

Cambridge TECHNICALS LEVEL 3

APPLIED SCIENCE

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Unit 14

Environmental management

J/507/6161

Guided learning hours: 60

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ENVIRONMENT
AGENCY

LEVEL 3

UNIT 14: Environmental management

J/507/6161

Guided learning hours: 60

Essential resources required for this unit: Access to environmental surveying data

This unit is internally assessed and externally moderated by OCR.

UNIT AIM

In this unit, you will study the legal and regulatory frameworks underpinning environmental management practice and specific issues of importance. These will include water quality management, managing industrial and natural environments and environmental assessments and reporting.

You will study environmental management, from small scale, local issues to larger, national and international infrastructure developments, analysing and proposing solutions to key environmental questions in a scientifically and logically sound manner.

You will carry out an environmental survey of a site or sites using environment testing techniques on water, air, soil, diversity of flora and fauna. You will report on your findings to relevant authorities such as land owners or local authorities.

TEACHING CONTENT

The teaching content in every unit states what has to be taught to ensure that learners are able to access the highest grades.

Anything which follows an i.e. details what must be taught as part of that area of content. Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples in their work, although these do not need to be the same ones specified in the unit content.

For internally assessed units you need to ensure that any assignments you create, or any modifications you make to an assignment, do not expect the learner to do more than they have been taught, but must enable them to access the full range of grades as described in the grading criteria.

Learning outcomes	Teaching content
The Learner will:	Learners must be taught:
1 Understand principal characteristics of environments	<p>1.1 Principal biomes i.e.:</p> <ul style="list-style-type: none"> • deserts • forests • grasslands • tundra • polar • aquatic <p>1.2 Built environments i.e.:</p> <ul style="list-style-type: none"> • urban • industrial • transport networks <p>1.3 Principal characteristics of environments i.e.:</p> <ul style="list-style-type: none"> • geographical location • climate • seasonality (e.g. temperature ranges, humidity, light) • geology and soil • aquatic (e.g. pond/lakes, stream/river, estuarine, marine) • chemical (e.g. salinity, pH) • atmosphere • plant and animal life <p>1.4 Lifecycles of built environments (e.g. plan, construct, use, decommission/redevelop)</p>

Learning outcomes	Teaching content
The Learner will:	Learners must be taught:
<p>2 Be able to identify pollution in the environment</p>	<p>2.1 Natural and human-generated pollutants, i.e.:</p> <ul style="list-style-type: none"> • air-borne <ul style="list-style-type: none"> ○ harmful gases (e.g. industrial emissions, transport emissions, agricultural emissions, natural emissions - volcanic/radon) ○ dust and particles (e.g. industrial particulates, agricultural, natural particles) • water-borne (e.g. Industrial chemicals, agricultural run-off, ground and surface water exchange) • soil-borne (e.g. heavy-metal contaminants, biological contamination) <p>2.2 To apply safe working practices in the field and laboratory i.e.:</p> <ul style="list-style-type: none"> • health and safety (risk assessment) <p>2.3 Data collection techniques i.e.:</p> <ul style="list-style-type: none"> • sampling • qualitative and quantitative laboratory techniques <p>2.4 Recording Information i.e.:</p> <ul style="list-style-type: none"> • qualitative and quantitative data • systematic recording
<p>3 Understand how legislation, regulation and agreements impact on managing natural and built environments</p>	<p>3.1 Natural and built environment legislation, regulation and agreements i.e.:</p> <ul style="list-style-type: none"> • Domestic (UK) • EU • Supra-national <p>3.2 How legislation affects the management of natural and built environments i.e.:</p> <ul style="list-style-type: none"> • environmental protection • town and country planning • water protection and management • air quality management • disposal of dangerous waste
<p>4 Understand environmental management assessments</p>	<p>4.1 Environmental management assessments i.e.:</p> <ul style="list-style-type: none"> • ecological footprinting <ul style="list-style-type: none"> ○ local ○ global • product life cycle assessment (e.g. environmental impact of pre-production, production and use, disposal, recycling.) • environmental impact assessment <ul style="list-style-type: none"> ○ Legislation ○ Purpose ○ Stages

Learning outcomes	Teaching content
The Learner will:	Learners must be taught:
<p>5 Be able to carry out and report outcomes of an environmental management study</p>	<p>5.1 Identify purpose of environmental management study i.e.:</p> <ul style="list-style-type: none"> • scope • environments • evidence • management techniques • target audience (e.g. investors, industry, local communities, governmental or inter-governmental bodies) <p>5.2 Use environmental management assessment techniques (e.g. ecological footprinting, product life cycle assessment, environmental impact assessment)</p> <p>5.3 Interpret and report on outcomes of environmental management study i.e.:</p> <ul style="list-style-type: none"> • Present conclusions and recommendations relevant to the target audience

GRADING CRITERIA

LO	Pass	Merit	Distinction
	The assessment criteria are the Pass requirements for this unit.	To achieve a Merit the evidence must show that, in addition to the Pass criteria, the candidate is able to:	To achieve a Distinction the evidence must show that, in addition to the pass and merit criteria, the candidate is able to:
1. Understand principal characteristics of environments	*P1: Describe principal characteristics of a natural environment		
	*P2: Describe a lifecycle of a built environment		
2. Be able to identify pollution in the environment	*P3: Conduct safety assessments of field activity and laboratory activities		
	*P4: Carry out an environmental investigation, to include field and laboratory work which produces both qualitative and quantitative data	M1: Analyse results from the investigation in P4	
3. Understand how legislation, regulation and agreements impact on managing natural and built environments	*P5: Describe how domestic or EU legislation impacts on the management of an environment		
	*P6: Describe how natural or built environments are influenced by Supra-national agreements		
4. Understand environmental management assessments	*P7: Describe a case study of the use of one environmental management assessment technique	M2: Evaluate the use of the environmental management assessment technique in P7 in terms of its advantages, disadvantages and consequences	

LO	Pass	Merit	Distinction
5. Be able to carry out and report outcomes of an environmental management study	*P8: Provide a report on at least one environmental management case study for a given target audience	M3: Justify the suitability of the report for the target audience in terms of the environmental management technique, and the level and scope of the content	D1: Critically reflect on the report, and recommend changes to present the environmental management case study for other audiences
	*P9: Describe how the report is made relevant to the given target audience		

ASSESSMENT GUIDANCE

LO1 Understand principal characteristics of environments

For P1, learners could produce a short presentation or report on the environments of choice. They should include in a clear manner the key points in LO1, either as a narrative or bullet points.

For P2, a poster presentation or online page would be a suitable medium, presenting the life-cycle graphically or in text form.

LO2 Be able to identify pollution in the environment

Learners should identify a site or more than one site for comparison purposes and carry out appropriate pollution tests e.g. the use of indicator species, water quality, biodiversity, building erosion. They may choose to present this to an audience such as a manufacturer or land owner.

LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments

For P5, learners could prepare individual literature reviews of legislation and protocols. Since this is a wide area, learners could individually focus on one given aspect each (for example planning regulations, chemical regulations, water quality protocols).

LO4 Understand environmental management assessments

This learning outcome can be addressed through relevant employer or organisation-led case studies in environmental management, with, for P7, learners describing the management technique applied, to include how it was used in the particular case. M2 then requires a more in-depth analysis, looking at the suitability of the technique and its consequences, in terms of, for example, environmental impacts, employer or organisation behaviours and policies and community impacts.

LO5 Be able to carry out and report outcomes of an environmental management study

To achieve P8, learners must submit a report, presentation or similar material describing the process and outcomes of a given environmental management case study. The material may either be submitted individually, or learners may work in groups. It is however, essential that the individual contributions are both made clear, and have sufficient content to warrant a pass. An important point of P8 is that the report must be targeted at a given audience or readership. Examples include: Industry investors, planning officers, general public meetings and briefings for broadcast media.

The case study used for P7 may be used.

For P9 and M3, the learner must describe (P9) and justify (M3) how the report in P8 addresses the target audience. Example points to look for include:

- Appropriate language – e.g. use non-technical terms for the general public, media and similar, whereas planning officers will be familiar with, and will expect, more technical language.
- Appropriate content – e.g. investors will be looking for financial details and financial risks, whereas the general public may be more interested in how the case study directly affects their lives (eg, through increased pollution)
- Appropriate structure – e.g. are the core points of the report made clear? Are they set in context?

Criterion D1 requires the learners to critically reflect on the report or presentation, assessing, for example, its effectiveness with respect to the target audience. Additionally, learners must reflect on how the report would need to be changed in order to address a different audience (for example, if the original report was aimed at investors, how would need to be changed to address the needs of the media? It is not necessary to re-write the report, however, brief examples of sentences, short paragraphs or other content should be provided

Feedback to learners: you can discuss work-in-progress towards summative assessment with learners to make sure it's being done in a planned and timely manner. It also provides an opportunity for you to check the authenticity of the work. You must intervene if you feel there's a health and safety risk.

Learners should use their own words when producing evidence of their knowledge and understanding. When learners use their own words it reduces the possibility of learners' work being

identified as plagiarised. If a learner does use someone else's words and ideas in their work, they must acknowledge it, and this is done through referencing. Just quoting and referencing someone else's work will not show that the learner knows or understands it. It has to be clear in the work how the learner is using the material they have referenced to inform their thoughts, ideas or conclusions.

For more information about internal assessment, including feedback, authentication and plagiarism, see the centre handbook. Information about how to reference is in the OCR Guide to Referencing available on our website: <http://www.ocr.org.uk/i-want-to/skills-guides/>.

*SYNOPTIC ASSESSMENT

When learners are taking an assessment task, or series of tasks, for this unit they will have opportunities to draw on relevant, appropriate knowledge, understanding and skills that they will have developed through other units. We've identified those opportunities in the grading criteria (shown with an asterisk) and provided more detail in the assessment guidance. Learners should be encouraged to consider for themselves which skills/knowledge/understanding are most relevant to apply where we have placed an asterisk.

*During the assessment of this unit, learners will benefit from using learning from the following units and Learning Outcomes:

Name of other unit and related LO	This unit:
Unit 1 Science fundamentals LO1 Understand the chemical structures of elements and compounds LO2 Understand reactions in chemical and biological systems LO4 Understand the principles of carbon chemistry LO5 Understand the importance of inorganic chemistry in living systems	LO2 Be able to identify pollution in the environment (P3, P4) Learners will identify a site or more than one site for comparison purposes and carry out appropriate pollution tests e.g. the use of indicator species, water quality, biodiversity, building erosion. In doing so they will use the fundamental knowledge in Unit 1.
Unit 2 Laboratory techniques LO1 Understand the importance of health and safety and quality systems to industry LO4 Be able to examine and record features of biological samples	LO1 Understand principal characteristics of environments (P1, P2) LO2 Be able to identify pollution in the environment (P3) LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments (P5, P6) LO5 Be able to carry out an environmental management study (P8) Learners will follow industry recognised standard procedure and, as part of an environmental management study will need to identify biological samples of plants and animals including microorganisms

Name of other unit and related LO	This unit:
Unit 3 Scientific analysis and reporting LO1 Be able to use mathematical techniques to analyse data LO2 Be able to use graphical techniques to analyse data LO3 Be able to use keys for analysis LO4 Be able to analyse and evaluate the quality of data LO5 Be able to draw justified conclusions from data	LO2 Be able to identify pollution in the environment (P3) LO4 Understand environmental management assessment (P7) LO5 Be able to carry out an environmental management study (P8) Learners will use many of the learning outcomes in Unit 3 when identifying pollution in the environment and carrying out an environmental management study
Unit 6 Control of hazards in the laboratory LO1 Understand the types of hazard that may be encountered in a laboratory LO2 Be able to use health and safety procedures to minimise the risk presented by hazards in a laboratory	LO2 Be able to identify pollution in the environment (P3) LO5 Be able to carry out an environmental management study (P8) While testing for pollution in the environment learners will apply health and safety procedures to minimize risks as assessed within Unit 6.
Unit 13 Environmental surveying LO1 Understand environmental impacts of human activity and natural processes LO2 Understand environmental surveying LO3 Be able to use field and laboratory techniques to conduct an environmental investigation	LO1 Understand principal characteristics of environments (P1, P2) LO2 Be able to identify pollution in the environment (P3) LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments (P5, P6) LO4 Understand environmental management assessment (P7) LO5 Be able to carry out an environmental management study (P8)
Unit 15 Sustainability and renewable energy LO1 Understand the impacts of energy consumption	LO1 Understand principal characteristics of environments (P1, P2) LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments (P5, P6) LO4 Understand environmental management assessment (P7)

Name of other unit and related LO	This unit:
<p>Unit 16 Waste management</p> <p>LO1 Understand how to manage waste</p> <p>LO2 Understand how to manage air emissions</p> <p>LO3 Understand how waste water is managed</p> <p>LO4 Be able to test air and water emissions</p>	<p>LO1 Understand principal characteristics of environments (P1, P2)</p> <p>LO2 Be able to identify pollution in the environment (P3)</p> <p>LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments (P5, P6)</p> <p>LO4 Understand environmental management assessment (P7)</p> <p>LO5 Be able to carry out an environmental management study (P8)</p>
<p>Unit 17 Food technology</p> <p>LO3 Understand the importance of quality control in food manufacture</p>	<p>LO2 Be able to identify pollution in the environment (P3)</p>
<p>Unit 18 Microbiology</p> <p>LO1 Be able to classify and identify microorganisms</p> <p>LO2 Understand the use of microorganisms in agriculture</p>	<p>LO1 Understand principal characteristics of environments (P1, P2)</p> <p>LO2 Be able to identify pollution in the environment (P3)</p> <p>LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments (P5, P6)</p> <p>LO4 Understand environmental management assessment (P7)</p> <p>LO5 Be able to carry out an environmental management study (P8)</p>

Name of other unit and related LO	This unit:
<p>Unit 19 Crop production and soil science</p> <p>LO1 Understand how common crops are grown for commercial production in the UK</p> <p>LO2 Understand factors affecting the growth of crops</p> <p>LO3 Be able to monitor the growth of a crop plant species</p> <p>LO4 Be able to carry out soil testing</p>	<p>LO1 Understand principal characteristics of environments (P1, P2)</p> <p>LO2 Be able to identify pollution in the environment (P3)</p> <p>LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments (P5, P6)</p> <p>LO4 Understand environmental management assessment (P7)</p> <p>LO5 Be able to carry out an environmental management study (P8)</p> <p>Learners will test soil quality as part of a pollution study which will lead to conclusions on the effects of plant growth which can include crops. Agriculture is highly regulated in how chemicals such as pesticides and fertilizers are used and unit 19 complements this unit if learners wish to focus on agriculture aspects.</p>

<p>Unit 20 Conservation of biodiversity</p> <p>LO1 Understand the importance of conserving and monitoring natural resources</p> <p>LO2 Understand the value of global biodiversity</p> <p>LO3 Understand the factors that threaten global biodiversity</p> <p>LO4 Be able to investigate the efficacy of practical measures to conserve biodiversity</p>	<p>LO1 Understand principal characteristics of environments (P1, P2)</p> <p>LO2 Be able to identify pollution in the environment (P3)</p> <p>LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments (P5, P6)</p> <p>LO4 Understand environmental management assessment (P7)</p> <p>LO5 Be able to carry out an environmental management study (P8)</p> <p>As part of the environmental management study, learners will identify all species within a particular habitat to further identify at risk species leading to conclusions which will include recommendations on how to protect and conserve at risk species.</p>
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To find out more
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