

Cambridge TECHNICALS LEVEL 3

APPLIED SCIENCE

Cambridge
TECHNICALS
2016

Unit 14 – Environmental management
DELIVERY GUIDE

Version 2

ENVIRONMENT
AGENCY

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INTRODUCTION

This Delivery Guide has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic. The Guide is structured by learning outcome so you can see how each activity helps you cover the requirements of this unit.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resources.feedback@ocr.org.uk.

OPPORTUNITIES FOR ENGLISH AND MATHS SKILLS DEVELOPMENT AND WORK EXPERIENCE

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. We've also identified any potential work experience opportunities within the activities. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.



English



Maths



Work

Please note

The activities suggested in this Delivery Guide **MUST NOT** be used for assessment purposes. The timings for the suggested activities in this Delivery Guide **DO NOT** relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk. The latest version of this Delivery Guide can be downloaded from the OCR website.

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.

Unit 14 Environmental management

LO1	Understand principal characteristics of environments
LO2	Be able to identify pollution in the environment
LO3	Understand how legislation, regulation and agreements impact on managing natural and built environments
LO4	Understand environmental management assessments
LO5	Be able to carry out and report outcomes of an environmental management study

To find out more about this qualification, go to: <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-technicals-applied-science-level-3-certificate-extended-certificate-foundation-diploma-diploma-extended-diploma-05847-05849-05879-05874-2016-suite/>

Cambridge
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2016

2016 Suite

- New suite for first teaching September 2016
- Externally assessed content
- Eligible for Key Stage 5 performance points from 2018
- Designed to meet the DfE technical guidance

RELATED ACTIVITIES

The Suggested Activities in this Delivery Guide listed below have also been related to other Cambridge Technicals in Applied Science units/Learning Outcomes (LOs). This could help with delivery planning and enable learners to cover multiple parts of units.

This unit (Unit 14)	Title of suggested activity	Other units/LOs		
LO1	Characterising your environment 1 – the natural biome	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes	
		Unit 20 Conservation of biodiversity	LO1 Understand the importance of conserving and monitoring natural resources LO2 Understand the value of global biodiversity LO3 Understand the factors that threaten global biodiversity	
	Characterising your environment 2 – the human dimension Built environment lifecycles 1 – what factors do you need to think about? Built environment lifecycles 2 – from plans to structures	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes	
		Unit 15 Sustainability and renewable energy	LO1 Understand the impacts of energy consumption	
		Unit 16 Waste management	LO1 Understand how to manage waste LO2 Understand how to manage air emissions LO3 Understand how waste water is managed	
	What factors affect environments?	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes	
		Unit 20 Conservation of biodiversity	LO3 Understand the factors that threaten global biodiversity	
	Built environment lifecycles 3 – decommissioning	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes	
		Unit 15 Sustainability and renewable energy	LO1 Understand the impacts of energy consumption	
		Unit 16 Waste management	LO1 Understand how to manage waste LO2 Understand how to manage air emissions LO3 Understand how waste water is managed	
		Unit 20 Conservation of biodiversity	LO3 Understand the factors that threaten global biodiversity	
	LO2	Human versus natural pollution?	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes
			Unit 14 Environmental management	LO1 Understand principal characteristics of environments
		Defining an investigation into pollution 1 – what do you want to find?	Unit 1 Science fundamentals	LO1 Understand the chemical structures of elements and compounds LO2 Understand the reactions in chemical and biological systems
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	
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 environmental investigations	
Unit 14 Environmental management			LO1 Understand principal characteristics of environments	
Unit 16 Waste management			LO1 Understand how to manage waste LO2 Understand how to manage air emissions LO3 Understand how waste water is managed LO4 Be able to test air and water emissions	

This unit (Unit 14)	Title of suggested activity	Other units/LOs	
LO2	Defining an investigation into pollution 2 – how will you do it?	Unit 1 Science fundamentals	LO1 Understand the chemical structures of elements and compounds LO2 Understand the reactions in chemical and biological systems
		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
		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
		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 environmental investigations
		Unit 14 Environmental management	LO1 Understand principal characteristics of environments
		Unit 16 Waste management	LO1 Understand how to manage waste LO2 Understand how to manage air emissions LO3 Understand how waste water is managed LO4 Be able to test air and water emissions
	Health and safety in the investigation	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
	Recording data What did you find?	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
	Unit 13 Environmental surveying	LO3 Be able to use field and laboratory techniques to conduct environmental investigations	
LO3	What is the value of legislation and regulation on the environment? A hierarchy of regulations Enforcing regulation 1 – domestic Enforcing regulation 2 – global	Unit 2 Laboratory techniques	LO1 Understand the importance of health and safety and quality systems to industry
		Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes LO2 Understand environmental surveying
		Unit 16 Waste management	LO2 Understand how to manage air emissions LO3 Understand how waste water is managed LO4 Be able to test air and water emissions
		Unit 20 Conservation of biodiversity	LO3 Understand the factors that threaten global biodiversity
	Where is regulation used? 1 – the natural environment	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes LO2 Understand environmental surveying
		Unit 20 Conservation of biodiversity	LO3 Understand the factors that threaten global biodiversity

This unit (Unit 14)	Title of suggested activity	Other units/LOs	
	Where is regulation used? 2 – the human environment	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes LO2 Understand environmental surveying
		Unit 16 Waste management	LO2 Understand how to manage air emissions LO3 Understand how waste water is managed LO4 Be able to test air and water emissions
LO4	What is an environmental management assessment?	Unit 3 Scientific analysis and reporting	LO4 Be able to analyse and evaluate the quality of data
		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 environmental investigations
		Unit 14 Environmental management	LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments
	What is your ecological footprint?	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
		Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes
		Unit 14 Environmental management	LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments
		Unit 20 Conservation of biodiversity	LO4 Be able to investigate the efficacy of practical measures to conserve biodiversity
	The product lifecycles of common items	Unit 14 Environmental management	LO1 Understand principal characteristics of environments LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments
	Environmental impact assessments in international development	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes
		Unit 14 Environmental management	LO1 Understand principal characteristics of environments LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments
		Unit 15 Sustainability and renewable energy	LO1 Understand the impacts of energy consumption
		Unit 16 Waste management	LO1 Understand how to manage waste LO2 Understand how to manage air emissions LO3 Understand how waste water is managed
		Unit 20 Conservation of biodiversity	LO3 Understand the factors that threaten global biodiversity LO4 Be able to investigate the efficacy of practical measures to conserve biodiversity
	Techniques for environmental assessments 1 – some useful techniques Techniques for environmental assessments 2 – applying techniques to your circumstances	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
Unit 14 Environmental management		LO1 Understand principal characteristics of environments LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments	

This unit (Unit 14)	Title of suggested activity	Other units/LOs	
LO5	What does your audience need to hear?	Unit 13 Environmental surveying	LO1 Understand environmental impacts of human activity and natural processes LO3 Be able to use field and laboratory techniques to conduct environmental investigations
		Unit 14 Environmental management	LO1 Understand principal characteristics of environments LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments LO4 Understand environmental management assessments
	Preparing material for an environmental assessment	Unit 2 Laboratory techniques	LO2 Be able to separate, identify and quantify the amount of substances present in a mixture LO3 Be able to determine the concentration of an acid or base using titration LO4 Be able to examine and record features of biological samples
		Unit 14 Environmental management	LO2 Be able to identify pollution in the environment LO4 Understand environmental management assessments
		Unit 15 Sustainability and renewable energy	LO1 Understand the impacts of energy consumption
		Unit 16 Waste management	LO1 Understand how to manage waste LO2 Understand how to manage air emissions LO3 Understand how waste water is managed
		Unit 20 Conservation of biodiversity	LO1 Understand the importance of conserving and monitoring natural resources LO2 Understand the value of global biodiversity
	Designing your report 1 – target your audience Designing your report 2 – create your report	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
		Unit 14 Environmental management	LO2 Be able to identify pollution in the environment LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments LO4 Understand environmental management assessments
	Thinking about your environmental assessment 2 – retargeting a report	Unit 2 Laboratory techniques	LO1 Understand the importance of health and safety and quality systems to industry
		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
		Unit 13 Environmental surveying	LO3 Be able to use field and laboratory techniques to conduct environmental investigations
		Unit 14 Environmental management	LO2 Be able to identify pollution in the environment LO3 Understand how legislation, regulation and agreements impact on managing natural and built environments LO4 Understand environmental management assessments

KEY TERMS

Explanations of the key terms used within this unit, in the context of this unit

Key term	Explanation
Biome	In contrast to a habitat, which may be a very small region or environmental niche, a biome is a larger region, typically on a continental or oceanic scale, which has a relatively uniform climate and types of plants and animals. There are a number of ways of defining biomes, probably the most comprehensive being that of the World Wildlife Fund (WWF) which recognises fourteen terrestrial biomes, as well as a number of freshwater and marine biomes.
Ecological footprint	Ecological footprints usually relate to human influences and are measures of a population's environmental impact required to support current lifestyles and cultures at a given level of technology. The ecological footprint assesses the amount of land and sea required to support a human population and its infrastructure (housing, transport etc), as well as the forested area required to absorb the population's carbon dioxide emissions. Part of the ecological footprint is therefore the carbon footprint component of a population.
Environmental impact assessment	<p>An assessment of the impacts that a project may have on an environment, including the natural, social and economic aspects.</p> <p>Internationally, practice in environmental impact assessment (EIA) is supported by the International Association for Impact Assessment (IAIA). This organisation defines an environmental impact assessment as 'the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.'</p> <p>An important point of EIAs is that they do not seek a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts of the proposal.</p>
Environmental management	In the context of this course, environmental management is defined as the process of managing human-environment relationships. This doesn't mean the 'hands-on' aspects of looking after an environment, but relates to ideas of regulation and policy and enabling the emergence of new policies and practices.
European Union Directorate General for the Environment	<p>The Directorate General for the Environment (DG Environment) is a body within the European Commission with a responsibility to define new environmental legislation and enact measures to ensure such legislation is put into practice in EU member states. The DG Environment's responsibilities can be summarised as:</p> <ul style="list-style-type: none"> • To maintain and improve the quality of life through protection of natural resources, effective risk assessment and management and the implementation of Community legislation. • To develop resource-efficiency in production, consumption and waste-disposal measures. • To integrate environmental matters into other areas of EU policy. • To promote growth in the EU that takes account of current and future economic, social and environmental needs. • To address the global challenges; notably combating climate change and the international conservation of biodiversity. • To ensure that all policies and measures involve all stakeholders in the process and are communicated in an effective way.
Global hectare (gha)	The unit of measurement for ecological footprint and biocapacity accounting. A global hectare is a biologically productive hectare with world average biological productivity for a given year. Global hectares are needed because different land types have different productivities. A global hectare of, for example, cropland, would occupy a smaller physical area than the much less biologically productive pasture land, as more pasture would be needed to provide the same biocapacity as one hectare of cropland. Because world productivity varies slightly from year to year, the value of a global hectare may change slightly from year to year.

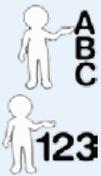
Explanations of the key terms used within this unit, in the context of this unit	
Key term	Explanation
Habitat	An environmental area inhabited by humans or other organisms. Habitats aren't necessarily natural, or geographical. For example, the habitat of a human might be a city, town or village; that of a flea, the skin of a cat or a dog.
Land and area types	The Earth's productive land and water areas are categorised into six types: cropland, grazing land, forest land (production), forest land (CO ₂ absorption), fishing ground, and built-up land.
Lifecycle assessment	An attempt to quantify the environmental impact of a product or service over its entire life, from production of raw materials to disposal. The findings of a lifecycle assessment (LCA) are used to identify which parts of a product's life are responsible for the principal environmental impacts, enabling manufacturers and users to reduce the overall environmental impact, and users to make more informed choices of products or services.
Stakeholder	In the context of environmental management, a stakeholder is any group of people, organised or unorganised, who share a common interest or stake in a particular matter; they can be at any level or position in society, from global, national and regional bodies (e.g. UN, EU, national governments, commercial companies) down to the level of local communities, households or individuals.
System	In an environmental management context, a system can be defined as an interconnected and interdependent set of components with coherent organisation. For example, a natural environment can be considered as a system, comprising all living and non-living components, connected by their interactions – e.g. predator-prey relationships, seasonal cycles etc. Likewise, a building project is also a system, whose components include planning and regulation, building materials, workforces and support industries.
United Nations Environment Programme (UNEP)	A United Nations body, with a global remit to set the environmental agenda and promote adoption and implementation of environmental policies. Specifically, UNEP's scope covers: <ul style="list-style-type: none"> • Assessing global, regional and national environmental conditions and trends • Developing international and national environmental procedures • Strengthening institutions for the wise management of the environment.

MISCONCEPTIONS

Some common misconceptions and guidance on how they could be overcome		
What is the misconception?	How can this be overcome?	Resources which could help
The different meanings of 'biome' and 'habitat'	<p>Learners may confuse these terms to the extent that that they are seen as interchangeable.</p> <p>Tutors could show learners specific examples, such as biome maps, and emphasise that habitats are contained within biomes. Tutors could also facilitate understanding by examining definitions according to the UN and WWF.</p> <p>Learners could research examples where the terms have been misused or misunderstood, using these as discussion points to reinforce the correct understanding.</p>	<p>Habitats, Biomes & Eco-Regions The Environmental Literacy Council http://enviroliteracy.org/ecosystems/habitats-biomes-eco-regions/ A resource defining biomes.</p> <p>Biome; Habitat Wikipedia https://en.wikipedia.org/wiki/Biome https://en.wikipedia.org/wiki/Habitat General discussions on definitions and distinctions.</p> <p>Ecoregions World Wildlife Fund http://www.worldwildlife.org/biomes A more detailed description of biomes from WWF.</p>
Environmental management involves 'hands-on' looking after the environment	<p>Learners may envisage environmental management as the hands-on control or other work in the field. Rather, tutors should emphasise that environmental management is about the process of managing human-environment relationships, and relates to ideas of regulation and policy and enabling the emergence of new policies and practices.</p>	<p>Unit 1 The Earth System and its Components: 1.3 What is environmental management? School of Oriental and African Studies (University of London) http://www.soas.ac.uk/cedep-demos/000_P500_ESM_K3736-Demo/unit1/page_10.htm A good summary of what environmental management entails.</p>
All human activities are harmful to the environment (similar to a misconception in environmental surveying)	<p>While there are many examples of environmental harm due to human activities, there are cases where the reverse is true, with environments either being preserved against harm, or restored after either natural events or damage due to human activity.</p> <p>Tutors could use specific case studies where positive human action has preserved or restored environments.</p> <p>Tutors can also ask students to explore the corollary to this, i.e. that all natural processes are <i>good</i> for the environment.</p>	<p>Environment Agency Gov.uk https://www.gov.uk/government/organisations/environment-agency Responsible for protecting the natural and human environment in the UK. The agency has many examples of environmental harm caused by human activity.</p> <p>Protecting the environment D+C Development and Cooperation http://www.dandc.eu/en/article/how-people-brazil-can-contribute-preventing-natural-catastrophes-protecting-environment An example of environmental preservation protecting against natural disasters.</p> <p>Environmental impacts of volcanic eruptions V. Yu. Kirianov http://www.eolss.net/sample-chapters/c12/E1-07-01-08.pdf Discusses the destructive (and constructive) effects of volcanoes.</p>

Some common misconceptions and guidance on how they could be overcome		
What is the misconception?	How can this be overcome?	Resources which could help
<p>Global and regional environmental guidelines and regulations are not enforceable</p>	<p>It is commonly assumed that global environmental initiatives are not effective or enforceable, due to the fact that global organisations or bodies such as the UN, WWF and WHO do not have direct powers over national practices.</p> <p>A good way for tutors to overcome this misconception is through looking at case studies of globally sponsored environmental projects, in which adherence to global policies is built into the support offered.</p>	<p>Environmental Governance United Nations Environment Programme (UNEP) http://www.unep.org/environmentalgovernance/Publications/tabid/383/Default.aspx A general resource with a wide range of documents.</p> <p>Enforcement of Environmental Law: Good Practices from Africa, Central Asia, ASEAN Countries and China United Nations Environment Programme (UNEP) http://www.unep.org/delc/Portals/119/publications/enforcement-environmental-laws.pdf Outlines enforcement of environmental law with some case studies.</p>

SUGGESTED ACTIVITIES

LO No:	1		
LO Title:	Understand principal characteristics of environments		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
Characterising your environment 1 – the natural biome	<p>As an Ice-breaker activity for this unit, learners could review and describe their local natural environment. Learners could think about this as a hierarchy of levels, from the general natural biome, right down to the range of local habitats.</p> <p>Ecoregions World Wildlife Fund http://www.worldwildlife.org/biomes Learners could assess the biome using the WWF classification.</p> <p>Data and maps European Environment Agency http://www.eea.europa.eu/data-and-maps/ Information and maps on European ecosystems and habitats.</p> <p>Habitat explorer The Wildlife Trusts http://www.wildlifetrusts.org/wildlife/habitat-explorer Information on UK habitats.</p> <p>Habitats in the UK Joint Nature Conservation Committee http://jncc.defra.gov.uk/default.aspx?page=2 Information on UK habitats.</p> 	30 minutes	Unit 13 LO1 Unit 20 LO1, LO2, LO3
Characterising your environment 2 – the human dimension	<p>Learners now need to look at the human dimension. They could review the human environment of their home or institution, basing their assessment on their 'anthropogenic biome'.</p> <p>Anthropogenic Biomes Laboratory for Anthropogenic Landscape Ecology http://www.ecotope.org/anthromes/ Learners could use this website to define their anthropogenic biome.</p> <p>Neighbourhood Statistics Office for National Statistics http://www.neighbourhood.statistics.gov.uk/dissemination/ Provides additional information on local areas.</p> 	30 minutes	Unit 13 LO1 Unit 15 LO1 Unit 16 LO1, LO2, LO3

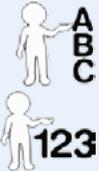
Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>What factors affect environments?</p>	<p>Learners have examined the characteristics of their natural and human environments. They should now address the factors which affect these characteristics. Learners could work in small groups, each researching a particular aspect. For example:</p> <ul style="list-style-type: none"> • Climatic patterns (e.g. rainfall, temperature). • Seasonal patterns (e.g. severity or otherwise of seasonal variations) • Geographical location (e.g. latitude, proximity or otherwise to the sea) • Underlying geology. <p>For information on general climate, geography and seasonal effects, see:</p> <p>North Atlantic Drift (Gulf Stream) WeatherOnline http://www.weatheronline.co.uk/reports/wxfacts/North-Atlantic-Drift-Gulf-Stream.htm A site discussing the general behaviour and influence of the Gulf Stream.</p> <p>Patterns of Climate Weather & Climate http://www.weather-climate.org.uk/13.php Describes different climate types.</p> <p>Climate of Europe Wikipedia https://en.wikipedia.org/wiki/Climate_of_Europe Outlines the general climatic conditions for the UK and Europe.</p> <p>Geological information can be found at:</p> <p>Geology of Britain viewer British Geological Survey https://www.bgs.ac.uk/discoveringgeology/geologyofbritain/viewer.html?src=topNav An interactive map and other resources for learners to explore their local geology.</p> <p>Geology and biodiversity – making the links English Nature http://publications.naturalengland.org.uk/file/111029 A downloadable document illustrating the link between geology and surface features.</p> 	30 minutes	Unit 13 LO1 Unit 20 LO3

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Built environment lifecycles 1 – what factors do you need to think about? 	<p>The final activities suggested for this Learning Outcome address the idea of lifecycles in the built environment, and their effect on environments. For this activity, learners could investigate the reasons for looking at lifecycles in the built environment, with a focus on environmental matters such as sourcing of materials and issues around demolition, decommissioning and recycling. Resources to assist learners include:</p> <p>Life-cycle analysis of the built environment UNEP Industry and Environment http://www.bvsde.paho.org/bvsaiia/fulltext/lifecycle.pdf A report on lifecycles in the built environment.</p> <p>Life Cycle Assessment for the Built Environment Cold Climate Housing Research Center http://www.cchrc.org/sites/default/files/docs/LifeCycleAssessmentReport.pdf Lifecycle assessment outlines and procedures, with useful links to other resources.</p>	1 hour	Unit 13 LO1 Unit 15 LO1 Unit 16 LO1, LO2, LO3
Built environment lifecycles 2 – from plans to structures 	<p>This activity continues the process from the activity above. Learners could examine given case studies of lifecycles, and discuss the level to which environmental matters are considered at both the planning and construction stages. Examples include:</p> <p>Life cycle assessment of road construction Finnish National Road Administration http://alk.tiehallinto.fi/tppt/lca3.pdf A lifecycle assessment for road construction in Finland.</p> <p>The environmental impact of the Waitakere NOW Home®: A Life Cycle Assessment case study Beacon Pathway Limited http://www.aucklandcouncil.govt.nz/EN/planspoliciesprojects/plansstrategies/unitaryplan/Documents/Section32report/Appendices/Appendix%203.8.13.pdf Lifecycle analysis of sustainable housing in New Zealand.</p> <p>Life-Cycle Assessment Modeling of Construction Processes for Buildings Melissa M. Bilec, Robert J. Ries and H. Scott Matthews http://www.cmu.edu/gdi/docs/lca-modeling.pdf An academic journal article on lifecycle analysis.</p> <p>Projects Mott MacDonald https://www.mottmac.com/projects A portfolio of projects by development consultants Mott MacDonald.</p>	1 hour	Unit 13 LO1 Unit 15 LO1 Unit 16 LO1, LO2, LO3

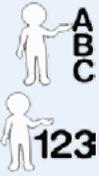
Title of suggested activity	Suggested activities	Suggested timings	Also related to
Built environment lifecycles 3 – decommissioning	<p>The final phase of a built environment occurs when the structure or infrastructure has either deteriorated beyond usability, is no longer fit for purpose or fails to meet prevailing environmental or other standards.</p> <p>In this activity, learners could assess the factors which need to be considered in this final phase, and how they weigh against one another. For example, learners could:</p> <ul style="list-style-type: none"> • Determine possible outcomes of a decommissioning and their benefit or otherwise to the natural or human environments. For example: <ul style="list-style-type: none"> – Demolish and abandon the site (wasteland) – Clear a site, but no or limited restoration (brownfield) – Clear a site and full restoration to natural or farmed environment – Immediate reuse of site for built environment • Examine a case study, and evaluate the environmental cost of decommissioning and recycling versus upgrading existing structures. <p>Examples to assist learners in this analysis can be found in:</p> <p>LCA of the Demolition of a Building Sara Kuikka http://publications.lib.chalmers.se/records/fulltext/164270.pdf Lifecycle analysis of a building demolition. This assessment was conducted at the IVL Swedish Environmental Research Institute.</p> <p>Decommissioning in the North Sea Arup http://www.arup.com/~media/Publications/Files/Publications/D/Decommissioning%20in%20the%20North%20Sea%20-%20Demand%20vs%20Capacity_low-res.ashx This is a report on decommissioning oil platforms in the North Sea. It is good for oil and gas studies.</p> <p>PV Life Cycle Analysis Nadav Enbar, Electric Power Research Institute http://www.solarpowerinternational.com/wp-content/uploads/2016/09/N253_9-14-1530.pdf A US-focused presentation that looks at the decommissioning of solar power sites.</p> 	1 hour	Unit 13 LO1 Unit 15 LO1 Unit 16 LO1, LO2, LO3 Unit 20 LO3

SUGGESTED ACTIVITIES

LO No:	2		
LO Title:	Be able to identify pollution in the environment		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
Human versus natural pollution?	<p>Whilst much pollution is caused by human actions, a broader approach that considers naturally occurring pollution is needed. For this activity, learners could look at historic data on pollution, and chart trends in common pollutants, such as CO₂, SO₂ and nitrogen oxides.</p> <p>Learners could then examine how pollution correlates with events such as major volcanic eruptions and the growth of human industrial activity.</p> <p>A good source for such data is polar ice cores. Data sets for many sites and types of pollutant can be found at:</p> <p>NOAA Paleoclimatology Ice Cores Datasets National Centers for Environmental Information https://www.ncdc.noaa.gov/cdo/f?p=517:1:::APP:PROXYDATASETLIST:7 A resource and database of polar ice core measurements.</p> <p> An Antarctic ice core recording both supernovae and solar cycles Yuko Motizuki et al https://arxiv.org/ftp/arxiv/papers/0902/0902.3446.pdf</p> <p> Presents evidence for atmospheric impacts of supernovae and solar cycles and considers the possibility of cosmic events affecting climate and atmosphere.</p>	45 minutes	Unit 13 LO1 Unit 14 LO1

Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>Defining an investigation into pollution 1 – what do you want to find?</p> 	<p>This, and the following activity, will concentrate on developing a pollution investigation to be conducted by the learners. It is suggested that learners conduct their investigations in pairs or small groups; lone working should be discouraged. It is recommended that all groups conduct the same investigation.</p> <p>In this first activity, tutors could ask learners what aspects of pollution in their local environment they consider important, and guide the learners into choosing a suitable investigation. Such an investigation should include:</p> <ul style="list-style-type: none"> • A field survey • A laboratory investigation • Scope for a statistical analysis. <p>Examples could include:</p> <ul style="list-style-type: none"> • Water quality (e.g. nitrate levels) measurements at different locations in a river, such as upstream and downstream of a drain outflow • Variations of air quality (e.g. particulates) in built-up areas as a function of time • Soil contaminant levels (especially relevant in brownfield sites and intensively used farmland). <p>Tutors should guide learners towards an investigation suitable for their local environment, and with regard to apparatus and capabilities available. For example, water quality clearly requires a local river or stream and the capability to measure, for example, nitrate levels; and air quality requires air sampling apparatus and microscopic analysis of collected samples.</p> <p>Tutors also need to guide learners towards defining statistically testable hypotheses (and corresponding null hypotheses).</p>	30 minutes	Unit 1 LO1, LO2 Unit 2 LO1, LO4 Unit 13 LO1, LO2, LO3 Unit 14 LO1 Unit 16 LO1, LO2, LO3, LO4
<p>Defining an investigation into pollution 2 – how will you do it?</p> 	<p>Having selected an investigation, tutors could guide learners into thinking about how they're going to carry out the investigation. Points to consider include:</p> <ul style="list-style-type: none"> • Considering field sampling sites and/or times • The number of samples to be collected • How the samples will be collected • What laboratory tests will be needed • How will tasks be distributed amongst members of the group? <p>A good set of resources to inform and inspire tutors is:</p> <p>Acadia Learning for Participatory Science http://participatoryscience.org/welcome Resources and ideas for pollution investigations in the field.</p>	1 hour	Unit 1 LO1, LO2 Unit 2 LO1, LO4 Unit 3 LO1, LO2, LO3, LO4 Unit 13 LO1, LO2, LO3 Unit 14 LO1 Unit 16 LO1, LO2, LO3, LO4

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Health and safety in the investigation	<p>Having defined the investigation, learners could now devise a health and safety protocol for their investigation. A risk assessment template which can help learners with this process is available from:</p> <p>Risk assessment and policy template Health and Safety Executive http://www.hse.gov.uk/risk/risk-assessment-and-policy-template.doc A standard risk assessment document learners and tutors can adapt for their investigation.</p> <p>This is a good opportunity for learners to engage in peer review; the groups could exchange their H&S protocols with other groups, and review and be reviewed. This will enable learners to include risks and hazards they may not have considered, but which have been spotted by other learners. At the end of the activity, tutors could discuss with the whole group their protocols, and, with the group, draw up a single protocol for all learners to follow.</p> <p> As well as personal protection, learners also need to consider protocols to protect the site they'll be studying and the integrity of the data (e.g. avoiding contamination of data, data labelling and storage).</p>	45 minutes	Unit 6 LO1, LO2
Recording data	<p>As with other practical activities, learners need to ensure they are collecting and recording data and information appropriately. Tutors could introduce notekeeping in the classroom through a short tutorial on what makes a good field record. This could include looking at some historic samples.</p> <p>Darwin Papers & Manuscripts Darwin Online http://darwin-online.org.uk/manuscripts.html Darwin's Beagle notes (both original images and transcripts).</p> <p>Notes on keeping a field journal University of Western Ontario http://instruct.uwo.ca/biology/320y/fj.html Guidance notes (which may need adapting).</p> <p>Ecology Lab: How to keep your field notes and journal Stockton College http://loki.stockton.edu/~cromartj/ecology/fieldnotes Note, despite what this says, notes should be kept using permanent, waterproof ink.</p> <p>  It may not be practicable for all learners to keep their own logs continuously (e.g. making records while collecting samples in a river), but tutors should ensure that at least one log is kept per group, and that all learners contribute. Learners should not feel restricted to paper, but encouraged to use technology such as smartphones to record location data (photographs, GPS coordinates etc).</p>	2 hours	Unit 3 LO1, LO2, LO3, LO4 Unit 13 LO3

Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>What did you find?</p> 	<p>To conclude the investigation, this activity could take the form of a tutor-led debrief, where learners report back on, for example:</p> <ul style="list-style-type: none"> • Initial impressions and qualitative observations (take care that these do not introduce confirmation bias later on) • Issues arising in the investigation • Factors which may affect their outcomes. <p>In addition, encourage reflections on the execution of the investigation, which could include:</p> <ul style="list-style-type: none"> • factors that should have been considered (e.g. extraneous and confounding variables) • things that might have been done differently, such as choice of experimental methods, organisation of groups and division of tasks. 	1 hour	Unit 3 LO1, LO2, LO3, LO4 Unit 13 LO3

SUGGESTED ACTIVITIES

LO No:	3		
LO Title:	Understand how legislation, regulation and agreements impact on managing natural and built environments		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
What is the value of legislation and regulation on the environment?	<p>To get started with understanding the role of legislation and regulation in environmental management, learners could engage in a whole-class debate on the value of legislation and regulation. Specifically, learners could present historical evidence of events that have led to regulation.</p> <p>Examples of medieval regulations can be found at:</p> <p>History of Building Regulations Researching Historic Buildings in the British Isles http://www.buildinghistory.org/regulations.shtml Resource discussing historical building regulations and their origins.</p> <p>Regulations for building construction and fire safety Florilegium Urbanum http://users.trytel.com/~tristan/towns/florilegium/community/cmfabr08.html Early thirteenth century regulations.</p> <p>More recent examples:</p> <p>Great Smog Wikipedia https://en.wikipedia.org/wiki/Great_Smog The London smog of the 1950s led to the Clean Air Act of 1956 and subsequent legislation:</p> <p>Clean Air Act 1956; Clean Air Act 1993 The National Archives http://www.legislation.gov.uk/ukpga/1956/52/pdfs/ukpga_19560052_en.pdf http://www.legislation.gov.uk/ukpga/1993/11 Links to UK government papers on the 1956 Clean Air Act and successive legislation.</p> <p>Learners could also look at more recent events and practices, and debate how regulation and legislation could have alleviated environmental issues.</p>	45 minutes	Unit 2 LO1 Unit 13 LO1, LO2 Unit 16 LO2, LO3, LO4 Unit 20 LO3

Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>What is the value of legislation and regulation on the environment? (continued)</p> 	<p>Examples learners could consider include:</p> <p>Learning from Regulatory Disasters Julia Black https://www.lse.ac.uk/collections/law/wps/WPS2014-24_Black.pdf Provides a general overview of recent failures in the environmental regulatory system.</p> <p>Understanding One of the Worst Environmental Disaster in Brazil's History Oxford Human Rights Hub http://ohrh.law.ox.ac.uk/understanding-one-of-the-worst-environmental-disaster-in-brazils-history/ Material on the Fundão dam disaster in Brazil in 2015.</p> <p>An Unnatural Disaster: The Aftermath of Hurricane Katrina Center for Progressive Reform http://www.progressivereform.org/articles/Unnatural_Disaster_512.pdf and The effects and consequences of Hurricane Katrina on New Orleans in 2005.</p> <p>Hurricane Katrina Wikipedia https://en.wikipedia.org/wiki/Hurricane_Katrina Background on Hurricane Katrina.</p>		
<p>A hierarchy of regulations</p> 	<p>In an increasingly connected world, environmental regulations are rarely isolated. For this activity, learners could draw up a flow chart or other diagram showing the connectedness of a chosen regulation or class of regulations from national to global levels. Examples of global, regional and national regulations can be found at:</p> <p>United Nations Environment Programme http://www.unep.org/ Information on the United Nations Environment Programme.</p> <p>Environment European Commission http://ec.europa.eu/environment/index_en.htm Information on the European Environment Action Programme.</p> <p>United Kingdom environmental law Wikipedia https://en.wikipedia.org/wiki/United_Kingdom_environmental_law Details the main environmental legislation with links to more detailed resources.</p>	1 hour	Unit 2 LO1 Unit 13 LO1, LO2 Unit 16 LO2, LO3, LO4 Unit 20 LO3

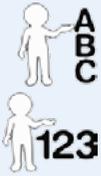
Title of suggested activity	Suggested activities	Suggested timings	Also related to
Where is regulation used? 1 – the natural environment	<p>To gain a global view of how environmental regulation is used, learners could report on a selected case study of an international initiative on natural environment protection.</p> <p>Ecosystem Management: Our Stories United Nations Environment Programme http://web.unep.org/ecosystems/who-we-are/our-stories Examples of initiatives from around the world.</p> <p>Ecosystem services case studies Environment Agency https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291631/scho0409bpvm-e-e.pdf Case studies within the UK.</p> 	30 minutes	Unit 13 LO1, LO2 Unit 20 LO3
Where is regulation used? 2 – the human environment	<p>As well as protecting the natural environment, regulation is also used to protect and improve the human environment.</p> <p>As for the previous activity, learners could examine a global or national initiative aimed at improving the human environment, but now debate how it impacts or could impact their lives.</p> <p>Examples include:</p> <p>Partnership for Clean Fuels and Vehicles United Nations Environment Programme http://www.unep.org/transport/new/pcf/about.asp A global public-private initiative promoting cleaner fuels and vehicles in developing and transition countries.</p> <p>Highest recycling rates in Austria and Germany – but UK and Ireland show fastest increase European Environment Agency http://www.eea.europa.eu/media/newsreleases/highest-recycling-rates-in-austria Information on recycling waste in EU countries.</p> 	30 minutes	Unit 13 LO1, LO2 Unit 16 LO2, LO3, LO4

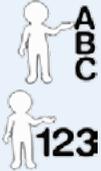
Title of suggested activity	Suggested activities	Suggested timings	Also related to
Enforcing regulation 1 – domestic	<p>The legal framework for enforcing planning and environmental regulations is complex, and involves multiple agencies. Learners could approach this topic by looking at a particular industry in the context of its environmental regulation.</p> <p>A well-documented example is onshore oil and gas production in the UK, which is highly regulated.</p> <p>Fact Sheet: Onshore Oil and Gas Regulation United Kingdom Onshore Operators Group (UKOOG) http://www.ukoog.org.uk/images/ukoog/pdfs/fact%20sheets/regulation.pdf Information and outlines of current practice for the onshore oil and gas industry from UKOOG, an industry body.</p> <p>Planning practice guidance for onshore oil and gas Department for Communities and Local Government https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224238/Planning_practice_guidance_for_onshore_oil_and_gas.pdf Outlines the procedures and responsibilities for onshore oil and gas activities.</p> <p>Environment Agency enforcement, sanctions and offences Gov.uk https://www.gov.uk/government/publications/environment-agency-enforcement-and-sanctions-statement UK government documents on enforcement roles by the Environment Agency.</p> 	30 minutes	Unit 2 LO1 Unit 13 LO1, LO2 Unit 16 LO2, LO3, LO4 Unit 20 LO3
Enforcing regulation 2 – global	<p>Global regulations are often seen as ‘unenforceable’ since to operate they need to be incorporated into national laws and policies. For this activity, learners could investigate and report on case studies reflecting successes of international initiatives.</p> <p>Enforcement of Environmental Law: Good Practices from Africa, Central Asia, ASEAN Countries and China United Nations Environment Programme http://www.unep.org/delc/Portals/119/publications/enforcement-environmental-laws.pdf Contains examples of case studies learners could research.</p> 	1 hour	Unit 2 LO1 Unit 13 LO1, LO2 Unit 16 LO2, LO3, LO4 Unit 20 LO3

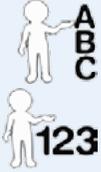
SUGGESTED ACTIVITIES

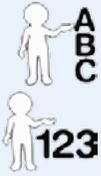
LO No:	4		
LO Title:	Understand environmental management assessments		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
What is an environmental management assessment?	<p>Tutors could facilitate learners' understanding of an environmental management assessment through a guided discussion. For example:</p> <ul style="list-style-type: none"> • What do learners need to know to assess a population's impact on an environment? • What do learners need to know to protect an environment? • How could learners connect the above requirements to help them make suitable decisions? <p>Tutors could guide learners to think about three key types of assessment which connect to the above:</p> <ul style="list-style-type: none"> • Ecological footprinting • Product lifecycle assessment • Environmental impact assessment. <p>Footprint Basics Global Footprint Network http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview/ Information on ecological footprinting and some definitions.</p> <p>Ecological footprint Wikipedia https://en.wikipedia.org/wiki/Ecological_footprint Descriptions and definitions for ecological footprinting.</p> <p>Global hectare Wikipedia https://en.wikipedia.org/wiki/Global_hectare A definition of a common measure in ecological footprinting, the global hectare.</p> <p>Background report for a UNEP Guide to Life Cycle Management – A bridge to sustainable products Life Cycle Initiative http://www.lifecycleinitiative.org/wp-content/uploads/2013/09/UNEP_Background_document_LCM_2006_Febr.pdf An extensive review of product lifecycle environmental management.</p>	45 minutes	Unit 3 LO4 Unit 13 LO1, LO2, LO3 Unit 14 LO3



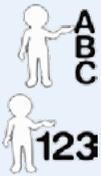
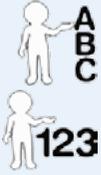
Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>What is your ecological footprint?</p> 	<p>In this activity, learners will evaluate their own ecological footprint, reflecting the sustainability of their lifestyles. Learners could well find the results thought-provoking and potentially amusing.</p> <p>Resources for calculating ecological footprints are available at:</p> <p>Take the One Planet Living Challenge Bioregional http://calculator.bioregional.com/ Links to a questionnaire that calculates ecological footprint and carbon emissions.</p> <p>What is your ecological footprint? Anthesis Consulting Group, LLC http://ecologicalfootprint.com/ Ecological footprint calculator designed for use by individuals.</p>	30 minutes	Unit 3 LO1, LO2, LO3 Unit 13 LO1 Unit 14 LO3 Unit 20 LO4
<p>The product lifecycles of common items</p> 	<p>For this activity, tutors could guide learners through a discussion of a well documented case study of an environmentally relevant product.</p> <p>An excellent example of this is the Fairphone initiative, aimed at delivering smartphone technology with environmental consideration at each stage – from sourcing raw materials to final disposal.</p> <p>Examining the Fairphone’s environmental impact Fairphone https://fairphone.com/en/2015/01/22/first-fairphones-environmental-impact/ Information on the Fairphone lifecycle assessment.</p> <p>A better phone is a phone made better Fairphone https://fairphone.com/en/our-goals/ More general details of the Fairphone project.</p>	30 minutes	Unit 14 LO1, LO3

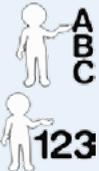
Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>Environmental impact assessments in international development</p> 	<p>As with the lifecycle assessment, this activity could be handled as a tutor-led discussion of an environmental impact assessment case study.</p> <p>Learners and tutors could use the case studies in this publication to inform the discussion:</p> <p>Studies of EIA Practice in Developing Countries United Nations Environment Programme http://www.iaia.org/pdf/case-studies/CaseStudies.PDF A series of case studies of environmental impact assessment practice in developing and transitional countries.</p> <p>A specific example tutors might find useful to introduce is the Safir-Hadramout Road project in Yemen:</p> <p>Environmental assessment study of the Safir-Hadramout Road project Ilham A.A. Basahi http://www.iaia.org/pdf/case-studies/Safir.pdf This case study investigates the procedure and format of the EIA study carried out in the Republic of Yemen for this road project. The overall project was funded by the World Bank.</p> <p>Safir-Hadramout Road project: Studies related to environmental assessment feasibility and detailed design Consulting Engineering Services (India) Private Limited http://documents.worldbank.org/curated/en/212911468781521213/pdf/multi-page.pdf This is the full environmental impact assessment and is a very long document.</p>	30 minutes	Unit 13 LO1 Unit 14 LO1, LO3 Unit 15 LO1 Unit 16 LO1, LO2, LO3 Unit 20 LO3, LO4

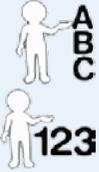
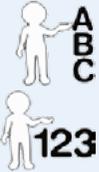
Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>Techniques for environmental assessments 1 – some useful techniques</p> 	<p>In previous activities, learners have looked at the kinds of information environmental assessments can give. In this activity, learners will look at how we make sure the assessment is relevant.</p> <p>Learners will look at techniques of assessment. Two examples learners are recommended to consider are:</p> <ul style="list-style-type: none"> • stakeholder analysis • driver-pressure-state-impact-response (DPSIR). <p>Resources to help learners and tutors define and understand these techniques are at:</p> <p>Stakeholder Analysis World Wildlife Fund http://www.panda.org/standards/1_4_stakeholder_analysis A downloadable WWF document outlining the stakeholder analysis method and its application.</p> <p>Module 2 – DPSIR Overview United States Environmental Protection Agency https://archive.epa.gov/ged/tutorial/web/pdf/dpsir_module_2.pdf Provides an overview of the DPSIR framework, and case studies in which it has been used.</p> <p>The DPSIR Framework Peter Kristensen, National Environmental Research Institute, Denmark http://wwz.ifremer.fr/dce/content/download/69291/913220/file/DPSIR.pdf Describes the DPSIR method and its use.</p> <p>To complete this activity, learners could apply the assessment techniques to case studies. For example, learners could carry out a stakeholder analysis of the Safir-Hadramout Road project EIA:</p> <ul style="list-style-type: none"> • What stakeholders can be identified? • Which of them are passive or active, or can be considered both? • How influential, if this is identifiable, was each stakeholder to the outcomes of the EIA? <p>They could apply the DPSIR approach to products such as smartphones; the Fairphone project could be used as an example.</p>	2 hours	Unit 3 LO1, LO2, LO3 Unit 14 LO1, LO3

Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>Techniques for environmental assessment 2 – applying techniques to your circumstances</p> 	<p>In the previous activity, we looked at some techniques applicable to environmental management assessments, and some examples.</p> <p>For this activity, learners could apply one or more techniques to their own circumstances, to gain experience in analysing and interpreting novel situations.</p> <p>For example, learners could use the outcomes from their ecological footprint analysis using:</p> <ul style="list-style-type: none"> • A stakeholder analysis to interpret how changes to their footprint might affect others • A DPSIR analysis to interpret factors which affect their footprint, and how changes to these factors might feed back to their overall lifestyle. 	30 minutes	Unit 3 LO1, LO2, LO3 Unit 14 LO1, LO3

SUGGESTED ACTIVITIES

LO No:	5		
LO Title:	Be able to carry out and report outcomes of an environmental management study		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
What does your audience need to hear? 	<p>To introduce the topic of reporting on an environmental management study, learners could first decide on the target audience they wish to address. Tutors may suggest all learners address the same audience, or each learner may choose or be assigned to a particular audience.</p> <p>Tutors could lead a discussion with the group as to the best approach for audiences, which could include:</p> <ul style="list-style-type: none"> • Planning bodies • Non-governmental organisations (NGOs) • Consumer groups • Local communities • Newspapers and other media • Other environmental specialists and professionals. 	30 minutes	Unit 13 LO1, LO3 Unit 14 LO1, LO3, LO4
Preparing material for an environmental assessment 	<p>Ideally, learners could prepare their reports based on their findings from the suggested activity for Learning Outcome 2 on identifying pollution. For this activity, learners could analyse and prepare the information and data from their study into forms which match the needs of their chosen audience.</p> <p>For example:</p> <ul style="list-style-type: none"> • A local community might wish to know about local pollution levels, but not be interested in how these relate to past or global levels. Data may therefore be most useful as 'spot measurements' at given locations, with interpretation based on the immediate local impact. • Conversely, NGOs and planning bodies may need to know about wider contexts, in order to plan strategies. Such an audience may therefore need to know how the learners' outcomes fit into longer term trends, and how existing strategies and policies may have affected the results. <p>If learners are using information from a case study, the above still applies, in that learners will need to interrogate carefully the case study to extract relevant information.</p>	45 minutes	Unit 2 LO2, LO3, LO4 Unit 14 LO2, LO4 Unit 15 LO1 Unit 16 LO1, LO2, LO3 Unit 20 LO1, LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>Designing your report 1 – target your audience</p> 	<p>With the type of information established, learners could now decide on the best approach or medium for their chosen audience.</p> <p>Examples include:</p> <ul style="list-style-type: none"> • A poster or informal presentation for local communities • A formal presentation for NGOs and planning bodies • A formal report and executive summary for specialists • A press release for newspapers or other media. <p>Learners could also consider using more interactive methods, such as:</p> <ul style="list-style-type: none"> • Short video clips presenting their work (e.g. a short documentary) • Designing an interactive web page, perhaps as a learning resource. <p>Information and guidance on preparing reports in different formats can be found at:</p> <p>What is a Presentation? SkillsYouNeed http://www.skillsyouneed.com/present/what-is-a-presentation.html</p> <p>Making an academic poster presentation Northern Arizona University https://nau.edu/undergraduate-research/poster-presentation-tips/</p> <p>Report Writing: The Structure of Scientific Reports UniLearning http://unilarning.uow.edu.au/report/2b.html</p> <p>Ideas for producing short documentaries can be found at:</p> <p>How To: make a short documentary Freecording https://www.youtube.com/watch?v=lwpjSvxPu4w</p>	30 minutes	Unit 3 LO1, LO2, LO3, LO4 Unit 14 LO2, LO3, LO4

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Designing your report 2 – create your report 	<p>This activity is a major part of the Learning Outcome, and will see learners creating their reports based on their findings and decisions in the previous three suggested activities.</p> <p>Learners could work either individually, or in the same groups which carried out Learning Outcome 2, with the proviso that individual learners' contributions can be identified.</p>	2-3 hours	Unit 3 LO1, LO2, LO3, LO4 Unit 14 LO2, LO3, LO4
Thinking about your environmental assessment 1 – reflecting on your report 	<p>This activity relates to reflective practice in science, and could involve learners:</p> <ul style="list-style-type: none"> • Peer-reviewing each others' final reports • Reviewing their experimental procedure in the light of their outcomes and identifying, for example: <ul style="list-style-type: none"> – Variables not taken into account or inadequately controlled (e.g. temperature, river flow rate etc) – Procedures which may have affected their outcomes (e.g. sampling protocols) • Thinking about actions or recommendations their investigations suggest – especially important if the investigation is part of a planning process. 	1 hour	Unit 2 LO1 Unit 3 LO1, LO2, LO3, LO4 Unit 13 LO3 Unit 14 LO2, LO3, LO4
Thinking about your environmental assessment 2 – retargeting a report 	<p>For this final activity, learners could reflect on the way their report is written or presented, and address how they would change or adapt it to address a different audience.</p>	30 minutes	Unit 3 LO1, LO2, LO3, LO4 Unit 14 LO2, LO3, LO4



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