



## Higher National Unit specification

### General information

**Unit title:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

**Unit code:** H65K 34

**Superclass:** QE

**Publication date:** January 2014

**Source:** Scottish Qualifications Authority

**Version:** 01

### Unit purpose

This Unit enables learning and development for those aspiring to be, or are already employed within the Waste Sustainable/Resource Management Sector. It is designed to provide the learner with an understanding of the materials and resources with which the Waste Sustainable/Resource Management Sector transact. It is aimed principally at learners who aspire to work or are already employed within the Waste Sustainable/Resource Management Sector.

### Outcomes

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

- 1 Examine the materials and resources used within an economy.
- 2 Examine how materials and resources produced by different industrial and non-industrial business sectors impact upon society, other businesses and the environment.
- 3 Explain the theory of the circular economy and its function and role in sustainable resources management and wider governmental/industrial policy scenarios.

### Credit points and level

2 Higher National Unit credits at SCQF level 7: (16 SCQF credit points at SCQF level 7)

### Recommended entry to the Unit

Entry is at the discretion of the centre.

## **Higher National Unit specification: General information (cont)**

**Unit title:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

### **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:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

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.

### **Outcome 1**

Examine the materials and resources used within an economy.

#### **Knowledge and/or Skills**

- ◆ Sources, types and uses of materials from industrial processes and non-industrial businesses
- ◆ Use and interaction of resources
- ◆ Redundancy of terms

### **Outcome 2**

Examine how materials and resources produced by different industrial and non-industrial business sectors impact upon society, other businesses and the environment.

#### **Knowledge and/or Skills**

- ◆ Interaction of materials and resources upon society and other businesses
- ◆ Interaction of materials and resources upon the environment

### **Outcome 3**

Explain the theory of the circular economy and its function and role in sustainable resources management and wider governmental/industrial policy scenarios.

#### **Knowledge and/or Skills**

- ◆ Theory of the circular economy and the traditional linear model
- ◆ Application of circular economy theory to governmental and industrial policy and planning
- ◆ Theory and use of life cycle analysis (LCA)
- ◆ Attributional Life Cycle Analysis (LCA) and Consequential Life Cycle Analysis (LCA)

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

**Unit title:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

### 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:

#### Outcome 1

- ◆ identify and discuss the materials used and generated within one industrial process or similar scenario and one non-industrial business (eg service sector) situation and identify any interactions or links between materials within the scenarios.
- ◆ identify and discuss the resources used and generated within one industrial process or similar scenario and one non-industrial business (eg service sector) situation and identify any interactions or links between resources within the scenarios.
- ◆ explain why in an holistic sustainable resource model there can be redundancy of terms such as raw materials, feedstocks, by-products, products and wastes.

Written and/or recorded oral evidence is required from learners to demonstrate this.

Assessment will be completed under open-book conditions.

#### Outcome 2

- ◆ describe, discuss and critically evaluate (positive, negative, neutral) how materials and resources used in and or generated by one industrial process or similar and one non industrial business (eg service sector) situation interact with other businesses and society.
- ◆ describe, discuss and critically evaluate (positive, negative, neutral) how materials and resources used in and or generated by one industrial process or similar and one non industrial business (eg service sector) situation interact with the environment.

Written and/or recorded oral evidence is required from learners to demonstrate this.

Assessment will be completed under open-book conditions.

#### Outcome 3

- ◆ define the theory of the circular economy and compare with linear models.
- ◆ discuss, with supporting examples, the application of the circular economy theory.
- ◆ define life cycle analysis (LCA) theory and demonstrate its application.
- ◆ discuss, with supporting examples, Attributional LCA and Consequential LCA.

Written and/or recorded oral evidence is required from learners to demonstrate this.

Assessment will be completed under open-book conditions.



## Higher National Unit Support Notes

**Unit title:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

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 80 hours.

### Guidance on the content and context for this Unit

This Unit will enable learners to develop knowledge and understanding of the value and uses of materials and resources within a sustainable economy. Learners will be asked to evaluate the redundancy of terms such as raw materials, feedstocks, by-products, wastes, recyclables, and end-products within a sustainable economy model. Learners will investigate how materials and resources interact. A range of different materials and resources from a spectrum of sources will be considered. Learners will investigate the theory of the circular economy and life cycle analysis (LCA) and the application of such techniques in real-world and research scenarios. This will enable learners to critically appreciate key aspects of contemporary sustainable resources management.

Materials are used and produced by many different industrial processes and other business operations (eg the service sector). Learners will investigate different processes, procedures or operations and research and explore the materials involved. Industrial and non-industrial examples should be included, these may provide topics for further study and investigation — this should be encouraged. The relative status of these materials should be explored, ie how is each perceived and can and should that status be challenged. Is there or should there be any real difference between them within sustainable resources management?

Resources are a critical part of a sustainable economy. The range of resources available and how they may be used and their relative importance across a range of industries and businesses will be explored. It is vital to note that resources are not only traditional material resources (raw materials or feedstocks), but also cover the demands of space (spatial), energy (eg power), manpower, time and water, etc. How such factors fit into the concepts of sustainable resources management will be considered.

The impacts of the materials and resources used and produced in a range of industrial and non-industrial situations upon society and other businesses will be investigated. Impacts can be considered in many different ways and can be positive, negative or neutral. Does anything truly operate independently of anything else — do interactions always occur and is such an holistic approach always appropriate?

The impact of materials and resources can be localised or global in nature, long or short term, deliberate or accidental, static or dynamic, such factors should be discussed within the Unit.

## Higher National Unit Support Notes (cont)

**Unit title:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

The impact of sustainable resources management thinking and greater environmental awareness as resulted in the demand for 'new' (alternative) ways of examining and perceiving industry and business and its use of materials and resources. This has led to the concept of the circular economy theory model (holistic closed loop recycling). Learners will examine and evaluate this theory and compare it to other existing models (eg linear models). Methods for assessing the impacts, implications and 'true cost' of industrial and business processes, operations or policies in light of sustainable resource thinking have given rise to life cycle analysis (LCA) or cradle to grave models. The value and use of such techniques will be explored; both attributional and consequential LCA will be considered by the learners.

### Guidance on approaches to delivery of this Unit

This Unit is likely to form part of a Group Award which is designed to provide learners with the professional and technical Knowledge and Skills for Wastes Sustainable/Resource Management Sector. In these circumstances, the Unit is likely to be delivered towards the beginning of the Group Award as the information provides the background to many of the Units which make up the Group Award.

Alternatively the Unit can be undertaken as a standalone Unit for learners to support their continued professional development.

A range of delivery techniques can be employed including class-room based lectures and small group workshops and activities. Field trips and site visits are encouraged. Life Cycle Analysis (LCA) software tools could be used in relation to Outcome 3. The importance of real-world or industrial scenarios is highlighted. It is suggested that Outcomes 1 and 2 are delivered first, to give learners knowledge and understanding of materials, resources and impacts before they study Outcome 3 upon LCA.

Practical site visits to some waste/resource sites and other business locations should be encouraged. These may be difficult for learners with disabilities; appropriate sites should be carefully selected to ensure there are no unnecessary barriers. A short film/commentary depicting waste/resource sites and other business locations may be considered as an alternative.

This Unit could be delivered by distance-learning. The use of a virtual-learning environment (VLE) is highlighted, with on-line lectures and activities; the employment of video and audio clips, social-media and other online tools is encouraged. Learners should be encouraged to use the Internet as a research tool in addition to traditional library based resources. Independent study should be encouraged by using learner-centred, resource based methodologies.

## Higher National Unit Support Notes (cont)

**Unit title:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

### Guidance on approaches to assessment of this Unit

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

It is suggested an holistic approach is taken to the assessment of this Unit. The Unit may be assessed by integration of the Outcomes 1–3 or 1 and 2 or by using an individual instrument of assessment for each Outcome or remaining Outcomes. The use of directed studies, eg essays, structured questions, case studies and other investigative activities such as portfolios or blogs (written and/or orally recorded) is suggested. Where an integrated assessment is used, an overall word count in the region of 2,500 words would be envisaged. Where individual instruments of assessment for each Outcome are used a word count of approximately 600–800 words per Outcome would be expected. Each assessment will be completed under open-book conditions.

As with any Unit, centres should ensure they can authenticate learners assessments. This may be done by questioning learners about their work, by viewing drafts of partially completed assessments or by using an online anti-plagiarism tool.

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

There are opportunities to develop the Core Skills of *Communication* at SCQF level 6, *Problem Solving* at SCQF level 6, *Numeracy* at SCQF level 5 and *Information and Communication Technology (ICT)* at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

## History of changes to Unit

Version	Description of change	Date

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## General information for learners

### **Unit title:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

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.

This Unit will enable you to develop knowledge and understanding of the value and uses of materials and resources within a sustainable economy and society. A range of different materials and resources from many sources will be considered. You will also investigate the theory of the circular economy and life cycle analysis (LCA) and the application of such techniques. This will help you to critically appreciate key aspects of contemporary sustainable resources management.

You will research and explore a range of industrial processes and non-industrial business situations, eg the service sector and discover the range of different materials produced and used within a particular process, procedure or operation. You will discover why in an holistic sustainable resource model there could be redundancy of terms such as raw materials, feedstocks, by-products, products and wastes.

You will also explore a range of resources and their use, value and status with respect to a range of different industries and businesses. It is vital to note that resources are not only traditional material resources (raw materials or feedstocks), but also cover the demands of space, energy (eg power), manpower, time and water, etc. How such factors fit in to the concepts of sustainable resource management will be considered.

You will research and explore the impacts of such materials and resources on society and other businesses. Does anything truly operate independently of anything else — do interactions always occur and is such an holistic approach always appropriate?

These can be localised or global in nature, long or short term, deliberate or accidental, static or dynamic.

Greater environmental awareness as resulted in the demand for 'new' (alternative) ways of examining and perceiving industry and business and its use of materials and resources. This has lead to the concept of the circular economy theory model (holistic closed loop recycling). You will examine and evaluate this theory and compare it to other existing models (eg linear models). Methods for assessing the impacts, implications and 'true cost' of industrial and business processes, operations or policies in light of sustainable resources thinking have given rise to life cycle analysis (LCA) or cradle to grave models. The value and use of such techniques will be explored.

On successful completion of the Unit you will be able to:

- 1 Examine the materials and resources used within an economy.
- 2 Examine how materials and resources produced by different industrial and non-industrial business sectors impact upon society, other businesses and the environment.
- 3 Explain the theory of the circular economy and its function and role in sustainable resources management and wider governmental / industrial policy scenarios.

## General information for learners (cont)

**Unit title:** Sustainable Resource Management: Materials and Resources (SCQF level 7)

You will be expected to and encouraged to do self-study and independent research during this Unit. You will need to achieve all the Outcomes to pass this Unit. Assessment will be varied and will be open-book in nature.

Over the course of this Unit, there may be opportunities for you to develop Core Skills in the areas of *Communication* at SCQF level 6, *Problem Solving* at SCQF level 6, *Numeracy* at SCQF level 5 and *Information and Communication Technology (ICT)* at SCQF level 5, although there is no automatic certification of Core Skills or Core Skills components.