



Environmental Science (National 5)

Draft National Course Assessment Specification



This edition: November 2011, draft version 1.0

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

© Scottish Qualifications Authority 2011

Contents

Course outline	1
Course assessment structure	1
Equality and inclusion	1
Assessment	2
Course assessment	2
Added value	2
Grading	2
Structure and coverage of the Course assessment	4
Setting, conducting and marking of assessment	5
Further mandatory information on Course coverage	6
Administrative information	9

Course outline

Course title:	Environmental Science (National 5)
SCQF level:	5 (24 SCQF credit points)
Course code:	to be advised
Course assessment code:	to be advised

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 for 40 additional programmed hours to allow 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 will be provided in the *Course Support Notes*.

Assessment

To gain the award of the Course, the learner must pass all 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.

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 this question paper is to assess breadth of knowledge from across the Units, depth of understanding, and application of this knowledge and understanding to solve problems and to explain the impact of environmental science applications on society/the environment.

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

- ◆ integrate and apply environmental science knowledge and understanding
- ◆ apply scientific inquiry skills
- ◆ apply scientific analytical thinking skills
- ◆ explain the impact of applications on society/the environment

The question paper will have 80 marks (80% of the total mark).

The question paper has one Section. This will contain restricted and extended response questions.

Marks will be distributed approximately evenly across the three Units.

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

Component 2 — assignment

The purpose of this assignment is to assess the application of skills of scientific investigative/research and the impact of applications on society/the environment, using related knowledge, by carrying out a meaningful and appropriately challenging task in environmental science and communicating findings.

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

- ◆ investigate/research an appropriate environmental science topic/issue
- ◆ process the information gathered, using scientific investigative/research skills
- ◆ apply knowledge and understanding related to the topic/issue
- ◆ present a reasoned and well-developed conclusion, supported by evidence

The assignment will have 20 marks (20% of the total mark).

This assignment has one Section.

The majority of the marks will be awarded for applying scientific investigative/research skills. The other marks will be awarded for applying related knowledge and understanding.

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 one hour and 30 minutes.

Controlled assessment — assignment

This assignment is:

- ◆ set by SQA
- ◆ 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.

Learners will complete the write-up of this assignment in no more than one hour and under open book supervised conditions.

SQA will provide an assignment specification for the generation of evidence. Learners will have a choice of topic/issue to be investigated/researched. SQA will specify the extent of the material to be taken into the write-up.

The production of evidence for assessment will be conducted:

- ◆ with the use of specified resources
- ◆ 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 Environmental Science (National 5) 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 of scientific inquiry, investigation and analytical thinking.

Learners should be able to:

- ◆ apply knowledge and understanding of environmental science to unfamiliar situations, interpret information and solve problems
- ◆ select information from a variety of sources
- ◆ present information appropriately in a variety of forms
- ◆ process information, using calculations where appropriate
- ◆ plan, design and carry out investigations/research to test a hypothesis or to illustrate effects
- ◆ evaluate experimental procedures
- ◆ draw valid conclusions and give explanations supported by evidence or justification
- ◆ make predictions and generalisations based on evidence/information
- ◆ communicate findings
- ◆ evaluate information to solve problems, make decisions and resolve conflicts

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

The following table specifies the mandatory knowledge for the Environmental Science (National 5) Course assessment.

Living Environment
Investigating ecosystems and biodiversity <ul style="list-style-type: none">◆ biodiversity in the context of terrestrial and aquatic ecosystems of national importance◆ sampling using qualitative and quantitative techniques, sources of error for each technique◆ measure abiotic factors and use data to assess their effect on the distribution of organisms◆ use and construct paired statement keys to identify organisms
Interdependence <ul style="list-style-type: none">◆ complex food webs and factors affecting them, including predation, disease, competition, natural and human impacts◆ energy flow through food webs◆ the relationship between the processes of photosynthesis and respiration◆ the chemistry of the stages and the organisms involved in the nitrogen and carbon cycles

Human influences on biodiversity

- ◆ human activities, including acid rain, which can affect ecosystems from a positive and negative viewpoint, including species reduction or increase, extinction and loss of biodiversity
- ◆ the effects and prevention measures that could be taken
- ◆ the importance of indicator species
- ◆ the impact of non-native species on ecosystems
- ◆ conflicting interests between land and/or water-based activities and between these activities and an environment of national importance
- ◆ multi-use integration between land and/or water user groups
- ◆ the role of national organisations for the protection of the environment
- ◆ national initiatives for the protection of the environment
- ◆ national legislation for the protection for the environment

Earth's Resources

Overview of Earth systems and their interactions

- ◆ Earth systems — geosphere, hydrosphere, atmosphere and biosphere
- ◆ the principles of cycles and how they connect the geosphere, hydrosphere, atmosphere and biosphere and the interactions between these systems
- ◆ resources to include physical, biological, renewable and non-renewable

Geosphere

- ◆ structure of the Earth: inner core, outer core, mantle and crust
- ◆ difference between minerals and rocks
- ◆ properties of rocks, including porosity and permeability
- ◆ the rock cycle and formation of igneous, sedimentary and metamorphic rocks
- ◆ limestone: formation, discovery, extraction, processing, uses
- ◆ difference between ore minerals and ores
- ◆ iron ore: formation, discovery, extraction, processing and uses of iron
- ◆ petroleum: formation, discovery, extraction, processing, uses
- ◆ the carbon cycle in the context of the geosphere

Hydrosphere

- ◆ the main reservoirs of water
- ◆ the hydrological (water) cycle
- ◆ distribution of water resources, including national areas of surplus and deficit
- ◆ uses of water: industrial, domestic and agricultural
- ◆ sources of energy from water, including hydroelectric and tidal power
- ◆ siting of hydroelectric and tidal power stations

Biosphere

- ◆ biodiversity and terrestrial and marine biomes
- ◆ oceanic and freshwater biological resources
- ◆ terrestrial resources, including soil, forestry, types of woodland (native and planted)
- ◆ energy from biological resources, including biofuels

Atmosphere

- ◆ uses of nitrogen and oxygen
- ◆ the natural greenhouse effect
- ◆ wind power, including the contribution to electricity supply and the siting of wind farms

Sustainability

Introduction to sustainability

- ◆ sustainability and sustainable development — social, economic and environmental
- ◆ introduction to the need for sustainable approaches, considering potential insecurities in food, water, energy supplies and waste management
- ◆ concept of global citizenship

Food security

- ◆ global population increase and the pressure on food supplies
- ◆ sustainable management of food resources, including distribution
- ◆ strategies for sustainable food production in freshwater and marine-based systems and appraisal of methods used
- ◆ intensive farming and its advantages and disadvantages
- ◆ sustainable approaches to farming, including GM crops, organic farming, biological controls and their advantages and disadvantages
- ◆ intensive fishing and its advantages and disadvantages
- ◆ sustainable approaches to fishing, including alternative species, zoning, marine conservation areas, no-take zones and their advantages and disadvantages
- ◆ national policies and legislation

Water

- ◆ increased water demand
- ◆ comparison of water supplies between developed and developing countries and access to clean water supplies
- ◆ issues of industrial, domestic and commercial water use, including international conflicts in river basins, contamination of water supplies, impact on public health, effluents, thermal pollution, tourism and recreation
- ◆ sustainable approaches to personal, domestic and industrial water use, including water conservation strategies
- ◆ national policies, legislation and statutory bodies

Energy

- ◆ energy use and increased demand
- ◆ changing patterns of production and consumption
- ◆ enhanced greenhouse effect, the main gases involved, their sources, including domestic, commercial, transport, industry and agriculture and their effect
- ◆ sustainable approaches in reducing greenhouse gas emissions from domestic, commercial, transport, industry and agriculture
- ◆ environmental impact of climate change, through energy consumption, at national level
- ◆ national policies and legislation

Waste

- ◆ the problem of increased waste
- ◆ methods of domestic and commercial waste (including food) disposal to include landfill, composting and incineration and the issues arising
- ◆ sustainable approaches in waste management
- ◆ comparison of recycling methods in the UK and elsewhere
- ◆ upgrading waste, including industrial by-products
- ◆ education and personal responsibility
- ◆ national policies and legislation
- ◆ the role of statutory, commercial and voluntary organisations

Administrative information

Published: November 2011 (draft version 1.0)

Superclass: to be advised

History of changes

Course details	Version	Description of change	Authorised by	Date

© Scottish Qualifications Authority 2011

This specification may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged. Additional copies of this Unit can be downloaded from SQA's website at www.sqa.org.uk.

Note: You are advised to check SQA's website (www.sqa.org.uk) to ensure you are using the most up-to-date version of the Course Specification.