



National Unit specification: general information

Unit title: Land-based Engineering: An Introduction: Land-based Machinery (SCQF level 4)

Unit code: H1MR 10

Superclass: SK

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Summary

The purpose of this Unit is to provide candidates with the knowledge, understanding and skills which will enable them to identify, set, operate and maintain a range of machinery used in the land-based sector.

This Unit is suitable for candidates, who wish to enter a career in land-based engineering as an apprentice or progress to the National Certificate in Land-based Engineering at SCQF level 6.

This is a mandatory Unit in the National Certificate in Land-based Engineering: An Introduction at SCQF level 4. It may also be taken as a freestanding Unit.

Outcomes

- 1 Identify land-based machinery uses and functions.
- 2 Maintain land-based machinery according to manufacturers' guidance.
- 3 Adjust and operate land-based machinery according to manufacturers' guidance.

Recommended entry

Entry is at the discretion of the centre.

National Unit specification: general information (cont)

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Credit points and level

1 National Unit credit at SCQF level 4 (6 SCQF credit points* at SCQF level 4)

**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.*

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 4

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

National Unit specification: statement of standards

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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

Identify land-based machinery uses and functions.

Performance Criteria

- (a) Identify land-based sectors.
- (b) Identify machinery suitable for use in these sectors.
- (c) Classify machinery according to its function and sector.

Outcome 2

Maintain land-based machinery prior to use according to manufacturers' guidance.

Performance Criteria

- (a) Inspect machinery in preparation for use following manufacturers' guidance.
- (b) Carry out maintenance following manufacturers' guidance.
- (c) Comply with safety procedures and practices at all times.
- (d) Record maintenance using an appropriate method.

Outcome 3

Operate and adjust land-based machinery according to manufacturers' guidance.

Performance Criteria

- (a) Operate machinery according to manufacturers' guidance.
- (b) Adjust machinery according to manufacturers' guidance.
- (c) Comply with safety procedures and practices throughout.
- (d) Record testing and adjustment using an appropriate method.

National Unit specification: statement of standards (cont)

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Evidence Requirements for this Unit

All practical activities must be carried out under supervision, in accordance with current health and safety legislation and guidance, codes of practice and manufacturers' recommendations. Personal protective equipment (PPE) must be used wherever necessary.

A safety induction must be undertaken on workshop practices and the safe use of equipment.

Evidence is required to demonstrate that the candidates have achieved all of the Outcomes and Performance Criteria. Evidence can be produced holistically or Outcome by Outcome.

Written and/or oral and performance evidence must be produced in supervised conditions. All practical tasks must be carried out successfully on at least **one** occasion.

Outcome 1

Written/oral recorded or performance evidence is required which must be gathered under closed-book supervised conditions. Candidates must:

- ◆ identify the three land-based sectors as agriculture, ground care and forestry
- ◆ identify eight machines from the list below
- ◆ identify the functions, uses and sector for eight of the following machines:
 - ploughs, powered cultivators, non-powered cultivators, de-stoners, aerators, slicers, seed drills, precision seeders, fertilizer spreaders, sprayers, slurry/manure spreaders, irrigation equipment, scarifiers, agri mowers/conditioners, cylinder mowers, chainsaws, rotary mowers, flail mowers, brush cutters, combines, balers, wrappers, tedders, potato harvesters, root harvesters, forage harvesters.

Outcome 2

Performance, product and written/oral evidence is required which must be gathered under open-book, supervised conditions.

Candidates must carry out pre-operation checks on two machines from the list in Outcome 1, according to the manufacturer's guidance. They should then safely perform maintenance procedures under close supervision, on the same two machines according to manufacturers' instructions and in line with current health and safety guidelines.

Each candidate will complete a written record for the tasks carried out.

National Unit specification: statement of standards (cont)

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Outcome 3

Performance, product and written/oral evidence is required which must be gathered under open-book, supervised conditions. Candidates must:

- ◆ test two machines from Outcome 2 for appropriate operation following manufacturer's guidance
- ◆ adjust the settings of the two machines to perform correct operation following manufacturer's guidance
- ◆ operate the two machines in accordance with operator's manual
- ◆ complete a written record stating adjustments carried out

National Unit specification: support notes

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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

This is a mandatory Unit in the National Certificate in Land Based Engineering: An Introduction at SCQF level 4. It may be offered as a free standing Unit.

This Unit is aligned to the following Lantra Sector Skills Council's National Occupational Standard (NOS):

- ◆ LEO 17 Service and repair land-based cutting and mowing equipment
- ◆ LEO 18 Service and repair land-based harvesting and processing equipment
- ◆ LEO 19 Service and repair land-based soil preparation, cultivation and plant establishment equipment

This is a practical based Unit designed to develop a candidate's basic knowledge, understanding and skills to enable them to identify, set and operate a range of machinery used in the land-based sector. The aim of this Unit is to introduce candidates to a variety of areas within the land-based sector, the various types of machinery used in the sector, their function, basic settings, adjustments and operation.

Machinery which could be covered ranges from ploughs, powered cultivators, non-powered cultivators, de-stoners, aerators, slicers, seed drills, precision seeders, fertilizer spreaders, sprayers, slurry/manure spreaders, irrigation equipment, scarifiers, agri mowers/conditioners, cylinder mowers, chainsaws, rotary mowers, flail mowers, brush cutters, combines, balers, wrappers, tedders, potato harvesters, root harvesters, forage harvesters.

Centres may use a range of machines from all three sector areas (agriculture, ground care or forestry) or limit the selection to one or two depending on candidate's core interest.

The candidate should be given the opportunity to identify common wearing parts on machinery and encouraged to remove and replace and set and adjust these components.

Correct use of tools and safe working practices must be observed at all times. The potential hazards associated with the tasks will be highlighted to candidates.

National Unit specification: support notes

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Guidance on learning and teaching approaches for this Unit

It is recommended that the Unit is delivered in the same sequence as the Outcomes are presented in the Unit. The Unit is designed to be delivered as a practical exercise; it should be carried out in a workshop/field environment with access to a range of hand tools and lifting equipment.

As Outcome 1 is an identification exercise, visits to suitable industrial environments may be beneficial to candidates.

The identification and differences between the three sectors should be highlighted to candidates. This could be followed up with candidates investigating the range of machinery utilised within each sector. E-learning facilities could be incorporated to raise awareness of less common machinery and direct candidates to further information regarding function of the machinery.

As Outcomes 2 and 3 require candidates to work with potentially hazardous components and equipment on site and in the workshop, it is essential that candidates are inducted into current legislation, regulations and safe working procedures and practices before starting practical work.

Manufacturers' standards should be observed at all times; operators manuals, workshop manuals and technical data can provide key information for the exercise and are a useful source of learning material for the candidates.

Guidance on approaches to assessment for this Unit

Outcome 1

Assessment may consist of a paper with multiple choice questions, picture identification, matching exercises or structured, short answer questions. This assessment may suit online delivery.

Candidates could be asked to identify machinery from pictures and match these pictures to a stated function.

Alternatively, machinery could be placed in the workshop environment where candidates could place name cards and function description cards onto the appropriate machinery. Candidate evidence must be in the form of written and/or recorded oral evidence or performance evidence.

National Unit specification: support notes (cont)

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Outcomes 2 and 3

Assessment should comprise of practical exercises designed to ensure candidates can gather sufficient evidence to satisfy the Outcome and Performance Criteria. Task instruction sheets and manufacturer's product literature should be made available to candidates.

Candidate evidence could be in the form of written and/or recorded oral evidence or product and performance evidence. Observation checklists and job cards could be completed as evidence.

Opportunities for the use of 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 candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

Opportunities for developing Core Skills

In this Unit candidates will develop skills which will enable them to identify, adjust and operate a selection of land-based machinery.

Candidates will:

- ◆ identify land-based machinery
- ◆ match land-based machinery to their function
- ◆ share workshop tools and equipment
- ◆ set and adjust land-based machinery in preparation for operation
- ◆ operate land-based machinery

This means that as candidates are doing this Unit they will be developing aspects of the Core Skills of *Communication*, *Problem Solving* and *Numeracy*.

In addition, whilst completing this Unit candidates may develop aspects of the following Core Skills where specific learning and teaching approaches are adopted:

- ◆ *ICT* — Candidates may use the ICT to locate information regarding manufacturers' specifications and set up procedures
- ◆ *Working with Others* — candidates may be required to allocate work space and share tools and equipment

National Unit specification: support notes (cont)

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This Unit has the Critical Thinking component of Problem Solving embedded in it. This means that when candidates achieve the Unit, their Core Skills profile will also be updated to show they have achieved Critical Thinking at SCQF level 4.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements

History of changes to Unit

Version	Description of change	Date
02	Core Skills Component Critical Thinking at SCQF level 4 embedded.	08/06/2012

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