



## Higher National Unit Specification

### General information

**Unit title:** Global Climate Systems (SCQF level 8)

**Unit code:** HV9X 34

**Superclass:** QA

**Publication date:** November 2017

**Source:** Scottish Qualifications Authority

**Version:** 02

### Unit purpose

The aim of this unit is to introduce the learner to the nature and processes of global environmental change, enabling the learner to better understand the wide range of environmental issues faced by current and future human society under a changing climate. Learners will study the mechanisms underpinning earth's energy balance and the processes which are driving change in global climate systems. They will study the interacting components of Earth's systems which drive such change and will assess climate variability.

This unit is suitable for those who wish to pursue a career in the environmental or conservation sectors. Upon completion of the unit the learners may be able to progress to further study on environmental impacts of climate change.

### Outcomes

On successful completion of the unit the learner will be able to:

- 1 Describe earth's spheres, circulation systems and cycles.
- 2 Explain global climate zones.
- 3 Identify and explain mechanisms of climate change.

### Credit points and level

1 Higher National Unit credit at SCQF level 8: (8 SCQF credit points at SCQF level 8)

## Higher National unit Specification: General information (cont)

**Unit title:** Global Climate Systems (SCQF level 8)

### Recommended entry to the unit

Entry is at the discretion of the centre. Learners undertaking this unit do not need prior knowledge or experience of *Global Climate Systems*.

### Core Skills

Achievement of this Unit gives automatic certification of the following Core Skills component:

Complete Core Skill                      None

Core Skill component                      Critical Thinking at SCQF level 6

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of this Unit specification.

### Context for delivery

If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

### Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements).

## Higher National Unit Specification: Statement of standards

**Unit title:** Global Climate Systems (SCQF level 8)

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 SQA.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

### Outcome 1

Describe earth's spheres, circulation systems and cycles.

#### Knowledge and/or skills

- ◆ Global spheres:
  - Lithosphere
  - Hydrosphere
  - Biosphere
  - Atmosphere
- ◆ Atmospheric circulation of energy:
  - Atmospheric convection cells
  - Coriolis effect
  - Winds
  - Temperature
  - Air masses
- ◆ Oceanic circulation of energy:
  - Surface winds
  - Surface and deep ocean currents
  - Thermohaline circulation
- ◆ The processes, and drivers, of key environmental change in global cycles:
  - Energy cycle and its perturbation
  - Carbon cycle and its perturbation
  - Water cycle

## Higher National unit specification: Statement of standards (cont)

**Unit title:** Global Climate Systems (SCQF level 8)

### Outcome 2

Explain global climate zones.

#### Knowledge and/or Skills

- ◆ Local regional and global drivers of climate and weather systems:
  - Atmosphere-Oceanic coupled systems
  - El Nino/El Nino Southern Oscillation (ENSO)/La Nina
  - Weather systems
  - Seasonality
  - Hurricanes
  
- ◆ Classification, and characteristics, of climate zones using the Köppen system

### Outcome 3

Identify and explain the mechanisms of climate change.

#### Knowledge and/or skills

- ◆ Climate variability:
  - Long-term versus short-term variability
  - Glacial and interglacial periods
  
- ◆ Earth's energy budget:
  - Greenhouse effect
  - Greenhouse gases
  - Radiative forcing
  
- ◆ Drivers of climate change:
  - Natural climate change
  - Anthropogenic/enhanced climate change
  - Feedback mechanisms

#### Evidence requirements for this unit

Learners will need to provide evidence to demonstrate their knowledge and/or skills across all outcomes by showing that they can use information and evidence from wider reading of scientific literature to:

- ◆ explain the transfer of energy between key global systems.
- ◆ explain how global circulation of energy contributes to the development of global climate zones and regional weather systems.
- ◆ explain climate variability.
- ◆ explain the processes and drivers of environmental change with reference to changes to atmospheric and oceanic circulation systems and the greenhouse effect.
- ◆ identify and explain the main natural and anthropogenic drivers of climate change.



## Higher National unit Support Notes

**Unit title:** Global Climate Systems (SCQF level 8)

Unit support notes are offered as guidance and 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

This unit has been developed as part of the HND in Environmental Resource Management. It is designed to provide the learner with an understanding of the key drivers for climate change with particular emphasis being paid to the underpinning science of the greenhouse effect. The unit will introduce learners to a range of transferable skills including reading and interpreting information from a variety of sources.

Learners will be introduced to the major interacting components of earth's systems, they will study the main characteristics of the four major global spheres (lithosphere, hydrosphere, atmosphere and biosphere), and their role in the transfer of energy. Particular focus will be paid to atmospheric and oceanic circulation processes and their role in distribution of energy within the earth system. As part of this section of the Unit consideration will be given to the role of biogeochemical cycles, in particular the implications of disruption of the carbon cycle.

Learners will then be introduced to the concept of global climate patterns and zones and the drivers that create and change them. This will include discussion of the difference between climate and weather, the atmosphere-oceans coupled systems; global climate trend. Learners will also be introduced to the Köppen system for classification of global climate zones.

The third learning outcome will expand on the content of Outcome 1 and Outcome 2 to discuss the changing climate system, looking at climate variability, introducing the greenhouse effect and the role of human activity in the climate system.

### Guidance on approaches to delivery of this unit

The delivery of this unit could be based on a series of lectures, tutorials, workshops and class discussions supported by information from reading and on-line material, which could include textbooks, videos and published statistics.

The unit should be taught following the order of the main bullet points in the statement of standards. The unit lends itself to the use of tutorials and workshops as a means of delivery, where the tutor can encourage learners to share and develop their existing knowledge and skills.

## Higher National unit Support Notes (cont)

**Unit title:** Global Climate Systems (SCQF level 8)

### Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Each outcome could be assessed separately in a mix of restricted response and extended response questions, but a holistic approach to assessment could be employed across all outcomes through a set of restricted response questions which build towards an integrated assessment submission addressing all three outcomes.

The assessment could take the form of an open book format based on set reading material from a range of relevant sources.

To spread the assessment load, separate outcomes could be submitted at intervals throughout the delivery of the unit. Different questions (based on the same reading material) should be set for any re-assessment of the unit.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

### Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at [www.sqa.org.uk/e-assessment](http://www.sqa.org.uk/e-assessment).

### Opportunities for developing Core and other essential skills

This Unit has the Critical Thinking component of Problem Solving embedded in it. This means that when learners achieve the Unit, their Core Skills profile will also be updated to show they have achieved Critical Thinking at SCQF level 6.

This unit also offers opportunities to develop Core Skills in Planning and Organising; Reviewing and Evaluating; Written Communication; Using Graphical Information; Accessing Information; Providing/Creating Information. In addition broader skills in Sustainable Development and Citizenship will be developed.

Use of restricted response assessments will develop the learner's skills in communicating information within a set word limit.

## History of changes to unit

Version	Description of change	Date
02	Core Skills Component Critical Thinking at SCQF level 6 embedded.	24/11/2017

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## General information for learners

### Unit title: Global Climate Systems (SCQF level 8)

This section will help you decide whether this is the unit for you by explaining what the unit is about, what you should know or be able to do before you start, what you will need to do during the unit and opportunities for further learning and employment.

The aim of this unit is to introduce you to the nature and processes of global environmental change, enabling you to better understand the wide range of environmental issues faced by current and future human society under a changing climate. You will study the mechanisms underpinning earth's energy balance and the processes which are driving change in global climate systems. You will also study the interacting components of earth's systems which drive such change and will assess climate variability.

This unit is suitable for you if you wish to pursue a career in the Environment or Conservation. Upon completion of the unit you may be able to progress on to further study on environmental impacts of climate change.

On successful completion of the unit you should be able to:

- ◆ describe earth's spheres, circulation systems and cycles.
- ◆ explain global climate zones.
- ◆ identify and explain mechanisms of climate change.

Climate change is a global issue and we are currently in an era of global warming. As a consequence of studying this unit you should be aware of past, present and possible future changes in global climates and the underlying natural and anthropogenic drivers for such change. You will understand the difference between climate and weather and will be able to identify the key characteristics of global, regional and local differences in climate and weather and their impact in climate systems.

This unit will help you understand what causes change in the earth's climate and how that change then impacts on the environment. You will be introduced to the concept of climate systems and their interacting components. In studying the drivers for climate change you will study the basic science underpinning 'the greenhouse effect' which will enable you to study *Climate Science* at a higher level.

The unit also introduces you to the concept of global climate zones and how these relate to different and changing environmental conditions.

This Unit has the Critical Thinking component of Problem Solving embedded in it. This means that when you achieve the Unit, your Core Skills profile will also be updated to show you have achieved Critical Thinking at SCQF level 6.