



Level 2 Certificate in Gardening

Qualification handbook (0062)

Version 2

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Publications and enquiries

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or

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Level 2 Certificate in Gardening (0062)

Introduction

This qualification is aimed at candidates who

- have a personal interest in developing their gardening skills
- or do not have access to an N/SVQ
- or wish for career progression within the horticulture industry

This qualification is designed to contribute towards the knowledge and understanding for the Level 2 N/SVQ in Amenity Horticulture (0329), while containing additional skills and knowledge which go beyond the scope of the National Occupational Standards. It provides a valuable alternative for those candidates who do not have access to the N/SVQ.

This qualification has been designed by City & Guilds to support government initiatives towards the National Qualifications Framework. It can contribute towards the knowledge and understanding required for the related N/SVQ while not requiring or proving evidence of occupational competence.

General structure

The qualification is made up of units expressed in a standard format. Each unit is preceded by details of the

- structure of the unit
- aims and general coverage of the unit
- outcomes
- assessment methods.

Assessment and quality assurance

National standards and rigorous quality assurance are maintained by the use of

- NPTC's set and marked written tests, which are marked by the centre according to externally set marking criteria, with quality assurance provided by the centre and NPTC's assessing examiners.
- NPTC's practical tests, which are marked by the centre according to externally set marking criteria, with quality assurance provided by the centre and monitored by NPTC's external verification system, to ensure that national standards are maintained.

Quality assurance includes initial centre approval, scheme approval, the centre's own procedures for monitoring quality and NPTC's ongoing monitoring by an External Verifier. Details of NPTC/City & Guilds criteria and procedures, including roles of centre staff and External Verifiers can be found in *Providing NPTC Qualifications - a guide to centre and qualification approval*.

Written components are graded (Pass, Credit, Distinction), the practical tasks (Unit 15) are graded Pass/Fail.

For candidates with particular requirements, centres should refer to NPTC policy document '*Reasonable adjustments and Special considerations*'.

Course Design

Teachers/assessors should familiarise themselves with the structure and content of the qualification before designing an appropriate course. In particular they are advised to consider the knowledge and understanding requirements of the N/SVQ.

NPTC does not itself provide courses of instruction or specify entry requirements. As long as the requirements for the qualification are met, tutors/assessors may design courses of study in any way that they feel best meets the needs and capabilities of the candidates. Units are broadly the same size and centres may deliver them in any order they wish. Centres may wish to introduce other topics as part of the programme which will not be assessed through the qualifications, e.g. to meet local needs.

It is recommended that centres cover the following in the delivery of the course, where appropriate

- Key Skills (such as Communication, Application of Number, Information technology, Working with others, Improving own learning and performance, Problem solving)
- Health and safety considerations, in particular the need to impress to candidates that they must preserve the health and safety of others as well as themselves
- Spiritual, moral, social and cultural issues
- Environmental education
- European issues.

It is recommended that 125 hours should be allocated for the course. This may be on a full time, part time or distance learning basis.

No specific prior qualifications, learning or experience are required for candidates undertaking the qualification. However, the nature of both the learning and assessment required for the qualification is such that at Level 2 candidates will need basic literacy and numeracy skills i.e. the ability to read and interpret written tasks and to write answers in a legible and understandable form. Candidates will also need to be able to organise written information clearly and coherently, although they will not be assessed for spelling or grammatical accuracy unless this is part of the assessment criteria.

Centre and scheme approval

Centres wishing to offer NPTC/City & Guilds qualifications must gain approval.

New centres must apply for centre and qualification approval.

Existing NPTC or City & Guilds centres will need specific qualification approval to run this qualification.

Full details of the process for both centre and scheme approval are given in *Providing NPTC qualifications - a guide to centre and qualification approval* which is available from NPTC

Registration and certification

Candidates must be registered at the beginning of their course. Centres should submit registrations using Walled Garden or Form S (Registration), under scheme 0062.

When examinations have been completed and tutor marked, provisional candidate results should be recorded on Form S (Results submission), which is sent to the assessing examiner with the examination scripts. The assessing examiner will moderate the marking and forward the confirmed grades to NPTC. Centres should note that results must NOT be submitted to City & Guilds directly by centres, except for the practical unit. The results for the practical unit should not be submitted to City & Guilds until after external verification. For more information, see the current guidance notes.

Candidates achieving one or more assessment components will receive a Certificate of Unit Credit listing the assessment components achieved. Candidates achieving the number and combination of assessment components required for the qualification will, in addition, be issued a Certificate. Please note that assessment component results do **not** combine to give an overarching grade.

NPTC reserves the right to suspend an approved centre, or withdraw its approval from an approved centre to conduct a particular NPTC/City & Guilds scheme or schemes, for reasons of debt, malpractice or for any reason that maybe detrimental to the maintenance of authentic, reliable and valid qualifications or that may prejudice the name of NPTC or City & Guilds.

Full details on all the above procedures will be found on the NPTC Web site

<http://www.nptc.org.uk>

External verification

For 0062-02 (The practical certificate) an External Verifier will make an annual visit to the centre and their role includes the following

- ensuring that internal verifiers are undertaking their duties satisfactorily
- monitoring internal quality assurance systems and sampling assessment activities, methods and records
- acting as a source of advice and support
- promoting best practice
- providing prompt, accurate and constructive feedback to all relevant parties on the operation of the centre's assessment systems.

Guidance notes on assessment

The NPTC's Level 2 Certificate in Gardening is designed to provide opportunities for candidates to gain accreditation for their individual level of understanding of the underpinning knowledge relevant to the industry.

In order to gain the full certificate candidates **must** complete all the assessments for the programme chosen (see page 9).

Unit 1 is assessed by a multiple choice question test, which is available online via the City & Guilds Global Online Assessments System (GOLA).

Short-answer written question papers are available on demand for units 2-14. These examinations are available from Examinations, NPTC, Stoneleigh Park, warwickshire. CV8 2LG. These will be marked in centres using marking criteria provided by NPTC and moderated by NPTC's assessing examiners.

There are a set of practical tests for unit 15, which are marked in centres and subject to external verification by NPTC. These are set out in the Practical Tasks Manual which is available from City & Guilds Publications Sales or the NPTC website.

Online assessment requirements

City & Guilds Conduct of Examinations-General Regulations sets out the requirements in terms of seating, individual space and invigilator: candidate ratios. For the purposes of clarity these regulations state *inter alia*, that seating arrangements must be made that will prevent candidates from seeing each other's work intentionally or otherwise, that the minimum distance in all directions from centre to centre of candidate's chairs is 1.25 metres and that for written or computer tests there must be a minimum of one invigilator in each examination room per thirty candidates.

The entire test will be conducted via the candidate's VDU. All data relating to the assessment will be held by City & Guilds with results and performance feedback being delivered back to the approved centre.

NPTC will continue to apply its rigorous quality control procedures to the production, editing, marking, moderating and revision of all questions whilst at the same time applying a robust security system to prevent assessments being accessed or drawn down by unauthorised persons or for purposes beyond those authorised.

Staffing requirements

The following key roles must be filled:

Management Contact (Also referred to as the Promissor contact)

A key member of staff who will be responsible for the overall installation and running of the Global Online Assessments System. This person will be issued with the initial Promissor ID and password with which they will be able to gain access to the installation software and create other staff member IDs and passwords for their centre. This person will be receiving advance notification of all updates/service outages etc by email hence it is vital a correct and up to date email address is supplied.

Technical Contact

If different from the management contact, this person will be responsible for ensuring that the online testing system (including local network) is functioning properly prior to any scheduled tests taking place. This person will be receiving advance notification of all updates/service outages etc by email hence it is vital a correct and up to date email address is supplied.

Administrator Contact

If different from the management contact, this person will be responsible for the scheduling and administering of the tests on a day to day basis.

The Qualification

For the award of a certificate, candidates must successfully complete the assessments as specified in the table below

complex	title	units	GLH
0062-01	Level 2 Certificate in Gardening	Any five from 001-014 (5 units in total)	125
0062-02	Level 2 Certificate in Gardening (Practical)	Unit 015 plus any four from 001-010, 012-014 (5 units in total)	125

Units		Assessment components required	
Unit 1	Health, safety and tools in gardening	0062-001	Written-multiple choice
Unit 2	Sites, soils and cultivation	0062-002	Written-short answer
Unit 3	Trees, shrubs and hedges	0062-003	Written-short answer
Unit 4	Beds and borders	0062-004	Written-short answer
Unit 5	Plant Propagation	0062-005	Written-short answer
Unit 6	Weeds, pests and diseases	0062-006	Written-short answer
Unit 7	Lawns, landscapes and structures	0062-007	Written-short answer
Unit 8	Ponds and water features in gardens	0062-008	Written-short answer
Unit 9	Organic gardening	0062-009	Written-short answer
Unit 10	Garden design	0062-010	Written-short answer
Unit 11	Garden history	0062-011	Written-short answer
Unit 12	Growing vegetables and salads	0062-012	Written-short answer

Unit 13	Growing fruit	0062-013	Written-short answer
Unit 14	Wildlife Gardening	0062-014	Written-short answer
Unit 15	Practical gardening tasks	0062-015	Practical tasks

Test Specifications

The knowledge requirements will be assessed by a multiple choice test for Unit 1 and short-answer tests for Units 2-14 as specified below

Unit 0062-001		Duration	30 minutes	
Outcome			No of items	%
1	monitoring and maintaining health, safety and security		12	60
2	the use and maintenance of hand tools		8	40
Total			20	100

Unit 0062-002		Duration	90 minutes	
Outcome			No of items	%
1	site analysis		3	16.67
2	soil composition, texture and structure		3	16.67
3	soil fertility		3	16.67
4	soil pH		3	16.67
5	soil drainage and cultivation		3	16.66
6	soil water and aeration		3	16.66
Total			18	100

Unit 0062-003		Duration	90 minutes	
Outcome			No of items	%
1	trees		3	16.67
2	shrubs		3	16.67
3	wall shrubs and climbing plants		3	16.67
4	hedges		3	16.67
5	site preparation and planting for trees, shrubs, climbing plants and hedges		3	16.66
6	maintenance		3	16.66
Total			18	100

Unit 0062-004		Duration	90 minutes
Outcome		No of items	%
1	hardy herbaceous perennials	4	22.2
2	annuals, biennials and bedding plants	5	27.7
3	outdoor ornamental containers and baskets	3	16.7
4	outdoor bulbs	3	16.7
5	maintenance of flowers	3	16.7
Total		18	100

Unit 0062-005		Duration	90 minutes
Outcome		No of items	%
1	the principles of plant propagation	6	33.3
2	propagation by seed	6	33.3
3	vegetative propagation	6	33.4
Total		18	100

Unit 0062-006		Duration	90 minutes
Outcome		No of items	%
1	The principles of weed control	5	27.7
2	The principles of pest control	4	22.3
3	The principles of disease control	5	27.7
4	nutrient deficiencies and physiological disorders	4	22.3
Total		18	100

Unit 0062-007		Duration	90 minutes
Outcome		No of items	%
1	lawn establishment	3	16.7
2	lawn maintenance	3	16.7
3	landscapes and structures	4	22.2
4	laying foundations, paths and driveways	4	22.2
5	the construction of boundaries	2	11.1
6	the construction of a pergola	2	11.1
Total		18	100

Unit 0062-008		Duration	90 minutes
Outcome		No of items	%
1	the principles of water features	3	16.67
2.	pond construction	3	16.67
3.	planting	3	16.67
4.	fish and other animal life	3	16.67
5.	special features	3	16.66
6.	maintenance of a garden pond	3	16.66
Total		18	100

Unit 0062-009		Duration	90 minutes
Outcome		No of items	%
1	organic principles	3	16.6
2	soil management and cultivation	3	16.7
3	nutrition and fertility	3	16.7
4	crop rotation	3	16.7
5	composting	3	16.7
6	crop protection	3	16.6
Total		18	100

Unit 0062-010		Duration	90 minutes
Outcome		No of items	%
1	site analysis	2	11.1
2	the principles of design	5	27.7
3	soft landscape	5	27.8
4	hard landscape	5	27.8
5	draughting	1	5.6
Total		18	100

Unit 0062-011		Duration	90 minutes
Outcome		No of items	%
1	early Influences	3	16.7
2	Medieval gardens	2	11.1
3	early formal gardens	2	11.1
4	landscape gardens	3	16.7
5	gardens in the 19 th Century	3	16.7
6	the early Twentieth Century garden	2	11.1
7	the plant hunters	3	16.6
Total		18	100

Unit 0062-012		Duration	90 minutes	
Outcome		No of items	%	
1	the principles of vegetable gardening	3	16.7	
2	site preparation, cultivation and management	3	16.7	
3	Brassica crops	2	11.1	
4	root crops	2	11.1	
5	onions and related crops	2	11.1	
6	legumes	2	11.1	
7	early and salad potatoes	2	11.1	
8	salad crops	2	11.1	
Total		18	100	

Unit 0062-013		Duration	90 minutes	
Outcome		No of items	%	
1	site selection and preparation for growing fruit	3	16.7	
2	fruit tree production	2	11.1	
3	pollination	2	11.1	
4	pruning	3	16.7	
5	annual routine maintenance	2	11.1	
6	the cultivation of apples	2	11.1	
7	soft fruit	4	22.2	
Total		18	100	

Unit 0062-014		Duration	90 minutes	
Outcome		No of items	%	
1	introduction to ecology and threats to wildlife	3	16.7	
2	attracting invertebrates into the garden	3	16.7	
3	attracting vertebrates into the garden	4	22.2	
4	native plants, habitats and landscape management	4	22.2	
5	establishing and maintaining wildlife ponds	2	11.1	
6	establishing and maintaining wildlife meadows	2	11.1	
Total		18	100	

Unit 0062-02-015

This unit contains practical tasks relating to the other units within the qualification. To achieve the component, candidates are required to complete a minimum of **three** tasks for **each** unit they have studied

Relationship to knowledge and understanding of Level 2 NVQ in Amenity Horticulture (0329)

Unit	NVQ Units
1	L27 CU2
2	L1, L2, L19
3	L2, L4, L19, L22
4	L4, L18, L22
5	L4, L17, CU72, CU73
6	L3, L9, L17, L18, L19, L22, CU76
7	L1, L3, CU19, CU20, CU21
8	L1, L2, L28, CU74, CU76
9	L2, CU74, CU76, CU77
10	L2, L4, CU74, CU76
11	N/A
12	L21, L2, CU72, CU74, CU76
13	L2, CU72, CU74, CU76
14	L2, CU2.2, L28.1
15	N/A

Identification of Key Skills summary relationship table

Unit No	Communication	Improving own learning and performance	Problem Solving
1	C1.1 C1.2	L1.1 L1.2	
2	C1.1 C1.2		
3	C1.1 C1.2		
4	C1.1 C1.2		
5	C1.1 C1.2		
6	C1.1 C1.2		
7	C1.1 C1.2		
8	C1.1 C1.2		
9	C1.1 C1.2		

10	C1.1 C1.2		
11	C1.1 C1.2		
12	C1.1 C1.2		
13	C1.1 C1.2		
14	C1.1 C1.2	L1.1 L1.2	PS1.2
15			PS1.1 PS1.2

Identification of opportunities for evidence generation of moral, ethical, spiritual, European dimension, Environmental education and Health and safety

Units	Spiritual, Moral, Ethical, Social and Cultural	Environmental	Health and Safety	European Development
1	X	X	X	X
2		X	X	X
3		X	X	X
4		X	X	X
5		X	X	X
6		X	X	
7		X	X	
8		X	X	
9	X	X	X	
10		X	X	X
11	X	X		X
12		X	X	
13		X	X	
14		X	X	
15	X	X	X	X

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UNIT 1 Health, Safety and Tools in Gardening

Rationale

This unit is concerned with safety awareness and communication skills needed to work effectively. It covers health and safety, interaction with others and an understanding of the use and maintenance of hand tools.

This unit covers two learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 monitoring and maintaining health, safety and security
- 2 the use and maintenance of hand tools

Connection with other qualifications

This unit combines and extends the knowledge contained in units
CU2
L27
of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC multiple choice paper on-line.

Outcome 1 Monitoring and maintaining health, safety and security

The candidate will be able to

1. state their role and responsibilities for maintaining health and safety with regards to legislation
2. state the reasons why inadequate measures to control risks should be reported to colleagues and corrected if possible
3. state the importance of following manufacturers' and organisational instructions
4. list the potential consequences for failing to follow manufactures' and organisational instructions
5. briefly describe the procedures for dealing with the following workplace emergencies
 - a. fires
 - b. chemical spillage
 - c. electrical problems
6. identify the range of fire fighting equipment available at the workplace
 - a. carbon dioxide extinguishers
 - b. water extinguishers
 - c. foam extinguisher
 - d. fire blankets
7. describe briefly the correct usage for the fire fighting equipment identified in 6
8. state why it is important that others know your location when working alone
9. describe briefly the safety procedures for lone working
10. define the terms
 - a. organic waste
 - b. inorganic waste
11. state why it is important to differentiate between the above
12. list the range of waste that develops within the workplace and state an appropriate method for its disposal
 - a. grass clippings - compost heap
 - b. builders waste- stored for foundation layers in path construction
 - c. diseased plant material - burned on fire heap.
 - d. broken glass- skip for waste removal

13. describe the safe storage for the following tools and materials
 - a. hand tools (spade, fork, rake, etc.)
 - b. fertilisers
 - c. pesticides
 - d. fuel
14. describe briefly the methods for the safe transportation of tools and equipment within the workplace
15. explain the principles for the safe lifting and transportation of materials
16. state why accidents should be reported
17. describe the correct method for reporting accidents within the workplace
18. list the requirements for ensuring the security of the workplace
19. state the importance for maintaining effective workplace security
20. list the risks to child safety within the workplace to include
 - a. contact with chemicals
 - b. sharp tools and objects
 - c. moving parts
 - d. holes and trenches
 - e. water containers
21. list the appropriate personal protective equipment for the following tasks
 - a. mowing
 - b. pruning
 - c. lifting and transportation of materials
 - d. working at height
 - e. working in holes and trenches
 - f. pruning
 - g. shredding woody material
 - h. strimming
 - i. application of pesticides
22. describe the correct use, maintenance and storage of the following personal protective equipment
 - a. safety boots
 - b. coveralls
 - c. eye protection
 - d. ear defenders
 - e. gloves
 - f. hard hat
23. state the importance for maintaining good workplace hygiene

24. explain how to deal with the following basic first aid situations
 - a. eye contamination
 - b. bleeding
 - c. burns
 - d. unconscious person
25. state their own limitations when dealing with workplace emergencies
26. state the reasons for not exceeding their own limitations
27. list typical examples of accidental or deliberate environmental damage that may occur during working practices
28. describe methods to reduce damage during working practices
 - a. planning
 - b. risk assessment
 - c. correct tool and equipment maintenance
 - d. adequate training
 - e. correct storage and transportation of materials
 - f. recycling of materials
 - g. correct timing and application of fertilisers and pesticides
 - h. correct timing of work
29. list the relevant legislation and codes of practice associated with the working environment
 - a. health and safety at work act 1974
 - b. manual handling operations regulations 1992
 - c. food and environment protection act 1985
 - d. provision and use of work equipment regulations 1998
 - e. reporting of diseases and dangerous occurrences regulations
 - f. control of substances hazardous to health regulations
 - g. risk assessments

Outcome 2 The use and maintenance of hand tools

The candidate will be able to

1. state that hand tools should only be used for what they were designed for
2. describe the consequences for using a hand tool incorrectly
3. list the appropriate tools for the following operations
 - a. digging
 - b. relieving compaction in the bottom of a trench
 - c. pruning annual growth
 - d. pruning growth over 25mm diameter
 - e. removal of a broken bough
 - f. moving bags of compost and fertiliser
4. describe the correct maintenance for the following tools
 - a. spade
 - b. fork
 - c. secateurs
 - d. loppers
 - e. bow saw
 - f. wheelbarrow
5. describe the consequences of poor tool maintenance

UNIT 2 Sites, Soils and Cultivation

Rationale

This unit is concerned with developing knowledge of sites, the soils and methods of cultivation.

This unit covers six learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 site analysis
- 2 soil composition, texture and structure
- 3 soil fertility
- 4 soil pH
- 5 soil drainage and cultivation
- 6 soil water and aeration

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L1

L2

L19

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 Site analysis

The candidate will be able to

1. list the factors which affect the horticultural potential of the site
 - a. soil type
 - b. aspect and orientation
 - c. climate
 - d. topography
 - e. water table
 - f. budget
 - g. time available for maintenance
 - h. availability of a water supply
 - i. presence of perennial weeds
 - j. existing and potential uses
 - k. planning and legal constraints
 - l. remains of former structures
 - m. replant problems arising from the presence of pest and disease
2. explain the need to investigate the soil to establish its
 - a. texture
 - b. structure
 - c. pH
 - d. depth
 - e. drainage
 - f. soil profile
3. explain that account must be taken of the climate prevailing on the site
 - a. rainfall
 - b. temperature
 - c. wind
 - d. microclimate
 - e. aspect
4. list measures which may be taken on a site to regulate
 - a. wind damage
 - b. frost damage
5. explain how the choice of plants on a site is constrained by
 - a. latitude
 - b. longitude
 - c. distance from the sea
 - d. altitude
6. explain how a frost pocket forms

Outcome 2 Soil composition, texture and structure

The candidate will be able to

1. explain that soil consists of solid matter, air and water and that the solid matter consists of mineral and organic matter and soil organisms.
2. define the term organic matter
3. describe briefly the importance of organic matter in soil
4. explain that mineral particles in a soil are named according to their size, as sand, silt and clay
5. state that sand and silt particles are chemically inert but that clay holds reserves of various plant nutrients
6. explain the effect of soil texture on soil aeration, drainage, water holding capacity, temperature, fertility and ease of cultivation
7. state that the relative proportions of sand, silt and clay determine the texture of a soil
8. identify the main textural groups by means of a tactile test
9. state that it is usually impractical to change the texture of the soil
10. explain that soil structure is formed by the aggregation of individual soil particles into lumps of various sizes called peds or aggregates
11. state that aggregation can increase aeration without loss of water holding capacity
12. state that crumbs are not usually water stable and collapse when bare soil is compacted by rain or large droplets of irrigation water, or is subjected to pressure
13. state that many of the cements binding the aggregates together are of organic origin and therefore regular incorporation of organic matter is a way of preserving the soil structure
14. state that under vegetation, especially grass, soil particles become aggregated to form crumbs
15. describe the role of earthworms in the maintenance of soil structure

Outcome 3 Soil fertility

The candidate will be able to

1. state that elements required by plants are carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, sulphur, magnesium and a range of trace elements
2. state that air and water supply plants with carbon, hydrogen and oxygen
3. state that nitrogen, phosphorus, potassium, and magnesium are mineral elements required in significantly larger quantities than many other plant nutrients
4. explain that nutrients can be applied as organic or inorganic fertilizers
5. state that a straight fertiliser supplies only one major nutrient
6. state that a compound fertiliser supplies two or three major nutrients
7. list the common forms of fertilisers, i.e. granules, powder, liquids, prills, crystals
8. list the organic and inorganic sources of the major nutrients for plant growth
9. state sources of trace elements
10. state that the over-application of fertiliser can lead to environmental pollution
11. state that the over-application of some nutrients can affect the uptake of other nutrients, or cause root damage, leaf scorch and even death of the plant
12. state the roles of mycorrhizae, rhizobium and other soil organisms in the uptake, recycling and availability of nutrients by plants

Outcome 4 Soil pH

The candidate will be able to

1. state that the degree of acidity or alkalinity is measured on a pH scale (0-14) where the neutral point is 7.0.
2. state that the pH scale is logarithmic, i.e. each movement of 1 on the scale is equivalent to a 10 x change
3. describe one colorimetric method for measuring the soil's pH level
4. state that the widest selection of plant material can be grown in soils whose pH is around 6.5
5. describe the detrimental effects of a soil that is
 - a. too acidic
 - b. too alkaline
6. describe how the acidity or alkalinity of a soil may be changed by
 - a. the addition of lime
 - b. the addition of acidic material eg sulphur
7. state that some plants (calcifuges) have evolved to grow in soils with a low pH, while others (calcicoles) have evolved to grow in soils with a high pH
8. state examples of calcifuge and calcicole plants

Outcome 5 Soil drainage and cultivation

The candidate will be able to

1. describe the importance for good soil drainage on a site
2. state the causes of poor drainage in a soil
3. describe methods for the improvement of soil drainage
 - a. piped drainage
 - b. mole drainage
4. describe methods for increasing the rate of soil drainage
 - a. sub-soiling
 - b. suitable cultivations
 - c. addition of organic matter
5. explain the importance of top soil conservation
6. describe the preparation of land for sowing or planting
 - a. the importance of timing of operations
 - b. clearance of debris and weeds
 - c. primary cultivations
 - i. digging or ploughing
 - ii. incorporation of organic matter
 - d. secondary cultivations
 - i. raking to rough level
 - ii. consolidation
 - iii. base dressing of fertiliser
 - iv. raking to required tilth

Outcome 6 Soil water and aeration

The candidate will be able to

1. state that water uptake from the soil by plant roots is dependant on water availability, oxygen for respiration and temperature
2. state that water enters the plant roots through the root hairs and root tip
3. state that water travels through the plant in a continuous column from the roots to the leaves where it evaporates from pores in the leaf in a process called transpiration
4. explain that the rate of transpiration is dependent on wind speed, temperature, solar radiation and humidity
5. describe how the rate of transpiration is controlled in plants by
 - a. closure of leaf pores
 - b. a range of leaf modifications such as waxy covering, reduced size of leaf, hairs and silver colouring
6. State that water is held in the soil in pore spaces between the soil particles and soil aggregates
7. Explain that the water held in the smaller pore spaces may be unavailable to the plant
8. Explain the meaning of the following terms and the relationship between them
 - a. field capacity
 - b. water holding capacity
 - c. wilting point
 - d. available water
 - e. soil organic matter
 - f. soil texture and structure
9. State that the larger pore spaces and any not filled with water are filled with air
10. State that air in the soil is essential for root respiration and to support other soil organisms.

UNIT 3 Trees, Shrubs and Hedges

Rationale

This unit is concerned with developing knowledge of trees, shrubs and hedges.

This unit covers six learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 trees
- 2 shrubs
- 3 wall shrubs and climbing plants
- 4 hedges
- 5 site preparation and planting for trees, shrubs, climbing plants and hedges
- 6 maintenance

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L2

L4

L19

L22

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 Trees

The candidate will be able to

1. state that, in general, a tree is defined as a woody perennial plant with a single stem (occasionally multi-stemmed) from ground level
2. give reasons for growing trees in gardens
 - a. stature
 - b. height
 - c. permanence
 - d. visual and noise barrier, shelter and dust pollution filtering
 - e. focal point
 - f. seasonal variation
 - g. creation of shade and shelter and modification of the planting environment
 - h. creation of habitat and source of food and shelter for wildlife
3. state that the disadvantages of trees in gardens include
 - a. size and height
 - b. root incursion and damage to structures
 - c. competition with other plants
 - d. shade
 - e. production of debris
 - f. cost of maintenance
 - g. source of friction between neighbours
4. state that trees can usually be purchased as container-grown, root-balled or bare root and that seasonal factors apply to the availability of each
5. explain the factors influencing the choice of tree production methods in 4 above
6. state advantages for the common sizes of trees used for garden planting
 - a. feathered whip
 - b. standard
7. identify other sizes of trees that may be used for special purposes; transplants, extra heavy standards, semi-mature trees
8. describe the desirable characteristics of trees selected for purchase
 - a. healthy
 - b. vigorous
 - c. appropriate shape (leader/bush habit)
 - d. no crossing, damaged or dead wood
 - e. correctly named
 - f. pest and disease free

9. describe the main shapes/forms of trees
 - a. spreading
 - b. pyramidal
 - c. fastigate
 - d. pendulous (weeping)

10. describe trees exhibiting the following ornamental features
 - a. coloured foliage (eg *Gleditsia triacanthos* 'Sunburst')
 - b. evergreen foliage (eg *Eucalyptus niphophila*)
 - c. attractive flowers (eg *Malus* 'Eleyi')
 - d. attractive fruits (eg *Malus* 'Red Sentinel')
 - e. attractive bark (eg *Betula ermanii*)
 - f. autumn colour (eg *Acer* 'Ozakazuki')
 - g. weeping habit (eg *Betula pendula* 'Youngii')
 - h. fastigate habit (eg *Carpinus betulus* 'Fastigiata')
 - i. suitability for acid soil (eg *Betula pendula*)
 - j. suitability for wet sites (eg *Metasequoia glyptostroboides*)

Outcome 2 Shrubs

The candidate will be able to

1. state that a shrub is generally defined as a woody perennial plant with several persistent stems arising from at or near ground level
2. give reasons for growing shrubs in gardens
 - a. decorative effect/ seasonal variation
 - b. structure
 - c. height
 - d. permanence
 - e. visual and noise barrier, shelter and dust pollution filtering
 - f. creation of habitat and source of food and shelter for wildlife
3. describe the uses of shrubs in gardens
 - a. shrub and mixed borders
 - b. topiary
 - c. ground cover
 - d. wild and woodland gardens
 - e. specimens and mass planting
 - f. rose gardens.
4. state that shrubs are usually purchased as container-grown plants but that some may also be available as field grown root-balled plants (e.g. Magnolia).
5. state that the cost of the plant will be related to various factors including age, size of plant, size of container and means of propagation
6. state that unless instant effects are required it is usually sensible to plant 2 to 5 litre size container-grown plants for most garden purposes
7. describe the desirable characteristics of shrubs selected for purchase
 - a. healthy
 - b. vigorous
 - c. appropriate shape
 - d. no damaged or dead wood
 - e. roots not spiralling in the container
 - f. correctly named
 - g. pest and disease free
8. describe shrubs exhibiting the following ornamental features
 - a. coloured foliage (eg *Cotinus coggygia* 'Grace', *Physocarpus* 'Dart's Gold')
 - b. evergreen foliage (eg *Berberis darwinii*, *Viburnum davidii*)
 - c. attractive flowers (eg *Mahonia* 'Charity', *Kolkwitzia amabilis*)
 - d. attractive fruits (eg *Callicarpa* 'Profusion', *Cotoneaster horizontalis*)
 - e. attractive stem colour (eg *Cornus* 'Winter Beauty', *Rubus biflorus*)
 - f. autumn colour (eg *Euonymus alatus*, *Acer palmatum* 'Dissectum')

- g. upright habit (eg *Viburnum x bodnantense* 'Dawn', *Chamaecyparis lawsoniana* 'Ellwoodii')
- h. suitability for acid soil (eg *Rhododendron yakushimanum*, *Pieris formosa*)
- i. suitability for moist sites (eg *Salix alba* 'Britzensis', *Sambucus racemosa* 'Plumosa Aurea')
- j. winter interest (e.g. *Hamamelis mollis* 'Pallida'; *Erica carnea* 'Challenger')
- k. suitability for coastal exposure (e.g. *Griselinia littoralis*)
- l. fragrant flowers (e.g. *Viburnum carlesii*, *Daphne mezereum*)
- m. ground cover (e.g. *Pachysandra terminalis*, *Cornus canadensis*)

Outcome 3 Wall shrubs and climbing plants

The candidate will be able to

1. state that wall shrubs are shrubs which are particularly attractive or effective when grown against walls
2. state that some wall shrubs are grown in that situation due to the effects of the microclimate that are provided (shade, shelter from winter cold, provision of additional summer warmth to ripen wood)
3. state that climbing plants are plants which have natural adaptations enabling them to climb
4. describe climbing plant adaptations and identify at least one plant exhibiting the adaptations listed
 - a. twining stems (e.g. *Wisteria sinensis*)
 - b. twisting petioles (e.g. *Clematis montana*)
 - c. adventitious roots (e.g. *Campsis radicans*, *Hydrangea petiolaris*)
 - d. tendrils (e.g. *Passiflora caerulea*, *Vitis cogneticiae*)
 - e. tendrils with suckers (eg *Parthenocissus tricuspidata*)
 - f. thorns (e.g. *Rosa* 'Veilchenblau')
5. state that self-clinging climbers are suited to growing without necessity for additional support
6. describe suitable support methods for wall shrubs and climbers, to include vine eyes and wire; wooden trellis; netting
7. describe other locations that are suitable for climbing plants, e.g. pergola, trees
8. identify wall shrubs or climbing plants for the following aspects
 - a. north facing (e.g. *Hydrangea anomala petiolaris*, *Hedera helix*)
 - b. east facing (e.g. *Chaenomeles speciosa*, *Pyracantha* 'Orange Glow')
 - c. south facing (e.g. *Chimonanthus praecox*, *Ceanothus* 'Concha')
 - d. west facing (e.g. *Clematis cirrhosa*, *Wisteria sinensis*).

Outcome 4 Hedges

The candidate will be able to

1. state the functions of hedges in gardens
 - a. shelter
 - b. privacy/screening
 - c. background to plant displays
 - d. divisions within the garden
 - e. wildlife habitat
 - f. creation of formal effects
 - g. seasonal interest (flowers, berries)
2. list the potential limitations of hedges in gardens
 - a. shade
 - b. competition from roots/dry impoverished soil
 - c. maintenance requirement
 - d. pest and disease habitat.
3. define formal and informal hedges
4. explain why hedges are effective windbreaks by filtering of wind
5. describe the typical constituents of 'native' wildlife hedges
6. state plants suitable for
 - a. formal hedges below 45cm maintained height (e.g. *Buxus sempervirens* 'Suffruticosa')
 - b. formal hedges from 1 to 1.8m maintained height (e.g. *Lonicera nitida* 'Baggesen's Gold')
 - c. formal hedges over 1.8m maintained height (e.g. *Carpinus betulus*)
 - d. large informal hedge for flower (e.g. *Viburnum tinus*)
 - e. small informal hedge for flower (e.g. *Lavendula* 'Hidcote')
7. describe the maintenance of the formal and informal hedges listed above

Outcome 5 Site preparation and planting for trees, shrubs, climbing plants and hedges

The candidate will be able to

1. explain why perennial weeds should be controlled or eradicated before planting
2. describe the soil conditions favourable to most woody plants
3. describe why it is preferable to improve a whole planting site rather than plant in a pit
4. describe the sequence of operations to plant a standard tree
 - a. preparation of the plant (watering, frost/wind protection, pruning of branches or roots (if required))
 - b. dig hole of appropriate dimensions to accommodate root ball
 - c. breaking open cultivation or mineral pans
 - d. planting depth
 - e. positioning of tree and stake (viewpoint, wind direction)
 - f. backfilling
 - g. consolidation
 - h. tying
 - g. mulching
 - h. protection from pests
 - i. protection from adverse weather conditions
5. state that the function of a stake is to prevent root rock until establishment
6. describe the benefits of short stakes in building up the strength of the stem and the use of angled stakes for container grown trees
7. describe any differences in planting of whips, shrubs, wall shrubs and climbing plants and hedges as compared with standard trees including
 - a. use of tree shelters (grow tubes) for whips
 - b. planting to line
 - c. single or staggered double row planting for hedges
 - d. importance of adding organic matter to locally dry areas by walls
 - e. planting 30-45cms away from walls if possible
 - f. care relating to damp proof courses when planting wall plants
 - g. planting depth for budded roses and Clematis)
8. describe suitable planting distances for formal hedging plants to include *Buxus sempervirens* 'Suffruticosa', *Lonicera nitida* 'Baggesen's Gold', *Taxus baccata*, *Carpinus betulus*

Outcome 6 Maintenance

The candidate will be able to

1. describe the reasons for pruning trees, shrubs and hedges
 - a. improve and maintain plant shape
 - b. regulate size of plant
 - c. improve the ornamental display (more/better flowers/fruit; better leaf size/colour; better stem colour)
 - d. remove dead, damaged and diseased wood
 - e. remove non-typical growth (suckers, reverted growth)
 - f. thinning out when required
 - g. remove crossing branches and competing leaders
2. list the tools required for garden pruning activities
 - a. secateurs
 - b. loppers
 - c. pruning saw
 - d. long-arm pruner
 - e. hedging shears
 - f. hedge trimmer
 - g. suitable personal protective equipment (PPE)
3. describe the sequence of cuts to remove a small branch from a tree without tearing
4. state that branches are best removed to a point just beyond the branch collar/bark ridge where healing is most rapid
5. state that wound paints are not generally used as they impair healing
6. state that pruning of deciduous trees can take place at any time but it is good practice to avoid times when severe bleeding of sap occurs
7. state that evergreens are best pruned during the period from spring to autumn
8. state that most shrubs do not require routine pruning to enhance their effectiveness as garden plants
9. describe the process of rejuvenation pruning for mature shrubs
10. describe (including timing of operation) the routine pruning of shrubs to maximise flowering
 - a. shrubs that flower mainly on current season's wood, e.g. *Buddleja davidii*
 - b. shrubs that flower mainly on wood of the previous season's growth e.g. *Forsythia*, *Philadelphus*; *Chaenomeles* grown as a wall shrub
 - c. *Wisteria* grown as a wall-trained climber
 - d. *Clematis* 'Nelly Moser' (or other early large-flowered cultivar)
 - e. *Clematis* 'Jackmannii' (or other late large-flowered cultivar)
 - f. *Clematis alpina* (or other early flowered species)

- g. hybrid tea/large-flowered bush rose
 - h. floribunda/cluster-flowered bush rose
 - i. climbing rose grown as a wall plant
 - j. rambler rose grown as a wall plant
 - k. heathers
11. describe the pruning of shrubs grown for stems (e.g. *Cornus alba*) or foliage (e.g. *Sambucus racemosa* 'Plumosa Aurea', Photinia 'Red Robin') to maximise effect
12. describe the routine trimming of hedges
- a. desired shape
 - b. use of line and template
 - c. timing (including care to avoid harm to nesting birds and other adverse wildlife impacts)
 - d. frequency of trimming
13. describe the safety factors to be considered in pruning operations
- a. PPE
 - b. use of cutting equipment
 - c. electricity or other powered equipment
 - d. working above ground
 - e. awareness of surroundings including potential fixed hazards, other people and children
14. describe the other maintenance operations required by trees, shrubs and other woody plants in gardens
- a. watering
 - b. feeding
 - c. weed control
 - d. mulching
 - e. pest and disease control
15. list common pests and diseases affecting woody plants in gardens
- a. honey fungus
 - b. aphids
 - c. black spot (roses)
 - d. powdery mildew
 - e. scab
 - f. coral spot
 - g. scale insect
 - h. rabbits
 - i. vine weevil

UNIT 4 Beds and Borders

Rationale

This unit is concerned with developing knowledge of beds and borders.

This unit covers five learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 hardy herbaceous perennials
- 2 annuals, biennials and bedding plants
- 3 outdoor ornamental containers and baskets
- 4 outdoor bulbs
- 5 maintenance of flowers

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L4

L18

L22

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 Hardy herbaceous perennials

The candidate will be able to

1. define 'herbaceous perennial plant' as one that lives for more than two years, but does not develop a woody stem structure and often dies back to a perennial rootstock during its dormant season
2. explain that the rootstock may be fibrous (e.g. *Aster*), fleshy (e.g. *Papaver*), rhizomatous (e.g. *Schizostylis*) or a crown (e.g. *Hosta*)
3. state that the dormant season is usually the winter time, but that some herbaceous perennials are winter active and summer dormant (e.g. *Helleborus niger*)
4. list the common ways of using herbaceous perennials in garden situations
 - a. traditional herbaceous borders
 - b. island beds
 - c. mixed borders
 - d. ground cover
 - e. bog and waterside planting
 - f. in containers
5. describe a traditional herbaceous border
 - a. linear in nature (straight or serpentine)
 - b. backed by a hedge or wall
 - c. viewed from one side only
 - d. usually proportioned approximately 1 ½ times as wide as the height of the backdrop
 - e. preferably in a sunny location and not heavily shaded by overhanging trees
 - f. ideally with a grass/lawned front for aesthetic appeal though paving is acceptable for ease of maintenance
6. describe an herbaceous island bed
 - a. formal or informal shape
 - b. set within a lawn or in a paved area
 - c. open sunny situation
 - d. viewed from all sides
 - e. taller plants positioned centrally
7. describe how herbaceous plants can be used as part of a mixed border with shrubs, trees and bulbs and are especially able to add summer colour and interest to these borders
8. describe the use of herbaceous plants in 'prairie' or 'steppe' planting designs, rather than traditional uses
9. state that an ideal soil for most herbaceous plants would be a medium loam with good winter drainage, slightly acid pH and reasonable water retention in summer

10. describe the preparation of a planting site for perennials
 - a. elimination of perennial weeds
 - b. soil improvement by the addition of suitable well-rotted organic material and thorough cultivation by digging or mechanical cultivation
 - c. adjustment of pH if necessary
 - d. leave to settle naturally or consolidation by treading if immediate planting is required
 - e. addition of base fertiliser dressing prior to planting
11. state that for most herbaceous plants, early spring would be the most desirable planting time, but that autumn is more suitable for spring and early flowering herbaceous perennials
12. state that most herbaceous plants are purchased as container-grown plants, usually in 2-3 litre pots
13. state that herbaceous plants can also be purchased in smaller sizes and that if spring planted and correctly maintained these will be equally successful and less costly
14. describe the usual planting design principles for herbaceous borders
 - a. plant in groups of odd numbers
 - b. plant smaller plants at the front and taller plants at the rear of the border
 - c. plant to create a wave effect rather than a rigid triangular profile
 - d. plant with colour complements, contrasts and harmonies in mind
 - e. create all year round or short seasons of interest
15. describe the planting of a container-grown herbaceous perennial
 - a. ensure that the plant is well watered prior to removal from pot
 - b. excavate hole to allow for size of pot
 - c. loosen spiralling roots
 - d. plant with crown of plant at or just below finished soil surface depending on species of plant
 - e. backfill carefully
 - f. firm well without damaging plant
 - g. water in if required
16. list hardy herbaceous perennials for the following attributes
 - a. spring flower (e.g. *Doronicum* 'Harpur Crewe', *Euphorbia* 'Fireglow')
 - b. summer flower (e.g. *Delphinium* 'Blue Nile', *Echinacea purpurea*)
 - c. autumn flower (e.g. *Sedum* 'Herbstfreude', *Anemone* 'Honorine Jobert')
 - d. winter flower (e.g. *Helleborus niger*, *Helleborus argutifolius*)
 - e. ground cover (e.g. *Geranium macrorrhizum*, *Hosta sieboldiana elegans*)
 - f. fragrance (e.g. *Phlox paniculata*, *Monarda* 'Cambridge Scarlet')
 - g. bog gardens (e.g. *Ligularia dentata*, *Astilbe* 'Fanal')
 - h. use in containers (e.g. *Hosta* 'Halcyon', *Stachys byzantina*).

Outcome 2 Annuals, biennials and bedding plants

The candidate will be able to

1. define an annual plant as one that completes its entire life cycle within one growing season and a biennial plant as one that completes its entire life cycle in two growing seasons separated by a dormant period
2. state that hardy annuals (HA) can complete the life cycle entirely outdoors whereas half hardy annuals (HHA) need to be started indoors in warmth in order to achieve the full life cycle
3. state that many plants grown for bedding out in summer are not annuals but tender perennials, but are treated as annuals for the purpose of bedding out
4. describe the garden uses of hardy annuals and biennials
 - a. annual borders
 - b. mixed borders
 - c. cut flower
 - d. attraction for wildlife
5. describe the uses of bedding plants
 - a. create carpets of colour
 - b. formal effects
 - c. use in containers and baskets
6. describe the requirements of sites for annuals, biennials and bedding
 - a. sunny and open
 - b. sheltered from wind if possible
 - c. well drained
 - d. slightly acid pH
 - e. moderate fertility
7. describe the preparation of a site for planting/sowing annuals etc
 - a. remove perennial weeds
 - b. add very well-rotted organic matter once per year (usually in spring)
 - c. dig or mechanically cultivate
 - d. consolidate evenly by treading
 - e. rake to a medium/fine tilth
 - f. check pH and adjust if necessary (usually in autumn)
 - g. add base dressing of fertiliser if required
8. describe the marking out and sowing of a border for hardy annuals by
 - a. marking out planting bays with sand lines or string
 - b. drawing out drills within each bay at a different angle to adjoining bays
 - c. drawing out drills to the correct depth for the species
 - d. sowing the seeds thinly along the drills
 - e. covering carefully and labelling each planting bay
9. state that annuals can be broadcast sown in bays but that this makes initial weed control difficult

10. list hardy annuals suitable for use in annual borders (eg *Clarkia unguiculata*, *Consolida ajacis*, *Tropaeolum majus*, *Nigella damascena*, *Convolvulus tricolor*)
11. state that bedding borders may include edging plants, standard plants, dot plants and groundwork plants and explain each term
12. describe the planting of formal bedding borders
 - a. position and plant standards first
 - b. plant edging plants to ensure formal accurate edges
 - c. plant groundwork and dot plants to fill site
 - d. all plants firmed in and site tidied
 - e. water if required
13. state that summer bedding comprises tender plants and so should take place after the risk of frost is passed
14. state that winter/spring bedding is usually planted in autumn, while the soil retains some warmth
15. list summer bedding plants (eg *Zonal Pelargonium*, *Impatiens walleriana*, *Multiflora Petunia*, *Lobelia erinus*, *Begonia Non Stop* series)
16. list winter bedding plants (eg *Viola Ultima* series, *Primula Polyanthus* group, *Erysimum cheiri*, *Myosotis alpestris cvs*, *Bellis perennis*)

Outcome 3 Outdoor ornamental containers and baskets

The candidate will be able to

1. state reasons for the popularity of containers
 - a. ideal for small sites
 - b. easily managed
 - c. accessible
 - d. decorative for the house
 - e. seasonal interest and colour
 - f. enhances 'outdoor rooms'
 - g. colour for homes without gardens.
2. state that whilst management is easy, it is continuous and labour intensive and has a high water requirement.
3. describe the planting of a wire hanging basket
 - a. position on large pot or bucket for stability
 - b. line with moss, waste wool or other suitable liner
 - c. add growing medium to half full
 - d. push in trailing plants (if used) through sides
 - e. position central plants
 - f. complete filling with growing medium
 - g. plant remaining surface plants and firm in
 - h. water thoroughly and allow to drain
 - i. hang in a protected environment to establish unless plants are fully hardened off
4. state that summer baskets and containers benefit from use of specific growing medium or the addition of water-retaining polymer and controlled release fertiliser to conventional potting composts
5. state that outdoor pots and containers require good drainage, particularly if they are to be used in winter as well as summer
6. state that containers for winter interest may include dwarf shrubs and bulbs in addition to bedding plants
7. list plants suitable for use in summer baskets (eg *Sanvitalia procumbens*, *Petunia Surfinia* series, *Verbena x hybrida*, *Fuchsia* 'Golden Marinka', *Lobelia Cascade* series)
8. list plants suitable for use in winter containers (eg *Erica carnea*, *Hedera helix* 'Glacier', *Skimmia japonica* 'Rubella', *Viola Ultima* series, *Iris histrioides* 'Major')

Outcome 4 Outdoor bulbs

The candidate will be able to

1. state that bulbs, corms and tubers are distinct botanical structures but in gardening terms are usually grouped together
2. state the functions of bulbs
 - a. food storage
 - b. dormant phase/organ of perennation
 - c. propagation
3. list garden uses for bulbs
 - a. naturalising
 - b. mixed borders
 - c. in ornamental containers
 - d. bedding out
 - e. cut flowers
4. describe the conditions required for most bulbs
 - a. good drainage
 - b. open soil structure
 - c. adequate light during active growing period
5. state that most winter and early spring flowering bulbs are easily grown in dappled shade; most late spring and summer bulbs require full sun
6. state that purchased bulbs should be plump, firm and without any evident sign of rotting
7. state that species bulbs should be acquired from reputable/sustainable sources
8. describe the planting of bulbs, including tools, spacing, depth and drainage improvement when
 - a. planting in beds and borders for temporary display
 - b. naturalising under turf
9. give examples of bulbs that should be planted shallow (eg *Lilium candidum*, *Cyclamen hederifolium*) or deep (*Lilium regale*, *Fritillaria imperialis*) as compared with the normal guidance
10. describe bulbs for the uses in 3, giving name, planting time and flowering season

Outcome 5 Maintenance of flowers

The candidate will be able to

1. describe the maintenance of annuals, biennials, herbaceous perennials and bulbs, grown in borders, naturalised and in containers, (as applicable to each type of plant and planting site)
 - a. dead-heading
 - b. weed control
 - c. watering
 - d. feeding
 - e. staking and support
 - f. mulching
 - g. cutting back of foliage
 - h. lifting, dividing and replanting

2. list common pests and diseases affecting flowers
 - a. slugs and snails
 - b. aphids
 - c. botrytis (grey mould)
 - d. powdery mildew

UNIT 5 Plant Propagation

Rationale

This unit is concerned with developing knowledge of plant propagation.

This unit covers three learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 the principles of plant propagation
- 2 propagation by seed
- 3 vegetative propagation

Connection with other qualifications

This unit combines and extends the knowledge contained in units
L4
L17
CU72
CU 73
of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 The principles of plant propagation

The candidate will be able to

1. state that plants can be propagated by either sexual or asexual means
2. state that sexual propagation is usually by seed, and in certain specialised plants by spores
3. state that asexual propagation is more commonly called vegetative propagation
4. list reasons for plant propagation to include increase in plant numbers, reproduction of a particular plant characteristic, retention of plant health and to create specific shape or size of plant
5. describe the requirements and characteristics of propagation media (structure, aeration, drainage, nutrition, freedom from pest and disease, water holding capacity) for
 - a. seed sown in a protected environment
 - b. seed sown outdoors
 - c. cuttings propagated indoors
 - d. cuttings propagated outdoors
6. give examples of bulky materials commonly used in the preparation and amelioration of propagation media, to include
 - a. peat
 - b. peat substitutes
 - c. loam
 - d. vermiculite
 - e. sharp sand
 - f. perlite
 - g. rockwool
7. describe the requirements and characteristics of propagation methods
 - a. environments (temperature, humidity, hygiene, ventilation) for
 - b. half-hardy seed sown indoors
 - c. hardy seed sown outdoors
 - d. cuttings propagated indoors
 - e. cuttings propagated outdoors
8. describe the requirements of effective labelling when propagating plants.

Outcome 2 Propagation by seed

The candidate will be able to

1. describe the structure of typical endospermic and non-endospermic seeds
2. explain the terms open-pollinated, F₁ Hybrid and the F₂ generation as applicable to seed
3. explain the term viability as applicable to seed
4. state that the viability of seed is related to species and storage conditions
5. describe suitable small scale storage conditions for most seed as being dry, in a closed container in a refrigerator at 3-4°C
6. state that some large seeds, e.g. horse chestnut, should not be allowed to desiccate and should be sown fresh rather than stored
7. describe physical and physiological seed dormancy and give suitable means of overcoming or avoiding dormancy
8. give, with examples, reasons why some plants are usually or always seed raised
 - a. F₁ Hybrids
 - b. cheaper
 - c. difficult or impossible to propagate by conventional vegetative means
 - d. usually free from diseases
9. list the requirements for germination to occur
 - a. warmth
 - b. moisture
 - c. oxygen
 - d. viable seed which is not dormant
10. describe the stages in seed germination
 - a. water uptake
 - b. seed swells
 - c. radicle emerges
 - d. plumule emerges
11. describe epigeal and hypogeal germination, giving an example of each
12. give examples of how germination can be improved
 - a. seed treatment with chemicals
 - b. use of pre-germinated seed
 - c. use of fleece or other protection outdoors
 - d. specialist germination facilities such as heated propagators
13. state that once germinated, seedlings require suitable levels of light, temperature and moisture to develop correctly

14. state that seedlings grown in poor light become etiolated ('drawn') and susceptible to diseases
15. give examples of common seedling problems and state how to avoid them
 - a. mice
 - b. damping-off disease
 - c. sciarid fly
 - d. slug and snail attack
16. describe the process of pricking out seedlings raised in seed trays individually and in clumps
17. describe the process of thinning-out drilled crops in the open ground
18. state examples of seed-raised crops
 - a. Half-hardy bedding plants (eg *Lobelia*, *Petunia*, *Begonia*, *Pelargonium*,
 - b. *Impatiens*)
 - c. Hardy annuals (eg *Nigella*, *Clarkia*, *Amaranthus*, *Tropaeolum*,)
 - d. Salad or vegetable crops (e.g. carrot, parsnip, beetroot, cabbage, tomato)
 - e. Hardy trees and shrubs (e.g. *Fraxinus*, *Aesculus*, *Crataegus*, *Ilex*, *Quercus*)
19. state the benefits associated with sowing seeds into
 - a. seed tray
 - b. modules
 - c. root trainers
 - d. bio-degradable pots
20. describe how to collect and separate seed from
 - a. plants with fleshy fruit (e.g. tomato)
 - b. plants with dry fruit (e.g. poppy)
21. state what information should be recorded when gathering and saving seed
 - a. date
 - b. location
 - c. name of plant.

Outcome 3 Vegetative propagation

The candidate will be able to

1. give the main reasons for propagation by vegetative means
 - a. propagules are true-to-type
 - b. earlier maturity
 - c. only available method
 - d. confer particular growth characteristics
2. list the main methods of vegetative propagation
 - a. layering (simple, serpentine, air)
 - b. division
 - c. stem cuttings (softwood, semi ripe, hardwood)
 - d. root cuttings
 - e. leaf/leaf petiole/leaf bud cuttings
 - f. grafting and budding (chip budding, T budding, whip and tongue, side veneer)
3. state that micro-propagation is commonly used in commercial vegetative propagation but that it requires specialised facilities
4. give examples of plant types commonly propagated by division
 - a. hardy perennials (e.g. *Hosta*, *Aster*, *Erigeron*, *Achillea*, *Schizostylis*)
 - b. tender perennials (eg *Spathiphyllum*, *Sansevieria*, *Maranta*, *Chlorophytum*, *Adiantum*)
5. state that the principle of division is to divide an established plant into smaller pieces, each having roots, at least a single bud and the capacity to develop into another plant
6. state that for summer flowering perennials, early spring is commonly the most suitable time for division, while spring flowering plants should be divided in the autumn
7. describe the methods and equipment used to divide plants with fibrous and fleshy rootstocks, solid crowns and rhizomes
8. list the advantages of division in domestic situations
 - a. old plant parts are discarded
 - b. new plants have greater vigour
 - c. opportunity to 'clean' the site of perennial weed
 - d. new plants available for propagation and planting elsewhere
9. describe the aftercare of the new plants to ensure effective establishment
10. state that a cutting is taken from one part of a plant and aims to produce a complete plant from the propagule
11. describe the treatment of stock plants used to produce stem cuttings material to enhance the success rate (juvenility, hard pruning, non-flowering material)

12. state the importance of position on the stock plant for success of the cuttings
13. describe the collection, preparation and insertion of soft stem cuttings
 - a. tools and equipment required (knife, secateurs, scissors)
 - b. location of cut on stock plant
 - c. prevention of drying out of cuttings
 - d. length and thickness of cuttings
 - e. trimming of cutting below a node
 - f. removal of excess leaves
 - g. use of internodal cuttings for specific examples
 - h. use of hormone rooting dips/powders
 - i. importance of hygiene in soft cutting propagation
 - j. immediate aftercare of the inserted cuttings
14. describe the collection, preparation and insertion of semi-ripe stem cuttings
 - a. tools and equipment required (knife, secateurs, scissors)
 - b. location of cut on stock plant
 - c. prevention of drying out of cuttings
 - d. length and thickness of cuttings
 - e. trimming of cutting below a node
 - f. removal of excess leaves
 - g. discarding of soft tips
 - h. use of hormone rooting dips/powders
 - i. importance of hygiene in semi-ripe cutting propagation
 - j. immediate aftercare of the inserted cuttings
15. describe the collection, preparation and insertion of hardwood stem cuttings
 - a. tools and equipment required (knife, secateurs)
 - b. location of cut on stock plant
 - c. differences in treatment between leafy and leafless cuttings
 - d. length and thickness of cuttings
 - e. trimming of cutting below a node
 - f. improved rooting by use of wounding
 - g. use of hormone rooting dips/powders
 - h. importance of hygiene in hardwood cutting propagation;
 - i. immediate aftercare of the inserted cuttings
16. describe the production of callus (undifferentiated tissue) produced at the base of the cutting; roots emerge through the callus
17. state that soft cuttings are usually taken in spring and early summer and take up to 4 weeks to root
18. state that semi-ripe cuttings are usually taken in mid-summer and take from 4 to 10 weeks to root
19. state that hardwood cuttings are usually taken in autumn and winter and take from 6 to 16 weeks to root

20. give examples of plants commonly propagated by each method
- soft stem cuttings (e.g. *Delphinium*, *Phlox*, *Verbena*, *Chrysanthemum*, *Dahlia*, *Fuchsia*, *Phygelius*)
 - semi-ripe cuttings (eg *Erica*, *Buxus*, *Berberis*, *Lavandula*, *Ceanothus*)
 - hardwood cuttings (eg *Buddleja*, *Cornus*, *Salix*, *Rosa*, *Kerria*)
21. describe the aftercare of soft, semi-ripe and hardwood cuttings
- disease prevention
 - humidity
 - watering
 - temperature
 - potting up or lining out.
22. describe the collection, preparation and insertion of leaf cuttings
- equipment required (knife, polythene bag)
 - selection and removal of mature leaf blade
 - whole leaf used or leaf divided into sections
 - importance of polarity
 - importance of hygiene in leaf section propagation
 - immediate aftercare of inserted propagule.
23. describe the collection, preparation and insertion of leaf petiole cuttings
- equipment required (knife, polythene bag)
 - selection and removal of mature leaf with petiole attached
 - importance of hygiene in leaf petiole propagation
 - immediate aftercare of inserted propagules.
24. describe the collection, preparation and insertion of leaf bud cuttings
- equipment required (knife, secateurs, polythene bag)
 - selection and removal of suitable material (young wood)
 - adverse effects of rooting hormone
 - importance of hygiene in leaf bud propagation
 - immediate aftercare of inserted propagules.
25. describe the collection, preparation and insertion of root cuttings
- equipment required (fork to lift/expose rootstock, knife, polythene bag)
 - timing of operation (usually during the early or late dormant period)
 - importance of healthy vigorous root selection
 - importance of polarity (flat top, slanting basal cut)
 - importance of hygiene in root cuttings propagation
 - immediate aftercare of inserted propagules (depth, moisture levels).
26. describe the preparation of stock plants for root cuttings to improve success rates;
root prune stock plant one season in advance of cuttings removal

27. give examples of plants propagated by each of the following:
- a. leaf cuttings (e.g. *Streptocarpus*, *Begonia rex*)
 - b. leaf petiole cuttings (e.g. *Saintpaulia*, *Peperomia*)
 - c. leaf bud cuttings (e.g. *Camellia*, *Hedera*)
 - d. root cuttings (e.g. *Phlox paniculata*, *Papaver orientale*).

UNIT 6 Weeds Pests and Diseases

Rationale

This unit is concerned with developing knowledge of weeds, pests and diseases.

This unit covers four learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 the principles of weed control
- 2 the principles of pest control
- 3 the principles of disease control
- 4 nutrient deficiencies and physiological disorders

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L3

L9

L17

L18

L19

L22

CU76

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 The principles of weed control

The candidate will be able to

1. define the term weed
2. state that the two major categories of weed are annual weeds and perennial weeds.
 - a. annual weeds and seedling perennials have small root systems and are easily controlled
 - b. established perennial weeds have extensive root systems, which must be eliminated to effect control
3. state that the detrimental effects of weeds are that they
 - a. compete for space and light
 - b. compete for water
 - c. compete for nutrients
 - d. harbour pests and disease
 - e. cause physical damage to crops
 - f. look unsightly
4. describe briefly the differences between annual and perennial weeds
 - a. life cycles
 - b. methods of perennation
5. state the main methods for weed control are
 - a. cultural
 - b. physical/mechanical
 - c. chemical
 - d. biological
6. state that mulching is an example of cultural weed control
7. briefly explain the principles of mulching for weed control and state examples of organic and inorganic mulches.
8. state that examples of physical/mechanical weed control are
 - a. hoeing
 - b. rotovating
 - c. digging
 - d. forking
 - e. flame gun
 - f. hand weeding
9. briefly describe the appropriate times, methods and examples of weeds controlled for each of the above
10. state that chemical weed control is by the use of herbicides

11. define terminology in relation to herbicide use, its modes of action and appropriate uses
 - a. contact
 - b. translocated
 - c. residual
 - d. selective uses
 - e. hormone
 - f. total
12. briefly describe crop situations where each of the above may be used
13. state that cover crops can be a suitable method of biological weed control
14. state that suitable examples of cover crops can be
 - a. green manures
 - b. ground cover plants
 - c. grass sward.

Outcome 2 The principles of pest control

The candidate will be able to

1. state that pests can be divided into invertebrates, which include insects, mites, molluscs, nematodes and vertebrates, which include mammals and birds
2. state that the detrimental effects of pests can range from
 - a. direct feeding damage
 - b. presence of the pests
 - c. presence of by products
 - d. transmission of disease
3. briefly describe typical examples to include pest and crop for each of the above
4. state the main methods for pest control are
 - a. cultural
 - b. physical
 - c. chemical
 - d. biological
 - e. legislative
5. state that cultural control is the best protection against pest attack and typical examples include
 - a. hygiene
 - b. crop rotation
 - c. good crop husbandry
6. briefly describe methods including crops and pests for each of the above cultural controls
7. state that physical control can include
 - a. non-chemical soil sterilisation (heat/steam)
 - b. low temperature
 - c. use of barriers
 - d. hand picking
8. briefly describe methods including crops and pests for each of the above physical controls
9. state that correct pest identification is vital when selecting the appropriate chemical control method
10. define the terms
 - a. insecticide
 - b. molluscicide
 - c. nematocide
 - d. acaricide

11. state that pests may be killed by
 - a. contact
 - b. stomach poisoning
 - c. fumigation

12. state that pesticides may be formulated as
 - a. sprays using water as a dilution
 - b. drenches to the roots of plants
 - c. granules
 - d. dusts
 - e. seed dressings
 - f. smokes
 - g. vapours
 - h. aerosols

13. give the disadvantages associated with the use of pesticides as
 - a. repeated use leads to resistance
 - b. they may be toxic to humans and wildlife
 - c. they may be slow to break down
 - d. they may accumulate in the soil and food chains
 - e. broad spectrum pesticides may also kill bees and other beneficial insects
 - f. high cost of chemicals

14. define the term systemic pesticide

15. briefly describe the benefits and limitations of systemic pesticides

16. state that the Food and Environmental Protection Act (FEPA) has placed responsibilities on all users of pesticides and that this includes plant protection products and growth regulating chemicals

17. define the term biological control and distinguish between predators and parasites with two examples of each

18. explain that a balance between pest and predator or parasite is difficult to achieve and maintain and that some level of damage to plants must be tolerated for biological control to be effective

19. state that legislative control can take the form of
 - a. plant health acts
 - b. inspection and quarantine of plant imports
 - c. destruction of infected crops

20. list the stages in the life cycle and explain the significance of each stage for
 - a. a named insect pest with a complete metamorphosis
 - b. a named insect pest with an incomplete metamorphosis

21. list the main ways in which insects spread
 - a. flight
 - b. being carried on the wind
 - c. carriage on plant material
 - d. walking
 - e. crawling and jumping

22. list the main ways in which insects over winter
 - a. migrating to a winter host
 - b. as a resistant stage in life cycle
 - c. protected in the soil or cracks and crevices in plants and rocks
 - d. buildings, tools and equipment

23. describe the control methods, life cycle and typical damage caused by
 - a. slugs and snails
 - b. red spider mites
 - c. aphids
 - d. potato eelworms
 - e. thrips
 - f. earwigs
 - g. caterpillars
 - h. vine weevils
 - i. chafers
 - j. gooseberry sawflies
 - k. leaf miners
 - l. leatherjackets

24. describe the control methods and typical damage caused by vertebrate pests
 - a. rabbits
 - b. moles
 - c. mice
 - d. deer
 - e. pigeons

25. describe the precautions that should be taken when purchasing and using pesticides
 - a. only use approved pesticides
 - b. only use for situation and in way stated on the label
 - c. only store in original labelled container
 - d. store in a secure place away from children and pets
 - e. only mix up exact quantity required
 - f. mix to concentration stated on the label
 - g. use appropriate personal protective equipment
 - h. always record what you have used, when and how much

26. state how to avoid drift when applying pesticide
- a. apply when there is a gentle breeze and be aware of wind direction
 - b. avoid spraying in windy conditions
 - c. avoid spraying in calm, sunny weather
 - d. choose suitable application equipment
27. state how to avoid pollution of water
- a. do not spray near water, including dry ditches and drains
 - b. do not put washings, diluted chemical or concentrate down the drain
 - c. avoid spraying when it is going to rain
 - d. use correct dilution of product

Outcome 3 The principles of disease control

The candidate will be able to

1. state that diseases may be caused by fungi, bacteria and viruses and that disease symptoms may also be the result of physiological disorders
2. state that plants suffering from excess nitrogen with soft growth are particularly prone to attack and that adequate potash (potassium) leads to disease resistance
3. explain how some diseases are more prevalent in particular conditions
 - a. humid atmosphere and wet surfaces - grey mould
 - b. dry soil and dry atmosphere - powdery mildew
 - c. acid soil - club root
 - d. alkaline soil/ lack of humus - common scab of potatoes
4. state the main methods for disease control are
 - a. cultural
 - b. chemical
 - c. physical (non-chemical soil sterilisation)
 - d. legislative (plant health passports)
5. State that cultural control is the best protection against disease attack and can range from
 - a. correct siting of plants
 - b. removal and destruction of infected material
 - c. use of clean stock
 - d. use of resistant cultivars
 - e. control of carriers
 - f. care in not spreading diseases on clothing, footwear tools and equipment
 - g. obtaining correct soil conditions
 - h. obtaining correct aerial environment
 - i. checking/adjusting soil pH
 - j. use of vigorous stock
6. give an example of each of the methods of control listed above.
7. state that fungicides may be either protectant or eradicant and explain the significance of each type
8. state that fungicides may be formulated as
 - a. sprays using water as a diluent
 - b. drenches to the roots of plants
 - c. granules
 - d. dusts
 - e. seed dressings
 - f. aerosols

9. state the disadvantages associated with the use of fungicides
 - a. repeated use leads to resistance
 - b. may be toxic to humans and wildlife
 - c. may be slow to break down
 - d. may accumulate in the soil and food chains

10. state that some diseases are soil borne
 - a. damping off
 - b. foot rots
 - c. club root
 - d. honey fungus

11. state that the following are fungal diseases and affect the stems of plants
 - a. grey mould
 - b. coral spot
 - c. apple tree canker
 - d. clematis wilt
 - e. rose rust

12. state that the following are fungal diseases and affect the foliage of plants
 - a. powdery mildew
 - b. black spot
 - c. rust
 - d. peach leaf curl
 - e. blight
 - f. grey mould

13. state that the following are all plant diseases caused by bacteria
 - a. fireblight
 - b. crown gall
 - c. halo blight
 - d. bacterial canker

14. describe the symptoms of attack together with a control method of the problems listed in 10-13 above

15. state that the symptoms of virus include
 - a. flower distortion
 - b. flower colour distortion (streaking)
 - c. leaf mottling and yellowing
 - d. stunted growth

16. state that many viruses show no obvious symptoms but may affect plant vigour and yield

17. state that there is no cure for virus infected plants and that control is by
 - a. purchase of certified virus free stock
 - b. destroying infected plants to prevent them becoming a source of infection
 - c. controlling vectors and alternative hosts.

Outcome 4 Nutrient deficiencies and physiological disorders

The candidate will be able to

1. state that physiological disorders may be caused by chemical deficiencies or excesses, by climatic conditions or by a combination of chemical and climatic factors
2. describe briefly the symptoms of deficiency of the following minerals and how plant growth is affected
 - a. nitrogen
 - b. potassium
 - c. phosphorus
 - d. calcium
 - e. magnesium
 - f. iron
3. recommend a suitable treatment to correct each of the mineral deficiencies listed in 2 above
4. state that plants may show signs of other physiological disorders and describe briefly how the plant is affected and the symptoms of the following
 - a. drought
 - b. frost
 - c. waterlogging
 - d. wind
 - e. excess salinity e.g. over-application of fertiliser causing salt burn
5. recommend a suitable corrective measure for each physiological disorder listed in 4 above.

UNIT 7 Lawns, Landscapes and Structures

Rationale

This unit is concerned with developing knowledge of lawns, landscapes and structures.

This unit covers six learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 lawn establishment
- 2 lawn maintenance
- 3 landscapes and structures
- 4 laying foundations, paths and driveways
- 5 the construction of boundaries
- 6 the construction of a pergola

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L1

L3

CU 19

CU 20

CU 21

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper

Outcome 1 Lawn establishment

The candidate will be able to

1. state that the two main methods for the production of a lawn are by
 - a. sowing seed
 - b. laying turves
2. list the benefits and limitations for the production of a lawn from seed as opposed to turf
3. list the benefits and limitations for the production of a lawn from turf as opposed to seed
4. list the functions of a lawn within a landscape
 - a. link features together
 - b. easily maintained ground cover
 - c. foil for other plants
 - d. retain colour throughout the year
 - e. cover slopes
 - f. recreation area
 - g. create a vista leading to a focal point
5. state a suitable seed mix for a high quality (fine turf) lawn
6. state a suitable seed mix for a general purpose lawn
7. describe the characteristics and uses for the following grass species
 - a. *Agrostis tenuis*
 - b. *Festuca rubra subsp. commutata*
 - c. *Festuca rubra subsp. rubra*
 - d. *Lolium perenne*
 - e. *Poa pratensis*
8. state the characteristics of a
 - a. seed bed intended for lawn establishment
 - b. turf bed intended for laying turves
9. describe the methods for achieving the characteristics listed in 8
10. state a suitable seed rate for establishing a lawn from seed
11. describe briefly the methods of sowing grass seed to ensure an even coverage
12. describe briefly how to maintain a newly sown lawn up to establishment
13. describe briefly the methods for laying turf
14. describe briefly how to maintain a newly laid lawn up to establishment.

Outcome 2 Lawn maintenance

The candidate will be able to

1. state that the operations required to maintain a quality lawn are
 - a. mowing
 - b. scarification
 - c. top dressing
 - d. aeration
 - e. feeding
 - f. weed control
 - g. pest and disease control
 - h. turf repair
2. state that the two main types of lawn mower are cylinder and rotary (hover and wheeled) and list the surfaces where each type may be used effectively
3. list the principles of mowing
 - a. using the correct mower
 - b. mowing in the right conditions
 - c. correct height of cut
 - d. correct frequency
 - e. blades sharp and correctly adjusted
4. state the benefits and limitations of boxing off clippings
5. state the benefits and limitations of allowing the clippings to 'fly'
6. define the term 'thatch' in turf care
7. list the reasons for the scarification of turf
 - a. remove thatch
 - b. improve surface drainage and aeration
 - c. reduce creeping lawn weeds
 - d. reduce moss
8. state when scarification should be carried out
9. briefly describe the methods of carrying out scarification by
 - a. hand
 - b. machine
10. list the reasons for the aeration of turf
 - a. relieve compaction
 - b. improve surface drainage
 - c. increase aeration
 - d. improve root activity
 - e. allow for alteration of soil texture by top dressing
 - f. reduce the incidence of moss

11. state when aeration should be carried out by
12. briefly describe the methods of carrying out aeration by
 - a. hand
 - b. machine
13. state the constituents of a bulky top dressing intended for turf maintenance
14. list the reasons for the application of bulky top dressings intended for turf maintenance
15. describe briefly the methods for the application of bulky top dressings
16. state that nitrogen, phosphorous, potassium and iron are essential for strong, balanced turf growth
17. state that turf fertilisers are applied as compound fertilisers, specially formulated for the purpose.
18. state that fertilisers applied in the spring and early summer have a higher nitrogen content than those applied in autumn and winter
19. describe the conditions and methods for the effective application of turf fertilisers
20. state that turf weeds can be divided up into three main groups
 - a. broadleaved weeds
 - b. fine-leaved weeds
 - c. grass weeds
21. describe briefly the methods for the control of turf weeds
 - a. culturally
 - b. mechanically
 - c. chemically
22. describe the detrimental effect of moss on turf
23. list the contributory factors, and state an appropriate remedy, for the accumulation of moss on turf
 - a. compaction
 - b. low fertility
 - c. high level of acidity
 - d. shade
 - e. shallow top soil
 - f. poor drainage
 - g. poor mowing
24. list common pests of turf
 - a. cast forming earthworms
 - b. leatherjackets
 - c. moles

25. state the damage caused and a suitable control method for the pests in 24 above
26. state that the three commonest turf diseases are
 - a. fusarium patch
 - b. red thread
 - c. fairy ring
27. describe briefly the symptoms and detrimental characteristics of the diseases in 26 above
28. state that the best method to control turf disease is good turf maintenance and that fairy rings are difficult to control but lesser infestations can be camouflaged by the use of iron
29. state that turf repair can take the form of
 - a. overseeding with a top dressing seed mix.
 - b. lifting damaged turf and replace with new turf
 - c. cutting and lifting turf, then adding or removing soil to repair humps and hollows
 - d. lifting turf and turning around to reinstate straight edge between lawn and borders
30. describe briefly the methods for carrying out each repair method in 29
31. state that turf disorders can range from
 - a. drought
 - b. waterlogging
 - c. compaction
 - d. frost damage
32. list the devices available for watering turf
33. list the principles for the effective watering of turf.
 - a. thoroughly to full water holding capacity
 - b. morning or late evening
 - c. check depth of penetration

Outcome 3 Landscapes and structures

The candidate will be able to

1. define the term hard landscape as opposed to soft landscape
2. list hard landscape features
 - a. pathways
 - b. drives
 - c. patios
 - d. fences
 - e. walls
 - f. pergolas
 - g. storage areas/structures
 - h. formal ponds and water features
 - i. play areas
 - j. raised beds
3. state that unwanted vegetation and materials may need to be removed from the site
4. describe the benefits of a site survey before carrying out hard landscape construction
 - a. identify features to be retained or removed
 - b. identify planning needs
 - c. to take accurate measurements of the site
 - d. to locate underground services
 - e. assess soil type and depth
 - f. assess water table and drainage
 - g. establish the levels
 - h. establish access requirements
 - i. allow accurate costings to be produced
5. state that accurate scale drawing of the site, including buildings, should be produced and larger scale construction plans may be required for detail.
6. list methods to accurately transfer features from the drawing to the site, indicating the layout with marking materials
 - a. dimensions on plan, not just scale
 - b. fixed datum points used
 - c. tie lines
 - d. use of metric measurements for plan and marking out
 - e. use of appropriate, durable materials

Outcome 4 Laying foundations, paths and driveways

The candidate will be able to

1. explain the use of the following in hard landscape construction
 - a. concrete mixes
 - b. mortar mixes
2. state a suitable concrete mix for a specific purpose
 - a. laying paving slabs
 - b. building a brick wall
3. state a suitable mortar mix for a specific purpose
 - a. laying paving slabs
 - b. building a brick wall
4. list the range of foundations depending upon function
 - a. stone foundation
 - b. step foundation
 - c. slab foundation
 - d. strip foundation
5. describe briefly how to install a strip foundation for the construction of a brick wall
6. describe briefly how to install a slab foundation for the construction for a specific purpose
7. list the range of materials available for the construction of pathways and driveways
 - a. bricks and block paving
 - b. natural and stone paving
 - c. tar macadam
 - d. cobblestones
 - e. random paving
 - f. gravel
 - g. timber (decking) and bark
8. state the importance of foundation depth for
 - a. pedestrian use
 - b. vehicular use
9. describe briefly the construction of a pathway using
 - a. rigid material
 - b. flexible material

Outcome 5 The construction of boundaries

The candidate will be able to

1. state the function of boundaries within the garden
2. list the materials available for the construction of fences
 - a. horizontal lap panel
 - b. vertical lap panel
 - c. interwoven panel
 - d. close board fencing
 - e. chestnut paling
 - f. wattle panel
 - g. ranch style fence
 - h. post and chain
 - i. chain link
 - j. picket fence
3. for the fence materials listed above briefly describe their construction
4. list the different types of bricks and blocks used in garden wall construction
 - a. commons
 - b. facings
 - c. engineering
 - d. concrete blocks
 - e. decorative facing blocks
 - f. screen blocks
 - g. reconstructed stone blocks
5. describe the methods for the construction of a garden wall using the materials in 4 above
6. state the health and safety considerations when constructing boundaries.

Outcome 6 The construction of a pergola

The candidate will be able to

1. state the purpose of a pergola or arch
 - a. interesting feature
 - b. support for climbing, trained and trailing plants
 - c. overhead cover above a pathway
 - d. support for hanging baskets
2. list the types of pergola that may be constructed
 - a. traditional pergola
 - b. oriental pergola
 - c. rustic pergolas
 - d. lean-to pergola
3. describe briefly the construction of the pergolas listed above
4. state the relevant health and safety considerations.

UNIT 8 Ponds and Water Features in Gardens

Rationale

This unit is concerned with developing knowledge of ponds and water features.

This unit covers six learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 the principles of water features
- 2 pond construction
- 3 planting
- 4 fish and other animal life
- 5 special features
- 6 maintenance of a garden pond

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L1

L2

L 28

CU 21

CU 76

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 The principles of water features

The candidate will be able to

1. give reasons for the use of ornamental water features in a garden
 - a. a specialised environment for aquatic and marginal plants
 - b. a specialised environment for fish and other aquatic fauna
 - c. to attract wildlife into the garden
 - d. to provide reflection from the water's surface
 - e. to introduce movement and sound from running water
 - f. to provide an integrated and coherent feature with rock gardens

2. explain site constraints for water features in a garden
 - a. integral within the overall design
 - b. appropriate to the contour and landform
 - c. sunny position
 - d. not in close proximity to trees
 - e. available electricity supply (for pumps etc.)
 - f. outlet for overflow of water
 - g. safety of small children.

3. describe ponds and water features that are suited to both formal and informal design settings
 - a. geometrical shapes
 - b. informal shapes
 - c. fountains
 - d. streams
 - e. cascades and waterfalls.

Outcome 2 Pond construction

The candidate will be able to

1. list the main materials used for pond construction in small gardens
 - a. butyl rubber
 - b. PVC or other flexible plastic sheet
 - c. semi-rigid fibreglass or plastic 'pre-formed' pool
 - d. concrete laid 'in-situ'
2. describe the advantages and disadvantages of each of the materials listed above for pond construction
3. state that an installed, permanent garden pond suitable for winter survival of submerged aquatic plants and fish should be at least 45cm deep, and that this is also beneficial in extended periods of summer heat
4. state that a balanced range of aquatic plants is best provided for by a shallow shelf around the edges of the pond (20-25cm deep)
5. calculate the dimensions of a sheet liner for a pond by measuring maximum overall length and width and adding twice the maximum depth of the pond to each measurement
6. describe the construction of a garden pond using butyl rubber or other flexible liner
 - a. mark out the pond on the site using sand line or by lifting turf etc, including sufficient working overlap area
 - b. excavate the site, including separation of topsoil for re-use if applicable
 - c. check the levels across the width and length of the excavation
 - d. shape sides of the excavation to vertical for formal ponds or to approximately 20° from vertical for informal and wildlife ponds
 - e. remove any sharp stones and projections from the excavated profile
 - f. smooth the profile with the back of a spade
 - g. line the excavation with building sand, geo-textile membrane or similar
 - h. lay the liner over the site and weight evenly into place around the edges
 - i. fill the liner by running water through a hose onto the liner and allowing the weight of water to stretch the liner carefully into the excavated contour
 - j. evenly release and replace the weights around the edges to ensure even spread and avoid over-stretching the liner
 - k. when full, remove all weights and check the levels, packing or trimming the excavation where necessary
 - l. trim the surplus liner to leave an overlap of 15cm all round
 - m. mask edges with paving, rocks, turf or otherwise as required by the design
7. state that if using liner to waterproof a raised brick-built pond, it should be inserted below the final brick course and then taken vertically up between the inner and outer courses and below the coping
8. state that concrete can be useful for garden pools of unusual shape

9. state that where concrete is used it is sensible to import ready-mixed concrete to ensure that there will be no future weak points in the construction where cracks are likely to occur
10. describe the construction of an informal concrete pond with sloping sides
 - a. excavation and preparation as in 6 above
 - b. water-proof concrete spread to a thickness of 15cm over the entire excavated profile
 - c. reinforcement shaped and placed over changes of angle, laid within the concrete
 - d. thoroughly tamped
 - e. trowel finished
 - f. protected until fully set from adverse weather (rain, frost, heat)
 - g. coat with waterproof sealant to prevent surface leaching of chemicals
 - h. fill with water when complete
11. explain why ponds should not be planted/stocked immediately on completion
 - a. water temperature should be allowed time to adjust to the ambient temperature to avoid shock to plants or fish and fauna
 - b. fish and other pond fauna should not be introduced to the pond until planting has established .

Outcome 3 Planting

The candidate will be able to

1. explain that a pond is usually planted with a balance of deep-water, and shallow- water marginal plants (eg yellow flag iris), submerged aquatics or oxygenators (eg Canadian pond weed), floating-leaved deep-water aquatics and floating aquatics
2. describe the functions floating leaved aquatics (eg water lily)
 - a. main features of central areas of the pond
 - b. include spectacular flowering plants
 - c. create shade for fish
 - d. help to avoid algae problems by preventing light reaching the surface of the water
3. describe the functions of marginal aquatics
 - a. mask the edges of the pond
 - b. wide range of plants with diverse and architectural shapes is suitable and so adds interest
 - c. allow protected area for terrestrial and amphibious wildlife
 - d. ensure that hedgehogs etc are able to easily get out of the pond if they fall in
4. describe the functions of floating aquatics
 - a. add seasonal interest to the pond
 - b. create shade for fish
5. describe the functions of submerged floating aquatics (oxygenators)
 - a. release oxygen into the water during daylight
 - b. compete with algae for light, nutrients and carbon dioxide
 - c. provide shelter and food for wildlife
6. identify and describe aquatic plants suitable for small garden ponds
 - a. deep-water aquatics (eg *Nymphaea* 'Fulgens', *Aponogeton distachyos*)
 - b. marginal plants (eg *Butomus umbellatus*, *Houttuynia* 'Chameleon' *Iris laevigata* 'Variegata', *Menyanthes trifoliata*, *Pontederia cordata*)
 - c. floating aquatic (eg *Stratiotes aloides*)
 - d. oxygenators (eg *Hottonia palustris*, *Myriophyllum verticillatum*)
7. describe the planting of an aquatic basket or container
 - a. best time usually late spring or early summer
 - b. basket lined with hessian or geo-textile membrane, unless ultra-fine mesh basket used
 - c. part fill with growing medium of heavy loam with no free organic matter
 - d. spread roots of plant out and backfill carefully
 - e. ensure that crown of plant is above compost surface
 - f. fold down flaps of hessian, if used
 - g. cover surface with round gravel mulch to weigh down soil
 - h. lower basket into pond slowly allowing air to bubble off
 - i. place onto platform of bricks or similar to allow plant foliage to extend and spread on surface and lower to final depth as plant growth develops.

Outcome 4 Fish and other animal life

The candidate will be able to

1. describe the main factors in keeping fish successfully in garden ponds
 - a. suitable depth of water (45cm minimum)
 - b. appropriate stocking rate
 - c. well-oxygenated water throughout the year and in all weather conditions
 - d. provision of shade, from floating leaves in summer, and shelter
 - e. adequate food supply only when required
 - f. freedom from pests and diseases
 - g. adequate gaseous exchange throughout the year
2. state that goldfish and golden orfe are the most suitable fish for use in garden ponds and that koi carp are usually kept in specialised, separate ponds
3. describe the introduction of new fish to a garden pond by balancing temperature of transport water with that in the pond
4. state that feeding of fish is related to season and temperature and that fish must only be fed during active periods
5. state that fish may suffer from fungus disease and parasites and that they should only be purchased from a disease-free source
6. state that fish suppliers also supply treatments for diseased fish
7. state that predation by herons is a major cause of fish loss from garden ponds and that netting or anti-landing wires may prevent this
8. state that ramshorn snails are suitable for introduction to established ponds and may help by scavenging and cleaning
9. state that frogs, toads and newts will probably colonise suitable ponds but should not be introduced artificially due to the potential spread of diseases and other problems to the pond
10. state that newts, frogs and toads spend much of their life out of the pond and need lush foliage, log-piles and damp corners in which to hide, feed and hibernate
11. state that ponds are important habitats for attracting a wide range of wildlife to feed, drink, wash, reproduce and live
12. describe the important features of wildlife ponds
 - a. no fish or low numbers of fish which predate pond life
 - b. well planted with a range of marginal and aquatic plants
 - c. surrounding lush vegetation to give protection to creatures leaving the pond
 - d. shallow exit/entry point for animals to come down to drink, wash and escape if they fall in

Outcome 5 Special features

The candidate will be able to

1. describe alternative means of oxygenating ponds
 - a. waterfalls and cascades
 - b. fountains
2. state that pumps may be installed at the bottom of the pond (submersible) or located in a separate pump-housing nearby
3. give advantages and disadvantages of each pump location
4. describe the factors involved in the selection of a pump
 - a. submersible or not
 - b. number of outlets required
 - c. volume of water required to produce the desired effect
 - d. horizontal distance from the pump to its outlet
 - e. the vertical lift (or head) from the pump to its outlet
5. state that electrical installation to water features is potentially dangerous and should be undertaken by qualified electrical contractors
6. describe the annual maintenance required by a small submersible pump
7. describe the construction of small waterfalls to create different effects (smooth water flows, splashing water, falling through a series of pools) by using
 - a. contoured concrete
 - b. rocks mortared into position
 - c. butyl sheet
 - d. pre-formed semi-rigid fibre glass or plastic
8. state that in a cascade or waterfall system where water is pumped from the lower pond to the head of the system, the volume of water in the system must be sufficient to supply the waterfall without significant depletion of water in the lower pond
9. explain that the benefits of moving water also have limitations
 - a. water lilies are more easily grown in still water
 - b. if too vigorous sediment in the pond will be continually disturbed at the point of water entry

Outcome 6 Maintenance of a garden pond

The candidate will be able to

1. explain why cloudiness of water is common in new ponds particularly in late spring and summer
2. state that algicides may be used to selectively clear algae
3. state that a pad of barley straw submerged in the pond can help clear algae from a pond
4. explain that a correctly planted pond has 50-70% of the water surface covered by plant foliage and that this helps to prevent blanket weed and other algae
5. state that keeping water clear also requires a suitable pH and the prevention of high levels of minerals in the water
6. state that blanket weed can also be removed from a pond by hand or using tools such as a wire rake, and that the resultant debris should be left on the pond edge before clearance to allow any wildlife to escape
7. state that other weed problems in ponds include *Lemna* (duckweed) and native sedge and these should not be introduced as they are very invasive
8. explain that accumulation of organic matter (particularly autumn leaf fall) is harmful because the breakdown of organic matter pollutes the water
9. describe methods of resolving the problem of leaf fall in ponds
 - a. stretch fine net over the pond during the leaf fall period
 - b. lift out leaves from the pond bottom by hand or with a wire rake
10. state that in autumn, dying foliage should be removed from herbaceous aquatic plants to prevent it decaying into the water
11. explain that in hot summers evaporation requires that the pond is frequently topped-up
12. state that if fish are seen 'sucking' at the surface in hot weather this indicates low oxygenation, and that this can be improved by directing water at the surface from a hose pipe
13. explain that prolonged freezing of the water surface is harmful to fish due to the build-up of polluting gases beneath the ice
14. state that a small ice-free area can be created by use of a pond heater or standing a container of hot water on to the ice to melt an area, but that ice must not be broken by use of a hammer etc. as the shock waves are potentially harmful to fish
15. describe the division and replanting of mature aquatic plants as a means of rejuvenating them

16. state that specialised plant feeds are available for use with water lilies that provide correctly balanced slow-release nutrients
17. describe the cleaning out of an established pond
 - a. why it is required
 - b. health and safety considerations including use of appropriate PPE
 - c. appropriate timing of the operation
 - d. temporary accommodation for fish, other fauna and plants during the process
 - e. preservation of wildlife
 - f. cleaning methods
 - g. refilling and restocking
18. state that water-lily beetle may be a pest of *Nymphaea* and describe the symptoms of attack

UNIT 9 Organic Gardening

Rationale

This unit is concerned with developing knowledge of organic gardening.

The unit covers six learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 organic principles
- 2 soil management and cultivation
- 3 nutrition and fertility
- 4 crop rotation
- 5 composting
- 6 crop protection

Connection with other qualifications

This unit combines and extends the knowledge contained in units
CU74
CU76
CU77
of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 Organic principles

The candidate will be able to

1. state that the principles of organic production are defined by the International Federation of Organic Agricultural Movements (IFOAM)
2. state that the Soil Association and Organic Farmers and Growers monitor commercial organic production and that the Henry Doubleday Research association (HDRA) carries out trials, research and promotes organic production methods to amateur and commercial growers
3. state that the underlying principles of organic growing include
 - a. working with natural systems to build a well-balanced and fertile soil from which healthy food of a high nutritional status can be produced
 - b. use of bulky organic materials and some organic fertilizers to improve soil structure, nutrient recycling by micro-organisms and achieve balanced nutrition. This is the 'feed the soil not the plant' technique.
 - c. sustainable use of natural resources with minimum reliance on outside inputs
 - d. avoidance of chemical fertilisers and artificial pesticides and herbicides
 - e. maintenance of bio-diversity
 - f. encouraging natural predators, such as ladybirds, lacewings, blue tits and thrushes
 - g. avoidance of genetically modified organisms (GMOs)
4. explain that organically grown plants should have balanced growth and so be naturally more able to resist or survive pest and disease attacks
5. explain that it will typically take at least two years for a balanced system to be created in a garden
 - a. to allow a build up of a balance of parasites, predators, pests
 - b. to allow a natural balance of soil nutrients to develop by the use of organic materials
6. state that seeds and plants should be acquired from organic sources wherever possible
7. explain the importance of varietal selection
 - a. resistance to pests and diseases
 - b. suitability to low input growing regimes.

Outcome 2 Soil management and cultivation

The candidate will be able to

1. state that an organically managed soil depends on a complex interaction between micro-organisms, plants and animals to maintain its health and fertility
2. state that the maintenance of suitable levels of organic matter in organically managed soils is the basis of soil health and fertility
 - a. maintains fertility
 - b. maintain good soils structure
 - c. encourages earthworms and other beneficial soil organisms
 - d. improves drainage of heavy soils and water retention in light soils
3. state that the decomposition of organic matter releases most of the nutrients required for healthy and balanced plant growth and describe the role of soil organisms in the natural recycling of nutrients
4. state that the most fertile part of the soil profile is just below the soil surface, (the top 20cm) where aeration supports the greatest level of biological activity
5. state that organic soil management aims to maintain and improve this fertile zone by avoidance of compaction and unnecessary disturbance
6. state that the 'bed' system of growing is an effective means of achieving this
7. describe fixed beds, deep beds and raised beds suitable for garden use permanent or temporary paths set between 1.2m wide beds
 - a. all activity managed from the sides so avoiding compaction
 - b. crops grown at closer spacing due to increased fertility and no need for management access
 - c. rows set across beds rather than along beds where applicable
 - d. fixed beds may have solid sides and level surfaces, giving clearly defined path and growing areas
 - e. raised beds may have additional soil added by 'skimming' the paths and adding the soil to the beds
 - f. rounded profiles spread the maturity of certain crops
 - g. deep beds are initially cultivated to twice the normal depth (double dug) to establish deep aeration and drainage and are then managed so as to maintain this good aeration and drainage
8. fertility of all beds is maintained by frequent additions of organic matter
9. state that 'no-dig' systems are effective ways of maintaining the health of organically managed soils in which fertility is maintained by frequent additions of sifted, humified organic matter applied to the soil surface and incorporated naturally by soil organisms (particularly earthworms)

10. state that the maintenance of good soil structure and retention of nutrients is greatly assisted by prevention of heavy or persistent rain beating on bare soil and that this can be achieved by
 - a. keeping the ground covered with crops;
 - b. laying plastic or other sheet mulch on the soil during non-productive periods
 - c. covering the soil with organic mulch
 - d. growing green manure crops during non-productive periods
11. explain the role of earthworms in the maintenance of good soil structure.

Outcome 3 Nutrition and fertility

The candidate will be able to

1. state that the sources of nutrients required by organically grown plants are
 - a. released from minerals in the soil by weathering
 - b. released from soil organic matter by decomposition
 - c. supplied by organically approved fertilisers that usually require biological action before their nutrients are released
2. state that the timing of release of nutrients by decomposition should coincide with the growing requirements of crop plants
3. state that in a sustainable organic system input of materials sourced from outside the garden will be minimised
4. state that maintenance of pH at 6.5 will maximise the availability of nutrients for plant growth and that natural materials such as lime may be used to raise the pH, increase the release of nutrients and provide a source of calcium
5. state that the nutrient content of organic additives can vary depending on the type, age and storage.
6. describe the suitability of sources of organic matter, giving typical/approximate nutrient content
 - a. garden compost
 - b. farmyard manure (FYM)
 - c. stable (horse) manure
 - d. other animal manures
 - e. leaf mould
 - f. composted straw
 - g. spent hops
 - h. spent mushroom compost
 - i. municipal compost
 - j. sewage sludge
 - k. seaweed
 - l. green manure
7. state that sources of organic matter must not be contaminated by pesticides, heavy metals or similar problems and pollutants
8. state that animal wastes and spent mushroom compost should be from organic sources if possible and, if not, should be composted before application to soil to ensure that any harmful residues are destroyed

9. list (with approximate nutrient values) permitted fertilisers for organic gardening to include
 - a. pelleted poultry manure
 - b. seaweed meal
 - c. calcined seaweed
 - d. wood ash
 - e. bone meal
 - f. ground limestone/chalk
 - g. rock phosphate

10. describe the use of green manures as a means of preserving and adding to the soil nutrient reserve and maintenance of soil structure
 - a. green manures are crops grown specifically for incorporating into the soil
 - b. may be incorporated at the growing site or applied elsewhere in the garden
 - c. choice depends on soil type, crop rotation, time of year, timing within cropping cycle
 - d. cycle
 - e. use as single varieties or in combinations to increase biological mass
 - f. leguminous green manures may add to the soil reserve of nitrogen when 'fixing' atmospheric nitrogen in their root nodules
 - g. conserve nutrients in the soil
 - h. protect the soil structure from rain while uncultivated
 - i. add organic matter when dug in, improving structure
 - j. smother weeds
 - k. provide cover for beneficial natural predators

11. list suitable green manures
 - a. grazing (winter) rye
 - b. red clover
 - c. white clover
 - d. vetch/winter tares
 - e. mustard
 - f. buckwheat
 - g. *Phacelia*

12. state that green manures may have additional benefits by attracting wildlife, but that they may also have negative aspects
 - a. nitrogen starvation
 - b. harbour pest and diseases
 - c. might get seeding down which would result in weed

13. state that the nutrients taken up by green manures are released into the soil when the crop decomposes in the soil but that the timing of release must be carefully planned to coincide with future crop requirements

14. state that specific liquid feeds are allowed in organic systems and include proprietary and home-made materials
 - a. seaweed extract
 - b. bio-dynamic preparations
 - c. comfrey liquid
 - d. nettle liquid
 - e. home made liquid manure

15. state that home-made liquid feeds are variable in nature and may have potentially harmful impacts because of this
16. describe (including applicable health and safety advice) the preparation of comfrey liquid from fresh comfrey foliage
17. state that proprietary and home-made liquid feeds may need to be diluted before use.

Outcome 4 Crop rotation

The candidate will be able to

1. state that crop rotation is the practice of growing allied crops on different sites in the garden each year in sequence
2. describe the benefits of green manures as part of a crop rotation systems
3. state that different crops have different rooting depths and differing nutritional requirements and thus growing in succession taps soil nutrients in a balanced and sustainable manner
4. list crops or crop groups that are particularly susceptible to soil-borne and soil-inhabiting pests and diseases and state that the rotation of crops reduces the potential for build-up of these problems, e.g.
 - a. brassicas -club root
 - b. potatoes -root-knot and potato cyst eelworm and many fungi
 - c. root crops -violet root rot and scerotinia
 - d. onions -several fungus diseases
5. describe a suitable crop rotation for an organic vegetable garden over a 4 year period
 - a. list the crops to be grouped together, giving reasons for the grouping and explain why
 - b. give suggested timings of green manures, additional organic matter and possible requirement for application of lime.

Outcome 5 Composting

The candidate will be able to

1. state that organic matter exists in soil in three states
 - a. fresh organic matter (minimal decomposition and still clearly recognisable as to source)
 - b. humified organic matter (partially decomposed and no longer clearly recognisable as to source)
 - c. humus (a dark colloidal state which is important in soil crumb formation and stability and the release and retention of nutrients)
2. state that soil benefits most from the addition of humified organic matter, in that the process of decomposition from this to humus releases nutrients for plant growth
3. state that the aim of composting is therefore to use fresh organic matter to produce humified organic matter for addition to the soil
4. state that composting is an environmentally friendly means of using waste material and an invaluable source of soil fertility
5. state that any material from plant origin can be composted and list the main materials used as sources of organic matter for garden compost
 - a. crop waste
 - b. annual weeds
 - c. animal manures
 - d. raw vegetable/fruit kitchen wastes
6. state that 'soft' plant waste is high in nutrients (especially nitrogen) and decomposes readily
7. state that 'woody' plant wastes (shrub prunings, end-of-season sweet corn haulm, straw etc.) are low in nutrients but high in lignin, making them slow to decompose
8. state that humus in soil is largely derived from lignified material and so 'woody' plant wastes are an essential part of good composting
9. state that good composting requires a balance of carbon and nitrogen to produce rapid decomposition to a valuable product and that at commencement this ratio should be around 25/30 parts of carbon to 1 part of nitrogen, i.e there must be a balance between the woody and green material
10. state that the other requirements for effective composting (in addition to organic matter with a suitable CN ratio) include
 - a. ample moisture (60-70%)
 - b. oxygen
 - c. a pH around 6.5
 - d. sufficient volume to generate heat
 - e. protection from extreme weather to conserve heat

11. state that woody materials for composting should be shredded to increase the surface area for decomposition and speed up the process
12. state that compost heaps can be managed as 'hot' or 'cold' heaps and describe the benefits and limitations of both systems
 - a. cold heaps can be built up slowly as material becomes available
 - b. cold heaps can produce a more nutritious end product
 - c. cold heaps are slow to mature and may take over a year to compost
 - d. cold heaps will not kill off weeds and pests and diseases
 - e. hot heaps are fast, as little as 6 weeks
 - f. the high temperature in hot heaps will kill off weeds, pests and diseases
 - g. hot heaps can smell and lose nutrients especially nitrogen as ammonia
 - h. hot heaps need to be built in one go
13. state that to generate maximum heat, materials for composting should be collected together and protected from rain until sufficient has been gathered to make the heap in a single operation
14. explain that the compost materials must be well mixed to ensure effective distribution of CN ratio materials and that more water may be added as the heap is built
15. state that additional soil should not be added to the heap as it does not compost and increases the bulk density
16. explain that a well-prepared hot compost heap will generate sufficient heat at its core (65°C) to kill perennial weeds and most fungus diseases, but that this temperature may not be attained throughout the heap
17. state that if temperatures in this range are not achieved perennial weeds and diseased material should not be composted
18. describe the decomposition process
 - a. rapid initial heating as bacteria work in moist, aerobic conditions
 - b. temperature peaking after 4-7 days
 - c. lack of oxygen and build up of carbon dioxide causing decomposition to slow down
 - d. at this point the heap should be turned, bringing the outsides into the centre, to allow fresh oxygen in, carbon dioxide to escape and even heating
 - e. second heating takes place
 - f. repeat turning process at 4-7 day intervals until humified state is reached
19. state that in good conditions humified organic matter can be produced in 6 weeks but this is variable according to seasonal factors and the quality of the initial ingredients as well as the compost management
20. state that care should be taken, including wearing suitable Personal Protective Equipment, during preparation especially if animal manures are used and when opening compost heaps as rodents may often be present

21. state that rotating (tumbler) compost bins are an effective means of turning compost in which air is distributed through the material, entering and leaving via ventilation holes
22. describe alternative composting methods including their potential uses
 - a. sheet composting
 - b. trench composting
23. state that worm composting is a distinct and specialised process that aims to use kitchen waste to produce material more allied to fertiliser in nature.

Outcome 6 Crop protection

The candidate will be able to

1. state that in organic growing the aim is to minimise adverse impacts of pests and diseases by building up the natural controls in the garden and avoidance of attacks
2. describe (with examples) suitable crop protection methods against pest attacks
 - a. use of barriers (e.g. fleece)
 - b. use of sacrificial plants (e.g. annual poppy for black bean aphid)
 - c. encouragement of natural parasites and predators (e.g. hoverfly)
 - d. use of introduced parasites and predators (e.g. *Encarsia*)
 - e. removal of crop residues
 - f. planting out of fully hardened off and strong plants
 - g. sowing/planting times that avoid most likely times of pest attack (eg delayed sowing of carrots)
 - h. use of companion planting (e.g. *Tagetes* with carrots and potatoes)
 - i. avoidance of monocropping to create diverse habitat
 - j. effective crop rotation
 - k. use of resistant cultivars (e.g. potato 'Kestrel' for slug resistance)
 - l. use of pheromone traps (e.g. codling moth traps)
3. describe that the methods listed above may also apply to control of diseases, and that in addition the following may also be appropriate
 - a. correct siting of plants (e.g. avoid planting intolerant plants into wet sites)
 - b. destruction of infected plant material
 - c. use of 'clean' stock (e.g. certified stock where available)
 - d. avoid spreading diseased material or soil on footwear, equipment or tools
 - e. maintenance of suitable pH
4. state that some natural chemicals are allowed to be used in organic growing systems, but should only be used as a last resort.
5. state that approved pesticide status is subject to change, by legislation or by current organic practice
6. describe the damage caused to crops by excessive weed growth
 - a. competition for light, water and nutrients
 - b. may harbour pests and diseases
 - c. may be unsightly
7. state that some weed growth may however help to protect the soil structure and may provide habitat for beneficial wildlife
8. describe the use of the following weed control methods in organic growing
 - a. mulching (including growing through plastic mulches)
 - b. hand weeding
 - c. hoeing
 - d. digging
 - e. flame weeding

- f. use of cover crops
- g. use of stale seed-bed technique
- h. digging out

UNIT 10 Garden Design

Rationale

This unit is concerned with developing knowledge of garden design.

The unit covers five learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 site analysis
- 2 the principles of design
- 3 soft landscape
- 4 hard landscape
- 5 draughting

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L2

L4

CU74

CU76

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 Site analysis

The candidate will be able to

1. list the factors, which affect the horticultural potential of the site
 - a. soil type
 - b. aspect and orientation
 - c. climate
 - d. budget
 - e. time available for maintenance
 - f. topography
 - g. water table
 - h. existing and potential use
 - i. planning and legal constraints
2. describe the importance of good analysis of
 - a. soil type
 - b. soil structure
 - c. pH level
3. list plants that thrive in conditions of
 - a. acidity
 - b. alkalinity
4. describe methods used to alter the pH level of a soil
5. explain the principles of drainage
6. describe the importance of a thorough site survey to ascertain
 - a. rainfall
 - b. temperature max/min
 - c. wind
 - d. microclimates
 - e. longitude
 - f. latitude
 - g. distance from coast
 - h. light and shade
 - i. desirable and undesirable views in and out of the garden
7. describe measures to reduce the effects of
 - a. wind
 - b. frost pockets
8. describe the methods used to carry out a measured survey of a garden
 - a. chain survey
 - b. triangulation
 - c. level.

Outcome 2 Principles of design

The candidate will be able to

1. define the term unity and describe its importance within garden design
2. describe the importance for appropriate scale and proportion in the selection of garden features
3. list good and poor examples in the use of scale and proportion
4. state that the relative proportion and scale of features within a garden may change as a result of plant growth and that this should be taken into consideration
5. describe how a garden may be designed to create an atmosphere of
 - a. seclusion
 - b. space
 - c. formal regularity
 - d. natural informality
 - e. variety and mystery
6. state that a sense of space may be achieved by building features in geometric shapes adjacent to the house to reinforce the link between house and garden and that these will include
 - a. terraces
 - b. patios
 - c. walks
 - d. raised beds
7. state that softer features of the garden such as lawns and planted areas allow for greater freedom of line and movement and at a distance, generate a sense of space
8. describe the visual effect of
 - a. dark or light boundaries
 - b. foreshortened perspective uphill
 - c. lengthened perspective downhill
 - d. the dappled shade of trees
 - e. the movement of shadows with the passage of the sun
9. state that movement and repose in a garden are to an extent the result of lines and space division
10. give examples of movement and repose in the garden
 - a. a vertical line appears alert
 - b. a horizontal line appears at rest
 - c. a square or circle appears at rest
 - d. an oblong or ellipse pointing away from the viewer suggests movement

- e. right angles convey sense of strength and stability
 - f. the rectangle represented by the Greek golden mean (approximately 1:1.6) is widely found in everyday surroundings and appears to be a subliminal visual ideal
11. define the terms
 - a. focal point
 - b. focal picture
 12. give examples of the construction of focal points and focal pictures in the garden
 13. describe the value of noting, enhancing and creating views to focal points and pictures
 - a. within the garden
 - b. beyond the garden (borrowed landscape)
 - c. into the garden from outside
 14. describe the uses of the colour wheel in garden design
 15. list the primary and secondary colours
 16. give examples of the following colour combinations
 - a. monochromatic
 - b. harmonising
 - c. contrasting
 - d. complementary
 17. give examples of the following colour effects
 - a. advancing
 - b. receding
 - c. cool
 - d. warm
 18. give examples of planting schemes demonstrating the above combinations and effects.

Outcome 3 Soft landscape

The candidate will be able to

1. define the term soft Landscape
2. list the uses of hedges in the landscape
 - a. security
 - b. seclusion
 - c. space division
 - d. screening of undesirable views
 - e. architectural form
 - f. ornament
 - g. shelter
 - h. wildlife
3. list hedging subjects which are most suitable and describe their properties for
 - a. formal hedges
 - b. informal hedges
4. list, using appropriate examples, the selection factors of trees for garden use
 - a. ultimate size
 - b. habit
 - c. ornamental properties
 - d. root requirements
 - e. shade
 - f. maintenance
5. list, using appropriate examples, the selection factors of shrubs for garden use
 - a. habit
 - b. texture
 - c. size
 - d. seasonal appearance
 - e. maintenance
6. describe the potential of trees, shrubs and hedges as structure/framework elements in the design of gardens
7. state that climbers and wall shrubs can be categorised according to their
 - a. mode of climbing
 - b. need for support
 - c. effect on structure
 - d. ornamental properties.
8. list examples of wall shrubs and climbers in the context of 7 above

9. describe the use of hardy herbaceous perennials as elements in garden design
 - a. habit
 - b. form and outline
 - c. seasonal variation
 - d. foliage texture and colour
 - e. flowers
10. list appropriate examples of hardy herbaceous perennials in the context of 9
11. describe the use of annuals in garden design
 - a. successional bedding
 - b. hardy annuals
 - c. troughs, hanging baskets window boxes
12. list appropriate examples of annuals in the context of 11
13. describe the use of turf as an element in garden design to include
 - a. coarse versus fine turf
 - b. visual effects
 - c. formal lawns
 - d. safe playing areas
 - e. rough grass
 - f. wildflower meadows
14. describe the importance of planning for ease of maintenance when designing grass features in a garden.

Outcome 4 Hard landscape

The candidate will be able to

1. define the term hard landscape.
2. state that a terrace may be used to
 - a. link the house with the garden
 - b. provide a viewing platform
 - c. provide a seating area
 - d. obtain flat levels in a sloping garden
3. describe the use of the following in the creation of terraces
 - a. cut and fill earthworks
 - b. retaining walls with a suitable batter
 - c. paving
 - d. balustrades
4. describe the differences between a terrace and a patio
5. describe the construction of a patio with particular reference to
 - a. levels
 - b. drainage
 - c. mowing arrangements around its perimeter
6. list, using appropriate examples, the considerations to be borne in mind when designing footpaths in a garden
 - a. function of the path
 - b. visual impact
 - c. desired lines
 - d. width
 - e. surface
7. describe the range of materials available for the construction of a rigid surface within the garden.
8. describe the construction of a rigid surface within the garden
 - a. soil excavation and consolidation
 - b. shuttering
 - c. sub-base and construction
 - d. pointing techniques and materials
9. describe, using examples the use of flexible materials for footpath construction
10. describe the construction of a flexible surface within the garden

11. list the materials used in the construction of garden walls within the garden
 - a. brick
 - b. stone
 - c. pre-cast concrete

12. describe methods of brick bond construction
 - a. English bond
 - b. English garden-wall bond
 - c. Flemish bond
 - d. stretcher bond

13. define the meaning of the following terms used in the construction of walls
 - a. footings
 - b. coping
 - c. tile crease
 - d. oversail

14. describe the reasons behind the specialist construction methods used in retaining walls with particular reference to
 - a. batter
 - b. weep holes

15. describe examples of garden fence types
 - a. post and rail
 - b. post and wire
 - c. post and chain
 - d. interwoven panel
 - e. close board
 - f. chain link
 - g. paling

16. state the importance of preserving wood to reduce timber decay

17. describe the design and construction of garden seating
 - a. materials used and their relative costs
 - b. advantages and disadvantages of each material
 - c. potential of garden seating for ornament as well as function

18. describe the potential use of garden ornaments as features and furniture in a garden design
 - a. gates
 - b. pergolas
 - c. statuary
 - d. plant containers
 - e. fountains.

Outcome 5 Draughting

The candidate will be able to

1. describe the standard method of laying out plan drawings
 - a. position of the title block
 - b. the key or legend
 - c. the north sign
 - d. the scale
 - e. elements of presentation
 - f. landscape symbols

2. describe the purpose of each of the following drawing instruments
 - a. t-square
 - b. set square
 - c. compasses
 - d. French/flexible curve
 - e. scale rule

3. describe the stages in the development of design drawings
 - a. preliminary sketches
 - b. site analysis drawing
 - c. concept plan
 - d. presentation plan
 - e. detail plan (construction plan/planting plan)
 - f. elevation drawing
 - g. perspective drawing.

UNIT 11 Garden History

Rationale

This unit is concerned with developing knowledge of garden history.

The unit covers seven learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 Early influences
- 2 Medieval gardens
- 3 Early formal gardens
- 4 Late formal gardens
- 5 Gardens in the 19th Century
- 6 The early Twentieth Century garden
- 7 The plant hunters

Connection with other qualifications

This unit has no direct relationship to the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 Early influences

The candidate will be able to

1. outline the evolution through history of garden design in response to
 - a. changing social, cultural and political circumstances
 - b. the ebb and flow of artistic development and taste
2. review the systems and organisations concerned with the conservation of historic parks and gardens
 - a. The National Trust
 - b. English Heritage
 - c. The Garden History Society
 - d. County Gardens Trusts and Association of Gardens Trusts
 - e. National Council of Plants and Gardens
 - f. Protective designations
3. state that Middle Eastern influences on European gardens included those from Ancient Egypt and the Persian Empire
4. explain that the principal features of patrician Roman Gardens included
 - a. shaded walks
 - b. lawns
 - c. topiary
 - d. statuary
 - e. water
 - f. views into the countryside
5. state that the above influences established lasting traditions of garden design throughout Europe.

Outcome 2 Medieval gardens

The candidate will be able to

1. state that our knowledge of medieval gardens is based almost entirely on literary and pictorial sources, physical survivals being limited to archaeological remains and hard landscape
2. state that monastic gardens were established primarily for the culinary and medicinal requirements of each religious institution, but that some aspects of ornamental or decorative function are also evident
3. state that from the 14th Century onwards there is evidence of pleasure grounds being laid out and of gardeners being employed to maintain them
4. list familiar features of medieval gardens including
 - a. defensive walls
 - b. gravel paths
 - c. covered walks
 - d. raised beds
 - e. arbours
 - f. flowery meads
 - g. clipped and trained fruit trees.

Outcome 3 Formal gardens

The candidate will be able to

1. state that ornamental gardens gradually increased in number, size and complexity of design from the late Middle Ages onwards, as the threat of attack became more remote and the countryside became more secure
2. describe the main features of the English formal garden in the 16th and 17th centuries
 - a. avenues and allées
 - b. knot garden
 - c. parterre
 - d. wilderness
 - e. canals
 - f. fountains and cascades
 - g. covered walks
 - h. mounts
 - i. clairvoyees
 - j. topiary
 - k. terrace walks
 - l. statuary
3. describe the influence of the French formal garden in England in terms of
 - a. large-scale 'forest' gardens
 - b. intersecting avenues
 - c. hedged enclosures
 - d. water features
 - e. architectural features
4. give examples of French formal gardens and English gardens that followed the French style
5. explain the influence of the Dutch formal garden in England and in the late 17th and early 18th centuries with particular reference to
 - a. rectangular layouts
 - b. reduced scale as compared with the grand French garden
 - c. parterres
 - d. bowling greens
 - e. elaborate water features
6. give examples of Dutch formal gardens and English gardens that were created in the Dutch style
7. describe the characteristic features of the garden style developed by London and Wise in late 17th Century England, and give examples of their work.

Outcome 4 Landscape gardens

The candidate will be able to

1. state that there was a gradual reaction against formality and over-elaboration in garden layout, alongside a developing taste for 'natural' scenery, from the early 18th Century
2. state that the transition from formality to informality took several decades and that many gardens exhibit elements of both styles
3. describe and give examples of the styles promoted by
 - a. Charles Bridgeman
 - b. Stephen Switzer
4. describe the artistic influence of Claude of Lorraine, Nicholas Poussin and Salvator Rosa on the early English landscape style
5. explain and give examples of how William Kent became known as a pioneering figure in garden design among other accomplishments, and state that his designs
 - a. were often superimposed on geometric layouts
 - b. were achieved by sketching and setting-out rather than the drawing of measured plans
 - c. combine formal and informal elements
 - d. are imbued with classical, artistic and political references
 - e. are crowded with architectural features
6. outline the design principles associated with the work of Lancelot Brown
 - a. an extensive, undulating landscape of turf
 - b. a surrounding belt of trees
 - c. clumps and specimens of trees scattered at intervals
 - d. use of the ha-ha
 - e. a sheet of water introduced into the middle distance
 - f. the house set directly within the park
 - g. sparing use of decorative architecture
 - h. concealment of the productive garden
 - i. use of circuitous drives and rides to show the park to advantage
7. explain the characteristics of the Picturesque approach to landscape design as promoted by William Gilpin, Uvedale Price and Richard Payne Knight
 - a. reaction against smooth, serpentine forms
 - b. a taste for intricate, irregular and broken forms

8. describe the landscape design ideas associated with the work of Humphry Repton
 - a. the re-introduction of the formal garden near to the house
 - b. use of the terrace to separate the house from the park
 - c. a restrained approach to picturesque scenery
 - d. the use of the 'Red Book' as a marketing tool
9. give examples of the work of Humphry Repton.

Outcome 5 Gardens in the 19th Century

The candidate will be able to

1. explain that John Claudius Loudon began as an advocate of the Picturesque but later developed the theory of the Gardenesque, which featured
 - a. individual specimens of trees and shrubs
 - b. careful attention to artistic groupings of plants and features
 - c. an increased emphasis on horticulture as an end in itself
2. explain that the Gardenesque style was well-suited to the villa residences of the emerging urban middle classes who
 - a. required a style which was appropriate to the scale of their gardens
 - b. drew inspiration from the proliferating garden literature of the day, of which Loudon was a major instigator
 - c. found the style well-suited to the display of the increasing range of new plant introductions from abroad
3. state that on a larger scale the Gardenesque style proved appropriate for public recreation and municipal areas
 - a. public parks
 - b. arboreta
 - c. cemeteries
4. explain that the public park movement was associated with social reform and improvement for the new urban industrial working class
5. state that Joseph Paxton was an important pioneer of Public Parks and give examples of his work and their characteristic layouts
 - a. promenades
 - b. lakes
 - c. ornamental buildings
 - d. successional bedding
 - e. recreational facilities
6. describe the characteristics of the gardens design style of William Andrews Nesfield and give examples of his work
 - a. parterres
 - b. terraces
 - c. fountains
 - d. statuary
7. state the characteristics of the mixed style, combining features of formality and informality and give examples of this style.

Outcome 6 The 20th Century garden

The candidate will be able to

1. explain that in the late 19th century there was a reaction against the elaborate formality of geometric bedding schemes and a call for a greater appreciation of hardy plants in naturalistic settings
2. explain the role, especially through publications, of William Robinson in promoting this view
3. describe the main characteristics of the work of Gertrude Jekyll and Edwin Lutyens
 - a. a strong architectural framework
 - b. superb craftsmanship
 - c. high levels of architectural detailing
 - d. formal water features
 - e. pergolas
 - f. carefully chosen planting schemes featuring the prominent use of herbaceous perennials
4. give examples of the work of Gertrude Jekyll and Edwin Lutyens, individually and in conjunction
5. explain that Miss Jekyll was especially interested in the artistic use of plants in the garden
 - a. colour schemes
 - b. the effects of light and shade
 - c. design principles more important than plant collections
6. explain that the influence of Miss Jekyll has proved to be long-lasting
7. state that other noted designers took up aspects of Lutyens' and Jekyll's style and give examples of their work
 - a. Thomas Mawson
 - a. Vita Sackville-West and Harold Nicholson
 - b. Lawrence Johnston
 - c. Nora Lindsay
8. state that Harold Peto was a designer contemporary with Lutyens and Jekyll whose style had strong classical influences, and give examples of his work
9. state notable design styles found in twentieth century British gardens and give examples
 - b. rock gardens
 - a. woodland gardens
 - b. Japanese gardens
 - c. the garden of rooms.

- 10 explain how the following people have influenced the design of 20th century English gardens and planting
- a) Harold Peto, Lawrence Johnston
 - b) Vita Sackville-West, Geoffrey Jellicoe
 - c) Christopher Lloyd, John Brookes
 - d) Beth Chatto

Outcome 7 The plant hunters

The candidate will be able to

1. state that the development of gardens in Britain has continually been stimulated by the introduction of new plant species from abroad
2. explain that the rate of plant introductions
 - a. gradually increased through the 17th and 18th centuries
 - b. rapidly increased in the 19th and early 20th centuries
 - c. has been a consequence of the nature of British influence abroad
3. outline the plant-collecting adventures of the Tradescants and give examples of their introductions
4. explain the roles in organisation plant-collecting expeditions and give specific examples of
 - a. botanical and horticultural institutions
 - b. nurseries
 - c. private individuals
5. state that David Douglas collected extensively in North America and list examples of his introductions
6. state that William Lobb collected extensively in South America and give examples of his introductions
7. state that Robert Fortune collected extensively in China and Japan, making use of the Wardian Case in conserving his collections, and give examples of his introductions
8. describe the work of Reginald Farrer in
 - a. collecting in the Himalayas and South-East Asia
 - b. developing modern thinking on rock garden design and construction
9. describe the work of E H Wilson in collecting new species in China and Tibet and give examples of his introductions
10. describe the work of George Forrest in collecting new species in the regions of China and South-East Asia and give examples of his introductions
11. state that other noted plant collectors continued to work in China and the Himalayas and that this tradition has been resumed in recent years.

UNIT 012 Growing Vegetables and Salads

Rationale

This unit is concerned with developing knowledge of vegetables and salad crops.

The unit covers seven learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 the principles of vegetable gardening
- 2 site preparation, cultivation and management
- 3 brassica crops
- 4 root crops
- 5 onions and related crops
- 6 legumes
- 7 early and salad potatoes
- 8 salad crops

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L1

L2

CU72

CU73

CU74

CU76

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 The principles of vegetable gardening

The candidate will be able to

1. list the commonly grown groups of vegetable crops grown outside in cool temperate countries
 - a. salad crops
 - b. legumes
 - c. root crops
 - d. brassicas
 - e. onions and related crops
 - f. potatoes
2. state that a number of other vegetables are now frequently grown but not specifically grouped together for cultivation purposes
3. state that herbs are also commonly grown in similar situations to vegetables and may be considered part of the overall process
4. state that, although most vegetables can be grown in the open without any protection, temporary shelter, e.g. with cloches or floating fleece, can be useful for increasing the growing season and improving the quality of the crop.
5. list the benefits of 'growing your own' crops
 - a. freshness of the produce
 - b. increased choice of variety
 - c. certainty of inputs (avoidance of chemicals)
 - d. improved flavour of produce
 - e. healthy recreation due to the physical activity involved
 - f. sense of pride and achievement in 'growing your own' food
6. state that potential drawbacks may include
 - a. lack of available space
 - b. need for regular work and attention
 - c. a degree of physical effort and fitness required
 - d. perceived lack of visual appeal
 - e. cost of seeds, plants, materials and time
7. state that even the smallest of gardens may be able to grow some seasonal salads and herbs, but that for any degree of 'self-sufficiency' in these crops an area similar to that of a standard allotment may be required.
8. state that many food crops are ornamental and can also be grown in an ornamental way, mixed within decorative planting areas, and that this increases the opportunity for their cultivation in domestic situations.

9. state that vegetables may be raised from seeds or by vegetative propagation and give examples
10. list the benefits and limitations of F₁ hybrid seed as compared with open-pollinated varieties
 - a. greater uniformity
 - b. better germination
 - c. harvesting and maturity are more predictable
 - d. diseases or pest resistance
 - e. higher cost of seed
 - f. whole crop may mature at the same time
 - g. own saved seed is not appropriate
11. list courgettes and other cucurbits, sweet corn and lettuce as vegetables grown from seed in domestic gardens
12. give suitable varieties/cultivars for
 - a. courgettes
 - b. marrow
 - c. winter squash
 - d. sweet corn
13. describe the site and soil for sweet corn and cucurbits
 - a. open, warm, sheltered from strong wind
 - b. soil well-drained, moisture retentive in summer, fertile, pH near neutral
14. describe the cultivation of sweet corn and courgettes
 - a. sowing time – indoors in containers; outdoors in situ
 - b. planting out time, if applicable
 - c. spacing – including block planting for sweet corn
 - d. pollination and fertilisation requirements for sweet corn
 - e. watering requirements of both crops
 - f. harvesting of courgettes – method and frequency
 - g. harvesting of sweet corn – recognition of maturity, method of harvesting

Outcome 2 Site preparation, cultivation and management

The candidate will be able to

1. list factors that are important in site selection for successful vegetable gardening
 - a. aspect
 - b. shelter
 - c. soil depth/depth of well-drained soil
 - d. soil structure and texture
 - e. shade from trees or other features
 - f. microclimatic factors (frost pockets, wind)
 - g. presence of perennial weeds
 - h. inherent soil-borne disease or pest problems
 - i. remains of former structures
 - j. local water supply
2. for each factor above, give reasons why they are important considerations
 - a. available light and warmth
 - b. affects the range of crops that may be suitable, causing particular problems with tall crops
 - c. provides potential for good root growth and effective moisture and nutrient reservoir
 - d. affects crops that will be successful and the timing of cultivations
 - e. affects growth rate of crops
 - f. can cause early damage to crop growth or shorten the effective ripening season in autumn
 - g. competition and smothering of crops by weeds which will be difficult to control when crops are growing
 - h. may have severe impact on affected crops for many years to come
 - i. foundations or similar may prevent cultivations
3. describe methods of improving drainage in garden situations
 - a. deep cultivations to break up soil pans
 - b. incorporation of bulky organic matter or other drainage improvers
 - c. developing a raised bed system
 - d. using lime to flocculate clay soils
4. describe methods of controlling pernicious perennial weeds
 - a. repeated cultivations
 - b. use of translocated herbicide
 - c. use of light-excluding fabric mulches over an extended period of time to smother weeds
5. state that a soil analysis is useful prior to commencement of cropping to identify soil pH and texture

6. state that where the pH is too low, garden lime or ground limestone may be used to raise the pH level
7. describe the differences between light and heavy soils
 - a. ease of cultivation
 - b. timing of cultivations
 - c. type of cultivations
 - d. relative earliness
 - e. drainage and water retention
 - f. nutrient retention
 - g. use of organic matter and lime
8. state that the growing season is locally determined but that it can be extended by use of plastic and fabric mulches, cloches and other materials at both ends of the growing season
9. describe types of protection for extending the growing season and cropping range, giving the benefits of each as applicable to particular crops
10. describe the reasons for crop rotation
 - a. vegetables with similar needs are grouped together
 - b. soil nutrient reserves are used most efficiently
 - c. allows for most efficient use of lime and manures
 - d. helps prevent the build-up of soil-borne pests and diseases
11. describe a typical crop rotation as used in vegetable gardening
12. state that the principle of crop rotation has to be managed to include functional requirements
 - a. overall crop quantities required
 - b. times of sowing, planting and harvest
 - c. intercropping
 - d. successional cropping
 - e. permanent crops
13. state the main methods of cultivation
 - a. single digging
 - b. double digging
 - c. forking
 - d. raking to produce a sowing/planting tilth
 - e. rotary cultivation
14. state that digging is particularly valuable for addition and incorporation of bulky organic matter
15. state that Nitrogen, Phosphorus and Potassium are the main nutrients required by vegetable crops

16. state that nutrients are usually supplied as a complete base dressing but that extra nitrogen may well be required as an additional top dressing by leafy crops and to encourage growth
17. state that sulphate of ammonia, hoof and horn meal and dried blood are all sources of nitrogen
18. state that seedbeds may require supplementary phosphorus and that superphosphate of lime is a suitable means of providing this
19. give reasons why vegetable gardens are usually maintained in a weed free condition
 - a. compete for light, water and nutrients
 - b. improved visual appearance
 - c. removes alternate hosts for pests and diseases
20. give examples of weeds that provide alternate hosts for common vegetable problems
21. state that in vegetable gardens weed control can be by the following methods
 - a. hoeing
 - b. hand weeding
 - c. mulching
 - d. use of herbicides
 - e. flame weeding
22. give examples of suitable herbicide use within the vegetable garden
23. list, with examples, the benefits of irrigation at particular times of the growing season
 - a. sowing into moistened drills
 - b. puddling-in of transplanted vegetables
 - c. watering thinned rows to settle soil quickly and remove scent of crushed foliage
 - d. irrigation of growing crop resulting in increased yields due to better flower production, leaf size or root tuber production
24. describe suitable methods of providing irrigation to vegetable crops in domestic garden situations
 - a. watering can
 - b. hose pipe
 - c. overhead sprinkler
 - d. seep-hose

Outcome 3 Brassica crops

The candidate will be able to

1. list the main vegetables within the brassica group
 - a. cabbage
 - b. kale
 - c. Brussels sprout
 - d. cauliflower
 - e. broccoli (including sprouting types)
 - f. chinese cabbage
 - g. turnip
 - h. swede
 - i. kohlrabi
 - j. radish
 - k. salad rocket
2. state that although the latter five crops are also considered as either root or salad crops, they should be grown with brassicas due to their similarities in terms of pest and diseases problems
3. state that wallflowers and weeds such as shepherds purse are also in the cabbage family and this must be considered in terms of rotation management
4. give advantages and disadvantages of the following methods for specific brassica crops
 - a. drilled and thinned
 - b. drilled and transplanted
 - c. sown in modules and planted out
5. describe the typical soil preparation for brassicas
 - a. pH neutral or above (liming if necessary)
 - b. addition of suitable bulky organic matter
 - c. firm seed bed prepared
 - d. base dressing prior to sowing or planting
 - e. transplanted crops consolidated well
 - f. extra nitrogen requirement for leafy crops
6. describe common pests and diseases of brassicas to include
 - a. cabbage root fly
 - b. cabbage white butterfly
 - c. pigeons
 - d. club root disease

7. give control methods for each problem listed
 - a. physical/cultural (e.g. rotation, fleece, collars)
 - b. natural (e.g. parasitic wasps)
 - c. use of resistant varieties
 - d. chemical (e.g. insecticides and fungicides)

8. describe the cultivation of a leafy brassica under the following headings
 - a. variety/cultivar
 - b. sowing date
 - c. sowing location
 - d. transplanting or thinning time
 - e. spacing
 - f. nutrition and watering
 - g. harvesting.

Outcome 4 Root crops

The candidate will be able to

1. list carrots, parsnips and beetroot as the main root crops
2. state that for carrots and parsnips the soil texture should preferably be sand or silt and that the soil should be worked to a deep, fine tilth and be free from stones and fresh organic matter
3. state that beetroot do not require such demanding soil conditions
4. state that root crops prefer a near-neutral pH
5. describe the sequence of cultivation for both carrots and parsnips
 - a. winter digging
 - b. final cultivation
 - c. base dressing of fertiliser
 - d. final tilth production
 - e. sowing times
 - f. seed drill
 - g. spacing between rows
 - h. thinning
 - i. harvesting and storage
6. list varieties/cultivars for carrots, parsnips and beetroot
7. state that beetroot may be grown from conventional and monogerm varieties and describe the advantages and drawbacks of each.
8. describe the main pests and diseases that may affect root crops
 - a. carrot fly
 - b. parsnip canker
9. describe methods of control or management for pests and diseases
 - a. physical/cultural methods (e.g. fleece, masking crops, sowing time)
 - b. natural (e.g. use of masking crops)
 - c. chemical (e.g. insecticides)
 - d. use of resistant varieties.

Outcome 5 Onions and related crops

The candidate will be able to

1. list the crops within this group
 - a. onions – bulb, salad, Japanese
 - b. leeks
 - c. shallots
 - d. garlic
2. describe the soil preparation and conditions for onions and related crops
 - a. fertile soil
 - b. open sunny site
 - c. absence of soil-borne diseases
 - d. incorporation of well-rotted organic matter
 - e. base fertiliser dressing
 - f. fine tilth for sowing or planting
3. state cultivars/varieties of maincrop, Japanese and salad onions
4. state that bulb onions can be raised from
 - a. seed – sown in drills in spring or August
 - b. seed – sown in modules indoors and transplanted out in mid/late spring
 - c. sets – planted in mid/late spring or autumn
5. state that salad onions are usually drilled thinly in situ and that this may be done from spring to autumn depending on variety
6. state that maincrop bulb onions benefit from adequate water and nitrogen in the early summer to produce ample leaf and bulb size, but that ripening and storage are adversely affected by wet conditions in late summer
7. state that bulb onions are harvested by easing loose the roots to cause ripening, but should not have the tops bent over unless fully died back
8. state that once harvested the bulbs should be dried thoroughly, in open warm conditions, to ensure that the skins fully ripen and then stored cool and dry for use over the winter
9. state that Japanese onions are used fresh rather than stored, and are harvested in early-mid summer.
10. give suitable cultivars for autumn and winter leeks

11. describe the cultivation of leeks
 - a. raised in containers and transplanted
 - b. sown in drills and transplanted
 - c. transplanted when approximately 15-20cm tall
 - d. dropped into dibbed holes 12-18cm deep for garden leeks and watered in
 - e. given irrigation in dry summers
 - f. harvested as required from autumn to spring according to variety
12. state that additional blanching is not required unless leeks are required for showing
13. give suitable cultivars/varieties for shallots
14. describe the cultivation of shallots
 - a. planting time
 - b. spacing and planting method
 - c. harvesting and storage
15. give suitable cultivars/varieties of garlic
16. describe the cultivation of garlic
 - a. cloves preferably planted in late summer or early autumn (spring for small bulbs)
 - b. planting depth and spacing
 - c. open sunny site
 - d. plant through black polythene to improve soil temperature and weed control, if preferred
 - e. harvesting and storage
17. describe the main pests and diseases that affect onions and related crops
 - a. onion fly
 - b. white rot
 - c. leek rust
18. give suitable means of control or management of these problems
 - a. cultural/physical (e.g. winter digging, fleece)
 - b. crop rotation
 - c. chemicals (e.g. fungicides, insecticides)

Outcome 6 Legumes

The candidate will be able to

1. state that legume crops are characterised by fruits in the form of dry pods, and that they also have nitrogen-fixing bacteria in root nodules enabling them to grow well in relatively poor soils
2. list the main legume crops
 - a. beans – broad, French, runner
 - b. peas – garden, snap, mange-tout
3. describe the soil and site conditions for legumes
 - a. moisture retentive for summer crops, well-drained for all crops
 - b. pH slightly acid
 - c. adequate organic matter but not too fertile
4. describe why legume crops require ample moisture in the flowering season
 - a. improves flower set
 - b. improves pod length and number of seeds
 - c. prevents early end to vegetative growth
5. describe the cultivation of peas
 - a. early or maincrop cultivars/varieties
 - b. sowing date
 - c. drill types
 - d. protection from pests
 - e. methods of support
 - f. harvesting
6. describe the cultivation of runner beans
 - a. climbing or dwarf varieties
 - b. sowing time and depth – in situ and in containers
 - c. plant spacing
 - d. methods of support if applicable
 - e. pollination and fertilisation
 - f. harvesting
7. describe the main pests and diseases that affect legumes
 - a. pea and bean weevil
 - b. black bean aphid
 - c. halo blight
 - d. pea moth

Outcome 7 Early and salad potatoes

The candidate will be able to

1. state that potatoes are available as
 - a. early
 - b. second early
 - c. maincrop
 - d. salad
2. state that second early and maincrop varieties require considerable space and so are often not grown in domestic gardens or allotments
3. give cultivars/varieties of early and salad potatoes
4. state that potatoes are grown from certified 'seed' tubers, guaranteeing that they are true to type and free from pests and diseases
5. state that the seed tubers should be purchased in winter and 'chitted' to give an early start once planted
6. describe the chitting process
 - a. tubers stood rose end up in boxes
 - b. placed in a light, frost-free location
7. describe the soil and site preparation for potatoes
 - a. acid, well-drained soil
 - b. open site
 - c. well-manured, cultivated and provided with a base fertiliser dressing
8. describe the planting and cultivation of early potatoes
 - a. planting time
 - b. planting in drills or space planted
 - c. spacing between rows and within the rows
 - d. depth of planting
 - e. earthing up
 - f. frost protection
 - g. watering once tubers start to form
 - h. harvesting
 - i. protection from pests and diseases (to include slugs, eelworm and potato blight).

Outcome 8 Salad Crops

- 1 List the plants grown for use in salads
 - a lettuce
 - b radish
 - c celery
 - d ridge cucumber
 - e tomato

- 2 State that salads are required throughout the year and for that reason lettuce is the most popular crop

- 3 List the different types of outdoor lettuce, suitable cultivars and season of use
 - a butterhead types for spring and summer sowing
 - b crisp lettuce
 - c pick and come again lettuce
 - d overwintering lettuce
 - e Cos lettuce
 - f miniature lettuce

- 4 State that an open, warm, sheltered, weed-free site is suitable for the cultivation of lettuce and salad crops.

- 5 State the features of a soil suitable for lettuce and salad crops
 - a well-drained
 - b high organic matter content
 - c light to medium loam
 - d fertile
 - e good depth and free of large stones
 - f neutral pH

- 6 describe the cultivation of lettuce for harvesting in summer
 - h. sowing time – indoors in containers; outdoors in situ
 - i. thinning or planting out time, if applicable, including spacing
 - j. watering requirements
 - k. control of the main pests, diseases and weeds
 - l. harvesting.

- 7 describe the use of cloches and frames in the cultivation of lettuce and salad crops throughout the year.

UNIT 013 Growing Fruit

Rationale

This unit is concerned with developing knowledge of growing fruit.

The unit covers seven learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 site selection and preparation for growing fruit
- 2 fruit tree production
- 3 pollination
- 4 pruning
- 5 annual routine maintenance
- 6 the cultivation of apples
- 7 soft fruit

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L2

CU72

CU74

CU76

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 Site selection and preparation for growing fruit

The candidate will be able to

1. state that fruit is divided into top or tree fruit and soft fruit and state examples of temperate tree fruits and soft fruits grown in the U.K
2. list the physical and climatic factors, which influence the growth of fruit and for each factor, give reasons why it is important
 - a. temperature
 - b. altitude
 - c. rainfall
 - d. soil
 - e. aspect
3. state the damaging effects of wind, and describe examples of how these effects can be mitigated by
 - a. living windbreaks such as hedges and shelterbelts
 - b. artificial windbreaks such as walls and fences
4. state that late spring frost is a great hazard to successful fruit growing and describe methods to reduce the hazard
5. list the important qualities of a soil intended for fruit growing
 - a. deep, well cultivated
 - b. well drained
 - c. good texture and structure
 - d. preferred pH of 6.6 – 6.8
 - e. free from perennial weeds
 - f. fertile
 - g. free from soil borne pests and diseases
6. describe methods to
 - a. improve the drainage of a site intended for fruit
 - b. improve the structure of a soil intended for fruit
 - c. adjust the ph (acidity or alkalinity) of a soil intended for fruit
7. state that fruit trees should not be planted on the same site as that previously occupied by the same kind of fruit trees, unless the soil is changed first
8. state the factors, which influence the planting distances between trees and explain why
 - a. vigour of cultivar
 - b. vigour of rootstock
 - c. form of tree
 - d. soil type
 - e. method of management.

Outcome 2 Fruit tree production

The candidate will be able to

1. State that the performance and quality of trees raised from seed will be unpredictable and that the new trees will not be identical to the parents as well as taking many years to fruit
2. State that fruit trees are propagated by grafting a scion from the desired cultivar onto the chosen rootstock. The principal methods are
 - a. whip and tongue grafting
 - b. T-budding
 - c. chip budding
3. list the advantages of the use of rootstocks
 - a. size of tree controlled
 - b. predictability of performance and bearing
 - c. quality of fruit
4. describe with the aid of diagrams the range of tree forms available
 - a. maiden
 - b. feathered maiden
 - c. bush
 - d. half standard
 - e. spindle bush
 - f. cordon
 - g. espalier
 - h. fan
 - i. pyramid
5. describe how each of the above tree forms may be used for fruit growing.

Outcome 3 Pollination

The candidate will be able to

1. state that the production of fruit depends upon successful pollination and fertilisation
2. state that top fruit and soft fruit are pollinated mainly by insects
3. state that each of the following may prevent pollination and fertilisation and describe the effect of each factor
 - a. low temperatures -flowers killed, insects do not fly
 - b. strong winds -flowers damaged, insects do not fly
 - c. heavy rainfall -insects do not fly, pollen washed away
 - d. spraying chemicals -pollen washed away, visiting insects killed
4. state that in self-pollination the pollen fertilises the ovule of a flower of the same cultivar
5. state that in cross-pollination the ovule is fertilised by pollen from a flower of a different cultivar of the same kind of fruit
6. state that, whilst some crops will be produced by self-pollination, a much greater crop will be obtained following cross-pollination
7. state that most apple cultivars are diploid, but some are triploid and some apples and pears are self-compatible (self-fertile)
8. state that triploids produce pollen, which is incapable of fertilising other flowers e.g. Bramleys seedling
9. state that plums are either self-incompatible (self infertile), partly self-compatible (partly self fertile) or self-compatible (self fertile)
10. state that cherries are either self-incompatible (self infertile) or self-compatible (self fertile)
11. describe the use of pollination tables for apples, pears, cherries and plums.

Outcome 4 Pruning

1. The candidate will be able to

2. list the range of pruning tools available for the pruning of fruit trees
3. describe
 - a. fruit bud
 - b. fruit spur
 - c. vegetative bud
 - d. leading shoot
 - e. lateral shoot
 - f. tip-bearing lateral
4. describe how cuts should be made in order to
 - a. prune back a shoot
 - b. reduce a large spur system
 - c. remove a branch
5. state that hard pruning by removing many shoots and branches will stimulate growth and reduce fruit production
6. list the reasons for pruning fruit trees
 - a. assist the continued development of the frame work
 - b. remove dead, damaged and diseased wood
 - c. remove crossing and misplaced branches
 - d. weak shoots and water sprouts
 - e. allow air and sunlight into the tree
 - f. regulate the production of growth
 - g. regulate the number of fruit buds
 - h. avoid or correct biennial bearing
7. describe the condition of a fruit tree exhibiting a correct balance between vegetative activity and fruit production
 - a. moderate extension growth
 - b. fruit buds produced on one, two and three year wood
 - c. regular cropping
 - d. good size fruit
 - e. good crops
8. state that unrestricted apples and pears are pruned in the dormant season but some stone fruits such as plums and damsons which are susceptible to Silver leaf, are pruned in late spring and early summer
9. describe why summer pruning is carried out on trees of restricted form such as cordons and espaliers

10. state that lateral branches on spindle trees are held down to
 - a. reduce vigour
 - b. stimulate fruit bud production

11. describe how to prune
 - a. cordon
 - b. bush tree
 - c. spindle tree.

Outcome 5 Annual routine maintenance

The candidate will be able to

1. list the operations involved in the annual routine maintenance of fruit trees
 - a. winter pruning
 - b. application of nutrients
 - c. mulching
 - d. pest and disease control
 - e. weed control
 - f. fruit thinning
 - g. summer pruning
 - h. harvesting
 - i. storage
2. describe the effect on tree growth and fruitfulness of the three main nutrients
 - a. nitrogen for growth crop requirements
 - b. phosphorus- for root development
 - c. potassium – colour, flavour, hardiness and future bud development.
3. state that a base dressing containing the three major plant nutrients may be applied at the beginning of each season according to the condition of the trees
4. state that disorders arising from deficiencies of magnesium, iron and calcium may occur and state materials to remedy these disorders
5. state a disorder arising from a calcium deficiency
6. state that weeds may be controlled by
 - a. hand hoeing
 - b. mulching
 - c. use of herbicides
7. state that, under some conditions, the strips between rows of trees are sown down with grass mixtures and mown regularly to
 - a. slow down growth and induce earlier bearing
 - b. easy to maintain
 - c. improve access
 - d. aesthetically pleasing
 - e. improves fruit colour
8. describe the term 'June Drop'
9. state the reasons for fruit thinning and describe the methods for the thinning of
 - a. apples
 - b. plums.

Outcome 6 The cultivation of apples

The candidate will be able to

1. state that the principal top fruit in the U.K. is the apple
2. describe the site and soil characteristics for the successful cultivation of apples
3. list the important points to consider before selecting an apple tree
 - a. choice of cultivar
 - b. pollination requirements such as diploid or triploid
 - c. pollination group
 - d. choice of rootstock
4. describe the qualities of the following rootstocks
 - a. M27 extremely dwarfing
 - b. M9 very dwarfing
 - c. M26 dwarfing
 - d. MM106 semi dwarfing
5. describe the importance of using virus free rootstocks and cultivars
6. list well established and recently introduced apple cultivars and describe their qualities, including dessert and culinary cultivars
7. describe a range of dessert cultivars to ensure effective cross-pollination and a spread of cropping season
8. list cultivars of culinary apple
9. describe how apples can be grown in the garden
 - a. boundaries and hedges
 - b. specimen trees
 - c. wall trees
 - d. orchards
 - e. arches
10. list the pests and diseases most likely to damage apple trees, describe the symptoms caused and suitable control methods
 - a. codling moth
 - b. fruit tree red spider mite
 - c. apple canker
 - d. powdery mildew
 - e. bitter pit
 - f. apple scab

11. state that regular inspection to monitor the health of the tree and developing fruit is essential and that control measures should be implemented without delay
12. state that fungicides are frequently applied as preventative measures to provide protection before the disease arrives in relation to weather and stage of fruit bud development
13. describe methods for the safe use/application of pesticides
14. state that when using chemicals the requirements of the Food and Environment Protection Act (FEPA) and Control of Substances hazardous to health regulations should be observed
15. describe non chemical methods for the control of pests and diseases
 - a. hand picking
 - b. biological pheromone traps,
 - c. use of resistant cultivars
 - d. natural predators
 - e. good crop husbandry
16. state when and how apples should be picked including selective picking
17. describe how fruit can be stored
 - a. control ripening
 - b. environment – need for cool temperature, darkness and ventilation
 - c. separation
 - i. earlies, mids and lates, as earlies do not store for a long time
 - ii. individual fruits from each other, e.g. by perforated polythene bags
 - d. inspection at regular intervals for rots of fruits in store

Outcome 7 Soft fruit

Strawberry Cultivation

The candidate will be able to

1. state that strawberries, of all fruits provide the quickest return and that from a summer or autumn planting of runners fruit will be available the following year
2. state the desirability of early planting
3. state that strawberries should be grown on a rotational system extending over 3-4 years and describe why.
4. list the factors to consider when selecting plants
 - a. buying in certified stock initially
 - b. buying in pot grown plants
 - c. buying in bare root plants
 - d. home produced runners
 - e. cold stored runners
5. list the options available for new stock
 - a. buying in and its advantages
 - b. production of runners for certification
 - c. home produced runners, importance of early runners, pegging down
 - d. advantages of pot grown runners
 - e. cold stored runners (see above)
6. list suitable cultivars for
 - a. summer fruiting
 - b. autumn fruiting (Perpetual)
7. describe the procedures for planting in open ground
 - a. time of planting
 - b. planting distances
 - c. method
 - d. positioning of crowns
8. state that the spring and summer planting of cold stored runners is an increasingly important method of obtaining out of season strawberries and for good establishment for normal cropping in the following year.
9. describe the benefits and limitations of the use of polythene in strawberry production
 - a. black-as a mulch, warms the ground, weed control and clean fruit
 - b. clear – as a cloche, to protect from birds and early crops from frost
 - c. all polythene is environmentally unfriendly

10. describe the annual routine maintenance of a strawberry crop
 - a. irrigation
 - b. weed control
 - c. strawing down or alternative materials
 - d. frost protection
 - e. runner treatment
 - f. nutrition
 - g. defoliation
 - h. pest and disease control

11. describe the methods used to protect the crop from birds
 - a. cages of varying heights
 - b. netting drapes
 - c. scarers

12. describe the damage caused by the following pests and for each state a method for its control
 - a. birds
 - b. slugs
 - c. virus diseases
 - d. grey mould
 - e. vine weevil.

Raspberry Cultivation

The candidate will be able to

1. state that a yield of 2-3 kg/m is a reasonable expectation from an established crop
2. describe the importance of starting with healthy plants from certified stock
3. describe the preparations and planting procedures
 - a. consider a trench
 - b. dimensions and preparation, incorporation of fertiliser and organic matter
 - c. time of planting
 - d. distance between plants and rows
 - e. double planting for shy cane- producers
 - f. depth
 - g. mulching
 - h. tidying up
 - i. pruning after planting
4. state that to provide support for the canes, strong posts are required at 3-3.6m intervals along the row, and up to 1.8m in height above the ground and 45cm below

5. describe how canes may be supported by
 - a. single fence
 - b. parallel wires
 - c. single post
6. describe the annual routine maintenance of a summer-fruiting raspberry crop
 - a. removal of surplus suckers and canes
 - b. spacing of canes
 - c. fertiliser application
 - d. mulching
 - e. irrigation
 - f. harvesting
 - g. pruning
 - h. tying in
 - i. cutting above top wire
7. describe the available methods of controlling weeds
 - a. shallow hoeing
 - b. use of herbicides
 - c. mulching
8. state that autumn-fruiting raspberries such as Autumn Bliss produce their fruit on top 300mm or so of the current year's canes
9. state that autumn-fruiting canes should be pruned to ground level in late winter
10. describe the damage caused by Raspberry beetle and state methods of control
11. list 4 successful summer-fruiting raspberry cultivars and 2 successful autumn-fruiting cultivars.

Blackcurrant cultivation

The candidate will be able to

1. list the reasons for growing blackcurrants
 - a. useful in preserves
 - b. regular crop
 - c. long life up to 15 years
 - d. rich in vitamin C
 - e. fruit available July to September
2. describe the conditions required for success
 - a. open sunny site
 - b. freedom from cold winds
 - c. freedom from damage by spring frosts
 - d. fertile, well-drained, reasonable depth of soil
 - e. pH 6.7 is the optimum

3. describe the preparation of the soil and planting procedures
 - a. certification schemes
 - b. two-year old bushes
 - c. abundant organic material incorporated
 - d. removal of perennial weeds
 - e. nutrition including high demand for potash
 - f. planting time and distance
 - g. depth of planting
 - h. pruning after planting
 - i. mulching
4. describe the cultivations required to grow good bushes
 - a. annual mulching
 - b. nutrition, high level of nutrition required
 - c. watering
 - d. weed control
5. state that blackcurrants produce the best fruit on one-year old shoots but that some is also produced on two and three year old wood
6. describe the pruning method on established bushes
 - a. removal of low-lying and damaged branches
 - b. removal of weak shoots
 - c. removal of a quarter to one third of the branches each year
 - d. removal of as much older wood without sacrificing one-year old wood
 - e. timing
 - f. tools used
7. explain why pruning is necessary
 - a. improved penetration of sunlight and air
 - b. new growth encouraged
 - c. disease potential reduced
 - d. ripening improved
8. state that berries may be picked individually or on a strig
9. describe how new stock may be propagated
 - a. selection of healthy stock
 - b. choice of material
 - c. preparation of cutting
 - d. insertion, spacing, firming
 - e. time of propagation
 - f. after care

10. describe the damage caused by Blackcurrant Gall Mite
 - a. destroys buds
 - b. transmits Reversion Disease
 - c. reduces yield
11. state that , once infected, control is difficult and eventually the bush will have to be destroyed
12. describe the changes following infection by reversion
 - a. change in appearance of flowers and change of leaf shape in June/July
 - b. abnormally large flower buds which abort
 - c. reduced crop
 - d. stunted growth
13. describe the damaged caused by aphids in spring and their control
 - a. foliage blistered and curled
 - b. chemical control-systemic insecticide of short persistence
 - c. no spraying at blossom time
14. name two cultivars suitable for the small garden and describe their characteristics
 - a. Ben Sarek
 - b. Baldwin
 - c. Ben Lomond

Gooseberry cultivation

The candidate will be able to

1. list the reasons for growing gooseberries
 - a. easy to grow
 - b. crop regularly
 - c. long life
 - d. yield 3.6 – 4.5kg when mature
 - e. relatively free from virus diseases
 - f. available in various forms e.g. bush, cordon, fan, standard.
2. describe the preferred site condition
3. describe the preparation of the soil and planting procedures
 - a. removal of perennial weeds
 - b. nutrition including high demand for potash
 - c. planting time
 - d. age of plants
 - e. qualities of a good plant
 - f. spacing for bush and cordon
 - g. planting and after care

4. describe how young plants are pruned to obtain an open centred bush or single cordon
5. state that gooseberries flower at the base of the shoots of the previous season and on spurs on older wood.
6. describe the pruning method on established bushes
7. describe why summer pruning is beneficial
8. describe the annual routine maintenance of a gooseberry crop
 - a. weed control
 - b. nutrition
 - c. mulching
 - d. irrigation
 - e. thinning
 - f. pest and disease control
 - g. pruning
9. describe the damage and control methods for gooseberry sawfly
10. describe the damage and control methods for gooseberry mildew, including resistant cultivars
11. describe how the cultivation of cordon gooseberries differs from bush cultivation
 - a. wall or framework support required
 - b. single, upright stem
 - c. pruning of leader shoot
 - d. pruning of side shoots
 - e. double or triple cordons
12. state that gooseberries are propagated from hardwood cuttings
13. list popular cultivars and those resistant to mildew.

Blackberry and hybrid berry cultivation

The candidate will be able to

1. list the cultivated forms of
 - a. blackberries
 - b. hybrid berries
2. state that growing black and hybrid berries is a useful way of clothing fences, walls, arches, and sheds

3. describe the conditions for successful establishment
 - a. soil type
 - b. planting time
 - c. age of plant
 - d. distance apart according to vigour of cultivar and training system
 - e. cut back to 225mm after planting

4. describe the various training systems and state that a post and wire fence or some other stout system of support is needed
 - a. one way rope system
 - b. two way rope system
 - c. fan
 - d. weaving
 - e. single post

5. describe the annual routine maintenance of a blackberry/hybrid berry crop
 - a. nutrition, in particular potash
 - b. mulching
 - c. weed control
 - d. irrigation
 - e. pest and disease control
 - f. pruning and training
 - g. harvesting

6. describe the propagation of new stock by
 - a. tip layering
 - b. leaf bud cuttings

7. describe the damage caused by raspberry beetle and describe a suitable control method

8. list popular cultivars of blackberry

9. list popular types of hybrid berry.

UNIT 14 Wildlife Gardening

Rationale

This unit is concerned with developing knowledge of wildlife, wildlife gardening and the natural landscape.

This unit covers six learning outcomes. The candidate will be able to demonstrate knowledge of

- 1 an introduction to ecology and threats to wildlife
- 2 attracting invertebrates into the garden
- 3 attracting vertebrates into the garden
- 4 native plants, habitats and landscape management
- 5 establishing and maintaining wildlife ponds
- 6 establishing and maintaining wildlife meadows

Connection with other qualifications

This unit combines and extends the knowledge contained in units

L2

CU2

L28

of the Level 2 NVQ in Amenity Horticulture

Assessment

The underpinning knowledge requirements are listed for each outcome. These will be assessed by an NPTC set short-answer paper.

Outcome 1 Introduction to ecology and threats to wildlife

The candidate will be able to

1. state that gardens are becoming increasingly important as refuges for wildlife due to human pressures on the environment
2. state that pressures are exerted on the environment by
 - a. introduction of alien species (for example mink)
 - b. pollution (for example caused by fertiliser runoff)
 - c. direct destruction of habitats (for example to make way for new housing)
 - d. changes in landscape management (for example the agricultural improvement of grasslands)
 - e. collection and or extermination of individual species (for example the trapping and killing of birds of prey or egg collecting)
3. state that while many habitats are being destroyed new habitats are also being formed for example road side verges, gardens and flooded gravel pits
4. state the dangers to the environment of introducing non native species or native species which come from different areas of the country, from the wild or abroad
 - a. transfer of disease (e.g. red-leg virus in frogs)
 - b. introduction of destructive and invasive species (e.g. mink)
 - c. dilution of regional genetic variations and hybridisation (e.g. Spanish bluebells)
 - d. extinction of species in the wild (e.g. rare orchids)
5. state that the reasons for creating a wildlife garden are to
 - a. provide an environment suitable for a diverse flora and fauna
 - b. create an attractive garden providing the opportunity to observe wildlife
6. state that careful planning and maintenance of a wildlife garden is necessary to
 - a. prevent the appearance of neglect
 - b. prevent invasive or undesirable species taking over or becoming a nuisance maintain the habitat at the optimum stage of succession
7. define the terms
 - a. local climate
 - b. micro-climate
8. describe how both local-climates and micro-climates affect plant and animal communities
9. describe the process of succession in plant communities
10. define the terms
 - a. seres (a stage in the process of succession)
 - b. climax vegetation (the final stage in a succession, depending on climate altitude etc).

11. define the terms
 - a. food chain
 - b. primary producers (plants)
 - c. consumers (herbivores and carnivores)
 - d. food web
 - e. energy flow

12. define the terms
 - a. habitat
 - b. niche
 - c. community
 - d. biodiversity

13. state the importance of linking habitats together and the importance of
 - a. wildlife corridors
 - b. size of nature reserve/habitat/wildlife garden
 - c. variety of habitats

14. state that binoculars are a valuable asset when observing wildlife in the garden

15. state the importance of the following terms when selecting a pair of binoculars
 - a. magnification
 - b. light value
 - c. lens coating
 - d. field of view
 - e. minimum focus.

Outcome 2 Attracting invertebrates into the garden

The candidate will be able to

1. state that invertebrates are animals which do not have a backbone
2. state that invertebrates include spiders (arachnids), segmented worms (annelids), snails (molluscs) and insects
3. state that the most numerous group of invertebrates (and life) on earth are the insects (22,500 in Britain alone)
4. state that insects include
 - a. Plant bugs *Hemiptera*
 - b. Dragonflies *Odonata*
 - c. Two wing flies *Diptera*
 - d. Beetles *Coleoptera*
 - e. Butterflies and moths *Lepidoptera*
 - f. Wasps and bees *Hymenoptera*
5. explain that invertebrates are important in the wildlife garden as
 - a. part of the food chain
 - b. biological control
 - c. breaking down and recycling of organic matter and nutrients
 - d. attractive and interesting
 - e. rare and endangered species
6. identify by name and describe plants for the following categories
 - a. native trees which support a high biodiversity of invertebrates
 - b. native plants which attract bees
 - c. native plants which attract butterflies
 - d. exotic plants which attract bees
 - e. exotic plants which attract butterflies
 - f. food plant for the caterpillars of named butterflies
7. state that native plants are, in general, more attractive to wildlife than introduced species and highly bred cultivars because they have evolved with the invertebrates, produce more of the required pollen and nectar and are more recognisable to native species
8. state that wildlife ponds support a wide variety of invertebrates
9. identify by name and describe common freshwater invertebrates
10. describe the method of creating suitable nest sites for bumble bees and solitary bees

11. describe how to construct a log pile suitable for attracting stag beetles
12. state that the hollow dead stem of herbaceous plants such as stinging nettles and those left over winter on an herbaceous border form important hibernating sites for invertebrates

Outcome 3 Attracting vertebrates into the garden

The candidate will be able to

1. state that vertebrates are animals which do have a backbone
2. state that vertebrates include amphibians, reptiles, mammals and birds
3. state that when designing a wildlife garden for vertebrates it is important to consider the following points
 - a. water
 - b. food
 - c. wildlife corridors and access to and from the garden
 - d. nesting/breeding sites
 - e. hibernating sites
 - f. roosting and sheltering sites
 - g. protection and cover from predators such as cats
4. state that hedgehogs are common garden visitors but are often killed by cars, drowning in steep sided ponds, poisoned by garden chemicals or disturbed when hibernating or nesting
5. describe how to build a hibernating/nesting pile suitable for hedgehogs and state where it should be located
6. state that hedgehogs cover large distances every night looking for food and that access in and out of the garden is important
7. give an example of a specific item of legislation that protects wildlife (e.g. in UK under the Wildlife and Countryside Act 1981, it is illegal to disturb bat roosts)
8. state that bats feed on insects and can be attracted to nocturnal insects such as moths flying around lights or feeding on night scented plants such as stocks or honeysuckle
9. describe how to construct and site a batbox
10. state that amphibians such as toads, frogs and newts can be attracted into the garden by constructing a wildlife pond, avoiding pesticides, creating damp logpiles and planting up lush vegetation such as bog gardens and meadows.
11. identify by name and describe plants for the following categories
 - a. trees which provide fruit for birds
 - b. shrubs which provide fruit for birds
 - c. herbaceous plants which provide seed for birds
 - d. trees which provide nesting and roosting sites for birds

12. describe how to construct and site nest boxes for
 - a. blue tits
 - b. robins
 - c. sparrows
 - d. house martins
13. state that it is important to clean out nest boxes of old nest material each year
14. state that all year round access to shallow water for drinking and bathing is vital for garden birds
15. state that putting food out for birds will attract a wide range of birds to the garden and can be important for the survival of many birds
16. state that it is now recommended to feed birds all year round
17. state that whole peanuts should only be used in purpose-built feeders that prevent birds such as tits taking entire nuts which can choke nestlings.
18. state that a range of bird food preparations can be put out to attract different birds to bird feeders and bird tables such as
 - a. hoppers/feeders- Seed such as sunflower, peanut, millet to attract tits and finches
 - b. bird table-mixed crushed seed and dried fruit such as raisins to attract ground feeders such as sparrows and dunnocks
 - c. bruised fruit such as apples for birds such as thrushes and blackcaps
 - d. bird 'pudding' (fruit, nuts and fat) for birds such as robins and blackbirds
19. state that bird feeders and tables should be located
 - a. away from cover for ambush by cats and other predators
 - b. in sight of a window for easy observation
 - c. near to cover for birds to hide and fly to if disturbed
20. state that bird feeder, tables and bird baths should be regularly cleaned using a mild detergent to prevent a build up of diseases such as salmonella.

Outcome 4 Native plants, habitats and landscape management

The candidate will be able to

1. state that the UK and Irish countryside is made up of a wide range of natural and semi natural habitats including
 - a. woodland
 - b. grassland and heathland
 - c. moorland
 - d. marshes and fens
 - e. freshwater rivers, ponds and lakes
 - f. arable fields
 - g. boundary hedges, walls and ditches
2. state that many of these habitats can be recreated in the wildlife garden on a reduced scale
3. state that the following influence the type of habitats formed and give examples to demonstrate this
 - a. underlying rock
 - b. drainage
 - c. chemical and physical properties of the soil
 - d. altitude
 - e. climate
 - f. exposure to wind and sea spray
 - g. human management and design
4. define the following woodland management terms and methods
 - a. coppicing and coppice management
 - b. pollarding and wood pasture
 - c. timber trees and timber
 - d. coppicing and coppice (woodland) products
 - e. plantations and clear felling
5. state that after the ice age the UK and Ireland was covered in natural deciduous woodland known as the wildwood
6. state that there is no wildwood left in the UK or Ireland and that almost all woodland has been managed at some time, often over hundreds of years
7. state that after World War 1 as little as 5% of the countryside was wooded and that now with re-planting around 10% is covered, much with conifer plantations
8. state that native deciduous woodland especially managed coppice supports a high biodiversity of woodland fauna and flora
9. identify by name and describe woodland plants for the following categories
 - a. timber trees
 - b. coppice trees
 - c. herbaceous plants typical of a coppiced woodland

10. state that grasslands and heaths are semi-natural habitats composed entirely of wild plants, yet if not managed by grazing, burning or mowing quickly become woodland
11. state that meadows are grasslands mown for hay and that pasture is grassland that is grazed by animals.
12. state that grazing or mowing will affect the variety of plants growing in the grassland and plants such as meadowsweet, sorrel, oxeye daisy and salad burnet are easily destroyed by grazing but withstand mowing, so are found in meadows.
13. state that grazing or mowing at specific times will prevent some plants flowering or setting seeds and so affect the variety of plants in the grassland
14. state that since 1945 95% of herb-rich meadows and 80% of downland grassland has been destroyed. This is due to changes in landscape management and farming practice such as neglect of downland grassland and agricultural 'improvement' of herb-rich meadows using fertilisers and sowing aggressive fast growing species of grass
15. state that herb-rich meadows and downland grassland support a high biodiversity of fauna and flora especially insects
16. state that heathlands form on well-drained acidic soils and are dominated by heathers
17. state that moorland forms where the ground is always wet due to high rainfall and poor drainage, leading to the accumulation of peat
18. state that the high rainfall on moorland leaches minerals out of the soil leading to infertile soils dominated by heathers and sphagnum moss
19. state that moorland is under threat from drainage, forestry and peat digging
20. state that hedgerows can be managed by laying
21. state that the base of a hedgerow, which is typified by a wide variety of herbaceous plants, is an important integral part of the hedgerow habitat
22. state that since 1945 over 250,000 miles of hedgerow have been destroyed or fallen into neglect
23. state that since the 1970's there has been a sharp decline in common farmland birds such as bullfinches, corn buntings, grey partridges and tree sparrows
24. state that the decline of many species of common animals and plants in the countryside has been due to the loss of habitat and changes in countryside management.

Outcome 5 Establishing and maintaining wildlife ponds

The candidate will be able to

1. state that a wildlife pond is an important feature in the wildlife garden because it provides a
 - a. habitat for aquatic plants and freshwater invertebrates and amphibians
 - b. drinking and bathing site for birds and mammals
2. state that the greatest biodiversity can be achieved by
 - a. sighting the pond in a sunny location
 - b. sighting the pond near to lush vegetation such as long grass to give cover to amphibians
 - c. avoiding stocking with ornamental fish
 - d. making the pond as large as possible and at least 45cm deep
 - e. providing a range of shelves at different depths to accommodate planting
 - f. providing a safe entry and exit point to allow animals to drink, bathe and escape if they fall in
3. state that it is important to ensure a diverse planting of native marginal, floating leaved deep water aquatics, submerged aquatics and floating aquatics
4. identify by name and describe **two** plants for all of the following categories
 - a. native marginal
 - b. native floating leaved deep water aquatics
 - c. native submerged aquatics
 - d. native floating aquatics
 - e. bog plants
5. list **three** materials available for use in constructing a wildlife pond and state the advantages and disadvantages of each
6. describe the stages of construction of making a wildlife pond and adjacent bog garden out of a flexible liner
7. describe the procedure for planting up a pond and introducing pond life
8. state that amphibians should not be introduced artificially either as adults or as spawn as this can spread diseases such as red-leg virus in frogs
9. state that Great Crested Newts are fully protected by law
10. describe the yearly maintenance of a wildlife pond.

Outcome 6 Establishing and maintaining wildlife meadows

The candidate will be able to

1. state that wildflower meadows can be established in most gardens instead of or in addition to a lawn and provides a
 - a. habitat rich in invertebrate fauna
 - b. feeding area for a wide variety of birds
 - c. low maintenance ground cover
 - d. planting area for a diverse and attractive flora
2. state that when selecting plants to plant up a meadow it is important to consider the following factors
 - a. when the meadow will be cut
 - b. soil properties such as drainage, pH, texture and structure
 - c. species of plant found in the local area
 - d. locally sourced seed, to maintain local genetic variation and avoid the introduction of invasive species
3. state when planning to establish a meadow that meadow plants establish better in soils that are not over fertile
4. state that the fertility of site can be reduced by
 - a. avoiding the use of fertilisers or nutrient rich manures and compost
 - b. growing and removing/harvesting fast growing greedy plants such as grass or mustard to deplete the site of available nutrients
 - c. removing the top layer of topsoil to leave a less fertile layer
5. state that meadows can be established by
 - a. planting pot grown plants and plugs into existing grass
 - b. laying wildflower rich turf
 - c. sowing with a wild flower seed mix
6. describe the site preparation, timing and sowing of a wild flower meadow
7. state that many meadow seed mixture also include a nurse crop of plants such as annual rye grass and corn field weeds such as poppies and corn flowers to add interest in the first year and to protect the establishing meadow plants
8. state that in the first year it is essential for good establishment to
 - a. make the first cut with a scythe, sickle or rotary mower to a height of 5-10cm when the grass is 10-18cm high, removing the clippings
 - b. cut subsequently at two monthly intervals until October, removing the clippings.

9. state that in the second and subsequent years cutting times will depend on the type of meadow
 - a. spring flowering meadow cut for hay when spring flowers set seed in midsummer and subsequently mow grass to 5-10cm at two monthly intervals until October, removing the clippings
 - b. summer flowering meadow mow grass to 5-10cm at two monthly intervals until April, removing the clippings and subsequently leave to flower and set seed over summer, cutting for hay in September

10. identify by name and describe plants for the following categories
 - a. spring flowering meadow
 - b. summer flowering meadow

UNIT 15 Practical Gardening Tasks

Rationale

This unit consists of **thirteen** groups of practical gardening tasks. Candidates **must** complete **three** tasks from **each** group for **each** unit studied in the qualification to achieve the unit. Recording and assessment documentation is provided in the Practical Tasks Manual

- 1 maintain safe working practices
- 2 sites and soils and cultivations
- 3 trees, shrubs and hedges
- 4 beds and borders
- 5 plant propagation
- 6 weeds, pests and diseases
- 7 lawns, landscapes and structures
- 8 ponds and water features in gardens
- 9 organic gardening
- 10 garden design
- 11 growing vegetables and salads
- 12 growing fruit
- 13 wildlife gardening

Assessment

Assessment is by observation of the candidate performing the tasks

Safety

The need to adopt safe working practices at all times cannot be over emphasised, and is the responsibility of all concerned. In any circumstances where a candidate has not been provided with the necessary means of self-protection or is working unsafely, the assessor must either refuse to permit the test going ahead or discontinue it.

Candidates should not, without the most careful precautions, be given material to identify and/or, evaluate which are known to be in any way toxic or irritant.

Providing for assessments of practical tasks

Candidates must be given adequate space in which to work and tools, equipment and material required should be at hand or easily accessible.

Tools, equipment and machines must be in good condition and conform with all current health & safety legislation. In particular, the following should be observed:

- Risk assessments should be carried out and tools must be used under supervision
- Units should be delivered in accordance with relevant existing legislation on Health and Safety e.g. PUWER

Group 1 Maintain safe working practices

The candidate will be able to

1. carry out a risk assessment for a specified task
2. identify a range of fire fighting equipment and state its use
3. respond to a workplace emergency
4. carry out routine maintenance on powered machinery
5. carry out routine maintenance on a range of hand tools
6. complete an entry in an accident book.

Group 2 Sites, soils and cultivations

The candidate will be able to

1. analyse the soil of a particular site to determine soils texture, structure and pH level.
2. carry out ground clearance primary, and secondary cultivations to include
 - a. single digging
 - b. incorporation of organic matter
 - c. preparation of an areas suitable for sowing and planting
 - d. application of base dressings
 - e. soil amelioration
3. collect a soil sample and make a pH determination of the soil extract by colorimetric method
4. measure and mix a spray chemical.

Group 3 Trees, shrubs and hedges

The candidate will be able to

- 1 plant and stake a standard ornamental tree
- 2 prune woody ornamentals
- 3 trim hedge using hedging shears or electrically powered trimmer
- 4 prune shrubs which flower on previous season's growth
- 5 prune shrubs which flower on current season's growth
- 6 prune shrubs which are coppiced/pollarded for new coloured foliage and stems
- 7 prune bush roses
- 8 prune climbing or rambler roses
- 9 identify trees and shrubs
- 10 plant and train a climbing plant.
- 11 carry out routine maintenance on a range of decorative areas to include
 - a. weed control
 - b. feeding
 - c. routine and formative pruning
 - d. pest and disease control
 - e. watering
 - f. mulching

Group 4 Beds and borders

The candidate will be able to

1. identify hardy annuals, bedding or herbaceous perennials
2. sow seeds by broadcast and in drills on open ground to include
 - a. hardy annuals
 - b. vegetable crops
 - c. grass species
3. establish a range of plant material to include
 - a. standard ornamental trees
 - b. successional bedding
 - c. bulbs corms and tubers
 - d. shrubs
 - e. herbaceous perennials
 - f. hedging material
4. establish decorative plants in a range of containers to include
 - a. hanging baskets
 - b. tubs/ troughs
 - c. alpine sink gardens
5. lift and divide herbaceous perennials
6. stake herbaceous perennials
7. sow an annual border
8. plant beds for successful bedding
9. plant and training a climbing plant
10. plant flower bulbs for a spring display
11. plant flower bulbs for 'naturalisation'

Group 5 Plant Propagation

The candidate will be able to

- 1 field grafting – 'T' budding
- 2 field grafting – chip budding
- 3 field grafting – whip and tongue
- 4 bench-grafting – woody ornamental plants
- 5 propagate by softwood cuttings
- 6 propagate conifers by semi-ripe cuttings
- 7 propagate broadleaved shrubs by semi-ripe cuttings
- 8 propagate by leaf lamina cuttings
- 9 propagate by root cuttings
- 10 propagate by hard wood cuttings
- 11 divide dahlia stools
- 12 sow seeds in trays (broadcast)
- 13 sow seeds singly in containers or spaced in trays
- 14 sow seed in peat blocks or other modular systems
- 15 prick out seedlings
- 16 sow seeds in short drills using a pointed implement and a straight-edge board.

Group 6 Weeds, pests and diseases

The candidate will be able to

1. hoe with a Dutch hoe
2. apply a mulch to established planting to control weeds
3. identify and describe weed seedlings
4. identify and describe an insect pest
5. identify and describe a mite pest
6. identify and describe a mollusc pest
7. identify and describe a fungal disease
8. identify and describe a bacterial disease
9. identify and describe a beneficial predatory insect
10. make a lacewing shelter.

Group 7 Lawns, landscapes and structures

The candidate will be able to

1. construct hard landscape features to include
 - a. pathway rigid material
 - b. pathway flexible material
 - c. post and rail fence
 - d. post and panel fence
 - e. pergola
 - f. decorative arch
2. maintain hard landscape features to include
 - a. gravel pathway
 - b. wooden fence or structure
3. level – setting an even gradient between two fixed points
4. lay concrete block paving
5. fill paving joints with mortar
6. lay concrete paving on a prepared evenly compacted base
7. cut building block and artificial stone paving with bolster
8. lay concrete blocks or bricks
9. construct simple steps
10. establish a lawn from seed
11. establish a lawn from turf
12. renovate an established lawn
13. carry out routine maintenance operations on a lawn to include
 - a. mowing
 - b. scarification
 - c. aeration
 - d. topdressing
 - e. feeding
14. edge turf with shears and iron

15. carry out sub surface aeration of turf by hand
16. calibrate and operate a pedestrian controller fertiliser distributor.

Group 8 Ponds and water features in gardens

The candidate will be able to

1. simulate an outcrop of rock suitable for a rock garden in a table-top model
2. plant a water lily in a crate
3. construct a small pond using a flexible liner
4. identify and describe pond invertebrates
5. lift and divide large aquatic plants
6. clear pond of debris.

Group 9 Organic gardening

The candidate will be able to

1. plant vegetables and mulch a no dig bed
2. sow seed on a no dig bed
3. sow green manure
4. make leafmould
5. make garden compost
6. turn a compost heap

or any appropriate task from outcomes 2, 3, 4, 5 11 or 12 carried out under organic conditions.

Group 10 Garden design

The candidate will be able to

1. carry out triangulation techniques
2. draw a plan to scale
3. set out from a plan
4. carry out levelling
5. identify garden features.

Group 11 Growing vegetables and salads

The candidate will be able

1. set a taut line
2. single dig
3. prepare an area of land for sowing seeds or planting small plants
4. sow seeds by hand in drills
5. prepare a trench suitable for raspberries, hedging plants or runner beans
6. plant row crops by hand
7. hoe
8. stake runner beans in rows
9. erect a continuous polythene cloche.

Group 12 Growing fruit

The candidate will be able to

1. plant and stake a young fruit tree
2. prune an established fruit tree by the regulated system
3. prune an established fruit tree (apple, pear or plum) by spur pruning
4. prune gooseberry bushes
5. prune blackcurrant bushes
6. prune established cane fruits.

Group 13 Wildlife gardening

The candidate will be able to

1. mow long grass/meadow area
2. sow wild flower meadow
3. construct a nest site for bumblebees
4. construct a nest box
5. invertebrate identification
6. identify and describe native wild flowers.

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Further information

Further information regarding centre/scheme approval or any aspect of assessment of our qualifications should be referred to NPTC, with the exception of registration and certification which is via the walled garden or City & Guilds regional office.

Region	Telephone	Facsimile
NPTC	024 7685 7300	0247669 6128
City & Guilds Scotland	0131 226 1556	0131 226 1558
City & Guilds North East	0191 402 5100	0191 402 5101
City & Guilds North West	01925 897900	01925 897925
City & Guilds Yorkshire	0113 380 8500	0113 380 8525
City & Guilds Wales	02920 748600	02920 748625
City & Guilds West Midlands	0121 359 6667	0121 359 7734
City & Guilds East Midlands	01773 842900	01773 833030
City & Guilds South West	01823 722200	01823 444231
City & Guilds London and South East	020 7294 2820	020 7294 2419
City & Guilds Southern	020 7294 2724	020 7294 2412
City & Guilds East	01480 308300	01480 308325
City & Guilds Northern Ireland/ Ireland	028 9032 5689	028 9031 2917

Websites www.nptc.org.uk and www.cityandguilds.com

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