, keepers and other staff; other land users (before and during shoot days); methods of communication eg radio, briefings, instructions; guns/clients briefing, safety, quarry, signals/communications and expected behaviours

*Health and safety:* risk assessments; guns briefing, staff briefing eg beaters, pickers-up, stops, beat/underkeepers; potential risks to public/bystanders eg roads/rights of way, trespassers; PPE

*Climatic conditions:* effect of weather on shooting program eg wind and bird flight lines, health and safety of cold staff, wet transport getting stuck, snow getting to the shoot area, mist and fog, visibility of birds

### 2 Be able to evaluate shoot day activities

*Evaluation of shoot days:* review of objectives, drive selection, order and balance, birds shot, day and per drive, per gun; effect of weather especially wind; effectiveness of communications; management and motivation of staff; transport arrangements; game collection and storage; review health and safety and risk assessments

*Feedback:* guns/clients expectations and satisfaction reviewed and considered; staff feedback and observations; methods of obtaining feedback

### 3 Understand how to control a game shooting programme

*Shooting program:* bag requirements; game availability; expectations and of guns/clients; implications of the weather especially wind; hospitality requirements; contingency planning;

contracts and finances: shooting rights/rental agreements for land; shoot insurance; clients contracts and charges, syndicate and let days; sale of game

*Resources:* staff eg keepers, beaters, pickers up/dog handlers, loaders; transport and storage of shot game, transport for guest and staff; staff wages and rewards; equipment eg radios, flags, sticks, PPE

*Health and safety:* health and safety of guests, staff and bystanders; risk assessments; personal protective equipment (PPE) eg hearing and eye protection; safety of livestock and horses

*Shoot layout:* position of drives; number of drives; cover crops and their uses, value, size and layout; use and management of existing cover eg heather moorland, farmland, woodland, hedges, shelterbelts

#### 4 Know the legal requirements for controlling a game shooting programme

*Legislation covering:* game shooting seasons and factors restricting shooting times eg bad weather, sunset/sunrise, restricted days; firearms and ammunition eg types, lead shot; people employed by shoots either temporary or permanent; handling of shot game, health and hygiene, storage

*Current relevant legislation:* eg Wildlife and Countryside Act 1981 including updates and amendments, Game Act 1831, The Regulatory Reform (Game) Order 2007, Hunting Act 2004, Wild Game Meat (Hygiene and Inspection) Regulations 1995, Firearms Act 1968 and amendments, Criminal Justice and Public Order Act 1994; Animal Welfare Act 2006; Environment Protection (Restrictions on Use of Lead Shot) (England) (Regulations 1999 plus Amendments 2002 and 2003; The Environmental Protection (Restriction on Use of Lead Shot) (Wales) Regulations 2002; Health and Safety at Work Act 1974 and amendments

*Codes of practice:* relating to game shooting eg Code of Good Shooting Practice, Respect for Quarry, Picking Up (Quarry Retrieval); Disruption of Shoots by Demonstrators; Gundogs; Transport of Beaters; Horses and Shoots

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to control shoot day activities	1.1 implement appropriate risk management processes for shoot day activities  1.2 oversee the allocation of resources to achieve shoot day activities  1.3 establish and maintain effective communication with personnel involved in shoot day activities  1.4 ensure that contingency plans are implemented to deal with factors that impact on shoot day activities
LO2  Be able to evaluate shoot day activities	2.1 monitor and feed back on the performance of personnel involved with implementing shoot day activities  2.2 obtain feedback from personnel involved with shooting activities to help develop the shooting programme  2.3 provide clear and accurate information for recording purposes on shoot day activities
LO3  Understand how to control a game shooting programme	3.1 examine roles and how these should be implemented for safe shoot day activities  3.2 explain methods used to prepare and brief personnel involved with shooting activities  3.3 explain methods available for gaining feedback from personnel involved in shoot day activities and the importance of doing so  3.4 evaluate how game react to shoot days and the influences that may alter their predicted behaviour
LO4  Know the legal requirements for controlling a game shooting programme	4.1 specify the laws that control shoot days  4.2 summarise legal requirements when controlling, handling and storing game carcasses  4.3 outline the roles of legislation, codes of practice and industry guidelines when implementing shoot programmes  4.4 explain the importance of effective recording with respect to shots taken and quarry shots

## Guidance

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### Links

The unit links to the following units:

- *Unit 34: Establish a Game Shooting Programme*
- *Unit 35: Fish, Game and Wildlife Management.*

### Essential requirements

Access to field site where game shooting is carried out is essential to this unit and to back up lectures. Tutors delivering this unit must be competent and experienced game managers.

### Employer engagement and vocational contexts

A team of employers could be identified to support this unit. Employers could help tutors with, for example, the planning of programmes of learning, or provision of visits, guest speakers and mentors. They could also help to design assessment activities.

The delivery of this unit would be enhanced through employer engagement involving, for example, local sporting estates, the Game and Wildlife Conservation Trust, British Association Shooting and Conservation. Learners could, for example, meet with employers who are directly involved in managing game populations locally.



## Unit 36: Develop a Wild Game Management Plan for a Wildlife Management Area

Unit code: F/503/1588

Level: 4

Credit value: 15

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- Aim

This unit aims to develop learners' understanding and practical management of wild game management through the development of appropriate planning techniques.

- Unit abstract

This unit gives learners an understanding of the management of wild game populations. This includes how to provide their main habitat requirements and how this is best achieved in a multiple land-use scenario. Census techniques that enable land managers to estimate population parameters and also determine whether there are sufficient wild game birds to harvest, will also be covered in detail.

The unit gives learners the understanding and skills required to plan for the production of wild game birds within the present economic and legislative framework and to discuss these plans, in a knowledgeable manner, with practitioners in the field

- Learning outcomes

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

- 1 Understand the role of wild game data analysis techniques
- 2 Understand the constraints related to game and wildlife management
- 3 Be able to manage programmes for game and wildlife management
- 4 Understand game and wildlife management activities.

## Unit content

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### 1 Understand the role of wild game data analysis techniques

*Game and wildlife populations:* census techniques to include pair counts and brood counts; young-to-old ratios, sex ratio; harvesting strategies

*Shoot records:* historical records; current records; young-to-old and sex ratios

*Environmental data:* habitats; climate; geology and soils; biodiversity; use of geographical information systems

### 2 Understand the constraints related to game and wildlife management

*Statute laws:* Wildlife and Countryside Acts, Countryside and Rights of Way Acts, Game Acts, Animal Welfare Acts, food hygiene regulations; health and safety legislation

*Codes of practice:* origins and legal status; CoPs that affect game and wildlife management eg Code of Good Shooting Practice, Fox Snaring, Gundogs, Lamping, Transport of Beaters, Trapping Pest Birds, Trapping Pest Mammals

*Agencies and organisations:* constraints and support offered by various agencies eg National Gamekeepers Organisation (NGO), British Association for Shooting and Conservation (BASC), The Game and Wildlife Conservation Trust (GWCT), The Game Farmers' Association, Defra, Royal Society for the Protection of Animals (RSPCA), League Against Cruel Sports (LACS)

*Influence on wild game management of other land uses:* agriculture; forestry; conservation; public recreation

### 3 Be able to manage programmes for game and wildlife management

*Programmes to include:* farm habitat plan; woodland management plans; shooting plan to include total capacity; financial plans and budgets

*Resources:* people; equipment; finance; time; habitats and game birds

### 4 Understand game and wildlife management activities

*Activities:* provision of suitable habitat – nesting cover, brood rearing cover and over-wintering cover; control of predation; artificial feeding; minimising disturbance; organising shootdays

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
<p>LO1</p> <p>Understand the role of wild game data analysis techniques</p>	<p>1.1 determine data analysis techniques for use in game and wildlife programmes</p> <p>1.2 discuss the role of data in target setting</p> <p>1.3 explain the importance of interpreting maps and other geographical data</p> <p>1.4 analyse methods used to determine shooting capacity</p>
<p>LO2</p> <p>Understand the constraints related to game and wildlife management</p>	<p>2.1 summarise the legal restrictions that guide game and wildlife management programmes and implementation</p> <p>2.2 summarise relevant government-approved codes of practice and industry guidelines</p> <p>2.3 analyse the constraints presented by other land uses</p>
<p>LO3</p> <p>Be able to manage programmes for game and wildlife management</p>	<p>3.1 plan measurable aims and objectives for a wild game management programme</p> <p>3.2 oversee the effective use of resources for game and wildlife management</p> <p>3.3 plan priorities for wild game conservation and control</p> <p>3.4 evaluate the opinions of those involved in implementing the programme, including estate users, outside agencies and organisations</p>
<p>LO4</p> <p>Understand game and wildlife management activities</p>	<p>4.1 explain the principles of habitat, game and wildlife management</p> <p>4.2 examine the interaction between shooting, the wildlife management area and biodiversity</p> <p>4.3 discuss how game and wildlife interacts with its environment and how it can be controlled, supported and encouraged through good management</p> <p>4.4 justify management activities required to support the implementation of a wild game management programme</p> <p>4.5 analyse the impact of the wild game management programme</p>

## Guidance

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### Links

This unit introduces learners to the detailed management of wild game bird populations and therefore links with more generic units in this qualification.

### Essential requirements

Learners need access to relevant literature and the internet. A range of site visits will be required to back up the lectures.

Tutors should have a good knowledge of local wild game bird populations and their management. Visits from people in the profession will help promote better understanding.

### Employer engagement and vocational contexts

A team of employers could be identified to support this unit. Employers could help tutors with, for example, the planning of programmes of learning, or provision of visits, guest speakers and mentors. They could also help to design assessment activities.

The delivery of this unit would be enhanced through employer engagement involving, for example, local sporting estates. Learners could meet with employers directly involved in managing wild game-bird populations locally.

Learners would benefit from visiting managed wild game populations. Learners could be encouraged to become student members of professional organisations.

## Unit 37: Monitor and Maintain Game Management Plans

Unit code: J/503/1589

Level: 4

Credit value: 15

- Aim

The unit aims to develop management skills and understanding needed for those who have responsibility for monitoring and maintaining game management plans.

- Unit abstract

This unit gives learners an understanding of how to monitor and maintain game management plans for a sporting estate. Learners will examine the legal context within which these plans are formulated and implemented.

The importance of accurate record-keeping will be emphasised throughout and a thorough understanding developed of the detailed long-term records required to manage game/wildlife on a sustainable basis.

The knowledge gained will give the learners the skills required to monitor and maintain game/wildlife management plans within the present economic and legislative framework, and to discuss these plans, in a knowledgeable manner, with practitioners in the field.

- Learning outcomes

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

- 1 Be able to monitor and maintain a game wildlife management programme
- 2 Understand how to monitor and maintain a game wildlife management programme
- 3 Understand legal considerations around game and wildlife management
- 4 Know how to maintain accurate records.

## Unit content

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### 1 Be able to monitor and maintain a game wildlife management programme

*Objectives:* financial, physical and qualitative; how to set and agree objectives; use of SMART targets; management by objectives; difference between aims and objectives; motivational objectives and stretching targets

*Monitoring progress:* data collection and analysis, quantitative and qualitative techniques; use of ICT; feedback from customers/staff and other stakeholders; accuracy and precision of data recording and entry

*Achieving objectives:* how to adjust a game management programme in respect of effectiveness and efficiency; contingency planning; scheduling of events

### 2 Understand how to monitor and maintain a game wildlife management programme

*Allocation of resources:* people; equipment; finance; time; animals

*Activities:* habitat management; game management; data collection

*Constraints:* estate objectives; human influences (other land users); conflicts of interest; political pressures

### 3 Understand legal considerations around game and wildlife management

*English legal system:* common/civil law compared with criminal/statute law; how statute law originates; roles of police and Criminal Prosecution Service (CPS)

*Civil law:* trespass; landowners liabilities, injunctions and proceedings for damages

*Statute Laws:* Wildlife and Countryside Acts, Countryside and Rights of Way Acts, Game Acts, Animal Welfare Acts, food hygiene regulations; health and safety legislation

*Codes of practice:* origins and legal status; codes of practice that affect game and wildlife management eg Code of Good Shooting Practice, Deer Stalking, Fox Snaring, Gundogs, Lamping, Transport of Beaters, Trapping Pest Birds, Trapping Pest Mammals

### 4 Know how to maintain accurate records

*Game management records:* shoot records; incubation; hatching and rearing records; predator control records; habitat management records; financial records

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
<p>LO1</p> <p>Be able to monitor and maintain a game wildlife management programme</p>	<p>1.1 oversee the allocation of resources to achieve planned objectives</p> <p>1.2 analyse collected data to determine progress against planned objectives</p> <p>1.3 ensure that accurate records are maintained with respect programme implementation</p> <p>1.4 adjust a game management programme in respect of effectiveness and efficiency</p>
<p>LO2</p> <p>Understand how to monitor and maintain a game wildlife management programme</p>	<p>2.1 explain the value of establishing an integrated game management programme</p> <p>2.2 examine the implementation requirements of the following activities:</p> <ul style="list-style-type: none"> <li>(i) habitat management</li> <li>(ii) game management</li> <li>(iii) data collection</li> </ul> <p>2.3 explain how the impact of the following constraints could be minimised during game wildlife management:</p> <ul style="list-style-type: none"> <li>(i) estate objectives</li> <li>(ii) human influences (other land-users)</li> <li>(iii) conflicts of interest</li> <li>(iv) political pressures</li> <li>(v) legislation</li> </ul>
<p>LO3</p> <p>Understand legal considerations around game and wildlife management</p>	<p>3.1 determine the influence of relevant national and local laws/by-laws that control game and wildlife management, access to the countryside and habitat management</p> <p>3.2 explain how legislation, government-approved codes of practice and published industry guidance support the management of game and wildlife</p>
<p>LO4</p> <p>Know how to maintain accurate records</p>	<p>4.1 summarise the process of maintaining accurate game management records</p> <p>4.2 summarise the importance/value of records in respect game and wildlife management</p>

## Guidance

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### Links

This unit introduces learners to the concept of management planning within the game and wildlife management sector and links with more specific units in this qualification.

### Essential requirements

Learners need access to relevant literature and the internet. A range of field visits will be required to back up the lectures.

Tutors should have a good knowledge of local game and wildlife resources. Visiting speakers from the profession will help promote a better understanding among learners.

### Employer engagement and vocational contexts

A team of employers could be identified to support this unit. Employers could help tutors with, for example, the planning of programmes of learning, or provision of visits, guest speakers and mentors. They could also help to design assessment activities.

The delivery of this unit would be enhanced through employer engagement involving, for example, local sporting estates. Learners could meet with a local land agent/estate manager to learn about the plans associated with game and wildlife management.

Learners would benefit from visiting sporting estates. A range of guest speakers would also be beneficial. Learners should be encouraged to become student members of professional organisations.

## Unit 38: Build and Maintain Effective Customer Relations

Unit code: T/503/1099

Level: 4

Credit value: 15

- Aim

The aim of this unit is to develop learners' awareness of the importance of customer relations within an organisation, and the wider impact that this has on the success of the organisation. The unit explores promotion and maintenance of customer relations and how to monitor the effectiveness of relations within the organisation.

- Unit abstract

This unit develops learners understanding and practical ability in customer service. Building and developing effective customer relations is a vital aspect of customer service. Strong customer relations will help any organisation to identify and understand their customers needs and expectations, and encourage a way of working that is based on partnership and mutual trust.

- Learning outcomes

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

- 1 Be able to promote effective customer relations
- 2 Understand how to maintain effective customer relations
- 3 Understand how to monitor customer relations within an organisation.

## Unit content

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### 1 Be able to promote effective customer relations

*Customers:* type and number of customers/ clients; two way communication; expectations of organisation and customers

*Building relations:* long term; short term; promoting loyalty; importance of good customer relations

*Communication:* negotiation (skills, effectiveness); dealing with dissatisfied customers; agreeing on solutions; diffusing situations; importance of communication to the organisation and customers; individual roles and responsibilities and communication of these roles/ responsibilities to customers;

*Market research:* information regarding customer's needs and wants; ways to gather market research eg questionnaires, telephone calls, letters, face to face surveying

### 2 Understand how to maintain effective customer relations

*Prioritising customers:* needs analysis; timing of service; organisation of priority and non priority customers; identifying needy and relaxed customers

*Communication skills and methods:* dealing with complaints; advantages and disadvantages of different communication methods; promotion of organisation through customer relations

*Establishing successful customer relations:* assessing whether expectations are being met; long and short term relations; new and existing customers; differences between these groups; benefits of long term customer relations; compromising with customers at an acceptable level to organisation

*Negotiation skills:* building rapport and confidence in own abilities; empowering self and organisation through customer service; accepting criticism from customers

### 3 Understand how to monitor customer relations within an organisation

*Customer satisfaction:* market research methods; effective ways of gathering valid information from customers; feedback ; data analysis; presentation of the data to peer groups and managers; success against benchmarks

*Exceeding customer expectations:* proposing changes; reasons for changes; how changes affect expectations; importance of exceeding expectations

*Recommending improvements:* review of customer satisfaction surveys; obtaining data; reviewing and comparing data to expectations; proposing and communicating changes to others; importance of surveying and carrying out market research

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to promote effective customer relations	1.1 determine customer groups for the chosen activity and their individual needs  1.2 communicate effectively with different customer groups  1.3 use effective negotiation skills within an organisation  1.4 deal effectively with dissatisfied customers  1.5 manage the collection and use of market research to gauge levels of customer satisfaction
LO2  Understand how to maintain effective customer relations	2.1 prioritise customer groups in terms of the attention they require  2.2 evaluate communication skills used in the sector  2.3 discuss how to establish customer relations with new or returning customers  2.4 examine negotiation skills used to maintain effective customer relations  2.5 explain appropriate methods of dealing with dissatisfied customers
LO3  Understand how to monitor customer relations within an organisation	3.1 evaluate methods of monitoring customer satisfaction  3.2 analyse methods of using influence and authority to meet or exceed customer satisfaction  3.3 explain how to maintain a long-term customer relationship  3.4 recommend appropriate improvements to customer relations within an organisation

## Guidance

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### Links

This unit introduces learners to building and maintaining effective customer relations and therefore links to the following units:

- *Unit 2: Project Management for Land-based Industries*
- *Unit 42: Business Environment.*

### Essential requirements

It is essential that learners are in a working environment (eg vocational work experience) to practice their customer service skills. It is also essential that learners have access to the internet and up to date literature such as books and professional journals to allow them to research relevant material for their knowledge and assessments.

### Employer engagement and vocational contexts

Delivery of this unit would benefit from learners being involved in 'real life' customer service positions in their chosen sector. It is important that learners are given the opportunity to identify and understand their target market's expectations, and how to maintain and exceed these expectations to make a strategic contribution to the organisation.

Learners would benefit from visits or guest lectures from large or small organisations to describe how they promote customer services and examples of poor customer services that they have witness within theirs or other organisations. A variety of both good and poor examples of customer services are available on the internet, and these may make good learning and teaching tools.

## Unit 39: Develop a Game Bird Production Programme

Unit code: A/503/1590

Level: 4

Credit value: 15

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- Aim

The unit aims to develop the management skills and understanding relevant to learners who will have responsibility for game bird management plans.

- Unit abstract

This unit will provide learners with an understanding of the processes involved in the production of reared game birds for release onto shoots. They will also examine the records associated with game bird rearing and be able to use these to plan future levels of production. The unit will enable learners to explore the economic and legal frameworks of game bird production in the UK.

- Learning outcomes

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

- 1 Understand the principles of game bird farming
- 2 Be able to record and analyse data to support the development of the game farming programme
- 3 Be able to produce effective planning systems for game bird production
- 4 Understand the legal requirements for game bird production programmes.

## Unit content

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### 1 Understand the principles of game bird farming

*Game bird farming:* requirements of major species – pheasant, partridge, mallard; management of laying flock and egg production; incubation and hatching; rearing from day old to poult stage

*Agencies and organisations:* review constraints and support offered by various agencies eg National Gamekeepers Organisation (NGO), British Association for Shooting and Conservation (BASC), The Game and Wildlife Conservation Trust (GWCT), The Game Farmers Association, Defra, Royal Society for the Protection of Animals (RSPCA), League Against Cruel Sports (LACS)

*Dietary requirements:* laying flock – maintenance and laying rations; protein and energy requirements from day old to poult stage; minerals, vitamins and supplements

*Bio-security and disease prevention:* sources/causes of disease; disease-causing organisms; methods of transmission and infection; signs of poor health in game birds; symptoms of common diseases of game birds; principles and practice of bio-security

### 2 Be able to record and analyse data to support the development of the game farming programme

*Game farm records:* egg production and laying flock records; incubation and hatching data; daily, weekly and overall mortality figures; administration of medication; notes on major events eg disease outbreak, feather pecking/biting, change of feed, change in environment

*Analysis of records:* number of eggs produced per hen; percentage fertility and hatchability of eggs; weekly and overall mortality rates; comparison with standard figures and/or targets

*Planning future production levels:* calculate hens required, eggs to set and day-olds required to achieve given levels of production

### 3 Be able to produce effective planning systems for game bird production

*Management plan:* annual production targets; long-term aims; opinions of others while developing programmes; communication of requirements to those involved in its implementation

*Required resources:* source of eggs/birds; feed required for each stage of production; water; energy for heat; equipment; people/staffing; finance

*Risks and contingencies:* prevention and consequences of disease outbreaks; levels of risk at each stage of production; means of minimising identified risks

### 4 Understand the legal requirements for game bird production programmes

*Statute Laws:* relevant game acts; relevant animal welfare acts; health and safety legislation

*Codes of practice:* origins and legal status; codes of practice that affect game bird farming eg Code of Good Shooting Practice, Code of Practice for the Welfare of Gamebirds Reared for Sporting Purposes

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
<p>LO1</p> <p>Understand the principles of game bird farming</p>	<p>1.1 explain the principles of game bird farming</p> <p>1.2 review the constraints that influence game bird farming</p> <p>1.3 discuss internal and external agencies and organisations which offer support</p> <p>1.4 discuss dietary requirements for game birds at different developmental stages</p> <p>1.5 assess principles of bio-security and disease prevention</p> <p>1.6 explain game farm design in relation to the influence of the physical environment</p>
<p>LO2</p> <p>Be able to record and analyse data to support the development of the game farming programme</p>	<p>2.1 produce a portfolio of relevant documentation required for a game bird programme</p> <p>2.2 carry out data analysis techniques to determine success rates of birds reared to birds ordered</p> <p>2.3 plan game bird production in accordance with customer requirements</p>
<p>LO3</p> <p>Be able to produce effective planning systems for game bird production</p>	<p>3.1 produce a management plan establishing aims and objectives for a game farm</p> <p>3.2 develop a list of required resources for the successful implementation of game bird production</p> <p>3.3 explain how to maintain effective resource usage</p> <p>3.4 design feeding programmes for a range of game bird age groups</p> <p>3.5 plan actions to deal with emergencies which may influence implementation of programmes</p> <p>3.6 assess risks for game bird production</p>
<p>LO4</p> <p>Understand the legal requirements for game bird production programmes</p>	<p>4.1 examine the key legal requirements for approved codes of practice for game bird production</p> <p>4.2 define the key legal requirements for the maintenance of good husbandry and welfare of game birds</p>

## Guidance

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### Links

This unit introduces learners to the detailed management of game birds reared for release into the wild and therefore links with more generic units in this qualification.

### Essential requirements

Learners need access to relevant literature and the internet. A range of field visits will be required to back up the lectures.

Tutors should have a good knowledge of game bird rearing. Visits from game bird professionals will help promote better understanding.

### Employer engagement and vocational contexts

A team of employers could be identified to support this unit. Employers could help tutors with, for example, the planning of programmes of learning, or facilitation of visits, guest speakers and mentors. They could also help to design assessment activities.

The delivery of this unit would be enhanced through employer engagement involving, for example, local game farms. Learners could, meet with employers who are directly involved in game bird rearing locally.

Learners would benefit from visiting game-bird-rearing establishments that show a range of techniques and sizes of operation. A range of guest speakers would also be beneficial. Learners should be encouraged to become student members of relevant professional organisations.

## Unit 40: Develop a Wild Deer Management Plan

Unit code: F/503/1591

Level: 4

Credit value: 15

- **Aim**

The unit aims to develop the management skills and understanding needed by those who have responsibility for wild deer management plans.

- **Unit abstract**

This unit gives learners the knowledge, skills and techniques to estimate wild deer populations, formulate wild deer management plans and implement and review those plans.

Those employed in managing deer must be able to predict changes in deer populations and understand the effects these changes will have. Deer managers must be able to formulate management plans that allow deer to fulfil the role as an important component of our countryside, but at the same time prevent conflict with human interests.

As part of the management planning process, learners will be required to generate baseline data for deer populations, to observe, analyse and predict change, and to formulate and review action plans.

- **Learning outcomes**

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

- 1 Understand deer population models
- 2 Understand wild deer management planning
- 3 Understand wild deer management implementation
- 4 Be able to review a wild deer management plan.

## Unit content

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### 1 Understand deer population models

*Species:* red; fallow; sika; roe; Chinese water deer; muntjac

*Ecology of wild deer:* breeding ecology; territories; home ranges; migration patterns; feed requirements; habitat preferences and interaction

*Wild deer population census methods:* total counts; sample counts; direct eg open hill count, vantage point, spotlight, thermal imaging, distance sampling; indirect eg dung counts; mortality data, cohort analysis; damage impact assessments; applicability in specific situations; census technique advantages and disadvantages

*Analysis of census data:* population estimation techniques to establish deer density population structure male/female, female/young ratios, age structure, recruitment, mortality

### 2 Understand wild deer management planning

*Management plan:* aims and objectives – short-, medium-, and long-term; location; site description, habitat type; designated areas; history of management; species present; future management objectives and strategies; responsibilities; carcass (retrieval, handling); population (dynamics, annual turnover) and estimation; cull planning; landowner objectives; health and safety; risk assessment

*Resources required:* people (roles, responsibilities); finance; equipment

*Factors influencing wild deer management:* land ownership; licensing; business objectives; political pressures; disease; legislation; income generation; commercial clients, crop and habitat protection; staffing; public access

### 3 Understand wild deer management implementation

*Relevant current legislation and codes of practice:* affecting development of deer management plans (identification, analysis of role and relevance) eg Deer Act(s), Firearms Acts and amendments; health and safety 1974; Game Act; game meat hygiene; best practice guides

*Equipment and resources required:* health and safety policy and risk assessments; staffing; transport; stalking equipment eg firearms, knives, clothing; larder and cold store; carcass disposal

*Emergency procedures:* tracking wounded deer; dealing with road traffic accidents; emergency culls

### 4 Be able to review a wild deer management plan

*Review wild deer management plan:* feedback of all those involved in implementing the plan; review aims and objectives – short-, medium-, and long-term, future management objectives and strategies; responsibilities, population trends (dynamics, annual turnover); comparison of population estimations against cull data; future cull planning; future development of plan

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1 Understand deer population models	1.1 explain the information and data required to model deer populations 1.2 examine how relevant wild deer agencies and organisations can support management of wild deer 1.3 analyse ecological characteristics of wild deer populations in relation to wild deer management objectives
LO2 Understand wild deer management planning	2.1 evaluate aims and objectives for given deer management plans 2.2 examine resources required to implement a deer management plan 2.3 assess valid factors that can influence deer management planning 2.4 explain prevention of risks and hazards common to deer management
LO3 Understand wild deer management implementation	3.1 explain how to effectively manage wild deer populations 3.2 examine the good practice requirements for wild deer management 3.3 critically compare the success and limitation of legal measures relevant to wild deer management
LO4 Be able to review a wild deer management plan	4.1 carry out data analysis techniques to determine success of deer management implementation 4.2 analyse the opinions of those involved in the development of the plan 4.3 evaluate the effectiveness of a wild deer management plan

## Links

The unit also links with the following units:

- *Unit 34: Establish a Game Shooting Programme*
- *Unit 35: Control Shoot Day Activities*
- *Unit 36: Develop a Wild Game Management Plan for a Wildlife Management Area*
- *Unit 37: Monitor and Maintain Game Management Plans*
- *Unit 41: Manage Wild Deer Culls.*

## Essential requirements

Access to a field site where deer are being managed and interaction with the deer manager are essential along with the use of guest speakers to back up the lectures.

Tutors should have recent industrial experience within deer management or show evidence of regular contact with the industry and/or technical updating.

Visiting expert speakers could add to the relevance of the subject. For example, a deer manager or Deer Initiative/Scottish Natural Heritage deer officer or Forestry Commission ranger could talk about their work, the situations they face and the methods they use.

## Employer engagement and vocational contexts

A team of employers could be identified to support this unit. Employers could help tutors with, for example, the planning of programmes of learning, or provision of visits, guest speakers and mentors. They could also help to design assessment activities.

The delivery of this unit would be enhanced through employer engagement involving, for example, local sporting estates, the Forestry Commission or the Deer Initiative. Learners could, for example, meet with employers who are directly involved in managing and surveying wild deer populations locally.

## Unit 41: Manage Wild Deer Culls

Unit code: J/503/1592

Level: 4

Credit value: 15

- Aim

The unit aims to develop the skills and understanding needed by those who may have responsibility for managing wild deer culls.

- Unit abstract

This unit will give learners an understanding of how to manage deer populations to control any impact they may have on natural environments and crops, and to exploit them as a wild food product.

The knowledge gained will provide learners with the skills they need to manage wild deer culls within the present economic and legislative framework. They will be able to discuss these plans, in a knowledgeable manner, with practitioners in the field.

- Learning outcomes

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

- 1 Be able to manage wild deer culls in accordance with legislation
- 2 Be able to communicate objectives to those involved in a wild deer cull
- 3 Understand how to manage wild deer culls
- 4 Understand legal requirements of a deer cull.

## Unit content

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### 1 Be able to manage wild deer culls in accordance with legislation

*Culling activities:* risk management processes; legal requirements; estate objectives

*Implement contingencies to do with:* human influences; unexpected deer behaviour; environmental conditions

*Deer carcasses:* handled, transported and storage

*Cull records:* reasons for; detail required; legislative requirements; management requirements

### 2 Be able to communicate objectives to those involved in a wild deer cull

*Resources:* people; transport; equipment; finance; animals

*Effective communication:* requirements of the cull; feedback from stalkers and support staff; monitoring and feedback on the performance; using feedback to support the development of the deer management plan

### 3 Understand how to manage wild deer culls

*Roles and resources required to support culling activities:* implementation of safety precautions; preparation of equipment and materials; liaison and organisation with stalkers and support staff; initial briefing; gaining feedback; use of records

*Wild deer behaviour:* how wild deer react during a cull; dealing with wounded deer; how to manage a wild deer cull in a built-up area or transport corridor

### 4 Understand legal requirements of a deer cull

*Statute Laws:* Deer Acts; Wildlife and Countryside Acts; Countryside and Rights of Way Acts; Animal Welfare Acts; Firearms Legislation; food hygiene regulations; health and safety legislation

*Codes of practice and best practice guides:* Deer Stalking; legislation, health and safety and welfare; Culling Deer ; Meat Hygiene; Records and Survey; Deer Management ; equipment; disease

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to manage wild deer culls in accordance with legislation	1.1 ensure that the implementation of culling activities is completed according to risk-management processes  1.2 manage cull activities to ensure they meet legal requirements and estate objectives  1.3 ensure that deer carcasses are stored, handled and transported according to legal requirements  1.4 maintain accurate cull records in accordance with legal requirements
LO2  Be able to communicate objectives to those involved in a wild deer cull	2.1 manage the allocation of resources to achieve planned objectives  2.2 establish and maintain effective communication with all involved in the cull  2.3 monitor and feed back on the performance of those involved in the cull  2.4 gain feedback from those involved in the deer cull to support the development of the deer management plan
LO3  Understand how to manage wild deer culls	3.1 examine the roles and resources required to support culling activities  3.2 explain the importance of briefing and providing feed back to those involved in the cull  3.3 explain how wild deer should react during a cull and how and why their predicted behaviour may alter  3.4 examine how to manage a wild deer cull in a built-up area or transport corridor
LO4  Understand legal requirements of a deer cull	4.1 explain the laws that control wild deer culls  4.2 explain how to maintain effective deer cull records and the importance of doing so  4.3 evaluate legal requirements that control the storage, handling and transport of wild deer carcasses  4.4 analyse the hazards associated with wild deer culls and how to manage them  4.5 explain the role of legislation, codes of practice, industry guidelines and additional requirements when managing and recording culling activities

## Guidance

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### Links

This unit introduces learners to the detailed management of wild deer populations and therefore links with more generic units in this qualification.

### Essential requirements

Learners need access to relevant literature and the internet. A range of field visits will be required to back up the lectures.

Tutors should have good knowledge of local deer populations and their management. Visits from professionals will help promote understanding.

### Employer engagement and vocational contexts

A team of employers could be identified to support this unit. Employers could help tutors with, for example, the planning of programmes of learning, or provision of visits, guest speakers and mentors. They could also help to design assessment activities.

The delivery of this unit would be enhanced through employer engagement involving, for example, local sporting estates. Learners could meet employers who are directly involved in culling wild deer populations locally.

Learners would benefit from visiting managed deer populations. A range of guest speakers would also be beneficial. Learners should be encouraged to become student members of relevant professional organisations.

## Unit 42: Business Environment

Unit code: Y/601/0546

Level: 4

Credit value: 15

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- Aim

The aim of this unit is to give learners an understanding of different organisations, the influence of stakeholders, and the relationship between businesses and the local, national and global environments.

- Unit abstract

This unit gives learners the opportunity to research the purpose and nature of business organisations and how they operate in ways that allow business objectives to be met. They will investigate the links with business stakeholders.

Businesses operate in an environment shaped by the government, competitors, consumers, suppliers and international factors. Learners will develop their understanding of direct influences on businesses in this environment, for example taxation policies on corporate activities. They will also consider other influences, such as those from the international arena and those with only an oblique impact on the national business environment.

Learners will explore business markets and how the form and structure of a market influences how organisations behave. Learners will consider how different market structures may shape the pricing and output decisions of businesses, as well as other aspects of their behaviour.

- Learning outcomes

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

- 1 Understand the organisational purposes of businesses
- 2 Understand the nature of the national environment in which businesses operate
- 3 Understand the behaviour of organisations in their market environment
- 4 Be able to assess the significance of global factors that shape national business activities.

## Unit content

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### 1 Understand the organisational purposes of businesses

*Categories of organisation:* type eg private company, public company, Government, voluntary organisation, co-operative, charitable; sector (primary, secondary tertiary)

*Purposes:* mission; vision; aims; objectives; goals; values; profits; market share; growth; return on capital employed (ROCE); sales; service level; customer satisfaction; corporate responsibility; ethical issues

*Stakeholder expectations:* owners; customers; suppliers; employees; debtors; creditors; financial institutions (banks, mortgage lenders, credit factors); environmental groups; government agencies (central government, local authorities); trade unions

*Responsibilities of organisations:* stakeholder interests; conflict of expectations; power, influence matrix; satisfying stakeholder objectives; legal responsibilities eg consumer legislation, employee legislation, equal opportunities and anti-discriminatory legislation, environmental legislation, health and safety legislation; ethical issues eg environment, fair trade, global warming, charter compliance eg Banking Code

### 2 Understand the nature of the national environment in which businesses operate

*Economic systems:* the allocation of scarce resources; effective use of resources; type of economic system eg command, free enterprise, mixed, transitional

*The UK economy:* size (gross domestic product, gross national product); structure; population; labour force; growth; inflation; balance of payments; balance of trade; exchange rates; trading partners; public finances (revenues, expenditure); taxation; government borrowing; business behaviour eg investment, objectives, risk awareness; cost of capital; consumer behaviour; propensity to save; propensity to spend; tastes and preferences

*Government policy:* economic goals; fiscal policy: control of aggregate demand; central and local government spending; Public Sector Net Borrowing (PSNB) and Public Sector Net Cash

Requirement (PSNCR); euro convergence criteria, monetary policy; interest rates; quantitative easing; private finance initiative (PFI); competition policy (up-to-date legislation including

Competition Act 1998, Enterprise Act 2002); Competition Commission, Office of Fair Trading; Directorate General for Competition); European Commission); sector regulators eg Ofgem, Ofwat, Civil Aviation Authority; Companies Acts; regional policy; industrial policy; enterprise strategy; training and skills policy

### 3 Understand the behaviour of organisations in their market environment

*Market types:* perfect competition, monopoly, monopolistic competition, oligopoly, duopoly; competitive advantage, strategies adopted by firms; regulation of competition

*Market forces and organisational responses:* supply and demand, elasticity of demand; elasticity of supply; customer perceptions and actions, pricing decisions; cost and output decisions; economies of scale, the short run; the long run, multi-national and transnational corporations; joint ventures, outsourcing; core markets; labour market trends; employee skills, technology; innovation; research and development; core competencies;

*Business and cultural environments:* business environment evaluation (political, economic, social, technical, legal, environmental); cultural environment, cultural web; wider issues relevant to organisations eg biodiversity, health and social inclusion, ethical considerations, sustainability, social equality and diversity

### 4 Be able to assess the significance of global factors that shape national business activities

*Global factors:* international trade and the UK economy; market opportunities; global growth; protectionism; World Trade Organisation (WTO); emerging markets (BRIC economies – Brazil, Russia, India, China)

*Impact on UK Organisations:* business, competition, growth, employment, education, economics and finance, employment, environment, science and technology, regional; labour movement; workforce skills; exchange rates; trading blocs eg monetary unions, common markets; customs unions, free trade areas; labour costs; trade duties; levies; tariffs; customs dues; taxation regimes; international competitiveness; international business environment (political, economic, social, technical, legal, environmental); investment incentives; cost of capital; commodity prices; intellectual property; climate change eg Kyoto Protocol, Rio Earth Summit; third world poverty; the group of 20 (G-20); global financial Stability

*EU policies:* EU membership; EU business regulations and their incorporation into UK law; EU policies eg agriculture

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand the organisational purposes of businesses	1.1 identify the purposes of different types of organisation  1.2 describe the extent to which an organisation meets the objectives of different stakeholders  1.3 explain the responsibilities of an organisation and the strategies employed to meet them
LO2  Understand the nature of the national environment in which businesses operate	2.1 explain how economic systems attempt to allocate resources effectively  2.2 assess the impact of fiscal and monetary policy on business organisations and their activities  2.3 evaluate the impact of competition policy and other regulatory mechanisms on the activities of a selected organisation
LO3  Understand the behaviour of organisations in their market environment	3.1 explain how market structures determine the pricing and output decisions of businesses  3.2 illustrate the way in which market forces shape organisational responses using a range of examples  3.3 judge how business and cultural environments shape the behaviour of a selected organisation
LO4  Be able to assess the significance of global factors that shape national business activities	4.1 discuss the significance of international trade to UK business organisations  4.2 analyse the impact of global factors on UK business organisations  4.3 evaluate the impact of policies of the European Union on UK business organisations

## Guidance

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### Links

This unit provides an opportunity for learners to explore the business environment within the UK and understand International factors influencing organisations.

### Essential requirements

Learners must keep up to date with current issues that may influence business behaviour within the Land-based sector. They must be encouraged to engage in regular research through a variety of sources eg reading quality newspapers and trade journals, watching news and current affairs programmes on the television. Attention should be paid to international trade and global factors that have an impact on UK businesses.

Sufficient time must be built into the teaching schedule to allow learners to undertake research into current issues.

### Employer engagement and vocational contexts

Centres can develop links with local employers. Many businesses look to employ learners when they finish their programmes of study and may provide information about the business environment which they operate in. They will have a view about the impact of the governmental and EU factors that shape how they behave. Guest speakers can offer an insight into such factors.

Many learners are, or have been, employed and will be able to draw on their experience of employment. They will have had experience of the nature of the business environment and the ways in which organisations respond to and determine future responsive strategies.



## Unit 43: Global Food Production

Unit code: L/503/1593

Level: 5

Credit value: 15

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- **Aim**

The aim of this unit will broaden learners' perspectives on food production through consideration of the global food industry. The unit examines food production systems throughout the world, their contribution to the global economy and the influences of natural, political and economic factors on food production.

- **Unit abstract**

A significant proportion of the UK food supply is deriving either imported in its entirety or contains imported ingredients, with many products from outside the European Union. In addition, the export of UK-produced food makes an important contribution to the value of UK export markets. It is therefore important that learners understand the global context of food production.

Learners are encouraged to consider the factors that are likely to affect the global production of food in the future.

- **Learning outcomes**

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

- 1 Understand global food production systems
- 2 Understand the contribution of agriculture and food production to the global economy
- 3 Understand the influences of government policy and international trade on food production and food markets
- 4 Understand the implications of projected future trends and developments within the global food industry.

## Unit content

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### 1 Understand global food production systems

*Agricultural production systems:* cash and subsistence farming; nomadic herding; slash and burn; terraces, and strips; small-scale commercial production; prairie farming; intensive and extensive production; environmental impact

*Physical environment:* effects of climate (temperature, rainfall and altitude) on products grown and methods of cultivation/stocking; influences of soils and erosion on methods

*Social and political factors influencing production:* structure of society; availability of labour; levels of technological development; alternative sources of income; government regimes; structure of land tenure and its historical development; regulation of markets

*Global commodity chains:* their influence and impact; air miles; energy consumption; sustainability; interdependency; consumer confidence; food safety and public health; transparency

### 2 Understand the contribution of agriculture and food production to the global economy

*Trends:* production; consumption; demographic statistics; economic contribution; media, local and government influence; sustainability; traceability; ethical issues

*Perspectives:* production; consumption of food worldwide; nutrition levels

*Global and regional agro-food systems:* agro-commodity chains; import/export trends; agribusiness; transnational corporations; sustainability of production

### 3 Understand the influences of government policy and international trade on food production and food markets

*Trends in global food trade:* World Trade Organisation (WTO); European Union (EU)

*Historical influences:* commonwealth; colony links; conflicts; trade in raw materials/processed foods

*Global markets:* concepts and practice; trade liberalisation/protectionism; strategic trade policy; trade agreements; politics of food/food aid

*EU and the Common Agricultural Policy (CAP):* effects on production and trade within and outside EU; role of CAP; implications of future expansion; financial issues regarding sustainability of policy

*WTO and General Agreement on Tariffs and Trade (GATT):* role in influencing food trade worldwide; implications for food producers; likely developments relating to GATT

**4 Understand the implications of projected future trends and developments within the global food industry**

*Future trends and developments:* current issues that are likely to affect the global food marketplace; technological advances; changes within CAP and GATT; sustainability; demographic growth; world population growth; limiting resources eg water, land and oil; crop competition; global warming

*Technical developments:* genetically modified (GM) foods; mechanisation; irrigation; pest and disease management; crop manipulation; crop protection

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
<p>LO1</p> <p>Understand global food production systems</p>	<p>1.1 compare a range of food production systems on a global scale</p> <p>1.2 examine geographical and physical factors that have influenced the location and nature of global food production</p> <p>1.3 evaluate the effects of social, economic and political influences on current global food production systems</p> <p>1.4 discuss examples of global commodity chains within food production</p>
<p>LO2</p> <p>Understand the contribution of agriculture and food production to the global economy</p>	<p>2.1 analyse the contribution of food production to the global economy</p> <p>2.2 compare subsistence and cash crop production systems and their contributions to the global economy</p> <p>2.3 evaluate trends in global food production/consumption using appropriate data sources</p>
<p>LO3</p> <p>Understand the influences of government policy and international trade on food production and food markets</p>	<p>3.1 summarise the historical and current influences on global food production and food markets</p> <p>3.2 explain the functions of the WTO and the EU in the global trading of food</p> <p>3.3 summarise effects of the CAP and GATT on food trade worldwide</p>
<p>LO4</p> <p>Understand the implications of projected future trends and developments within the global food industry</p>	<p>4.1 predict future trends in global food production/consumption with appropriate justifications</p> <p>4.2 review the likely future issues facing the global food industry, and consider their implications</p> <p>4.3 analyse the likely effects of current technological developments on global food production systems</p>

## Guidance

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### Links

This unit links directly to *Unit 15: Sustainable Development*.

### Essential requirements

Standard classroom facilities will provide an appropriate learning environment for this unit. Access to internet facilities is essential, complemented by a good range of up-to-date paper resources relating to global food production. Geographical charts and appropriate video clips would further enhance delivery.

### Employer engagement and vocational contexts

It is essential that this unit be delivered in an applied and vocational context. Work-based experience will also be important.

Due to the wide range of crops grown, this unit will be considerably enhanced by contact with crop importers, storage facilities and wholesalers. Centres are encouraged to develop links with local businesses, manufacturers and suppliers who can support the breadth and application of this unit. These employers can not only provide real practical exercises, but also provide guest speakers and experts to support the learning experience. Employer engagement will ensure the use of technically up-to-date information and processes.

Visits to conferences and specialist speakers from organisations focussing on world trade and global food production would further enhance the student experience.



## Unit 44: Work-based Experience

Unit code: A/601/0998

Level: 5

Credit value: 15

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- Aim

This unit aims to enable learners to experience the scope and depth of learning which takes place in a work-based context by planning, monitoring and evaluating work experiences.

- Unit abstract

A significant amount of learning can be achieved by carrying out practical activities in a workplace. Learning may be enhanced by taking a more formal approach to work-based activities – by planning, carrying out the activities and reflecting on the benefits of the activities to the organisation, business and learner.

Learners will have the opportunity, supported by their supervisors, to negotiate and perform activities which will enable them to achieve work related understanding and skills. They will recognise the scope of what they have achieved by recording evidence of carrying out different activities. Learners will gain maximum benefit by reflecting on, and evaluating of, the work they undertake.

- Learning outcomes

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

- 1 Be able to negotiate industry experience
- 2 Understand the specific requirements of the placement
- 3 Be able to undertake work experience as identified
- 4 Be able to monitor and evaluate own performance and learning.

## Unit content

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### 1 Be able to negotiate industry experience

*Suitable organisation and location:* types of establishments for placement eg industry-related work for a client brief at college, existing work environment, different department within current employer's business; other appropriate industry-related organisations or businesses

*Negotiation:* methods of contacting organisations; methods of undertaking negotiations

*Nature of duties:* type of undertaking eg routine duties and tasks, project work, development of new procedures/protocols

*Supervisors:* roles and responsibilities of academic and industrial mentors

*Expectations of learning:* aims eg proficiency in new tasks and procedures, time management and problem-solving skills; reflection; discussing progress with others; teamwork

*Business constraints:* consideration of possible limitations eg need to be fully trained, adherence to quality systems, health and safety considerations, supervision time, workload, customer satisfaction, limited staffing, cost of materials

### 2 Understand the specific requirements of the placement

*Tasks:* details of activities eg specific hourly, daily, weekly routine and non-routine tasks; breakdown of a project into stages; new procedures/protocols; adherence to health and safety practices

*Prioritise:* reasons for rationalising the order of tasks; methods of prioritising work

*Plan for the work experience:* methods used to develop detailed plan with schedule of tasks; proposed dates for reviews; expected input from supervisors

*Benefits to organisation and learner:* advantages to business eg allowing more routine tasks to be carried out, allowing procedures/techniques to be developed, increasing responsiveness, identifying cost saving measures; advantages to learner eg understanding how a business operates, understanding importance of teamwork, learning new techniques, development of problem-solving and time management skills

### 3 Be able to undertake work experience as identified

*Carry out the planned activities:* realisation eg carrying out tasks and project work according to relevant legislation, training, health and safety measures and codes of practice; developing new procedures or protocol

*Record activities in the appropriate manner:* systematic and appropriate recording of relevant activities eg logbook, diary, portfolio, spreadsheets, databases; list of resources

*Revise the initial plan as required:* methods used to review activities at the appropriate time to see if they meet requirements; make alterations as needed

**4 Be able to monitor and evaluate own performance and learning**

*Evaluation of the quality of the work undertaken:* meeting industry standards and evaluating own performance against original proposal; comments/testimony from supervisors; adherence to health and safety measures

*Account of learning during the work experience:* details of experience gained eg new procedures, interpersonal skills, time management, problem solving, teamwork; details of evidence eg portfolio of evidence, scientific report, management report

*Recommendations on how the learning experience could have been enhanced:* alternative ideas eg different location(s), different brief, different time period, more/less support, better time management, better preparation

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to negotiate industry experience	1.1 research and evaluate suitable organisations that could provide industry experience 1.2 negotiate with work and academic supervisors a proposal for the work experience 1.3 recognise the business constraints on the work experience offered
LO2  Understand the specific requirements of the placement	2.1 agree and prioritise the tasks and responsibilities involved in the work experience 2.2 produce a plan for the work experience 2.3 analyse the benefits of the proposed activities to the business and the learner
LO3  Be able to undertake work experience as identified	3.1 fulfil specified requirements of placement conforming to all related codes of practice 3.2 produce systematic records of work undertaken 3.3 revise the initial plan as required 3.4 make suggestions for improvement and review these with appropriate supervisor
LO4  Be able to monitor and evaluate own performance and learning	4.1 monitor progress against original proposal 4.2 evaluate the quality of own performance 4.3 analyse the learning which has taken place during the work experience using suitable reflections 4.4 make recommendations on how the experience could have been enhanced

## Guidance

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### Links

This unit links with other units in the qualification such as *Unit 42: Business Environment*, *Unit 2: Project Management for Land-based Industries*, *Unit 45: Small Business Enterprise* and *Unit 7: Employability Skills*. Other units that could enhance the learner's experience during placements are *Unit 13: Animal Health and Welfare*, amongst others, depending on the learner's interests and placement selection.

### Essential requirements

Learners must undertake a minimum of 450 hours work experience in a professional work environment. Given the work-based nature of the unit, the majority of resources used will be those available to the learner in the workplace. Work will normally be planned to be achievable within the resource constraints of the employer. Therefore knowledge of company structures and daily routines and expectations is essential.

Learners should have access to a wide range of research facilities including careers library and/or careers services.

Tutor support and guidance are essential. Learners should remain in contact with tutors during their work experience – email is a good way but some centres may have access to a virtual learning environment where learners can share information and experiences with each other and the tutor.

### Employer engagement and vocational contexts

Learners might find it beneficial to describe their placement experiences to peers on completion. Whether this is informal, or as part of an assessment, hearing about each other's placements will broaden the vocational context of the programme area for all learners. Learners may also wish to collect photographs, videos and other materials whilst undertaking their placements to enhance their presentations.

The unit is designed to allow flexibility of study for part-time and full-time learners. It is expected that learners will be supervised in the workplace in addition to the supervision provided by their centre supervisor.



## Unit 45: Small Business Enterprise

Unit code: H/601/1098

Level: 5

Credit value: 15

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- Aim

The aim of this unit is to give learners the opportunity to develop skills in change management, reviewing and improvement of the performance of a small business enterprise.

- Unit abstract

This unit examines the factors influencing the development and expansion of small business enterprise. The unit draws together many of the topics covered in the wider curriculum and also in other Higher National units and allows learners to apply these skills to the small business environment. The unit is appropriate for learners who are, or plan to become involved in small business enterprises.

- Learning outcomes

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

- 1 Be able to investigate the performance of a selected small business enterprise
- 2 Be able to propose changes to improve management and business performance
- 3 Be able to revise business objectives and plans to incorporate proposed changes
- 4 Be able to examine the impact of change management on the operations of the business.

## Unit content

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### 1 Be able to investigate the performance of a selected small business enterprise

*Business profile:* vision, goals, components, objectives, strategies and business processes, internal and external factors affecting business performance, performance measures, constraints and restrictions on business, responsibilities and liabilities of owner-managers

*Business performance:* skills audit; self evaluation/comparisons with similar-sized businesses in the same or similar industry and geographical area, comparisons with industry averages. (Comparisons should cover financial, production, marketing, sales, human resources, use of technology)

*Business strengths and weaknesses:* overall effectiveness and business performance review products/services, marketing, sales, production, finances, human resource efficiency, management effectiveness; use ratios, SWOT analysis, budget information, market research results, business image, business reports

*Management of employees:* employment policies; employment initiatives eg Investors in People; employee performance appraisal process; flexible working eg employment of part-time and temporary staff, teleworking, homeworking, job sharing, zero hours contracts, annual hours, staggered hours, compressed hours; equal opportunities within the workplace; discrimination (forms, legislation against)

### 2 Be able to propose changes to improve management and business performance

*Problem-solving actions; problem-solving strategies to overcome identified weaknesses,* sources and availability of professional advice, alternative solutions, availability and use of outsourcing for specific functions eg payroll, debt collection, staff development.

*Maintaining and strengthening existing business:* maintaining appropriate performance records, building on business strengths, maintaining market share/position, importance of good customer/supplier/adviser relationships

*New opportunities:* identifying areas for expansion eg niche markets and export opportunities where appropriate, research techniques, evaluating projects, assessing project requirements, costing and finding finance for new projects, risk assessment

### 3 Be able to revise business objectives and plans to incorporate proposed changes

*Business objectives:* structure of business objectives, assessment of business objectives in the light of current performance, making changes to business objectives, impact of changes on business plans

*Business plans:* structure of integrated business plans (financial, sales and marketing, production/output, personnel), use of business plans, evaluation of plans against business objectives, incorporating changes to plans, budgeting for changes, preparation of business forecasts

*Action plans:* plans to implement changes, systems to manage, monitor and evaluate changes, performance measures, setting deadlines

**4 Be able to examine the impact of change management on the operations of the business**

*Impact of change:* effects of change on all areas of business – finance, workloads, morale, job roles, physical aspects (eg office space, production methods), use of technology, anticipating possible obstacles/problems

*Management of change:* monitoring effects of change, maintaining systems and records to evaluate impact of change, appropriate revision of plans in response to actual results

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to investigate the performance of a selected small business enterprise	1.1 produce a profile of a selected small business, identifying its strengths and weaknesses  1.2 carry out an analysis of the business using comparative measures of performance
LO2  Be able to propose changes to improve management and business performance	2.1 recommend with justification, appropriate actions to overcome identified weaknesses in the business  2.2 analyse ways in which existing performance could be maintained and strengthened  2.3 recommend with justification, new areas in which the business could be expanded
LO3  Be able to revise business objectives and plans to incorporate proposed changes	3.1 produce an assessment of existing business objectives and plans  3.2 revise business plans to incorporate appropriate changes  3.4 prepare an action plan to implement the changes
LO4  Be able to examine the impact of change management on the operations of the business	4.1 report on the impact of the proposed changes on the business and its personnel  4.2 plan how the changes will be managed by the business  4.3 monitor improvements in the performance of the business over a given timescale

## Guidance

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### Links

This unit has links with other units such as:

- *Unit 7: Employability Skills*
- *Unit 9: Land Use Issues and Regulation*
- *Unit 21: Rural Planning and Development*
- *Unit 26: Rural Production Systems.*

### Essential requirements

It is essential for learners to be able to access realistic, contextualised case studies using data from sector-specific enterprises unless they are able to access this data from local enterprise and/or their own experience.

### Employer engagement and vocational contexts

Local small enterprises may consider advantages in sharing information in order to gain new thoughts to develop business opportunities and options.

Business links may provide some useful contact and materials to support development within this unit.



## Unit 46: Develop and Review a Marketing Policy

Unit code: R/503/1594

Level: 4

Credit value: 15

- Aim

The aim of this unit is to introduce learners to marketing products and services within their chosen sector. The unit involves making informed decisions to develop a marketing policy and then reviewing the policy once it has been carried out.

- Unit abstract

It is important when providing any service or product that it is marketed strategically and successfully to be purposeful and usually profitable for the organisation. This unit explores how to develop and review a marketing policy to ensure the success of the product or service, including reviewing the marketing process in order to develop and manage it.

- Learning outcomes

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

- 1 Understand the role of marketing
- 2 Be able to develop a marketing policy
- 3 Be able to manage a marketing activity
- 4 Understand the review process of marketing activities.

## Unit content

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### 1 Understand the role of marketing

*Marketing techniques:* identification of target groups; consumer/customer needs; reasons for using different techniques for different consumer groups;

*Principles of marketing:* segmentation; targeting; positioning to achieve differential or competitive advantage; elements of the marketing mix (price, place, promotion, product); Ansoff's matrix; service marketing

*Constraints on resources:* cost; availability; making a case for product development and marketing; resources available; cost-effectiveness; cost analysis; time; availability of personnel to carry out consumer research; risk factors of marketing a product; trial and error; use of expert opinion and advice; issues with suppliers; mitigation of risks

### 2 Be able to develop a marketing policy

*Target market identification:* consumer groups; market research; previous consumers of similar products; focus groups; trials; benefits to consumers; needs analysis

*Ways to market products:* cost-effectiveness; time-bound; specific marketing groups eg internet; shop/retail based; letter/flyer; local and national marketing; branding and special offers; associated and similar brands/products and services and methods of marketing these

*Resources needed:* production; packaging; delivery; sales and marketing materials; staffing; product researchers; other personnel such as project managers/product developers; individual roles and responsibilities of staff; when and where to get specialist advice; suppliers

### 3 Be able to manage a marketing activity

*Communication:* communicating policies to a range of personnel involved with the product from production staff to organisational proprietors; ways in which to communicate with different people; face to face; email; letter; telephone; Skype or conference call

*Selling products:* objectives of the product; importance of knowing the product thoroughly; consumer satisfaction; answering product queries; where to market it eg shop; show; internet only

*Evaluation of objectives, targets and criteria:* review set objectives; reasons for marketing the product in a specific way; target market and how to sell to it; regular review of objectives and targets

*Importance of branding:* individuality; copyright; eye-catching; memorable; advantages and disadvantages of current marketing promotions for similar brands/products

#### 4 Understand the review process of marketing activities

*Legal, regulatory and other constraints:* copyright when branding; protection act; sale of goods act; trade description act; consumer credit act

*Methods of communicating policies:* creating value and customers; new customers; existing customers; staff and personnel involved with the product

*Recommending further development:* strategic research; technical research; databank research; setting new objectives and targets

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1 Understand the role of marketing	1.1 evaluate techniques used to market products and services in the sector 1.2 analyse the main principles of marketing 1.3 assess risk factors associated with the marketing process 1.4 discuss potential constraints on resources used to carry out marketing activities
LO2 Be able to develop a marketing policy	2.1 identify target markets for the product or service 2.2 describe consumer groups, needs and benefits of using a product or service 2.3 identify cost-effective ways in which to market products or services 2.4 identify a work schedule from product development to marketing 2.5 identify resources needed to market a product/ service
LO3 Be able to manage a marketing activity	3.1 communicate the marketing policy to those involved with implementation 3.2 describe the most effective ways of selling the product 3.3 evaluate objectives, targets and criteria for successfully marketing a product or service 3.4 analyse the importance of branding and special identity of products
LO4 Understand the review process of marketing activities	4.1 evaluate legal, regulatory and other constraints affecting the marketing policy 4.2 analyse methods of communicating policy to those involved in implementation 4.3 make recommendation for further development of the marketing policy

## Guidance

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### Links

This unit introduces learners to developing and reviewing a marketing policy, and therefore has links to the following units:

- *Unit 2: Project Management for Land-based Industries*
- *Unit 42: Business Environment*
- *Unit 45: Small Business Enterprise.*

### Essential requirements

It is essential that learners are able to have access to word-processing equipment, up-to-date, current literature and journals related to business development and marketing, access to the internet. It is also important that learners are able to carry out market research in an appropriate setting and organisation.

### Employer engagement and vocational contexts

Delivery of this unit could be enhanced through using guest lecturers involved in marketing, such as company directors of both large and small organisations to give learners a balanced view of how it is carried out in day-to-day business.

It would be beneficial for learners to be involved in 'real life' market research using a variety of different consumer groups and strategies. This could be part of another project for their qualification (eg linked with project management unit) or carried out as a separate exercise.



## Unit 47: Manage Emergencies and Incidents in the Land-based Sector

Unit code: Y/503/1595

Level: 4

Credit value: 15

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- Aim

This unit aims to develop understanding of the practical management of emergencies and incidents in the land-based sector.

- Unit abstract

This unit covers anticipating and acting on incidents and emergencies in the land-based sector, and ensuring that correct and appropriate procedures are in place to manage them should they arise. The unit also includes ensuring that all staff are aware of the procedures, the correct actions to take, how and when to contact the emergency services, appropriate reports to prepare and disseminate, and the legal implications and requirements.

- Learning outcomes

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

- 1 Be able to manage incidents or emergencies in the land-based sector
- 2 Understand how to manage an incident or emergency in the land-based sector
- 3 Understand the procedures in place to deal with incidents or emergencies
- 4 Understand related legislative requirements involved with the management of incidents and emergencies.

## Unit content

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### 1 Be able to manage incidents or emergencies in the land-based sector

*Manage:* risk assess, anticipate problems, write policies, prepare procedures, estimate resources – human and financial, disseminate information to work force, instigate training, understand individual responsibilities, be aware of competence, health and safety, first aid, appropriate action, follow procedures, support others, COSHH, RIDDOR, report writing

*Incidents and emergencies:* fire, flood, contamination, rural crime, firearms, scenes of crime, accidents, first aid, medical emergencies

### 2 Understand how to manage an incident or emergency in the land-based sector

*Manage:* making safe environment, evacuation, secure safety zone, use of specialist health equipment/apparatus, isolate equipment, decommission for repair equipment, isolate, make safe for public, restrict access

### 3 Understand the procedures in place to deal with incidents or emergencies

*Procedures:* fire procedures, accident procedures, emergency procedures, contacting emergency services, evacuation, securing premises, giving location, map references, use of walkie-talkie radio, mobile phone

### 4 Understand related legislative requirements involved with the management of incidents and emergencies

*Related legislation:* eg COSHH, RIDDOR, PUWER, HASAWA, PPE, FEPA/COPR, Health and Safety at Work Act, moving and handling, Working at heights; HSE requirements; report writing (timescales, effective risk assessment, risk-assessment review)

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Be able to manage incidents or emergencies in the land-based sector	1.1 ensure that procedures are in place to deal with incidents and emergencies  1.2 oversee the allocation of resources to manage an incident or emergency  1.3 take appropriate action in the event of an incident or emergency  1.4 ensure that procedures are communicated to those who need to be informed  1.5 ensure that those who need to know can use appropriate emergency equipment  1.6 maintain own safety whilst dealing with an emergency or incident
LO2  Understand how to manage an incident or emergency in the land-based sector	2.1 examine details of incidents or emergencies that must be communicated to relevant emergency services  2.2 discuss appropriate ways to communicate procedures and instructions to others  2.3 explain the limits of own responsibility, authority and competence to deal with incidents and emergencies  2.4 evaluate the effectiveness of the procedures used in an incident or emergency
LO3  Understand the procedures in place to deal with incidents or emergencies	3.1 examine the procedures for dealing with incidents and emergencies  3.2 explain the procedures for contacting the emergency services  3.3 explain the importance of details that should be recorded and reported in the event of an incident or emergency  3.4 explain why these details should be recorded
LO4  Understand related legislative requirements involved with the management of incidents and emergencies	4.1 explain the legal requirements relating to an incident or emergency

## Guidance

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### Links

This unit links with many other units in this specification, particularly *Unit 17: Environmental Health Hazards* and *Unit 19: Habitat Restoration and Repair*.

### Essential requirements

It is essential that learners are able to demonstrate practical experience and skills in the management of emergencies and/or accidents with real examples, and give examples of policies and procedures that they have taken an active part in producing.

### Employer engagement and vocational contexts

Learners should demonstrate research and knowledge of policies and procedures in workplaces other than their own, and give examples of good practice if possible.

## Unit 48: Health and Safety in the Land-based Workplace

Unit code: D/503/1100

Level: 4

Credit value: 15

- Aim

The aim of this unit is to develop learners' understanding about their responsibilities in ensuring the health and safety of the land-based workplace and the people within it.

- Unit abstract

Health and safety is an essential consideration for all persons working within the land-based sector and this unit will enable learners to develop an understanding of the importance of continually monitoring the implementation of health and safety legislation and policies within a land-based setting.

Learners will gain a clear understanding of the implications of relevant legislation for their own role and the implementation of policies and systems in their own workplace. The importance of record keeping, monitoring and review health and safety policies and procedures will also be considered.

Elements of this unit should be contextualised, where possible, to an appropriate setting relevant to learners' workplace within the land-based sector.

- Learning outcomes

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

- 1 Understand how health and safety legislation is implemented in the land-based workplace
- 2 Understand how health and safety requirements impact on the land-based workplace
- 3 Understand the monitoring and review of health and safety in the land-based workplace.

## Unit content

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### 1 Understand how health and safety legislation is implemented in the land-based workplace

*Concept of risk, safety and security:* minimum risk, zero risk; risk for employees, customers, general public, visitors, trespassers ; public liability; hazard; accident prevention; first aid; security; machinery, equipment and implements; animals; plants; substances; risk and COSHH assessments; safe codes of practice; equipment; premises; storage; national occupational standards..

*Systems, policies and procedures for communicating information:* exemplar pro-formas; training; organisational culture; use of different media; exchange of information; record keeping; enforcement; compliance

*Responsibilities for management of health and safety:* organisational responsibilities (employers; employees including casual and fractional staff; external agencies; contractors; sub-contractors; external suppliers and service providers) monitoring and evaluating processes; auditing; inspecting the workplace; management structure and representation

*Legislative requirements:* current legislation, regulations and codes of practice relevant to health and safety in a land-based industry setting eg Health and Safety at Work Act 1974, Health and Safety (First Aid) Regulations 1981, Management of Health and Safety Regulations 1999, Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995, Control of Substances Hazardous to Health 2002, Manual Handling Operations Regulations 1992, Food Safety Act 1990, Food Safety (General Food Hygiene) Regulations 1995, Workplace (Health, Safety and Welfare) Regulations 1992, Disability Discrimination Act 1995, Food and Environment Act (FEPA) 1985; Health and Welfare at Work(Control of Vibration) Regulations 2006; Working at Height Regulations 2005; Control of Noise at Work Regulations 2005; Provision and Use of Work Equipment Regulations 1998; Health and Safety (Consultation with Employees) Regulations 1996, Pressure Systems Safety Regulations 2000, Lifting Operations and Lifting Equipment Regulations 1998

*Training and implementation:* pesticides storage and use; machinery including chainsaws, brushcutters, diggers, and ground maintenance machinery; manual handling; poisonous and hazardous plants; risk assessments; safe working practices; induction training; management and supervisor training including IOSH and NEBOSH; provision of personal protective equipment

**2 Understand how health and safety requirements impact on the land-based workplace**

*Work place planning:* static and mobile workplaces and teams; meeting needs of business; ensuring safety; principles of good practice; maintenance and monitoring procedures; staff training

*Dilemmas:* risk-benefit analysis; risk to self and others; resource implications; differing priorities between stakeholders; differences in priorities within both permanent and temporary work places

*Implications of non-compliance:* financial; legal; moral; physical; health; reputation

**3 Understand the monitoring and review of health and safety in the land-based workplace**

*Monitor and review:* active and reactive monitoring; audit of risks; review of practice; learning from experience; updating and implementation of policies and procedures; health surveillance; consultation.

*Positive health and safety culture:* individuals; teams; managers; organisational levels

*Own contributions:* responsibilities; compliance; training; practices; interactions with individuals, groups, agencies, contractors and sub-contractors

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
<p>LO1</p> <p>Understand how health and safety legislation is implemented in the land-based workplace</p>	<p>1.1 review systems, policies and procedures for communicating information on health and safety in a land-based workplace in accordance with legislative requirements</p> <p>1.2 assess the responsibilities in a specific land-based workplace for the management of health and safety in relation to organisational structures</p> <p>1.3 analyse health and safety priorities appropriate for a specific land-based workplace</p>
<p>LO2</p> <p>Understand how health and safety requirements impact on the land-based workplace</p>	<p>2.1 analyse how information from risk assessment informs planning for individuals and organisational decision making</p> <p>2.2 analyse the impact of one aspect of health and safety policy on land-based practice</p> <p>2.3 discuss how dilemmas encountered in relation to implementing systems and policies for health, safety and security may be addressed</p> <p>2.4 analyse the effect of non-compliance with health and safety legislation in a land-based workplace</p>
<p>LO3</p> <p>Understand the monitoring and review of health and safety in the land-based workplace</p>	<p>3.1 explain how health and safety policies and practices are monitored and reviewed</p> <p>3.2 analyse the effectiveness of health and safety policies and practices in the workplace in promoting a positive, healthy and safe culture</p> <p>3.3 evaluate own contributions to ensuring the health and safety needs of individuals</p>

## Guidance

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### Links

Within this unit there are direct links to the land-based professional bodies and national occupational standards and professional guidance that they oversee and implement which include the following areas and industries: horticulture, agriculture, equine; arboriculture, countryside management, floristry and animal management.

This unit has links with all of units as health and safety forms a key component within all of them. However it also has direct links to other health and safety units such as Health and Safety Site Supervisors.

### Essential requirements

Tutors must be conversant with the application of health and safety legislation in relevant settings. The learner's evaluative account of one aspect of health and safety in the workplace must be validated. This could be in the form of a witness statement from a workplace supervisor, or an observation record from their assessor.

Learners must be given the opportunity to carry out a risk assessment within the workplace. Ideally this would be in a setting relevant to their occupational sector, but if this is not possible a simulation of the setting will suffice. Access to IT, internet facilities, library resources including occupational magazines is also required.

### Employer engagement and vocational contexts

Visiting speakers from relevant settings and health and safety specialists would help learners to understand of legislative requirements and their management – especially for those learners undertaking a simulated risk assessment. Also work placements within the students chosen field should also be encouraged which will them to undertake risk assessments within an industrial setting but also give them scope for further research and investigation.



## Unit 49: Visitor Attraction Management

Unit code: R/601/1758

Level: 4

Credit value: 15

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- Aim

This unit aims to give learners an understanding of the range and importance of visitor attractions in the land-based sector, factors affecting their successful establishment and development, and the impact of management techniques on their sustainability.

- Unit abstract

Visitor attractions are an increasingly significant feature within the land-based sector, especially as public interest in the environment, conservation and sustainability continues to develop.

This unit gives learners a broad understanding of the nature, development and management of visitor attractions within the sector. The unit highlights the range of visitor attractions within the land-based sector, their importance at a local, regional, national and sometimes international level, and the potential conflicts between the different reasons underpinning their existence.

Learners will investigate the different types of visitor, their needs and motivations, and the impacts of visitors on different types of attraction, as well as gaining an understanding of the relevant tourism theories. The unit also enables learners to explore the development process for establishing a new visitor attraction.

Learners will review the techniques available to managers of visitor attractions and the impact of these techniques on the sustainability of the attraction.

- Learning outcomes

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

- 1 Understand the scope and importance of visitor attractions
- 2 Understand visitor types, impacts and tourist motivation theories
- 3 Understand issues affecting the development process in visitor attraction management
- 4 Understand the application of management techniques and their impact on sustainability.

## Unit content

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### 1 Understand the scope and importance of visitor attraction

*Scope:* purpose built attractions, eg zoo, botanical gardens, farm park, countryside centre; built or established with another primary purpose that have become visitor attractions, eg historic estates and gardens, forests and woodland; natural attractions, eg coastal areas, National Parks, lakes and rivers; purpose of attraction eg educational, entertainment, recreational, conservation, species protection, cultural development, for health and wellbeing, community engagement; overlaps of scope and/or purpose, eg a natural attraction that includes a purpose built feature, attractions which have multiple purposes; tensions between purposes, eg conservation and recreation

*Importance:* for conservation purposes (locally, regionally, nationally, internationally); educational benefits; cultural and heritage; to the local, regional and national economy; to the local community, eg employment opportunities, changes to transport routes, business opportunities, attracting tourism

### 2 Understand visitor types, impacts and tourist motivation theories

*Visitor types:* market segmentation, eg demographic, geographic, socio economic; special interests, characteristics and profile; individuals and groups (organised, eg clubs, societies, schools, interest groups; ad hoc eg family, friends)

*Visitor needs and motivations:* facilities required, eg access, transport and parking, hospitality, signage and interpretation; reasons for visiting, eg entertainment, recreation, education, special interest

*Impact of tourism:* negative impacts, eg congestion, pollution, increased risk of accidents, damage or disturbance to flora and fauna, overcrowding, erosion, increased demand for facilities, requirement for maintenance, effects of visitors on captive animals, birds or aquatic species; positive impacts eg income, increased public awareness, opportunities for support, source of potential volunteers

*Tourist motivation theories:* theories eg 'responsible tourism' (Goodwin, 1998), the 'smart consumer' (Voase, 2002)

### 3 Understand issues affecting the development process in visitor attraction management

*Issues:* location eg natural, aesthetics, existing amenities; opportunities; incentives, transport routes, access, catchment areas, restrictions on land use; land and reclamation; technology; legislation; pollution eg air, water, land, visual, noise; health and safety implications; funding eg private sector, public sector (local, regional, UK, EU), grants, loans, membership schemes; stakeholders; attraction management; tourism consultants; local authorities; local communities; tourist boards; private enterprise; public sector; pressure groups; organisations eg National Trust, English Heritage, Natural England, The Forestry Commission, Environment Agency, Department for Environment, Food and Rural Affairs (Defra), British Waterways, Sport England

*Development Process:* processes eg project management, feasibility study, market research, design, local community involvement, planning applications, construction period, landscaping, establishment of plants and animals, planning visitor routes and walkways, access and signposting, information and educational facilities, facilities and amenities, recruitment, training, marketing, opening event, customer care, crowd management, reservations and ticketing, internal and external communication

### 4 Understand the application of management techniques and their impact on sustainability

*Supply:* services eg visitor flows, flexible capacity (extended opening hours, peak strategies – specific time slots, differentiated pricing, increased staff levels, additional tills/eating area, identified routes within attraction, use of zoning, multi-skilling of staff); increasing capacity (additional buildings/attractions/facilities); security, health and safety

*Demand:* influence the number, characteristics or behaviour of visitors including price incentives, loyalty discounts/season tickets, payment structure (eg all inclusive ticket, payment for different parts of the attraction, payment according to time required), marketing, interpretation, education

*Renewal:* product life cycle, visitor expectations, passive and active modes of delivery; innovation eg new adventure, new theme, new area; addition of extra facilities and services, eg concerts and plays in historical gardens, 'behind the scenes' experiences in zoos and animal parks

*Sustainability:* economic (international, national, regional, local); visitor expectations (negative impacts result in lack of repeat business); social eg heritage, culture, lifestyle; environmental eg conflict between conservation and recreation, conflict between visitor numbers/access and preservation of natural attraction; visitor education to promote sustainability within the attraction eg use of recycling, avoiding flash photography, use of public transport, use of recognised walkways, involvement in maintenance of the attraction through volunteer work

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1 Understand the scope and importance of visitor attractions	1.1 discuss the overlap of visitor attractions to particular types of attraction 1.2 analyse the importance of different visitor attractions
LO2 Understand visitor types, impacts and tourist motivation theories	2.1 evaluate the needs and motivations of different visitor types 2.2 evaluate impacts of tourism on visitor attractions 2.3 analyse the effect of different theories of tourist motivation on the management of visitor attractions
LO3 Understand issues affecting the development process in visitor attraction management	3.1 discuss processes and potential issues involved in the development of visitor attractions
LO4 Understand the application of management techniques and their impact on sustainability	4.1 analyse different visitor management strategies 4.2 evaluate management techniques in relation to sustainability

## Guidance

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### Links

This unit links with *Unit 44: Work-based Experience*.

### Essential requirements

Visits to a variety of attractions within the land-based sector are essential.

To ensure learners have the opportunity to visit a range of visitor attractions, costs must be identified in advance and learners made aware of them. Where possible, learners should visit at least one purpose-built attraction, one non-purpose-built, a natural attraction and an event. This will show learners the range of attractions, similarities and differences, and also, of particular importance, issues in relation to management of attractions.

### Employer engagement and vocational contexts

Tutors could establish links with nearby visitor attractions as appropriate to the sector. It would be particularly useful to establish links with a relatively new or developing attraction if possible, to enable learners to appreciate the range of considerations in establishing, developing and managing an attraction. It would also be of benefit to establish a link with a nationally important attraction, such as the Eden Project, Kew Gardens or Longleat Safari Park as well as attractions run on a much smaller scale such as a local farm park, countryside centre or historical gardens.

The unit is especially appropriate for fieldwork-based investigation and a portfolio of research could form part of the assessment. Learners should be given the opportunity to meet managers/employees of visitor attractions. Such contacts could be useful data resources for learner research. Case study materials on visitor attractions in the UK and worldwide are recommended. National Parks authorities, English Heritage and National Trust are good sources of research materials.



## Unit 50: Arboricultural Management

Unit code: K/503/1438

Level: 5

Credit value: 15

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- Aim

This unit aims to develop learners understanding of tree management. Learners will develop their ability to survey trees and understand fundamental practices essential to high quality tree management.

- Unit abstract

Trees deliver a range of tangible social, environmental and economic benefits to our lives. This unit is designed to give the learner an understanding of how high quality arboricultural management can help realise these benefits. Research informed best practice is emphasised throughout the unit as the management of both young and mature trees is researched. Learners will develop their understanding of the criteria essential for tree establishment, skills in tree surveying and assessment and experience of recommending management interventions to meet specific arboricultural needs.

- Learning outcomes

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

- 1 Understand the value of trees
- 2 Understand the process of tree establishment
- 3 Be able to survey trees for a specific purpose
- 4 Understand the practical management of trees.

## Unit content

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### 1 Understand the value of trees

*Environmental benefits of trees:* the habitat value of trees; moderation of local climate by trees; the value of trees in reducing urban flooding and sustainable urban drainage systems (SUDS); trees and air quality; the evidence base for the environmental benefits of trees

*Social benefits of trees:* aesthetic value of trees; psychological benefits of trees; community projects involving trees; trees, green infrastructure and public health; the evidence base for the social benefits of trees

*Economic benefits of trees:* direct employment in tree management; products from trees; enhanced landscape character and increased property prices in relation to trees; link between quality landscape character and inward investment; reduced energy bills, prevention of flooding; the evidence base for the economic benefits of trees

### 2 Understand the process of tree establishment

*Tree selection criteria:* species selection for urban trees; application of ecophysiology in tree species selection; ensuring high quality tree stock and tree specification; bare-root, containerised and root-balled trees; tree handling prior to planting

*Tree rooting environment:* assessment of soil conditions; linking available soil volume to potential mature tree size; enhancing soil volume, promoting soil ecology

*Tree planting and aftercare:* best practice in planting; urban tree pits, staking and guying; tree protection; aftercare and maintenance (mulching, irrigation, formative pruning); reducing conflict with urban infrastructure; establishment problems caused by poor planting practice; research informed practice

### 3 Be able to survey trees for a specified purpose

*Collecting and recording tree data:* selection of appropriate tree data to meet required outcomes (species, height, girth, canopy spread, location, proximity to infrastructure); measurement of trees; survey criteria informed by British Standards (BS5837); standard tree survey equipment; recording tree data; use of geographical information systems (GIS) in tree data collection

*Assessment of tree condition:* Visual Tree Analysis (VTA); biological factors associated with tree hazards, biomechanical factors associated with tree hazards; targets; hazard rating systems; chlorophyll fluorescence as an aid to tree assessment

*Using tree data to inform tree management strategies and recommendations:* the value of tree inventories; strategic management of tree populations in the built environment; managing hazardous trees; use of tree data to assess the contribution of tree populations to local ecosystem services; justification of tree management recommendations using tree data

#### 4 Understand the practical management of trees

*The legal framework for arboricultural operations:* health and safety legislation and best practice in relation to tree work; statutory protection of trees (Tree Preservation Orders and Conservation Areas); environmental and habitat protection laws and their impact on arboricultural operations

*Standards for tree work:* British Standard 3998:2010 Tree Work Recommendations; British Standard 5837:2005 Trees in Relation to Construction – Recommendations

*Canopy maintenance:* equipment for canopy maintenance; canopy access and tree climbing techniques; pruning - natural target pruning, crown reductions, crown lifting, crown thinning, deadwood management; support systems (bracing, guying, propping); significance of poor practices such as topping trees, flush cuts and stub cuts; managing trees for habitat; research informed practice

*Managing the rooting environment:* mulching, tree nutrition and fertilisation, managing soil compaction; specialist equipment for soil injection and soil decompaction; soil water relations; tree irrigation; research informed practice

## Learning outcomes and assessment criteria

Learning outcomes  On successful completion of this unit a learner will:	Assessment criteria for pass  The learner can:
LO1  Understand the value of trees	1.1 explain environmental benefits of trees  1.2 explain the social benefits of trees  1.3 explain the economic benefits of trees  1.4 analyse methods which may be used to assess the benefits of trees
LO2  Understand the process of tree establishment	2.1 explain the selection of tree species and stock type suitable for a range of conditions found in built environments  2.2 evaluate the tree rooting environment for a specified location  2.3 outline management approaches which would enhance the rooting environment for young trees  2.4 examine best practice in urban tree establishment
LO3  Be able to survey trees for a specified purpose	3.1 collect and record data relating to trees  3.2 produce a detailed assessment of tree condition  3.3 use tree data to support tree management decisions  3.4 evaluate the use of tree survey equipment
LO4  Understand the practical management of trees	4.1 outline the legal framework for arboricultural operations  4.2 explain the application of British Standards to tree management scenarios  4.3 recommend canopy management to specified trees in a built environment  4.4 recommend arboricultural operations to enhance the rooting environment of an identified tree  4.5 examine how research has informed practice in arboriculture

## Guidance

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### Links

This unit is discrete in its scope and has no pre-requisites. However, learners may be able to apply knowledge gained in *Unit 10: Environmental Management*, *Unit 18: Habitat Management* and *Unit 19: Habitat Restoration and Repair*.

### Essential requirements

Access to a range of trees in urban and peri-urban environments is essential for the delivery of this unit. An extensive arboricultural library supported by electronic resources which facilitate access to primary literature in plant sciences, arboriculture and urban forestry is also essential. Unit tutors must have a higher education qualification in arboriculture and experience of managing trees in urban environments. Specialist arboricultural equipment is highly desirable but excellent vocational links may mitigate the need for a full range of specialist arboricultural equipment.

### Employer engagement and vocational contexts

This unit offers excellent opportunities to engage employers and arboricultural professionals. A field trip to an amenity tree nursery will be valuable. Companies engaged in developing products for urban tree planting, tree health care and other specialist equipment providers enhance learning. Professionals from both local authorities and private practice involved with managing urban trees could also support the delivery of this unit. Learners may also wish to engage with professional bodies and trade associations such as the *Institute of Chartered Foresters*, the *International Society of Arboriculture* and the *Arboricultural Association*.