

## National Unit Specification: general information

<b>UNIT</b>	Earth Physics, Structural Geology and Plate Tectonics (Higher)
<b>NUMBER</b>	D250 12
<b>COURSE</b>	Geology (Higher)

### SUMMARY

This unit seeks to develop knowledge and understanding of Earth structure and Earth movements.

### OUTCOMES

- 1 Demonstrate knowledge and understanding related to Earth physics, structural geology and plate tectonics
- 2 Solve problems related to Earth physics, structural geology and plate tectonics
- 3 Collect and analyse information related to structural geology obtained by practical work.

### RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained Intermediate 2 Geology or its component units. It would, however, be possible for able students to enter the course with no prior knowledge of geology. Previous experience of a science or Geography at Credit or Higher Level would be advantageous.

### CREDIT VALUE

1 credit at Higher.

### CORE SKILLS

This unit gives automatic certification of the following:

<b>Complete core skills for the unit</b>	Problem Solving	Higher
<b>Additional core skills components for the unit</b>	Using Graphical Information	Higher

Additional information about core skills is published in the *Catalogue of Core Skills in National Qualifications* (SQA, 2001).

---

### Administrative Information

<b>Superclass:</b>	RD
<b>Publication date:</b>	July 2002
<b>Source:</b>	Scottish Qualifications Authority
<b>Version:</b>	05

© Scottish Qualifications Authority 2002

This publication 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 specification can be purchased from the Scottish Qualifications Authority. The cost for each unit specification is £2.50 (minimum order £5).

## **National Unit Specification: statement of standards**

### **UNIT** Earth Physics, Structural Geology and Plate Tectonics (Higher)

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 Earth physics, structural geology and plate tectonics.

##### **Performance criteria**

- (a) The principles of geophysics are correctly explained
- (b) The description of geological structures is correct with reference to their forms and modes of origin
- (c) The explanation of major Earth movements is correct with reference to plate tectonic processes.

##### **Evidence requirements**

Evidence is produced from a closed book test which demonstrates successful achievement of all of the above performance criteria.

#### **OUTCOME 2**

Solve problems related to Earth physics, structural geology and plate tectonics.

##### **Performance criteria**

- (a) Relevant information is selected and presented in an appropriate format
- (b) Information is accurately processed using calculations where appropriate
- (c) Valid conclusions are drawn and explanations given are supported by evidence
- (d) Predictions and generalisations are made based on the available evidence
- (e) The geological structure and history of an area on a map are elucidated
- (f) Geological sections are drawn on given topographic profiles
- (g) Structure contours are drawn, interpreted and used.

##### **Evidence requirements**

Evidence is produced from a closed book test which demonstrates successful achievement of all of the above 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.

#### **OUTCOME 3**

Collect and analyse information related to structural geology obtained by practical work.

##### **Performance criteria**

- (a) Geological structures and igneous bodies are identified and described
- (b) The modes of origin and cross-cutting relationships are described
- (c) Fieldwork is planned, organised, conducted and reviewed effectively.

## **National Unit Specification: statement of standards**

**UNIT** Earth Physics, Structural Geology and Plate Tectonics (Higher)

### **Evidence requirements**

Candidates should submit a fieldwork report of about 1000 words, illustrated by apposite forms of graphical information, reflecting the observation, recording, identification and interpretation undertaken. The nature of the field area will determine which structures and igneous bodies are described.

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

## National Unit Specification: support notes

**UNIT** Earth Physics, Structural Geology and Plate Tectonics (Higher)

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

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

Guidance on the content and context for this unit, and on learning and teaching approaches, is given in the table in the Content section of the course details.

### GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Outcomes 1 and 2 will be assessed by means of an integrated end of unit assessment. The end of unit assessment has no specified mark allocation. However, the following approximate percentage mark allocations are recommended. (Note that the numbers given express a ratio of marks allocated. Candidates would not be expected to undertake test items with the actual mark allocations shown.)

**Outcome 1 (knowledge and understanding) 60%**

*PC:*

- |  |     |
|--|-----|
| (a) Earthquakes and the behaviour of earthquake waves                  | (6) |
| Gravity anomalies  | (3) |
| Principle of isostasy  | (4) |
| Earth's magnetic field   | (4) |
| Earth's internal thermal properties                                    | (3) |
| Modelling internal physical and chemical properties of the Earth.      | (8) |
| (b) Folds, faults, joints, foliations and lineations                   | (4) |
| Modes of formation of folds, faults, joints, foliations and lineations | (5) |
| Geological structures and igneous bodies on maps.                      | (4) |
| (c) The evidence for continental drift and sea-floor spreading         | (8) |
| Description of plate structure and plate movement                      | (8) |
| Description of plate movements in ancient times.                       | (3) |

**Outcome 2 (problem solving) 40%**

*PC:*

- |  |      |
|--|------|
| (a) Selecting and presenting information                                 | (2)  |
| (b) Processing information   | (4)  |
| (c) Drawing conclusions and explaining                                   | (6)  |
| (d) Making predictions and generalisations                               | (3)  |
| (e) Elucidating the geological structure and history of an area on a map | (10) |
| (f) Drawing geological sections  | (5)  |
| (g) Drawing, interpreting and using structure contours.                  | (10) |

## National Unit Specification: support notes (cont)

**UNIT** Earth Physics, Structural Geology and Plate Tectonics (Higher)

### *Explanatory notes for PCs for Outcome 2*

- (a) Selecting and presenting information
- sources of information include text, tables, charts, maps, diagrams
  - formats of presentation include written responses, tables, graphs, diagrams, geological sections, structure contours
- (b) Processing information may include: establishing sequence in a series of cross-cutting relationships; and performing calculations which include the use of trigonometric ratios to find dip
- (c) Conclusions drawn should include some justification and explanations should be supported by evidence
- (d) From given situations, candidates should be able to make predictions and generalisations eg predicting the speed of waves in rock layers
- (g) Only straight structure contours need be drawn. Candidates may be required to: draw outcrops of strata and faults; find the direction and amount of dip of strata and fault planes; find the amount of throw on a fault; identify a fault as being normal or reversed; and delineate the area under which opencast extraction of a coal seam or planar ore body may take place where a depth restriction applies to extraction.

### **Outcome 3**

The candidate should produce a fieldwork report of about 1000 words, illustrated by apposite maps, diagrams, photographs and other forms of graphical information and reflecting the observation, recording, identification and interpretation undertaken. If it is not possible to make fieldwork visits, the account should be based on simulated fieldwork that involves the candidate in all of the stages and decisions of a visit. In all cases the following aspects of assessment of fieldwork report apply.

#### **1. Gathering of information (Total 10 marks)**

- *Planning and organisation of work (2 marks)*  
Planning of the tasks and necessary resources should be appropriate to the objectives of the fieldwork eg
  - prior research such as obtaining and studying relevant maps
  - collection of necessary resources such as maps, safety and measuring equipment, recording equipment (clipboard, papers, pencils camera etc.)In the field, the candidate should be able to amend or extend the original plan of approach, eg by returning to areas previously visited in the light of later observations.
- *Observations (5 marks)*  
Marks in this category are awarded for skills shown by the candidate in making disciplined accurate observations of whatever is under investigation. Each student should play an active part in carrying out the investigation. The mark awarded may be drawn partly from follow-up laboratory work carried out by the student.
- *Recording (3 marks)*  
Marks awarded should be based on the ability of the student to record, in an appropriate and complete form, observation, measurements, calculations and interpretations drawn from fieldwork and any further practical work.

## National Unit Specification: support notes (cont)

**UNIT** Earth Physics, Structural Geology and Plate Tectonics (Higher)

### 2. Processing Information (Total 10 marks)

- *Identification (4 marks)*  
There should be evidence of recognition of specific features and of their description to an appropriate degree of detail. Marks should be awarded for the quantity of identification from the possible range of features and for the quality of the description given.
- *Overall content (4 marks)*  
The mark should take account of the quality of the geological content of the report and the degree to which relevant illustrations such as maps, diagrams, photographs and graphs are integrated into the report.
- *Presentation of report (2 marks)*  
The report is of a scientific investigation and its structure and accessibility to the reader should reflect this. At all levels the report should have:
  - a title
  - a specification of the locality of the area or areas studied
  - illustrations eg maps, diagrams, photographs, graphs
  - an account of observations, measurements and interpretations.At Higher, there should also be
  - recommendations for adjusting the approach, extending the study or further research
  - reference to limitations of the methods used in the investigations.

### 3. Interpretation (Total 10 marks)

- *Interpretation (10 marks)*  
Under this heading the assessor should consider the quality of the interpretations made, and the extent to which interpretations are justified.  
At Higher candidates should show an appreciation of the limitations of particular methods of investigations, the conclusions drawn from them and should make recommendations for improvements.

The field study for this unit is the only fieldwork required at Higher, and the mark for fieldwork contributes to the final external mark. The fieldwork report may also afford the candidate opportunities to demonstrate achievement beyond that required to attain the unit outcomes.

### 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 Arrangements* (SQA, 2001).