

NextGen: HN unit specification

Ecology and Environment for Horticulture (SCQF level 7)

Unit code: JA8V 47

SCQF level: 7 (16 SCQF credit points)

Valid from: August 2026

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year. It is for lecturers and assessors, and contains all the mandatory information you need to deliver and assess the unit.

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Unit purpose

This unit is suitable for learners studying HNC Horticulture, or pursuing similar routes of study. It gives learners a broad introduction to the ecological and environmental issues they need to bear in mind for the design, creation and maintenance of commercial gardens or green spaces.

Entry requirements and progression routes

Entry to this unit is at your centre's discretion. While learners would benefit from previous horticultural knowledge or experience, they do not need it to study the unit.

Before they start, however, we recommend that learners have completed one or more of the following:

- NC Horticulture at SCQF Level 5, ideally to include some level 6 units
- SVQ Horticulture at SCQF Level 6, or equivalent
- a relevant City & Guilds qualification at level 6
- a minimum of one Scottish Higher at grade C or above, or one A-level at grade D or above
- other equivalent qualifications
- relevant industry experience

If learners are studying the unit as part of HNC Horticulture, they may be able to progress to HND Horticulture, or go directly into employment in the horticulture industry.

Unit outcomes

Learners who complete this unit can:

1. explain the fundamental factors of ecology relevant to horticultural activities and industry
2. explain the fundamentals of environmental issues and sustainability relevant to horticultural activities and industry
3. apply the principles of ecology and environmental issues to actual or planned projects
4. develop general and subject-specific knowledge and understanding of and skills in sustainability, and the United Nations Sustainable Development Goals

Evidence requirements

Outcome 1

Learners must explain the fundamental factors of ecology relevant to horticultural activities and industry, including examples of:

- ecological principles
- symbiosis and mutualism
- diversity

Learners can generate assessment evidence for outcomes 1 to 4 in a single project, or generate assessment evidence of outcomes 1 to 3, and integrate evidence for outcome 4 in one of the project units in the HNC, such as Designing Gardens and Greenspace.

Outcome 2

Learners investigate and describe the fundamentals of environmental and sustainability issues relevant to horticultural activities and industry. These must include:

- environmental sustainability principles
- at least three examples from:
 - limited resources and mitigations
 - sustainable growing systems
 - soil conservation
 - climate change

Learners can generate assessment evidence for outcome 2 in a single project incorporating outcomes 1, 3 and 4.

Outcome 3

Learners apply the principles of ecology and the fundamentals of environmental issues and sustainability researched in outcomes 1, 2 and 4 to actual or planned projects.

Learners must produce evidence that they have applied ecological and environmental learning to planning, or creating and maintaining, garden or greenspace projects. They can apply aspects of ecological and environmental learning across more than one project, and do not need to duplicate them. Evidence can be in the form of a diary, report, presentation or portfolio, or any other appropriate format.

Outcome 4

Learners must gather evidence that demonstrates that they can:

- identify and describe sustainability in the context of the United Nations (UN) Sustainable Development Goals (SDGs)
- explain how horticulture products and processes could be made more sustainable and help meet the aims of at least two selected SDGs

Learners can generate assessment evidence for this outcome across any or all the units in HNC Agriculture.

Knowledge and skills

Knowledge	Skills
Outcome 1 Learners should understand: • fundamental factors of ecology relevant to horticultural activities, including ○ ecological principles ○ symbiosis and mutualism ○ diversity	Outcome 1 Learners can: • recognise and apply factors of ecology to commercial horticulture, and greenspace development and maintenance
Outcome 2 Learners should understand: • principles of environmental issues and sustainability relevant to horticultural activities • at least three examples from: ○ limited resources and mitigations ○ sustainable growing systems ○ soil conservation ○ climate change	Outcome 2 Learners can: • recognise and apply environmental and sustainability principles to commercial and greenspace maintenance and developments
Outcome 3 Learners should understand: • where learning about ecological and environmental issues is appropriate and applicable to horticultural activities	Outcome 3 Learners can: • recognise opportunities and impacts of commercial and greenspace maintenance and development • apply knowledge to actual and planned projects

Knowledge	Skills
Outcome 4 Learners should understand: • sustainability principles • the UN SDGs, their aims, and their interconnectivity • why it is important to adapt horticultural processes or products to be more sustainable, in terms of UN SDGs	Outcome 4 Learners can: • identify how UN SDGs are relevant to horticulture • adapt a horticultural product or process to make it more sustainable, in line with UN SDGs

Meta-skills

You must give learners opportunities to develop their meta-skills throughout this unit. We have suggested how to incorporate the most relevant ones into the unit content, but you may find other opportunities.

Self-management

This includes focusing, integrity, adapting and initiative. The most relevant are:

- focusing:
 - researching ecological and environmental sustainability for their project
- integrity:
 - taking an honest and environmentally ethical approach to all tasks and interactions
- adapting:
 - accommodating changes to circumstances, such as weather
- initiative:
 - taking responsibility for self-directed study and further exploration of a topic

Social intelligence

This includes communicating, feeling, collaborating and leading. The most relevant are:

- communicating:
 - discussing tasks and projects, and explaining the ecological and environmental background to decisions

- feeling:
 - taking other people's views into consideration in group work
- collaborating:
 - working together to plan and carry out project work
- leading:
 - taking responsibility for heading up a task or project

Innovation

This includes curiosity, creativity, sense-making and critical thinking. The most relevant are:

- curiosity:
 - asking questions and seeking out new information
- creativity:
 - considering alternative ways of doing things
- sense-making:
 - learning from mistakes
- critical thinking:
 - using logical reasoning to make informed decisions

Literacies

This unit provides opportunities to develop the following literacies.

Communication

Learners develop communication skills by working together to plan projects with consideration for ecological and environmental sustainability.

Learning for Sustainability

Throughout this unit, you should encourage learners to develop their skills, knowledge and understanding of sustainability.

This includes:

- a general understanding of social, economic and environmental sustainability
- a general understanding of the United Nations Sustainable Development Goals (SDGs)
- a deeper understanding of subject-specific sustainability
- the confidence to apply the skills, knowledge, understanding and values they develop in the next stage of their life

Delivery of unit

This is a mandatory unit in HNC Horticulture.

It is primarily designed to allow learners to apply ecological and environmental knowledge and skills in the horticulture industry. Learners may describe and explain ecology and sustainability as applied to project-based units. Where this is not possible — for example, where the unit is being taught as a stand-alone — then you should assess learners on how they apply their ecological and environmental knowledge to actual or planned projects.

Additional guidance

The guidance in this section is not mandatory.

Content and context for this unit

You can use a wide range of topics and themes to support the course of study. In this section, we suggest some appropriate topics that you can explore to support current horticultural activities and industry. Topics are likely to overlap and support each other as the unit progresses, and you can assess outcomes holistically and in combination.

Explain the fundamental factors of ecology relevant to horticultural activities and industry (outcome 1)

Learners should be able to explain the following:

Ecological principles:

- ecological units: biomes, niches, habitats, populations, communities, ecosystems
- evolution
 - processes of evolution: mutation, separation, survival of the fittest
 - direct and indirect effects on plants: range, suitability for environment, disease, and pest resistance
 - natural selection, artificial selection, bottlenecking, drift, hybrids
- interspecific competition: resource partitioning, community interactions, keystone and dominant species, invasive species
- food chains: trophic relationships and levels, energy transfer, predator-prey relationships, bioamplification
- succession: primary and secondary succession, natural and human disturbance, diversity, pioneer and climax species, pathways
- stratification: identification and interactions between layers of vegetation

Symbiosis and mutualism:

- competition between species, adaptations, mutual relationships ranging from symbiosis to predator-prey
- the role of bacteria: nutrient-fixing, nutrient recycling, decomposition, as pathogens
- the role of fungi: decomposition, nutrient recycling, parasites, and saprophytes
- microbial interactions: mycorrhizal roles and relationships, 'wood wide web' communication, nutrient and carbon redistribution, warning systems
- role of macro-organisms, where not covered elsewhere: worms, molluscs, mammals
- pest and disease management: pest and disease prevention, natural predators, rotation, companion planting, non-chemical methods

Diversity:

- loss of diversity: habitat loss, climate change, pollution, invasive species and disease, monocrops, wildlife corridors
- extinction: scale of the problem, relevant examples
- seed banks: reasons for, examples, methods, gene banks
- plant collections: botanic gardens and arboreta, national collections, species protection, education, gene banks, historic cultivars
- invasive species: methods of spread, impacts current and historical, relevant examples, biosecurity, legislation

Learners may find that exploring these areas leads to opportunities to collaborate and communicate with their peers, for example on discussion boards or blogs.

Explain the fundamentals of environmental issues and sustainability relevant to horticultural activities and industry (outcome 2)

This outcome looks at environmental principles of sustainability, such as:

- pillars of sustainability
- principles of sustainable development
- threats and opportunities
- public attitudes and education

Limited resources and mitigations:

- peat extraction: sources, uses, carbon dioxide (CO₂) sequestration and release, alternatives and challenges, effects of climate change, legislation
- recycling and waste avoidance: reusing, repurposing, upcycling, composting, waste management, minimising landfill, biosecurity and hygiene, soil sterilisation, legislation
- nutrient cycling: carbon and nutrient cycling and loss, microbial interactions, green manures, crop rotation, artificial fertiliser use
- heating and light: heating systems, seasonality of cropping, artificial lighting systems, photoperiodism and photosynthesis

Sustainable growing systems:

- organics: aims, principles, planning, managing, legislation
- permaculture, biodynamics, or other examples of sustainable systems: aims, history, ethics, benefits, success, practicality
- green architecture: opportunities, planning, infrastructure, hydroponics
- the effects of growing systems on ecology, environment and soils: advantages and disadvantages, impacts of chemicals, disease resistance, yields, quality, transport, storage, marketing
- the benefits of growing systems on ecology, environment and soils: particulate reduction and carbon sequestration

Soil conservation:

- erosion: causes and mitigation
- drainage: water movement and retention in soil, drainage systems, irrigation
- climate change impacts
- machinery use
- crop rotation, nutrients, pests and disease, green manures
- contamination: sewage by-products, residual chemicals

Climate change and mitigation:

- net zero: aims, timeframes, conflicts
- weed, pest and disease spread — including threats from more southerly pathogens, biosecurity and plant passports, invasive species, control methods, threats to natives
- pollination: threats to pollinators, mitigation
- phenology: flowering uncoordinated with pollinators, natural predators uncoordinated with pests, photoperiod, and temperature
- extended or limited crop opportunities
- carbon capture and trading, offsetting, carbon credits, feedback mechanisms, carbon sequestration, carbon dioxide fertilisation
- fire, permafrost and albedo

Apply the principles of ecology and environmental issues to actual and planned projects (outcome 3)

Learners achieve outcome 3 by applying their learning from outcomes 1, 2 and 4 to current or planned horticultural projects integrated into portfolios, reports or other appropriate submission formats. Alternatively, where accessibility is an issue, assessed themes are fundamental or theoretical in nature, or this unit is being studied in isolation, you can assess them in other ways, such as in a project carried out within the unit.

Learners must be able to identify and apply ecological and environmental issue themes integrated within a project submission. They should select and justify

appropriate themes and, where appropriate, describe and explain any opportunities, threats and conflicts.

Develop general and subject-specific knowledge and understanding of and skills in sustainability and the United Nations Sustainable Development Goals (outcome 4)

This outcome introduces the UN SDGs and encourages learners to identify the SDGs relevant to a horticultural product or process of their choosing. This could relate to a project or activity they are carrying out.

Resources

Centres delivering this qualification must have suitably qualified staff for each of the subject components. Your centre should already have established processes to ensure staff are appropriately qualified to deliver in this subject area.

Assessors and internal verifiers must hold an industry and/or subject-specific qualification equivalent to the qualification. Centre staff should have relevant industry experience and be able to demonstrate industry-relevant CPD to maintain their subject-specific knowledge and skills.

Approaches to assessment

You can assess the unit with a horticulture project combining all outcomes that allows learners to plan and apply what they have learned to real-life situations. They can present their project using slides, posters or handouts.

Alternatively, you could use open-book testing with 'describe' and 'explain' questions to establish that learners have gained underpinning knowledge of the fundamental factors of ecology in relation to horticulture.

Outcome 3

You can assess learners on their ability to relate their knowledge and understanding to the commercial, development or maintenance unit projects and case studies.

Learners do not need to relate any fundamental point to more than one project. This should prevent duplication of assessment and allow learners to select the most appropriate project to use as a case study.

Learners' successful completion of outcome 3 has no impact on project-based unit assessment outcomes. There is therefore no need for an overarching matrix between this and the project-based units. Learners can create an extract or proposal for their project-based units, outlining their objectives and including it with submissions to allow assessors to make appropriate judgements.

Outcome 4

You could assess outcome 4 in conjunction with outcome 3 of this unit, or if you study the unit as part of the HNC, you could integrate it with other project-based units. The assessment could take the form of a short report, a presentation or a poster.

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 must consider the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

Guidance on assessment arrangements for disabled learners and those with additional support needs is available on the [assessment arrangements web page](#).

Information for learners

Ecology and Environment for 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

This unit is suitable for you if you are studying HNC Horticulture, or similar routes. It gives you a broad introduction to ecological and environmental issues to help inform your decisions when designing commercial horticultural projects, or maintaining and creating gardens or green spaces.

On completion of the unit, you can:

- explain the fundamental factors of ecology relevant to horticultural activities and industry
- explain the fundamentals of environmental issues and sustainability relevant to horticultural activities and industry
- apply the principles of ecology and environmental issues to actual or planned projects
- develop general and subject-specific knowledge and understanding of, and skills in sustainability and the United Nations (UN) Sustainable Development Goals (SDGs)

Prior knowledge and skills

While some previous horticultural knowledge or experience is beneficial, you do not need it to study this unit.

Before you start, we recommend you have completed one or more of the following:

- NC Horticulture at SCQF Level 5, ideally to include some level 6 units
- SVQ Horticulture at SCQF Level 6, or equivalent
- a relevant City & Guilds qualification at level 6
- a minimum of one Scottish Higher at grade C or above, or one A-level at grade D or above
- other equivalent qualifications
- relevant industry experience

Assessment

You are likely to be assessed using a horticulture project that allows you to plan and apply what you have learned to real-life situations.

Future progression and employment

If you study the unit as part of HNC Horticulture, you may be able to progress to HND Horticulture, or directly into employment in the horticulture industry.

Meta-skills

Throughout this unit, you develop meta-skills that are useful for the horticulture sector.

Meta-skills are transferable behaviours and abilities that help you adapt and succeed in life, study and work. There are three categories of meta-skills: self-management, social intelligence and innovation.

Self-management

You develop self-management meta-skills in self-directed study and investigations into further topics — in particular when you apply research into ecological and environmental sustainability to your project.

Social intelligence

You develop social intelligence meta-skills when you work with others to plan and carry out project work. You develop communication, feeling and leading skills as you make decisions about how to carry out projects, and make justifications based on ecological and environmental principles.

Innovation

You develop innovation meta-skills through your reasoning processes, and by researching and applying your knowledge to your project work

Learning for Sustainability

Throughout this unit, you develop skills, knowledge and understanding of sustainability.

You learn about social, economic and environmental sustainability principles and how they relate to the horticulture sector. You also develop an understanding of the [United Nations Sustainable Development Goals](#).

Administrative information

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History of changes

Version	Description of change	Date

Please check [our website](#) to ensure you are using the most up-to-date version of this unit.

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