

Next Generation Higher National Unit Specification

Production Horticulture (SCQF level 7)

Unit code: J6F0 47
SCQF level: 7 (24 SCQF credit points)
Valid from: session 2024–25

Prototype unit specification for use in pilot delivery only (version 3.0) August 2024

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year.

This unit specification is for teachers and lecturers and contains all the mandatory information required to deliver and assess the unit.

The information in this unit specification may be reproduced in support of SQA qualifications only on a non-commercial basis. If it is reproduced, SQA must be clearly acknowledged as the source. If it is to be reproduced for any other purpose, written permission must be obtained from permissions@sqa.org.uk.

This edition: August 2024 (version 3.0)

© Scottish Qualifications Authority 2022, 2023, 2024

Unit purpose

This three-credit, project-based unit is suitable for learners studying Higher National Certificate (HNC) Horticulture or similar routes. It helps learners develop knowledge and skills in the production of ornamental, cut flower and edible crops. They develop knowledge and skills in production planning, and the practical skills required to propagate and produce a variety of crop plants. Learners also develop skills in information and communications technology (ICT), finance and marketing in the context of planning a commercial crop.

While learners would benefit from previous horticultural knowledge or experience, they do not need prior knowledge to study the unit. If learners are studying it as part of the HNC Horticulture group award, they can progress to Higher National Diploma (HND) Horticulture once they have completed the HNC.

Unit outcomes

Learners who complete the unit can:

- 1 produce a production plan for a crop
- 2 propagate a range of plants using a variety of techniques
- 3 produce a range of plants
- 4 describe how plant growth and development and plant physiology are manipulated in the production of plants

Evidence requirements

Outcome 1

Using a range of appropriate software, learners produce evidence in the form of a production plan for one crop, to include:

- ◆ a description of the sectors that make up the production horticulture industry, the general infrastructure required for different sectors, and the markets for these sectors
- ◆ a justification of their selected infrastructure for the chosen crop
- ◆ a description of how to source quality propagation material for the chosen crop
- ◆ a description of a range of propagation techniques appropriate for the chosen crop and justification of the preferred method
- ◆ a selection and description of a suitable propagule environment
- ◆ a selection and description of a suitable growing media
- ◆ a selection and description of production methods suitable for a chosen end point
- ◆ a selection and description of a suitable growing-on environment
- ◆ specifications of the crop for a chosen end point
- ◆ marketing material for the crop for retail sale using appropriate software, including crop pricing taking into consideration general production costs and promotional material

Outcome 2

Learners safely and effectively propagate a range of plants using appropriate techniques, including:

- ◆ softwood stem cuttings
- ◆ semi-ripe stem cuttings
- ◆ hardwood stem cuttings
- ◆ division
- ◆ seed

And at least two of:

- ◆ layering
- ◆ leaf cuttings
- ◆ root cuttings

NextGen: HN published prototype unit specification for use in pilot delivery only (version 3.0)
August 2024

- ◆ grafting
- ◆ bulb scaling

Learners should:

- ◆ provide appropriate care for propagules
- ◆ select and use appropriate growing media and containers
- ◆ be able to identify the plants they propagate by their botanical names

Learners should consider health and safety for all practical activities carried out.

Learners can include evidence, such as photographic, video or assessor observation checklists of practical activity, and health and safety considerations, in a portfolio.

Outcome 3

Learners produce one or more batches from at least three of the following categories:

- ◆ protected ornamental
- ◆ hardy ornamental
- ◆ bedding
- ◆ vegetable crops
- ◆ fruit crops
- ◆ cut flower
- ◆ trees
- ◆ environmental: for example, native plants for habitat restoration
- ◆ aquatic plants

Learners should identify an appropriate end point for each batch grown.

Where relevant, learners should:

- ◆ select appropriate growing media and containers, and pot on plants or propagules
- ◆ provide appropriate irrigation and nutrition
- ◆ control the temperature, humidity and light regime
- ◆ carry out plant-protection techniques
- ◆ formatively prune appropriately for chosen end-point or specification

Learners should identify the plants produced by their botanical names. They should consider health and safety for all practical activities carried out.

Learners can include evidence, such as photographic, video or assessor observation checklists of practical activity, and health and safety considerations, in a portfolio.

Outcome 4

Learners can describe how plant growth and development and plant physiology are manipulated in the production of plants, including:

- ◆ temperature regulation
- ◆ CO₂ supplementation
- ◆ nutrient regimes
- ◆ light factors: light intensity, photoperiodism and wavelength
- ◆ plant growth substances and exogenous plant growth regulators
- ◆ physical manipulation

Learners can include evidence, such as photographic, video or assessor observation checklists of the practical activity, and health and safety considerations, in a portfolio.

Knowledge and skills

The following table shows the knowledge and skills covered by the unit outcomes:

Knowledge	Skills
<p>Outcome 1 Learners should understand how to produce a production plan for a chosen crop plant, including:</p> <ul style="list-style-type: none"> ◆ the sectors that make up commercial production horticulture in the UK ◆ the general infrastructure that different sectors require ◆ how to select appropriate infrastructure for a specific crop ◆ how to source quality propagation material for a specific crop ◆ how to select an appropriate propagation technique ◆ how to select appropriate growing media ◆ the environmental requirements for propagules and for growing crops on ◆ how to produce a crop to required specifications ◆ how to use appropriate software for production planning ◆ how to calculate the costs involved with the production of a crop and the value of a crop ◆ how to market a crop for retail sale 	<p>Outcome 1 Learners can:</p> <ul style="list-style-type: none"> ◆ describe the sectors that make up commercial production horticulture in the UK ◆ describe the infrastructure that production horticulture requires ◆ select appropriate infrastructure for a specific crop ◆ describe and justify their choice of propagation techniques, growing media and production techniques ◆ describe and justify the environmental requirements for propagules and growing plants on ◆ use appropriate IT software to produce a production plan ◆ calculate the costs to produce a crop ◆ assign an appropriate value to a crop and produce marketing material for retail sales

Knowledge	Skills
<p>Outcome 2 Learners should understand:</p> <ul style="list-style-type: none"> ◆ how to choose appropriate methods of propagation for a range of crop plants ◆ why different propagation techniques are appropriate for different types of plant ◆ how to carry out a range of propagation techniques ◆ why different crops require different growing media ◆ why different crops require different containers ◆ the care requirements for propagules for a range of crops ◆ how to recognise identifying characteristics of plants and the use of botanical nomenclature ◆ the health and safety considerations appropriate to propagation activities 	<p>Outcome 2 Learners can:</p> <ul style="list-style-type: none"> ◆ choose appropriate methods of propagation for a range of crop plants ◆ carry out a range of propagation techniques safely ◆ select appropriate growing media for a range of crops ◆ select appropriate containers for a range of crops ◆ care for the propagules for a range of crops ◆ identify a range of plants ◆ carry out plant propagation and care of propagules practical activity safely
<p>Outcome 3 Learners should understand:</p> <ul style="list-style-type: none"> ◆ how to choose appropriate production methods for a range of crop plants ◆ why different production methods are appropriate for different types of plants ◆ how to choose appropriate growing media and containers for a range of crops ◆ how to provide appropriate care for a range of crops ◆ the importance of production techniques in growing for particular specifications ◆ how to recognise identifying characteristics of plants and the use of botanical nomenclature ◆ the health and safety considerations appropriate to propagation activities 	<p>Outcome 3 Learners can:</p> <ul style="list-style-type: none"> ◆ safely carry out appropriate production techniques, including potting on, formative pruning and plant protection to grow crops to particular specifications ◆ choose appropriate growing media for a range of crops ◆ choose appropriate containers for a range of crops ◆ identify a range of plants ◆ provide appropriate environmental conditions including irrigation, temperature and humidity control and light level adjustment for the production of a range of crops

Knowledge	Skills
<p>Outcome 4 Learners should understand:</p> <ul style="list-style-type: none">◆ the importance of the manipulation of plant growth processes and development in horticultural practice	<p>Outcome 4 Learners can:</p> <ul style="list-style-type: none">◆ grow plants optimally by manipulating the growing environment

Meta-skills

Throughout the unit, learners develop meta-skills to enhance their employability in the horticulture sector.

Self-management

This meta-skill includes:

- ◆ focusing
- ◆ integrity
- ◆ adapting
- ◆ initiative

Learners develop these meta-skills through their production planning; by considering the choices they make about labour, environmental impacts, and health and safety considerations; and by adapting to unpredictable events, such as weather or plant-health issues. They use their initiative to make decisions about producing their crops.

Social intelligence

This meta-skill includes:

- ◆ collaborating

Learners develop this meta-skill if they work together to produce crops in shared workspaces.

Innovation

This meta-skill includes:

- ◆ curiosity
- ◆ creativity
- ◆ sense-making
- ◆ critical thinking

Learners develop these meta-skills through their reasoning processes, by researching and designing production plans, and by selecting appropriate propagation and production methods from a large range of options.

Literacies

Learners develop core skills in the following literacies:

Numeracy

Learners develop numeracy skills by calculating costs and prices to investigate whether a crop would be profitable to grow.

Digital

Learners develop digital skills and computer literacy by presenting a production plan using appropriate software, producing costing and pricing spreadsheets, and using appropriate software to produce marketing information for a crop.

Delivery of unit

You can integrate this unit with the following units: Garden and Greenspace Maintenance at SCQF level 7, Creating Gardens and Greenspace at SCQF level 7, Environmental Horticulture at SCQF level 7 or Social Horticulture at SCQF level 7, by producing plants to be used in these contexts or a work-experience placement. Learners should also study Plant Biology at SCQF level 7 and use the scientific reasoning they gain to underpin their decision-making in this unit.

Additional guidance

The guidance in this section is not mandatory.

Content and context for this unit

Produce a production plan for a crop (outcome 1)

In their preparation, research and execution of a production plan, learners can:

- ◆ ensure they have access to a range of appropriate software, including word processing and spreadsheets
- ◆ include, in their description of sectors, classifications such as:
 - edibles, ornamentals, cut flowers
 - field production, protected production
 - herbaceous, shrub, tree production
 - soft fruit, orchard production
 - propagation nurseries, cut flower nurseries, growing-on nurseries, retail nurseries
- ◆ include as markets for these sectors:
 - retail
 - inter-nursery
 - wholesale
 - amenity
- ◆ source quality propagation material, including:
 - stock plant care
 - seeds of high quality and provenance, or of cutting-material quality
- ◆ describe a propagation technique appropriate to the chosen crop chosen, and justify it using practical and scientific reasoning; production can be:
 - from seed
 - softwood
 - semi-ripe or hardwood stem cutting
 - division or layering
 - a more specialist method, such as bulb scaling, root or leaf cuttings, or grafting
- ◆ take propagule environment factors into account, such as
 - irrigation
 - temperature
 - humidity
 - light levels
- ◆ justify their choice of growing media by its suitability to the situation and the crop including:
 - structure
 - nutrient content
 - drainage
 - suitability for container type

- price
- ease of handling
- environmental impact
- ◆ describe their production methods and growing-on environment, including:
 - formative pruning
 - provision of nutrients
 - irrigation
 - temperature control
 - humidity control
 - light levels
 - plant protection
- ◆ give a specification suitable to the chosen, possibly theoretical, end point for the crop such as:
 - plant trials
 - breeding programmes
 - retail sale
 - wholesale
 - amenity
 - habitat restoration
- ◆ propose a realistic price for the crop, taking into account general production costs and using appropriate software (such as Microsoft Excel spreadsheets, and Microsoft Word or publishing software), and produce promotional material in the form of planned retail display materials, such as:
 - bench cards
 - labelling
 - garden centre positioning
 - seasonal promotions
 - possible linked sales

Propagate a range of plants using a variety of techniques (outcome 2)

Learners propagate a range of plants using different techniques appropriate to plant type. You should provide learners with several growing media and container options so that they can choose appropriately for each crop propagated.

Care for propagules can include:

- ◆ watering
- ◆ shading and supplementary lighting
- ◆ humidity and temperature control
- ◆ plant-protection techniques, such as:
 - weed prevention or removal
 - pests and diseases
 - protection from abiotic factors, such as frost

Learners should be able to correctly identify the plants they propagate by their botanical names.

Produce a range of plants (outcome 3)

Learners grow on a range of crop types to gain experience of production techniques for different types of plants: for example, the different types of formative pruning required for herbaceous, shrub or tree crop specifications.

Batch production ensures learners can repeat techniques as they would in a commercial setting and identify variations in a batch, such as variable growth rate or flowering time.

You should provide learners with several growing media and container options so that they can choose appropriately for each crop propagated. Learners can then identify the required specification for each crop batch, according to a given end point, such as:

- ◆ wholesale
- ◆ retail or amenity sale
- ◆ plant trials
- ◆ planting out in an ornamental or environmental setting
- ◆ social purposes

Learners should be able to correctly identify the plants they produce by botanical name.

Approaches to delivery

You can deliver outcome 1, the production plan, alongside the practical elements of outcomes 2, 3 and 4. You could propagate plants for outcome 2, and then continue growing them in outcome 3, with an applied focus on manipulation to meet outcome 4. Alternatively, you could grow a different selection of more mature plants, for example, for plant trials, for sale, or for planting out. Learners must grow their crops for a known purpose to make the production meaningful and relevant. Ensure that you integrate ICT into the relevant parts of

NextGen: HN published prototype unit specification for use in pilot delivery only (version 3.0)
August 2024

the production plan, rather than assessing it separately. Teach plant-identification techniques while working with the plants at propagation and production stages.

Learners learn to propagate and produce a range of crop plants. They can do this in a range of suitable locations; for example, a commercial situation, a college glasshouse, polytunnel or garden, a community or public garden.

Learners would benefit from visits to a range of production enterprises and can undertake a work-experience placement in a plant-production context. If appropriate to the context and production techniques carried out, they can watch machinery, such as seed-sowing machines, potting machines or conveyor belts, being used — or indeed use them themselves.

Learners can base their production plan on one crop, which they propagate or produce, so that their decision-making has an impact on the crop's production. Each crop produced should be in a batch of multiple plants of the same variety so that learners can repeat techniques and compare differences in growth. Groups of learners can collaborate to produce a batch.

Ensure that learners have access to a range of resources, such as plant material for propagation, propagation equipment and tools, production equipment and tools, and growing media. They should also be able to use suitable propagation environments, such as propagation cases and infrastructure, for growing on. This can include a polytunnel or glasshouse, although some crops can grow unprotected. Learners can access these resources at the centre or in a public or commercial setting. Learners also need to have access to appropriate software for their production plan.

Approaches to assessment

Assess learners through a single portfolio, including a production plan and photographic, video or assessor checklist evidence of practical activities. You can combine all three outcomes into a single project.

Opportunities for e-assessment

You can use online portfolio software to gather evidence for this unit.

Equality and inclusion

This unit is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

You should take into account the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

Guidance on assessment arrangements for disabled learners and/or those with additional support needs is available on the assessment arrangements web page:

www.sqa.org.uk/assessmentarrangements.

Information for learners

Production Horticulture (SCQF level 7)

This information explains:

- ◆ what the unit is about
- ◆ what you should know or be able to do before you start
- ◆ what you need to do during the unit
- ◆ opportunities for further learning and employment

Unit information

In this three-credit, project-based unit, you develop knowledge and skills in the production of ornamental, cut flower and edible crops. You develop knowledge and skills in production planning, and the practical skills required to propagate and produce a variety of crop plants. You also develop skills in information and communications technology (ICT), finance and marketing in the context of planning a commercial crop.

You produce a production plan for a chosen crop that is appropriate for a commercial situation. You propagate a range of plants using at least five different methods and learn how to provide a suitable environment for the propagules. You produce a range of crops by potting on, pruning and caring for batches of plants from a variety of categories. You also learn how to identify a range of crops as you propagate and grow them.

When you complete this unit, you can:

- ◆ produce a production plan for a crop
- ◆ propagate a range of plants using a variety of techniques
- ◆ produce a range of plants
- ◆ describe how plant growth and development and plant physiology are manipulated in the production of plants

Throughout this unit you develop a range of meta-skills.

Administrative information

Published: August 2024 (version 3.0)

Superclass: SA

History of changes

Version	Description of change	Date
2.0	Amended evidence requirements of outcome 1 and outcome 2.	August 2023
3.0	Added outcome 4.	July 2024

Note: please check [SQA's website](#) to ensure you are using the most up-to-date version of this document.