

**MANAGING ENVIRONMENTAL
RESOURCES
Intermediate 2**

Fourth edition published March 2001

NOTE OF CHANGES TO ARRANGEMENTS FOURTH EDITION PUBLISHED MARCH 2001

COURSE TITLE: Managing Environmental Resources (Int 2)

COURSE NUMBER: C055 11

National Course Specification

Course Details: The Notes of the Course Details have been expanded, some of the more difficult scientific concepts have been removed.
The extended response question is now out of 10 marks (previously out of 15).

National Unit Specification:

| | | |
|----------------|-----------------------------|--|
| <i>D312 11</i> | <i>Natural Resource Use</i> | Minor amendments. |
| <i>D310 11</i> | <i>Ecosystems</i> | Title changed from D313 11 Ecological Principles and Investigations. Minor amendments. |
| <i>D314 11</i> | <i>Local Investigations</i> | Minor amendments. |

National Course Specification

MANAGING ENVIRONMENTAL RESOURCES (INTERMEDIATE 2)

COURSE NUMBER C055 11

COURSE STRUCTURE

This course comprises three mandatory units:

| | | |
|----------------|-------------------------------------|----------------------------|
| <i>D312 11</i> | <i>Natural Resource Use (Int 2)</i> | <i>1 credit (40 hours)</i> |
| <i>D310 11</i> | <i>Ecosystems (Int 2)</i> | <i>1 credit (40 hours)</i> |
| <i>D314 11</i> | <i>Local Environment (Int 2)</i> | <i>1 credit (40 hours)</i> |

In common with all courses, this course includes 40 hours over and above the 120 hours for the component units. This is for induction, extending the range of learning and teaching approaches, support, consolidation, integration of learning and preparation for external assessment. This time is an important element of the course and advice on its use is included in the course details.

Seasonality should be borne in mind when deciding on the order of delivery of the units.

Administrative Information

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National Course Specification: course details (cont)

COURSE Managing Environmental Resources (Intermediate 2)

RATIONALE

The course provides a balanced overview of the environment through the study of natural resources, ecology and land use. These three strands will encapsulate investigation of the environment, management of the environment and the uses made of its component parts in a mainly local context. The course will contribute to the candidate's general education by developing an enhanced awareness of, and responsibility for, natural resources and the environment. It will encourage candidates to think about environmental issues and will seek to provide sufficient awareness and understanding to allow them to be environmentally responsible citizens in a society which is increasingly concerned about sustainability issues, including biodiversity.

The course will develop the candidate's scientific knowledge and experience by introducing ecological principles and practices with regard to both the local area and other relevant situations. It will be delivered with the emphasis on fieldwork and investigations and could therefore contribute to the candidate's educational progression and employment prospects at a time when business and industry are attempting to respond to demands for resource conservation, pollution control and waste minimisation.

COURSE CONTENT

The course consists of three mandatory units. Each unit reflects one of the strands running through all Managing Environmental Resources courses (natural resources, ecological studies and land use). At Intermediate 2, the units - National Resource Use (Int 2) and Ecosystems (Int 2) are assessed by an end of unit test. The unit – Local Environment (Int 2) is assessed by an investigation.

An environmental theme runs through each of the units and this will be most apparent when the course is viewed holistically. Taken as a course component, each unit will be enriched by providing an integrated approach to considerations of the environment, its inter-relationships and human influences on it. The course offers excellent opportunities for the development of knowledge and understanding, problem-solving and practical abilities within the context of managing environmental resources.

The following tables indicate the content and suggested learning activities through which knowledge and understanding, problem solving and practical abilities are to be developed. The Content Section (which indicates the broad themes that must be covered) and the Notes section (which provides amplification) provide the mandatory content of the course. Suggested Learning Activities are shown in the right-hand column.

National Unit Specification: course details (cont)

Unit 1: Natural Resource Use (Intermediate 2)

Introduction

This unit considers the use of non-renewable resources in domestic, rural and industrial situations. In all cases problems associated with disposal of related waste materials are examined. The increasing number, availability and use of renewable resources are considered as a means of reducing some of these problems and of accepting environmental responsibility. Wise use of all natural resources is an underpinning theme of the unit.

| CONTENT | NOTES | SUGGESTED LEARNING ACTIVITIES |
|---|--|--|
| 1 Resources occurring on the earth. | Resources - Land, air, water (sea and fresh), all living things, coal, oil, natural gas, metal ores and other minerals and quarried rocks. | Identify local natural resources. |
| 2 Renewable and non-renewable resources. | <p>The difference between renewable and non-renewable resources and their use by people.</p> <p>The natural resources: water, air, soil, rocks, minerals and the life they support should be compared with the man-made resources: buildings, transport and machinery, which would not exist in the absence of human activity.</p> <p>Living things, water and air are renewable resources. Fossil fuels and mineral deposits are non-renewable resources.</p> | Using local, national and global examples of natural resources. |
| 3 Sustainable development. | <p>This involves development that meets the needs of the present without compromising the ability of future generations to meet their own needs.</p> <p>The careful use of non-renewable resources and the use of alternatives should be emphasised. Examples to include recycling of products made from using non-renewable resources, promotion of sustainable forestry methods, using renewable sources of energy.</p> | <p>Investigate examples of sustainable and non-sustainable activities in local, national and global contexts.</p> <p>Visit a recycling plant.</p> <p>Examine data on past/present use of resources.</p> <p>Visit from local speaker.</p> |

National Unit Specification: course details (cont)

Unit 1: Natural Resource Use (Intermediate 2)

| CONTENT | NOTES | SUGGESTED LEARNING ACTIVITIES |
|--|---|---|
| <p>4 Natural resources used in energy production.</p> | <p>Uranium, coal, oil, natural gas, peat, biofuels, water, wind, wave and solar power used to generate electricity; crude oil and its products (petrol, gas and diesel fuel) used to generate electricity and as transport fuels. Changes in the nature and extent of the use of these resources in the UK in recent decades.</p> | <p>Investigate U.K. data with respect to trends in energy production and use.</p> |
| <p>5 Energy production and use in the UK, other western European countries and third world countries.</p> | <p>Emphasis on similarities and differences between developed and developing countries. Examples should include use of nuclear energy in France, biofuel in Sweden, geothermal water in Iceland and use of wood and biofuels in developing countries; low grade fossil fuels and large dams for hydro-electric power (HEP); Energy use per head of population in developed and developing countries.</p> | <p>Compare data on energy production in developed and developing countries.</p> |
| <p>6 Environmental effects of different energy sources.</p> | <p>The effect on landscape, wildlife and biodiversity of using wind, wave, and fossil fuels as energy sources. The effects of waste and accidental fallout from nuclear energy, greenhouse gases from fossil fuels and their contribution to acid rain, and the greenhouse effect/global warming. Effects of exhaust fumes from transport. Reduction of these environmental effects by modifying production processes - use of scrubbers and catalytic converters, reducing energy demand, reducing car use and implementing strategic energy management plans.</p> | <p>Investigate case study eg Chernobyl</p> |
| <p>7 Reducing the consumption rate of non-renewable natural resources.</p> | <p>Promotion of renewable technologies. Using local environmental education programmes; local initiatives arising from Agenda 21 to include bottle banks, compost production, energy efficiency schemes.</p> | <p>Carry out investigation of personal and family behaviour patterns with respect to energy use and car use. Carry out investigation of local and other initiatives arising from Agenda 21.</p> |

National Unit Specification: course details (cont)

Unit 2: Ecosystems (Intermediate 2)

Introduction

This unit considers various ecosystems in relation to their constituent elements and dynamic nature. This will be supported as much as possible by related fieldwork and first-hand investigation of habitats. Consideration is given to the influence of industrial, rural and domestic practices on the stability of a number of ecosystems. The cycling of nutrients and their relationship to ecosystem stability are also explored.

| CONTENT | NOTES | SUGGESTED LEARNING ACTIVITIES |
|--|--|---|
| 1 Ecological concepts. | Appropriate examples to describe the terms biotic, abiotic, biomass, species, biodiversity, habitat, niche, population, community, ecosystem, adaptation and competition. Inter-relationships and their dynamic nature to be discussed and emphasised at all times. | Examples of terrestrial, freshwater and marine ecosystems should be studied using local examples where appropriate. |
| 2 Food chains and food webs. | Appropriate use and examples of the terms producer, primary and secondary consumer, herbivore, carnivore, omnivore, decomposer, predator and prey. Understanding of the terms symbiosis, mutualism and parasitism, using varied examples. Pyramids of number and biomass including inverted pyramids. | Analyse, complete and construct food chains, webs and pyramids using terrestrial, freshwater and marine examples. |
| 3 Energy and energy conversion. | The sun as the energy source. Photosynthesis as an energy converting process. The role of producers in converting light to chemical energy. The flow and loss of energy as seen in food chains. Energy loss through movement, heat and undigested food. Relationship between the number of components in a chain and extent of energy loss should be described. Resultant effects on length and efficiency of chains. Influence of length and efficiency of food chains on diet in Third World countries. | Calculate energy losses; efficiency of energy transfer. |

National Unit Specification: course details (cont)

Unit 2: Ecosystems (Intermediate 2)

| CONTENT | NOTES | SUGGESTED LEARNING ACTIVITIES |
|--|---|---|
| <p>4 Carbon and nitrogen cycles.</p> | <p>Photosynthesis and respiration illustrated by simple word equations.</p> <p>Description of carbon cycle to include photosynthesis, respiration, feeding relationships, and the contribution by combustion of fossil fuels.</p> <p>Description of nitrogen fixation, death and decay, nitrification, denitrification, absorption by plants and feeding relationships.</p> <p>Importance of decomposers in carbon and nitrogen cycles.</p> <p>Importance of the need to cycle nutrients.</p> | <p>Construct simple flow diagrams that illustrate cyclic activities.</p> |
| <p>5 The frequency and distribution of plant and animal species in relation to environmental variables.</p> | <p>Measure the environmental variables light intensity, pH, temperature, soil moisture, water flow rate in relation to the frequency and distribution of selected plant and animal species .</p> <p>Methods of sampling to include transects, quadrats, pitfall traps and nets.</p> <p>Significance of other environmental variables to include precipitation, wind velocity and wind direction.</p> | <p>Investigate the effect of light intensity on the distribution of a plant species eg daisy along a transect.</p> <p>Investigate the effect of moisture on the distribution of woodlice.</p> <p>Investigate the effect of light intensity in relation to the distribution of Pleurococcus.</p> |
| <p>6 Impact of human activities on ecosystems.</p> | <p>Habitat damage and destruction, species reduction or extinction, endangered species, and loss of biodiversity, The effects of acid rain, greenhouse gases, oil spills, lead, fertilisers and other agrochemicals, sewage and other wastes, eutrophication and litter on ecosystems.</p> | <p>Newspaper or magazine articles and electronic sources.</p> <p>Site visits; local speakers.</p> <p>Analyse data and case studies.</p> |

National Unit Specification: course details (cont)

Unit 2: Ecosystems (Intermediate 2)

| CONTENT | NOTES | SUGGESTED LEARNING ACTIVITIES |
|-------------------------------------|--|---|
| 7 Pollution and conservation | Study of local, national and international examples with emphasis on causes of pollution and preventative measures that could be employed. The role of indicator species in relation to pollution. Conservation in practice to include recycling, legislation, countryside protection and management and species enhancement action plans. | Carry out pollution surveys (eg litter). Effects of car exhaust on roadside plants. Study lichens and fresh water indicator species in relation to pollution. Case study of local or national example of conservation in practice. |

National Unit Specification: course details (cont)

Unit 3: Local Environment (Intermediate 2)

Introduction

This unit provides the opportunity to examine geology, climate, topography, natural features, wildlife and human influences in a local area through a detailed practical investigation. The investigation should be carried out over a period of time, and relevant observations and measurements should be recorded in a diary. These findings should be incorporated into the final report. The accumulated information will be used to identify conflicts of interest between user groups and to formulate possible future actions to harmonise interactions and integrate activities.

| CONTENT | NOTES | SUGGESTED LEARNING ACTIVITIES |
|---|---|--|
| <p>1 Features of the local area.</p> <p>2 Development of the local area.</p> <p>3 Flora and fauna.</p> | <p>Topographical features contributing to the local landscape. Climate and weather data for the local area. Natural features such as woods, fields, rivers and lochs. Features of human origin such as roads, railways, overhead cables, canals, buildings, archaeological artefacts, walls, fences, hedges and forestry plantations.</p> <p>Archaeological and historical influences deduced from signs of previous human activity, settlements and land use practices. Contribution of geology and soils to development of local area.</p> <p>Plant species to be identified as cultivated or wild. Animal species to be identified as domesticated and non-domesticated. Identification of plants and animals with the aid of keys. Historical changes to highlight the meanings of the terms native - red squirrel and <i>Primula scotica</i>, naturalised - grey squirrel and rhododendron, weed - ragwort and feral species - mink.</p> | <p>Examine the local landscape and study Ordnance Survey maps. Use local weather stations and/or records to determine parameters such as maximum and minimum temperature, wind, rainfall and sunshine for the duration of the investigation. Carry out transects and point samples of the local area to quantify and record natural features and features of human origin.</p> <p>Use O.S. maps, historical books and anecdotal evidence to investigate previous human activity. Examine solid and drift geology maps. Guest speaker/local historian.</p> <p>Construct and use keys to identify plants and animal species.</p> <p>Case studies.</p> <p>Compile database of local plants and animals species.</p> |

National Unit Specification: course details (cont)

Unit 3: Local Environment (Intermediate 2)

| CONTENT | NOTES | SUGGESTED LEARNING ACTIVITIES |
|---|--|--|
| <p>4 Local land and water use.</p> | <p>Land and water use described to include agriculture, aquaculture, conservation, horticulture, forestry, leisure and recreation, housing and industry and the specialisms of these activities as appropriate for the local area.</p> | <p>Examine land capability maps. Carry out surveys of the appropriate specialisms in a local context.</p> |
| <p>5 Conflicts of interest.</p> | <p>Description of conflicting interests between relevant land-and/or water-based activities and between these activities and the local environment. Evaluation of potential conflicts arising from future developments in transport-related, leisure-related, commercial or industry-related activities, as appropriate.</p> | <p>Carry out first-hand and library-based surveys.</p> |
| <p>6 Integration and co-operation.</p> | <p>Examples of current and potential multi-use and integration between land and/or water user groups in the local area such as farming, fishing, forestry, conservation, sport, recreation and tourism.</p> | <p>Carry out first-hand and library-based surveys.</p> <p>Investigate media coverage and/or methods of conflict resolution, lobbying activities and partnerships. Examples could include collaboration between the Royal Society for the Protection of Birds and the Crofters' Union with respect to rural development and corncrake conservation or the Scottish Tourist Board and Scottish Natural Heritage with respect to green tourism, or mountain biking.</p> |

National Course Specification: course details (cont)

COURSE Managing Environmental Resources (Intermediate 2)

ASSESSMENT

To gain the award of the course, Managing Environmental Resources, Int 2, the candidate must achieve all the component units of the course as well as the external assessment. External assessment will provide the basis for grading attainment in the course award.

When units are taken as component parts of a course, candidates will have the opportunity to demonstrate achievement beyond that required to attain each of the unit outcomes. This attainment may, where appropriate, be recorded and used to contribute towards course estimates and to provide evidence for appeals. Additional details are provided, where appropriate, with the exemplar assessment materials. Further information on the key principles of assessment are provided in the paper *Assessment*, published by HSDU in May 1996.

DETAILS OF THE INSTRUMENT FOR EXTERNAL ASSESSMENT

The instrument for external assessment is the external course examination which will sample across the outcomes of all the component units and will consist of a two hour paper worth approximately 100 marks. The paper will consist of two sections. The first will be made up of structured questions with an allocation of 90 marks, testing knowledge and understanding, problem-solving and/or practical abilities. Candidates will be expected to answer all questions. The second section will consist of three structured questions requiring extended responses, each with an allocation of 10 marks, of which candidates will be expected to answer one.

The assessment of knowledge and understanding, problem-solving and practical abilities will be based upon the course content described for the three units. The content statements and the supplementary notes will be sampled in the course examination, which will include both familiar contexts as well as less familiar and more complex contexts than in the unit assessments. While there are no compulsory practicals for the purposes of external assessment, there will be questions set in the examination on simulated practical work which will provide an opportunity for candidates to demonstrate skills in less familiar and more complex contexts.

GRADE DESCRIPTIONS

Grade description for C

Candidates demonstrating performance at grade C will have achieved the component units of the course. In addition, in the course assessment, candidates should be able to demonstrate the ability to:

- retain knowledge and skills over a longer period of time
- integrate knowledge and understanding, problem-solving and practical abilities acquired across component units
- select, organise and present relevant knowledge in an extended response.

National Course Specification: course details (cont)

COURSE Managing Environmental Resources (Intermediate 2)

Grade description for A

In addition, candidates at grade A should be able to demonstrate:

- the ability to apply knowledge and understanding, problem-solving and practical abilities in contexts less familiar and more complex than in the unit outcomes
- particular proficiency in selecting, organising and presenting relevant knowledge in an extended response.

The overall assessment proposed for the course, ie the combination of internal and external assessment, should provide the necessary evidence for the core skills where an automatic award is proposed. Confirmation of this will be provided at a later date.

National Course Specification: course details (cont)

COURSE Managing Environmental Resources (Intermediate 2)

APPROACHES TO LEARNING AND TEACHING

Suggestions for appropriate learning activities are contained within the tables of course content. These activities, together with the use of relevant support materials, will provide opportunities for active learning. An investigative approach should be taken to the learning and teaching of Managing Environmental Resources. Such an approach draws heavily on practical work and should provide opportunities to develop individual and group research using a variety of resources alongside the more traditional approaches of whole-class teaching. Although individual evidence of attainment of all learning outcomes is a prerequisite for each candidate, group activities can enhance the value of investigative work and foster personal, interpersonal and organisational skills.

There are opportunities, especially in the Local Environment unit, for interaction with the local community in investigative work. Local experts and visiting speakers should be used as appropriate to enhance these learning experiences. Site visits should play an important part in the delivery of all component units. This practical work could provide one way of delivering the requisite knowledge and understanding. Practical investigations should be used to develop problem-solving and practical skills and not just to provide evidence for the purposes of internal assessment.

Use of the additional 40 hours

This time may be best distributed throughout the duration of the course. It should be used:

- to provide an introduction to the course and to assessment methods
- to allow more practical work to be undertaken
- to allow the integration of knowledge and understanding from separate units to enhance the learning experience
- to allow further development of interpretation and problem-solving skills
- to practise applying knowledge and understanding, problem-solving and practical abilities in contexts more complex than in the units
- to develop extended response skills
- for support in particular aspects of units in which candidates require to be reassessed
- to practise techniques in answering the more challenging questions associated with the course assessment
- to prepare candidates for external examination conditions.

Arrangements should be made to ensure that there will be no artificial barriers to learning and assessment. The nature of a candidate's special needs should be taken into account when planning learning experiences and selecting assessment instruments. Alternative arrangements can be made as necessary.

National Course Specification: course details (cont)

COURSE Managing Environmental Resources (Intermediate 2)

SPECIAL NEEDS

This course specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).

SUBJECT GUIDES

A Subject Guide to accompany the Arrangements Documents has been produced by Higher Still Development Unit (HSDU) in partnership with the Scottish Consultative Council on the Curriculum (SCCC) and Scottish Further Education Unit (SFEU). The Guide provides further advice and information about:

- support materials for each course
- learning and teaching approaches in addition to the information provided in the Arrangements document
- assessment
- ensuring appropriate access for candidates with special educational needs.

The Subject Guide is intended to support the information contained in the Arrangements document. The SQA Arrangements documents contain the standards against which candidates are assessed.

National Unit Specification: general information

| | |
|---------------|---|
| UNIT | Natural Resource Use (Intermediate 2) |
| NUMBER | D312 11 |
| COURSE | Managing Environmental Resources (Intermediate 2) |

SUMMARY

This unit seeks to develop environmental awareness in a range of programmes. The concepts of renewable and non-renewable resources are central to this unit. On completion of the unit the candidate will be able to solve problems and collect and analyse data relating to how natural resources are used, and how activities concerning resource use may be modified towards sustainable development.

OUTCOMES

- 1 Demonstrate knowledge and understanding related to renewable and non-renewable natural resources and sustainable development.
- 2 Solve problems related to renewable and non-renewable natural resources and sustainable development.
- 3 Collect and analyse information obtained by investigation related to renewable and non-renewable natural resources and sustainable development.

Administrative Information

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|--------------------------|-----------------------------------|
| Superclass: | QA |
| Publication date: | March 2001 |
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National Unit Specification: general information (cont)

UNIT Natural Resource Use (Intermediate 2)

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following:

- Standard Grade Biology, grade 3 or 4
- Standard Grade Chemistry, grade 3 or 4
- Standard Grade Geography, grade 3 or 4
- Standard Grade Physics, grade 3 or 4
- Standard Grade Science, grade 3 or 4
- Intermediate 1 Managing Environmental Resources or its component units.

CREDIT VALUE

1 credit at Intermediate 2.

CORE SKILLS

This unit gives automatic certification of the following:

| | | |
|---|-----------------------------|-------|
| Complete core skills for the unit | Problem Solving | Int 2 |
| Additional core skills components for the unit | Using Graphical Information | Int 2 |

Additional information about core skills is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Natural Resource Use (Intermediate 2)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Demonstrate knowledge and understanding related to renewable and non-renewable natural resources and sustainable development.

Performance criteria

- (a) The terms renewable and non-renewable as applied to natural resources and the concept of sustainable development are defined accurately.
- (b) The natural resources currently used in the UK and their changing use over recent decades are described accurately.
- (c) The use of natural resources in selected developed and developing countries is compared accurately and with due regard to environmental impact.
- (d) Opportunities for reducing the consumption rate of non-renewable natural resources are evaluated accurately with supporting argument.

Evidence requirements

Evidence of an appropriate level of attainment must be generated from a closed book test or tests with items covering all performance criteria.

OUTCOME 2

Solve problems related to renewable and non-renewable natural resources and sustainable development.

Performance criteria

- (a) Relevant information is selected and presented in an appropriate format.
- (b) Information is accurately processed using calculations where appropriate.
- (c) Conclusions drawn are valid and explanations given are supported by evidence.
- (d) Predictions and generalisations made are based on available evidence.

Evidence requirements

Evidence of an appropriate level of attainment must be generated from a closed book test or tests with items covering all performance criteria including the interpretation and communication of graphical information at the appropriate level. With reference to PCs (c) and (d), the candidate's answers must include valid conclusions and explanations based on an evaluation of supporting evidence. Evidence from Outcomes 1 and 2 can be generated from an integrated test lasting 45 minutes.

National Unit Specification: statement of standards (cont)

UNIT Natural Resource Use (Intermediate 2)

OUTCOME 3

Collect and analyse information obtained by investigation related to renewable and non-renewable natural resources and sustainable development.

Performance criteria

- (a) Information is collected by active participation in the investigation.
- (b) Investigative procedures are described accurately.
- (c) Relevant measurements and observations are recorded in an appropriate format.
- (d) Recorded information is analysed and presented in an appropriate format.
- (e) Conclusions drawn are valid.
- (f) Procedures are evaluated with supporting argument.

Evidence requirements

Evidence of an appropriate level of attainment must be generated with items covering all performance criteria. A report of one investigative activity relating to renewable and non-renewable natural resources and sustainability is required.

The teacher/lecturer responsible must attest that the report is the individual work of the candidate derived from active participation in the investigation. This includes setting objectives for the investigation, planning of appropriate tasks, identifying and obtaining the necessary resources, carrying out the investigation and evaluating all stages. Conclusions and recommendations should be justified by reference to evidence drawn from the investigation.

Depending on the activity, the collection of information may involve group work.

National Unit Specification: support notes

UNIT Natural Resource Use (Intermediate 2)

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

Full details to assist staff who are delivering the unit as a free-standing unit are given in the contents section of the course specification. The outline of content and context is as follows:

Outcome 1

- 1 Renewable and non-renewable resources.
- 2 Sustainable development.
- 3 Resources occurring on the surface of the earth and underground.
- 4 Natural resources used in energy production.
- 5 Energy production and use in the UK, other western European countries and Third World countries.
- 6 Environmental effects of different energy sources.
- 7 Reducing the consumption rate of non-renewable natural resources.

Outcome 2

Details of problem-solving opportunities are given in the contents section of the course specification.

Outcome 3

Details of opportunities for investigations are given in the contents section of the course specification.

For Outcome 3 investigations may be based wholly or in combination on:

- Practical work in the field or classroom
- Research using relevant literature
- Survey of an appropriate topic using relevant sampling techniques.

The nature of the unit will determine the style and scope of the investigation. The support notes on assessment (below) indicate a range of points, which may aid professional judgement in guiding the candidate's investigation and in assessing whether the performance criteria have been met.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Details of suitable approaches are given in the course specification.

National Unit Specification: support notes (cont)

UNIT Natural Resource Use (Intermediate 2)

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Outcomes 1 and 2 can be assessed by an appropriate level of attainment in an integrated end-of-unit test with questions covering all performance criteria.

Test items should be constructed to allow candidates to generate evidence relating to the performance criteria as follows:

- a) Selecting and presenting information
 - sources of information include text, tables, charts, graphs, maps, diagrams
 - formats of presentation include written responses, tables, graphs, diagrams
- b) Calculations include percentages, averages and ratios. Significant figures, rounding and units should be used appropriately
- c) Conclusions drawn should include some justification and explanations should be supported by evidence
- d) From given situations, candidates should be able to predict and generalise.

Outcome 3 should be assessed by participation in an investigation and an appropriate level of attainment in the associated report.

The teacher/lecturer should ensure that the investigative activity to be undertaken in relation to Outcome 3 affords opportunities to demonstrate the ability to plan and organise such activity at an appropriate level of demand. The activity will relate to the unit content and candidates should be made aware of the range of skills that must be demonstrated to ensure attainment of Outcome 3.

In relation to PC (a), the teacher/lecturer checks by observation that the candidate participates actively in the planning of the investigation, deciding how it will be managed, identifying and obtaining resources and carrying out the investigation.

Candidates should provide a report with an appropriate title. The report should relate to Outcome 3, PCs (b) to (f) as follows:

| | |
|--|---|
| b) Investigative procedures are described accurately. | A clear statement of the purpose of the investigation. A few concise sentences including apposite illustrations and, as appropriate: <ul style="list-style-type: none">• A short description of the methods used• A labelled diagram or brief description of equipment used• How variables and controls were used• The range and balance of sources selected• How measurements were taken or observations made. There is no need for a long detailed description. The use of the impersonal passive voice is to be encouraged as an example of good practice but this is not mandatory for meeting the performance criteria. |
| c) Relevant measurements and observations are recorded in an appropriate format. | Readings or observations must be recorded in a clear format, normally a table with correct headings, appropriate units and results/readings entered correctly. |

National Unit Specification: support notes (cont)

UNIT Natural Resource Use (Intermediate 2)

| | |
|---|--|
| d) Recorded information is analysed and presented in an appropriate format. | Data should be analysed and presented in tabular, graphical, diagram, or other equivalent form as appropriate: <ul style="list-style-type: none">• For a tabular presentation this may be an extension of the table used for PCs above and must include suitable headings and units and appropriate computations.• For a graphical presentation this must include data presented in appropriate forms such as histograms, bar charts, line graphs with suitable scales and axes labelled with variable and units and with data correctly plotted. |
| e) Conclusions drawn are valid. | Conclusions should use evidence from the investigation and relate back to the aim of the investigation. At least one of the following, as appropriate, should be included: <ul style="list-style-type: none">• Overall pattern to findings, readings or observations• Trends in analysed information or results• Connection between variables and controls• Reasons for acceptance or rejection of arguments from sources used. |
| f) The investigative procedures are evaluated with supporting argument. | The evaluation should cover all stages of the activity, analysis of the activity and the results of the activity. The evaluation must include supporting argument in at least one of: <ul style="list-style-type: none">• Effectiveness of procedures• Control of variables• Limitations of the range and/or balance of sources used• Limitations of equipment• Possible sources of error• Possible improvements. |

The points beside each performance criterion give an indication of what should be addressed to achieve a pass. The relevance of the points will vary according to the style and scope of the investigation. The points are intended as helpful guidance. The decision of pass or fail is made by the professional judgement of staff of the presenting centre (subject to moderation) against the performance criteria.

It is appropriate to support candidates in producing a report to meet the performance criteria. Re-drafting of a report after necessary supportive criticism is to be encouraged both as part of the learning and teaching process and to produce evidence for assessment.

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).

National Unit Specification: general information

| | |
|---------------|---|
| UNIT | Ecosystems (Intermediate 2) |
| NUMBER | D310 11 |
| COURSE | Managing Environmental Resources (Intermediate 2) |

SUMMARY

This unit seeks to develop the concept of ecological inter-relationships. On completion of the unit the candidate will be able to describe and apply ecological principles and investigative techniques and to solve problems related to specified ecosystems and the effects of human influences on them.

OUTCOMES

- 1 Demonstrate knowledge and understanding related to ecological principles and investigations.
- 2 Solve problems related to specified ecosystems and the effects of human activities on them.
- 3 Collect and analyse information obtained by investigation related to selected ecosystems.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following:

- Standard Grade Biology, grade 3 or 4
- Standard Grade Chemistry, grade 3 or 4
- Standard Grade Geography, grade 3 or 4
- Standard Grade Physics, grade 3 or 4
- Standard Grade Science, grade 3 or 4
- Intermediate 1 Managing Environmental Resources or its component units.

Administrative Information

| | |
|--------------------------|-----------------------------------|
| Superclass: | QA |
| Publication date: | March 2001 |
| Source: | Scottish Qualifications Authority |
| Version: | 01 |

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National Unit Specification: general information (cont)

UNIT Ecosystems (Intermediate 2)

CREDIT VALUE

1 credit at Intermediate 2.

CORE SKILLS

This unit gives automatic certification of the following:

| | | |
|--|-----------------|-------|
| Complete core skills for the unit | Problem Solving | Int 2 |
|--|-----------------|-------|

| | | |
|---|-----------------------------|-------|
| Additional core skills components for the unit | Using Graphical Information | Int 2 |
|---|-----------------------------|-------|

Additional information about core skills is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Ecosystems (Intermediate 2)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Demonstrate knowledge and understanding related to ecological principles and investigations.

Performance criteria

- (a) Selected ecosystems are described correctly using current ecological terms.
- (b) Energy flow in an ecosystem is described correctly with respect to transfer efficiency.
- (c) Nutrient cycling in an ecosystem is described correctly with reference to uptake, transfer and output.
- (d) The effects of human activities on selected ecosystems are explained accurately in terms of positive and negative impacts.

Evidence requirements

Evidence of an appropriate level of attainment must be generated from a closed book test or tests with items covering all performance criteria.

OUTCOME 2

Solve problems related to specified ecosystems and the effects of human activities on them.

Performance criteria

- (a) Relevant information is selected and presented in an appropriate format.
- (b) Information is accurately processed using calculations where appropriate.
- (c) Conclusions drawn are valid and explanations given are supported by evidence.
- (d) Predictions and generalisations made are based on available evidence.

Evidence requirements

Evidence of an appropriate level of attainment must be generated from a closed book test or tests with items covering all performance criteria including the interpretation and communication of graphical information at the appropriate level. With reference to PCs (c) and (d), the candidate's answers must include valid conclusions and explanations based on an evaluation of supporting evidence. Evidence for Outcomes 1 and 2 can be generated from an integrated test lasting 45 minutes.

National Unit Specification: statement of standards (cont)

UNIT Ecosystems (Intermediate 2)

OUTCOME 3

Collect and analyse information obtained by investigation related to selected ecosystems.

Performance criteria

- (a) Information is collected by active participation in the investigation.
- (b) Investigative procedures are described accurately.
- (c) Relevant measurements and observations are recorded in an appropriate format.
- (d) Recorded information is analysed and presented in an appropriate format.
- (e) Conclusions drawn are valid.
- (f) Procedures are evaluated with supporting argument.

Evidence requirements

Evidence of an appropriate level of attainment must be generated with items covering all performance criteria. A report of one ecological investigative activity concerned with the relationships between environmental factors and the frequency and distribution of selected plant and animal species is required.

The teacher/lecturer responsible must attest that the report is the individual work of the candidate derived from active participation in the investigation. This includes setting objectives for the investigation, planning of appropriate tasks, identifying and obtaining the necessary resources, carrying out the investigation and evaluating all stages. Conclusions and recommendations should be justified by reference to evidence drawn from the investigation.

Depending on the activity, the collection of information may involve group work.

National Unit Specification: support notes

UNIT Ecosystems (Intermediate 2)

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

Full details to assist staff who are delivering the unit as a free-standing unit are given in the contents section of the course specification. The outline of content and context is as follows:

Outcome 1

- 1 Ecological concepts.
- 2 Component parts of ecosystems.
- 3 Pyramids of number and biomass.
- 4 Energy and energy conversion.
- 5 Carbon and nitrogen cycles.
- 6 Environmental variables.
- 7 The frequency and distribution of plant and animal species in relation to environmental variables.
- 8 Impact of human activities on ecosystems.
- 9 Pollution and conservation.

Outcome 2

Details of problem-solving opportunities are given in the contents section of the course specification.

Outcome 3

Details of opportunities for investigations are given in the contents section of the course specification.

For Outcome 3 investigations may be based wholly or in combination on:

- Practical work in the field or classroom
- Research using relevant literature
- Survey of an appropriate topic using relevant sampling techniques.

The nature of the unit will determine the style and scope of the investigation. The support notes on assessment (below) indicate a range of points, which may aid professional judgement in guiding the candidate's investigation and in assessing whether the performance criteria have been met.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Details of suitable approaches are given in the course specification.

National Unit Specification: support notes (cont)

UNIT Ecosystems (Intermediate 2)

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Outcomes 1 and 2 can be assessed by an appropriate level of attainment in an integrated end-of-unit test with questions covering all performance criteria.

Test items should be constructed to allow candidates to generate evidence relating to the performance criteria as follows:

- a) Selecting and presenting information
 - sources of information include text, tables, charts, graphs, maps, diagrams
 - formats of presentation include written responses, tables, graphs, diagrams
- b) Calculations include percentages, averages and ratios. Significant figures, rounding and units should be used appropriately
- c) Conclusions drawn should include some justification and explanations should be supported by evidence
- d) From given situations, candidates should be able to predict and generalise.

Outcome 3 should be assessed by participation in an investigation and an appropriate level of attainment in the associated report.

The teacher/lecturer should ensure that the investigative activity to be undertaken in relation to Outcome 3 affords opportunities to demonstrate the ability to plan and organise such activity at an appropriate level of demand. The activity will relate to the unit content and candidates should be made aware of the range of skills that must be demonstrated to ensure attainment of Outcome 3.

In relation to PC (a), the teacher/lecturer should check by observation that the candidate participates actively in the planning of the investigation, deciding how it will be managed, identifying and obtaining resources and carrying out the investigation.

Candidates should provide a report with an appropriate title. The report should relate to Outcome 3, PCs (b) to (f) as follows:

| | |
|--|---|
| b) Investigative procedures are described accurately. | A clear statement of the purpose of the investigation. A few concise sentences including apposite illustrations and, as appropriate: <ul style="list-style-type: none">• A short description of the methods used• A labelled diagram or brief description of equipment used• How variables and controls were used• The range and balance of sources selected• How measurements were taken or observations made. There is no need for a long detailed description. The use of the impersonal passive voice is to be encouraged as an example of good practice but this is not mandatory for meeting the performance criteria. |
| c) Relevant measurements and observations are recorded in an appropriate format. | Readings or observations must be recorded in a clear format, normally a table with correct headings, appropriate units and results/readings entered correctly. |

National Unit Specification: support notes (cont)

UNIT Ecosystems (Intermediate 2)

| | |
|---|---|
| d) Recorded information is analysed and presented in an appropriate format. | Data should be analysed and presented in tabular, graphical, diagram, or other equivalent form as appropriate: <ul style="list-style-type: none"> • For a tabular presentation this may be an extension of the table used for PCs above and must include suitable headings and units and appropriate computations. • For a graphical presentation this must include data presented in appropriate forms such as histograms, bar charts, line graphs with suitable scales and axes labelled with variable and units and with data correctly plotted. |
| e) Conclusions drawn are valid. | Conclusions should use evidence from the investigation and relate back to the aim of the investigation. At least one of the following, as appropriate, should be included: <ul style="list-style-type: none"> • Overall pattern to findings, readings or observations • Trends in analysed information or results • Connection between variables and controls • Reasons for acceptance or rejection of arguments from sources used. |
| f) The investigative procedures are evaluated with supporting argument. | The evaluation should cover all stages of the activity, analysis of the activity and the results of the activity. The evaluation must include supporting argument in at least one of: <ul style="list-style-type: none"> • Effectiveness of procedures • Control of variables • Limitations of the range and/or balance of sources used • Limitations of equipment • Possible sources of error • Possible improvements. |

The points beside each performance criterion give an indication of what should be addressed to achieve a pass. The relevance of the points will vary according to the style and scope of the investigation. The points are intended as helpful guidance. The decision of pass or fail is made by the professional judgement of staff of the presenting centre (subject to moderation) against the performance criteria.

It is appropriate to support candidates in producing a report to meet the performance criteria. Re-drafting of a report after necessary supportive criticism is to be encouraged both as part of the learning and teaching process and to produce evidence for assessment.

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).

National Unit Specification: general information

| | |
|---------------|---|
| UNIT | Local Environment (Intermediate 2) |
| NUMBER | D314 11 |
| COURSE | Managing Environmental Resources (Intermediate 2) |

SUMMARY

This unit seeks to develop the ability to undertake research activities in the form of direct observation and investigation of a local area, and information and maps relating to it. On completion of this unit the candidate will be able to investigate a local area in terms of its natural and man-made features, its weather and climate, and the human activities and wildlife it supports.

OUTCOMES

- 1 Demonstrate knowledge and understanding related to the environment in a local area.
- 2 Solve problems related to the investigation of the environment in a local area.
- 3 Collect and analyse information obtained by investigation related to the environment in a local area.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following:

- Standard Grade Biology, grade 3 or 4
- Standard Grade Chemistry, grade 3 or 4
- Standard Grade Geography, grade 3 or 4
- Standard Grade Physics, grade 3 or 4
- Standard Grade Science, grade 3 or 4
- Intermediate 1 Managing Environmental Resources or its component units.

Administrative Information

| | |
|--------------------------|-----------------------------------|
| Superclass: | QA |
| Publication date: | March 2001 |
| Source: | Scottish Qualifications Authority |
| Version: | 04 |

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National Unit Specification: general information (cont)

UNIT Local Environment (Intermediate 2)

CREDIT VALUE

1 credit at Intermediate 2.

CORE SKILLS

This unit gives automatic certification of the following:

| | | |
|---|------------------------------|-------|
| Complete core skills for the unit | Problem Solving* | Int 2 |
| Additional core skills components for the unit | Critical Thinking* | Int 2 |
| | Planning and Organising | Int 2 |
| | Reviewing and Evaluating | Int 2 |
| | Using Graphical Information* | Int 2 |

**To be confirmed.*

Note: If automatic certification of the component Critical Thinking (Int 2) is confirmed, the complete Problem Solving (Int 2) core skill will be achieved.

Additional information about core skills is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Local Environment (Intermediate 2)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Demonstrate knowledge and understanding related to the environment in a local area.

Performance criteria

- (a) The local environment and its development are described correctly with respect to its constituent elements.
- (b) The use of the local environment is described correctly with respect to land- and water-based activities.
- (c) Conflicts between land- and water-based activities and the local environment are evaluated with supporting argument.
- (d) Potential integrated land use schemes for the local environment are evaluated with supporting argument.

Evidence requirements

There is no end of unit test for this unit. The unit is assessed by a report, and the evidence requirements are therefore the same for all three outcomes.

Evidence of an appropriate level of attainment must be generated with items covering all performance criteria. A single report of an integrated survey relating to a local area could be used to meet the requirements of all three outcomes.

The teacher/lecturer responsible must attest that the report is the individual work of the candidate derived from active participation in the investigation. This includes setting objectives for the investigation, planning of appropriate tasks, identifying and obtaining the necessary resources, carrying out the investigation and evaluating all stages. Conclusions and recommendations should be justified by reference to evidence drawn from the investigation. The report must include the interpretation and communication of graphical information at the appropriate level.

Depending on the activity, the collection of information may involve group work.

National Unit Specification: statement of standards (cont)

UNIT Local Environment (Intermediate 2)

OUTCOME 2

Solve problems related to the investigation of the environment in a local area.

Performance criteria

- (a) Relevant information is selected and presented in an appropriate format.
- (b) Information is accurately processed using calculations where appropriate.
- (c) Conclusions drawn are valid and explanations given are supported by evidence.
- (d) Predictions and generalisations made are based on available evidence.

Evidence requirements

There is no end of unit test for this unit. The unit is assessed by a report, and the evidence requirements are therefore the same for all three outcomes.

Evidence of an appropriate level of attainment must be generated with items covering all performance criteria. A single report of an integrated survey relating to a local area could be used to meet the requirements of all three outcomes.

The teacher/lecturer responsible must attest that the report is the individual work of the candidate derived from active participation in the investigation. This includes setting objectives for the investigation, planning of appropriate tasks, identifying and obtaining the necessary resources, carrying out the investigation and evaluating all stages. Conclusions and recommendations should be justified by reference to evidence drawn from the investigation. The report must include the interpretation and communication of graphical information at the appropriate level.

Depending on the activity, the collection of information may involve group work.

National Unit Specification: statement of standards (cont)

UNIT Local Environment (Intermediate 2)

OUTCOME 3

Collect and analyse information obtained by investigation related to the environment in a local area.

Performance criteria

- (a) Information is collected by active participation in the investigation.
- (b) Investigative procedures are described accurately.
- (c) Relevant measurements and observations are recorded in an appropriate format.
- (d) Recorded information is analysed and presented in an appropriate format.
- (e) Conclusions drawn are valid.
- (f) Procedures are evaluated with supporting argument.

Evidence requirements

There is no end of unit test for this unit. The unit is assessed by a report, and the evidence requirements are therefore the same for all three outcomes.

Evidence of an appropriate level of attainment must be generated with items covering all performance criteria. A single report of an integrated survey relating to a local area could be used to meet the requirements of all three outcomes.

The teacher/lecturer responsible must attest that the report is the individual work of the candidate derived from active participation in the investigation. This includes setting objectives for the investigation, planning of appropriate tasks, identifying and obtaining the necessary resources, carrying out the investigation and evaluating all stages. Conclusions and recommendations should be justified by reference to evidence drawn from the investigation. The report must include the interpretation and communication of graphical information at the appropriate level.

Depending on the activity, the collection of information may involve group work.

National Unit Specification: support notes

UNIT Local Environment (Intermediate 2)

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

Full details to assist staff who are delivering the unit as a free-standing unit are given in the contents section of the course specification. The outline of content and context is as follows:

Outcome 1

- 1 Features of the local area.
- 2 Development of the local area.
- 3 Flora and fauna.
- 4 Local land and/or water use.
- 5 Conflicts of interest.
- 6 Integration and co-operation.

Outcome 2

Details of problem-solving opportunities are given in the contents section of the course specification.

Outcome 3

Details of opportunities for investigations are given in the contents section of the course specification.

For this unit the investigation related to the environment in a local area may be based on a combination of:

- Practical work in the field or classroom
- Research using relevant literature
- Survey of an appropriate topic using relevant sampling techniques.

The nature of the unit will determine the style and scope of the investigation. The support notes on assessment (below) indicate a range of points, which may aid professional judgement in guiding the candidate's investigation and in assessing whether the performance criteria have been met.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Details of suitable approaches are given in the course specification.

National Unit Specification: support notes (cont)

UNIT Local Environment (Intermediate 2)

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

All outcomes should be assessed by the demonstration of an appropriate level of attainment in carrying out an investigation and presenting a report relating to a local area.

The investigation must allow candidates to generate evidence relating to the performance criteria of Outcome 2 as follows:

- a) Selecting and presenting information
 - sources of information include text, tables, charts, graphs, maps, diagrams
 - formats of presentation include written responses, tables, graphs, diagrams
- b) Calculations include percentages, averages and ratios. Significant figures, rounding and units should be used appropriately
- c) Conclusions drawn should include some justification and explanations should be supported by evidence
- d) From given situations and information gathered and analysed, candidates should be able to predict and generalise.

The teacher/lecturer should ensure that the investigative activity to be undertaken affords opportunities to demonstrate the ability to plan and organise such activity at an appropriate level of demand. The activity will relate to the unit content and candidates should be made aware of the range of skills that must be demonstrated to ensure attainment of Outcome 3.

In relation to Outcome 3, PC (a), the teacher/lecturer should check by observation that the candidate participates actively in the planning of the investigation, deciding how it will be managed, identifying and obtaining resources and carrying out the investigation.

Candidates should provide a report with an appropriate title. The report should relate to Outcome 3 PCs (b) to (f) as follows:

| | |
|--|---|
| b) Investigative procedures are described accurately. | A clear statement of the purpose of the investigation. A few concise sentences including apposite illustrations and, as appropriate: <ul style="list-style-type: none">• A short description of the methods used• A labelled diagram or brief description of equipment used• How variables and controls were used• The range and balance of sources selected• How measurements were taken or observations made. There is no need for a long detailed description. The use of the impersonal passive voice is to be encouraged as an example of good practice but this is not mandatory for meeting the performance criteria. |
| c) Relevant measurements and observations are recorded in an appropriate format. | Readings or observations must be recorded in a clear format, normally a table with correct headings, appropriate units and results/readings entered correctly. |

National Unit Specification: support notes (cont)

UNIT Local Environment (Intermediate 2)

| | |
|---|--|
| d) Recorded information is analysed and presented in an appropriate format. | Data should be analysed and presented in tabular, graphical, diagram, or other equivalent form as appropriate: <ul style="list-style-type: none">• For a tabular presentation this may be an extension of the table used for PCs above and must include suitable headings and units and appropriate computations.• For a graphical presentation this must include data presented in appropriate forms such as histograms, bar charts, line graphs with suitable scales and axes labelled with variable and units and with data correctly plotted. |
| e) Conclusions drawn are valid. | Conclusions should use evidence from the investigation and relate back to the aim of the investigation. At least one of the following, as appropriate, should be included: <ul style="list-style-type: none">• Overall pattern to findings, readings or observations• Trends in analysed information or results• Connection between variables and controls• Reasons for acceptance or rejection of arguments from sources used. |
| f) The investigative procedures are evaluated with supporting argument. | The evaluation should cover all stages of the activity, analysis of the activity and the results of the activity. The evaluation must include supporting argument in at least one of: <ul style="list-style-type: none">• Effectiveness of procedures• Control of variables• Limitations of the range and/or balance of sources used• Limitations of equipment• Possible sources of error• Possible improvements. |

The points beside each performance criterion give an indication of what should be addressed to achieve a pass. The relevance of the points will vary according to the style and scope of the investigation. The points are intended as helpful guidance. The decision of pass or fail is made by the professional judgement of staff of the presenting centre (subject to moderation) against the performance criteria.

It is appropriate to support candidates in producing a report to meet the performance criteria. Re-drafting of a report after necessary supportive criticism is to be encouraged both as part of the learning and teaching process and to produce evidence for assessment.

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).