



National 5
Course Assessment
Specification



National 5 Environmental Science Course Assessment Specification (C726 75)

Valid from August 2013

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Please refer to the note of changes at the end of this *Course Assessment Specification* for details of changes from previous version (where applicable).

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Course outline

Course title:	National 5 Environmental Science
SCQF level:	5 (24 SCQF credit points)
Course code:	C726 75
Course assessment code:	X726 75

The purpose of the Course Assessment Specification is to ensure consistent and transparent assessment year on year. It describes the structure of the Course assessment and the mandatory skills, knowledge and understanding that will be assessed.

Course assessment structure

Component 1 — question paper	80 marks
Component 2 — assignment	20 marks
Total marks	100 marks

This Course includes six SCQF credit points to allow additional time for preparation for Course assessment. The Course assessment covers the added value of the Course.

Equality and inclusion

This Course Assessment Specification has been designed to ensure that there are no unnecessary barriers to assessment. Assessments have been designed to promote equal opportunities while maintaining the integrity of the qualification.

For guidance on assessment arrangements for disabled learners and/or those with additional support needs, please follow the link to the Assessment Arrangements web page: www.sqa.org.uk/sqa/14977.html.

Guidance on inclusive approaches to delivery and assessment of this Course is provided in the *Course Support Notes*.

Assessment

To gain the award of the Course, the learner must pass all of the Units as well as the Course assessment. Course assessment will provide the basis for grading attainment in the Course award.

Course assessment

SQA will produce and give instructions for the production and conduct of Course assessments based on the information provided in this document.

Added value

The purpose of the Course assessment is to assess added value of the Course as well as confirming attainment in the Course and providing a grade. The added value for the Course will address the key purposes and aims of the Course, as defined in the Course Rationale. It will do this by addressing one or more of breadth, challenge, or application.

In this Course assessment, added value will focus on the following:

- ◆ breadth — drawing on knowledge and skills from across the Course
- ◆ challenge — requiring greater depth or extension of knowledge and/or skills
- ◆ application — requiring application of knowledge and/or skills in practical or theoretical contexts as appropriate

This added value consists of:

- ◆ a question paper, which requires learners to demonstrate aspects of breadth, challenge and application; learners will apply breadth and depth of skills, knowledge and understanding from across the Course to answer questions in environmental science
- ◆ an assignment, which requires learners to demonstrate aspects of challenge and application; learners will apply skills of scientific inquiry, using related knowledge, to carry out a meaningful and appropriately challenging task in environmental science and communicate their findings

Grading

Course assessment will provide the basis for grading attainment in the Course award.

The Course assessment is graded A–D. The grade is determined on the basis of the total mark for all Course assessments together.

A learner's overall grade will be determined by their performance across the Course assessment.

Grade description for C

For the award of Grade C, learners will have demonstrated successful performance in all of the Units of the Course. In the Course assessment, learners will typically have demonstrated successful performance in relation to the mandatory skills, knowledge and understanding for the Course.

Grade description for A

For the award of Grade A, learners will have demonstrated successful performance in all of the Units of the Course. In the Course assessment, learners will typically have demonstrated a consistently high level of performance in relation to the mandatory skills, knowledge and understanding for the Course.

In addition, learners achieving a Grade A will have demonstrated a high overall level of performance by:

- ◆ retaining knowledge and understanding over a long period of time
- ◆ showing a deeper level of knowledge and understanding
- ◆ integrating and applying skills, knowledge and understanding across the three component Units of the Course
- ◆ displaying problem solving skills in less familiar and more complex contexts
- ◆ applying skills of scientific inquiry and analytical thinking in complex contexts that involve more complex data

Credit

To take account of the extended range of learning and teaching approaches, remediation, consolidation of learning and integration needed for preparation for external assessment, six SCQF credit points are available in Courses at National 5 and Higher, and eight SCQF credit points in Courses at Advanced Higher. These points will be awarded when a grade D or better is achieved.

Structure and coverage of the Course assessment

The Course assessment will consist of two Components: a question paper, and an assignment. The question paper will have one Section. The assignment will have one Section.

Component 1 — question paper

The purpose of the question paper is to assess breadth and depth of knowledge and understanding from across the Units.

The question paper will assess scientific inquiry skills, analytical thinking skills and the impact of applications on society and the environment.

The question paper will give learners an opportunity to demonstrate the following skills, knowledge and understanding by:

- ◆ demonstrating knowledge and understanding of environmental science by making statements, describing information, providing explanations and integrating knowledge
- ◆ applying knowledge of environmental science to new situations, interpreting information and solving problems
- ◆ planning or designing experiments/practical investigations to test given hypotheses or to illustrate particular effects, applying safety measures
- ◆ selecting information from a variety of sources
- ◆ presenting information appropriately in a variety of forms
- ◆ processing information (using calculations and units, where appropriate)
- ◆ evaluating information to solve problems, make decisions and resolve conflicts
- ◆ making predictions and generalisations based on evidence/information
- ◆ drawing valid conclusions and giving explanations supported by evidence/justification
- ◆ suggesting improvements to experiments/practical investigations

The mandatory skills and knowledge are specified in the 'Further mandatory information on Course coverage' section at the end of this Course Assessment Specification.

The question paper will have 80 marks out of a total of 100 marks. This is 80% of the overall marks for the Course assessment.

The question paper will have one Section, which contains restricted and extended response questions.

Marks will be distributed, approximately proportionally, across the Units. The majority of the marks will be awarded for applying knowledge and understanding. The other marks will be awarded for applying scientific inquiry, scientific analytical thinking and problem solving skills.

Component 2 — assignment

The purpose of the assignment is to assess the application of skills of scientific inquiry and related environmental science knowledge and understanding.

The assignment requires learners to apply skills, knowledge and understanding to investigate a relevant topic in environmental science and its effect on the environment and/or society. The effect may be positive and/or negative. The topic should draw on one or more of the key areas of the Course, and should be chosen with guidance from the assessor.

The assignment will give learners an opportunity to demonstrate the following skills, knowledge and understanding by:

- ◆ applying knowledge of environmental science to new situations and interpreting information
- ◆ selecting information from a variety of sources
- ◆ presenting information appropriately in a variety of forms
- ◆ processing the information (using calculations and units, where appropriate)
- ◆ drawing valid conclusions and giving explanations supported by evidence/justification
- ◆ communicating findings/information

The assignment will have 20 marks out of a total of 100 marks. This is 20% of the overall marks for the Course assessment.

The majority of the marks will be awarded for applying scientific inquiry and analytical thinking skills. The other marks will be awarded for applying knowledge and understanding related to the topic chosen.

The assignment offers challenge by requiring skills, knowledge and understanding to be applied in a context that is one or more of the following:

- ◆ unfamiliar
- ◆ familiar but investigated in greater depth
- ◆ integrates a number of familiar contexts

This assignment has two stages:

- ◆ a research stage
- ◆ a communication stage

For their assignment, learners are required to:

- ◆ choose, with support, a relevant topic in environmental science that has an effect on the environment and/or society
- ◆ devise an appropriate aim
- ◆ describe the relevant application(s) of environmental science and explain the effect on the environment/society
- ◆ research the topic by selecting, processing and presenting relevant data/information
- ◆ draw a conclusion
- ◆ describe underpinning environmental science knowledge and understanding and explain its relevance to the topic researched
- ◆ communicate the findings of the research in a report

Setting, conducting and marking of assessment

Question paper

This question paper will be set and marked by SQA, and conducted in centres under conditions specified for external examinations by SQA. Learners will complete this in 2 hours.

Controlled assessment — assignment

This assignment is:

- ◆ set by centres within SQA guidelines
- ◆ conducted under a high degree of supervision and control

Evidence will be submitted to SQA for external marking.

All marking will be quality assured by SQA.

Setting the assessment

Set by centres within SQA guidelines.

Conducting the assessment

The **research** stage will be conducted under some supervision and control.

The **communication** stage will be conducted under a high degree of supervision. SQA will provide Assignment General assessment information and Assignment Assessment task documents. SQA will specify the material to be taken into the communication stage of the assignment.

The production of the report will be carried out:

- ◆ in time to meet a submission date set by SQA
- ◆ independently by the learner

Further mandatory information on Course coverage

The following gives details of mandatory skills, knowledge and understanding for the National 5 Environmental Science Course. Course assessment will involve sampling the skills, knowledge and understanding. This list of skills, knowledge and understanding also provides the basis for the assessment of Units of the Course.

The following gives details of the skills:

- ◆ demonstrating knowledge and understanding of environmental science by making statements, describing information, providing explanations and integrating knowledge
- ◆ applying knowledge of environmental science to new situations, interpreting information and solving problems
- ◆ planning, designing, and safely carrying out experiments/practical investigations to test given hypotheses or to illustrate particular effects
- ◆ selecting information from a variety of sources
- ◆ presenting information appropriately in a variety of forms
- ◆ processing information (using calculations and units, where appropriate)
- ◆ evaluating information to solve problems, make decisions and resolve conflicts
- ◆ making predictions and generalisations based on evidence/information
- ◆ drawing valid conclusions and giving explanations supported by evidence/justification
- ◆ suggesting improvements to experiments/practical investigations
- ◆ communicating findings/information

These skills will be assessed, across the Course, in the context of the mandatory knowledge.

Component 1 — question paper

The purpose of the question paper is to assess breadth and depth of knowledge and understanding from across the Units.

The question paper will assess scientific inquiry skills, analytical thinking skills and the impact of applications on society and the environment.

The following table specifies the mandatory knowledge for the National 5 Environmental Science question paper.

Living Environment

1 Investigating ecosystems and biodiversity

- a. Ecological terms, to include habitat, community, biotic, abiotic, biodiversity, species, population, adaptation and competition
- b. Biodiversity in the context of one aquatic and one terrestrial ecosystem of national importance
- c. Quantitative techniques for sampling plants and animals, to include quadrats and pitfall traps
- d. The limitations of quantitative techniques and potential sources of error
- e. Techniques to measure abiotic factors, to include light intensity, temperature, pH and soil moisture
- f. The effect of abiotic factors on the distribution of organisms
- g. Identification of organisms, to include construction and use of paired-statement keys

2 Interdependence

- a. Food webs, to include carnivore, herbivore, omnivore, producer, primary/secondary/tertiary consumer, detritivore, decomposer and niche
- b. Factors affecting food webs including predation, disease, competition, natural and human impacts
- c. Energy flow through food webs and energy loss through movement, heat and undigested material
- d. Simple word equations of photosynthesis and respiration and the interdependence between plants and animals
- e. Processes involved in the nitrogen cycle, to include nitrogen fixation, death/decay, decomposers to include fungi and bacteria, nitrification and denitrification by bacteria, absorption of nitrates by plants, feeding by animals
- f. Processes involved in the biological carbon cycle, to include photosynthesis, respiration, feeding, decomposition, formation and combustion of fossil fuels

3 Human influences on biodiversity

- a. Human activities which have a positive or negative effect on ecosystems, with a focus on species reduction or increase, extinction and loss of biodiversity
- b. The role of indicator species in environmental monitoring
- c. The impact of non-native species (any species introduced intentionally or accidentally into a new community by human activity) on ecosystems. To include one named example
- d. Conflicts between land and/or water based activities and an environment of national importance
- e. Relevant current national organisations to include the role of SEPA as environmental regulator, the role of SNH as environmental educator and advisor, policies and legislation for the protection of the environment, to include the Wildlife and Countryside Act. The designation of Sites of Special Scientific Interest (SSSIS) under the Nature Conservation (Scotland) Act 2004 as a nature conservation tool

Earth's Resources
<p>1 Overview of Earth systems and their interactions</p> <ul style="list-style-type: none"> a. Earth systems — geosphere, hydrosphere, atmosphere and biosphere b. The rock, carbon, nitrogen and water cycles connect the systems c. Resources to include physical, biological, renewable and non-renewable
<p>2 Geosphere</p> <ul style="list-style-type: none"> a. The structure of the Earth: core, mantle and crust b. The difference between minerals and rocks c. Properties of rocks, to include porosity and permeability d. The rock cycle (to describe the processes of weathering and erosion, melting, and the effects of heat and pressure) and formation of igneous, sedimentary and metamorphic rocks (to include one example of each) e. Limestone: formation, discovery, extraction, processing, uses f. The difference between ore minerals (a mineral from which a metal may be economically extracted) and ores (a mixture of ore minerals and waste minerals). To include a named example of an ore g. Crude oil: formation, discovery, extraction, processing and uses of iron h. Petroleum: formation, discovery, extraction, processing and uses i. The geological carbon cycle, to include limestone and fossil fuels
<p>3 Hydrosphere</p> <ul style="list-style-type: none"> a. The main reservoirs of water, to include atmosphere, oceans, ice, freshwater and groundwater b. The water cycle, to include evaporation, transpiration, condensation and precipitation c. Uses of water, to include industrial, domestic and agricultural d. Issues arising from national availability of water resources in the UK, to include drought and flooding e. Energy from water, hydroelectric, tidal and wave power — to include the energy changes involved (kinetic to electrical) f. Requirements for siting hydroelectric and tidal power stations
<p>4 Biosphere</p> <ul style="list-style-type: none"> a. Oceanic and freshwater resources, including economically important species b. Terrestrial resources, including economically important species c. Energy from biological resources to include definition (biofuels are combustible biomass or fuels derived from biomass). The process of fermentation in formation of biofuels to include conditions required for formation of peat (acidic and anaerobic), and methane as the primary biogas
<p>5 Atmosphere</p> <ul style="list-style-type: none"> a. Uses of nitrogen and oxygen b. Energy from wind power to include energy changes involved (kinetic to electrical) c. Requirements for siting wind farms

<p>Sustainability</p> <p>1 Introduction to sustainability</p> <ul style="list-style-type: none"> a. Introduction to sustainability, to include definition. Sustainable development, to include definition, to include integration of social, economic and environmental issues, as well as the implementation of Agenda 21 to facilitate sustainable development at a local authority/community level b. Global citizenship
<p>2 Food</p> <ul style="list-style-type: none"> a. The impacts of increasing global population on food supplies b. Strategies in farming for a secure food supply, to include intensive farming, GM crops and agrochemicals c. Organic farming: advantages and disadvantages d. Strategies in freshwater and marine-based systems for a secure food supply, to include intensive fishing and alternative species e. Fish conservation approaches, to include marine conservation areas, zoning, sustainable fishing methods f. The environmental impact of food distribution — ‘food miles’ — to include the term ‘carbon footprint’. The term ‘carbon neutral’, including the impacts of carbon offsetting g. National and European policies and legislation relating to food production
<p>3 Water</p> <ul style="list-style-type: none"> a. The impacts of increasing global population on water supplies. Clean water supplies in LEDCs and MEDCs b. Issues arising from water use in: <ul style="list-style-type: none"> industry — thermal pollution, effluents agriculture — water abstraction and irrigation, may lead to low water levels in rivers domestic — washing, cooking, heating, sanitary, may lead to water shortages in times of drought, may lead to water use restrictions, impacts on public health, contamination of water supplies, conservation, and tourism and recreation c. Sustainable approaches to water use, to include methods of water conservation d. National policies, legislation and other organisations (SEPA) relating to water use
<p>4 Energy</p> <ul style="list-style-type: none"> a. The impacts of increasing global population on energy supplies b. Renewable and non-renewable energy sources and issues arising from their use c. The enhanced greenhouse effect, to include carbon dioxide and methane and their sources d. Sustainable approaches to reducing greenhouse gas emissions e. Social, economic and environmental impacts of climate change, including habitat loss, reduction in biodiversity, changes in species distribution, rising sea levels leading to flooding, loss of agricultural land and loss of business f. National organisations, policies and legislation relating to energy use

5 Waste management

- a. Increasing waste production in response to society's demands
- b. Sustainable approaches to managing waste, to include reduce, reuse and recycle
- c. The need for education and personal responsibility
- d. National organisations, policies and legislation relating to waste management

Component 2 — assignment

The purpose of the assignment is to assess the application of skills of scientific inquiry and related environmental science knowledge and understanding.

The assignment requires learners to apply skills, knowledge and understanding to investigate a relevant topic in environmental science and its effect on the environment and/or society. The effect may be positive and/or negative. The topic should draw on one or more of the key areas of the Course in the table above, and should be chosen with guidance from the assessor.

Administrative information

Published: April 2015 (version 1.3)

History of changes to Course Assessment Specification

Course details	Version	Description of change	Authorised by	Date
	1.1	Further information and clarification on scope and structure of the question paper/ assignment given in the 'Structure and coverage of Course assessment' section. Setting, conducting and marking of assessment section: wording added to clarify assessment conditions; Further mandatory information section: divided into separate parts for question paper and assignment; amendment to wording to clarify activities in skills list, plus changes to wording in Course/Unit content to clarify meaning and benchmarking	Qualifications Development Manager	June 2013
	1.2	Updates to mandatory knowledge section.	Qualifications Manager	June 2014
	1.3	Minor typographical errors corrected — removal of superfluous commas and formatting corrected.	Qualifications Manager	April 2015

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