



Higher National Unit Specification

General information for centres

Unit title: Transport Towards a Sustainable Future

Unit code: F2EH 35

Unit purpose: This Unit is intended to equip the candidate with an understanding of transport issues and in particular the environmental impacts of the different transport systems. It will also provide an overview of ways to mitigate these effects, with the emphasis on sustainable solutions.

On completion of the Unit the candidate should be able to:

- 1 Explain the factors which affect current transport systems.
- 2 Analyse the environmental impact from the construction and use of transport systems.
- 3 Evaluate measures designed to mitigate the impact of transport.

Credit points and level: 1 HN credit at SCQF level 8: (8 SCQF credit points at SCQF level 8*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit is at the discretion of the Centre. There is no specialist prior knowledge required. It would be beneficial if the candidate had at least two scientific or technical subjects at SCQF level 7 or equivalent, or substantial relevant work experience.

Core Skills: There may be opportunities to gather evidence towards Core Skills in *Working with Others* and in *Communications* at SCQF level 6 within this Unit, although there is no automatic certification of Core Skills or Core Skills components.

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.

Assessment: Suggested assessment methods for this Unit would be two separate instruments of assessment: an open-book submission responding to a set of short answer and extended response questions to assess Outcomes 1 and 2, and a report to assess Outcome 3.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and Evidence Requirements are mandatory.

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. Candidates 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

Explain the factors which affect the performance of current transport systems

Knowledge and/or Skills

- ◆ Principal modes of transport
- ◆ Features of commonly used power units
- ◆ Transport infrastructure
- ◆ Integration of transport systems

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ identify at least five principal modes of transport.
- ◆ explain least three key features of internal combustion engines, jet engines and electric motors of relevance to their environmental performance.
- ◆ explain the basic infrastructure, civil engineering and service industry requirements to support land, air and water based modes of transport. Reference must be made to roads, railways, stations, ports, energy sources and supply, vehicle construction and maintenance industries. These modes of transport must cover at least one from each of the following: land, air and water.
- ◆ explain three ways of improving the integration of current transport systems

Assessment Guidelines

This Outcome could be assessed by means of an open-book submission to a series of extended response questions undertaken in the student's own time. It is recommended that this assessment be combined with the assessment for Outcome 2. Combining assessments will also reduce the number of separate assessment events.

Higher National Unit specification: statement of standards (cont)

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Outcome 2

Analyse the environmental impact from the construction and use of transport systems

Knowledge and/or Skills

- ◆ Transport system pollutants
- ◆ Resource use
- ◆ Pollutant effects

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ identify at least three pollutants produced by any two transport systems during construction and use
- ◆ analyse the use of materials, energy and land by a given transport system
- ◆ evaluate the effect of a transport system on the environment, on human health and the quality of life

Assessment Guidelines

This Outcome could be assessed by means of an open-book submission to a series of extended response questions undertaken in the student's own time. It is recommended that this assessment be combined with the assessment for Outcome 1. Combining assessments will also reduce the number of separate assessment events.

Higher National Unit specification: statement of standards (cont)

Unit title: Transport Towards a Sustainable Future

Outcome 3

Evaluate measures designed to mitigate the impact of transport

Knowledge and/or Skills

- ◆ Technical measures
- ◆ Legislative measures
- ◆ Economic measures
- ◆ Strategic measures

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can explain at least six measures that can be used to mitigate the impact of transport in both the present and future. This should include reference to one measure from each of the following plus two other measures:

- ◆ technical measures: power Unit development, alternative fuels, efficiency improvements
- ◆ legislative measures (EU and UK): air quality management, vehicle emission standards, vehicle testing, treatment of end of life vehicles
- ◆ economic measures: road charging, fuel tax
- ◆ strategic measures: planning procedures and controls

Candidates will also need to evaluate at least three of these measures used in a specific context, in terms of long term sustainability.

Assessment Guidelines

This Outcome could be assessed by means of a report looking at the range of measures that can be used to mitigate the impact of transport in a specific situation and may contain an evaluation of the effectiveness of measures which have, or could be, taken in such a situation. A report of 1,500 words in length or equivalent should be sufficient to cover all Evidence Requirements.

Administrative Information

Unit code: F2EH 35

Unit title: Transport Towards a Sustainable Future

Superclass category: QA

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Higher National Unit specification: support notes

Unit title: Transport Towards a Sustainable Future

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

Transport plays a major contribution in our lives and quality of life, yet we are all aware of the environmental costs and compromises associated with it. This Unit examines the technological, functional and environmental aspects of transport systems and evaluates the issues in context to provide the student with an informed and balanced view of transport in the modern world.

The first Outcome considers the components involved in a modern transport system. This includes an overview of the different modes of transport on land, sea and in the air. These are road, bus, light rail and tram, traditional (heavy) rail, boat and air transport. More detail is then provided by looking at the technology of the common types of power Unit used in transport vehicles. Consideration is given to the infrastructure required by each mode of transport, to include not just the civil engineering structures required (roads, railways, stations, ports etc) but also the supporting manufacturing and service industry. Successful integration of transport systems is hugely important in the development of an effective transport network. Ways of doing this, such as park-and-ride, Ro-ro, through-ticketing, co-ordinated timetabling and provision of information will be investigated.

Outcome 2 moves on to the environmental consequences of the various modes of transport, in terms of pollutants produced, resource use (materials, energy and land), and the effect on landscape and quality of life.

Outcome 3 may be best taught in parallel with the previous Outcome, as it examines the range of measures that can be used to mitigate the impact of transport systems. Consideration of technological developments – to both the transport vehicles and to their power units, alternative fuels, and efficiency improvements - will be supplemented by an investigation of issues relating to strategic (ie planning), economic (road charging, fuel tax, other taxes) and legislative ways of tackling the issues (air quality, emission standards, vehicle testing, end-of-life vehicle legislation).

Many of the strategic and economic measures will require attendant legislation, and, equally, legislative measures will be dependent on technological developments (for example: air quality legislation).

As well as providing an overview of the range of such measures, Outcome 3 will focus in on a specific context and examine the effectiveness, and overall sustainability, of what has been, or could be, done to lessen the impact of transport systems. Hopefully it will be possible to select a context or situation which is familiar to as much of the student group as possible and/or is easily accessible during the delivery of this Unit.

Higher National Unit specification: support notes (cont)

Unit title: Transport Towards a Sustainable Future

Guidance on the delivery and assessment of this Unit

Ideally this Unit should be delivered using a variety of methods and media. There is a large amount of resource material on transport issues, though this dates quickly so care must be taken over its currency. It is anticipated that extensive use will be made of the news media. There may be opportunities to develop candidates' skills in researching information, in working with others and in communications by using a student-centred approach to gather, collate and present material to the group as a whole.

The assessment for Outcomes 1 and 2 is an open-book submission responding to a series of extended response questions. The specification for this will need to be carefully drawn up to ensure that all the points required are covered.

The assessment for Outcome 3 will be in the form of short report. The scenario examined should be as realistic as possible; but the importance of the exercise is to ensure that the relevant issues are considered in a logical and balanced fashion, rather than to obtain a "correct" answer. Alternatively, the assessment of Outcomes 1, 2 and 3 could be combined into one holistic assessment requiring the candidate to generate one report, the recommended length of which could be 2,000 words or equivalent.

Opportunities for developing Core Skills

There may be opportunities to gather evidence towards Core Skills in *Working with Others* and in *Communications* within this Unit, although there is no automatic certification of Core Skills or Core Skills components. The candidates work together in groups to both research and present topical information. During both class discussion and production of evidence the candidate has the opportunity to use and develop both oral and written communication skills.

Open learning

This Unit could be delivered by distance learning. In this case, to keep the administrative burden to a minimum, it is recommended that a single assessment, as discussed in the Assessment Guidelines, be used.

For information on open learning arrangements, please refer to the SQA guide *Assessment and Quality Assurance of Open and Distance Learning* (www.sqa.org.uk).

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (www.sqa.org.uk).

General information for candidates

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Transport is a hugely important aspect of modern life — one that directly affects, even controls, our daily routine and lifestyles. Transport also has a major indirect effect on all of us, through its effects on the environment. This Unit aims to equip you with not just the knowledge and skills required to understand the issues involved with transport, but to enable you to propose and evaluate ways of mitigating the environmental impact of transport.

The Unit starts by looking at the range of transport systems: the different modes of transport, the types of power Unit used and the infrastructural requirements (roads, railways, stations and ports, fuel supply, manufacturing and servicing industry etc). What is required for the successful integration of different modes of transport will also be investigated.

The Unit then moves on to consider the environmental impact of transport systems, in terms of pollution, waste (for instance: end of life vehicles) and resource use. More subjective impacts, such as the effect on landscape and quality of life will also be looked at. At the same time, measures to mitigate these environmental impacts will be examined and evaluated. To conclude the Unit, a specific situation will be examined in some detail, and measures that have been, or could be, used to lessen transport's environmental impacts in this situation, will be evaluated on the basis of long term sustainability.

Assessment for this Unit will normally be in two parts. Learning Outcomes 1 and 2 will be assessed by your providing answers to a series of extended response questions. This can be done in your own time, and will be open-book. Learning Outcome 3 will be assessed by your providing evidence that you have comprehensively evaluated the measures that have been, or will be, taken.