Unit 22: Undertake Tree and Shrub Pruning and Maintenance

Unit code: F/600/9911

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit aims to provide learners with an understanding of tree and shrub pruning and maintenance and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

Unit introduction

Trees and shrubs are important components of the landscape. They are long lived and visually imposing, and often play an important role in sustaining the ecological value and biodiversity of the landscape. It is vital, therefore, that trees and shrubs are managed properly to maintain or enhance their aesthetic value, to guarantee or increase their longevity and to ensure that they pose no risks to people or property around them.

Following this unit will enable learners to understand how pruning may be used to manage the growth and development of trees and shrubs and how pruning techniques will vary with plant species, age, situation and intended purpose. Learners will also appreciate the physiological and morphological principles that underpin pruning and understand how these principles influence the timing and techniques of formative maintenance and restorative pruning.

Learners will also understand the techniques and procedures used to prune trees and shrubs and carry out this work safely and effectively.

This unit will also enable learners to assess the health of trees and shrubs, to recognise structural and pathological causes of potential failure and to determine and undertake the appropriate remedial action.

Learners will understand the legal framework governing the management and maintenance of trees, ensuring that all pruning work complies with current UK legislation.

Tree access techniques and chainsaw use are not covered in this unit. Therefore learners would benefit from completing units which develop these skills.

Learning outcomes

On completion of this unit a learner should:

1 Understand pruning as a means of maintaining trees and shrubs

2 Be able to prune and maintain trees and shrubs

3 Be able to assess trees and shrubs for potential failure.

Unit content

1 Understand pruning as a means of maintaining trees and shrubs

Pruning: the reasons for pruning (formative pruning, maintenance of plant vigour, balance and structural stability, aesthetic considerations, renovation and rejuvenation, disease control); pruning and plant biology (anatomy of woody plants, apical dominance, branching patterns, juvenility and other developmental stages, suckering, epicormic growth, natural responses to wounding, natural barriers to decay); pruning techniques (seasonality and timing, crown thinning, crown reduction, crown lifting, crown cleaning, pollarding, coppicing, rejuvenation, root pruning); identification (by plant form, leaf shape, winter buds and twigs, flowers, use of identification aids)

Legal considerations: current relevant legislation eg Wildlife and Countryside(Amendment) Act 1991, Town and Country Planning (Trees) Regulations 1999, Town and Country Planning (General Permitted Development) Order 1995, Conservation (Natural habitats &c) Regulations 1994), Health and Safety at Work Act 1974, Work at Height Regulations 2005)

2 Be able to prune and maintain trees and shrubs

Assess pruning requirements: methods for assessing pruning requirements; species identification; plant characteristics (natural size and form, age, vigour, health, physical damage, surroundings); seasonality; aesthetic considerations; health and safety considerations; interpret client requirements (written, verbal, from plans)

Select appropriate pruning tools and equipment: hand tools; power tools; access equipment; personal protective equipment (PPE)

Carry out appropriate pruning in accordance with assessment: evergreen shrubs; deciduous shrubs (early and late flowering); hedges; wall shrubs; roses (bedding, climbing, rambling); coppicing; small trees (crown lifting, thinning, reduction, cleaning); correct disposal of arisings; health and safety; PPE

3 Be able to assess trees and shrubs for potential failure

Assessing potential failure: methods of assessing potential failure; species form and branching characteristics; inherent structural weakness; imbalance; physical injury (above and below ground); pathogens; surroundings (eg removal of other plants, construction work, changes in soil level); potential hazards to public and property

Remedial action: removal; appropriate pruning; physical support (propping, guying, bracing); site amelioration; costs/benefits of remedial actions; long- and short-term consequences; health and safety implications; legal implications (eg liability if actions are ineffective)

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 explain the aims and considerations of pruning trees and shrubs [IE, RL, SM]	**M1** explain how pruning may be used to achieve specific management objectives	**D1** explain how pruning is influenced by the context in which the plant is being grown
P2 evaluate pruning techniques	**M2** explain how given client requirements will influence the selection of appropriate pruning techniques	**D2** discuss how different pruning techniques may be suited to the specific contexts in which the plant is being grown
P3 explain the immediate and long-term biological processes of trees and shrubs in response to pruning and possible consequences of not pruning [IE, RL, SM]		
P4 summarise the legislation relating to pruning and maintenance		
P5 produce a pruning and maintenance plan for trees and shrubs [IE, CT, RL]	**M3** produce a plan which indicates the maintenance likely to be required by plants in the future.	**D3** produce a plan which takes account of possible changes in land use or management aims.
P6 carry out appropriate pruning and maintenance of trees and shrubs		
P7 explain the potential of trees and shrubs for failure		
P8 carry out assessment of trees and shrubs for potential failure		
P9 evaluate remedial actions for potential failure		
P10 carry out appropriate remedial action on trees and shrubs.		

PLTS: This summary references where applicable in the pass criteria, in the square brackets, the elements of the personal, learning and thinking skills. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Delivery of this unit will involve practical assessments, written assessment, visits to suitable collections and will link to work experience placements.

This unit is designed to provide learners with the theoretical understanding and practical skills needed to undertake the routine and remedial pruning required by woody plants. Delivery should inform learners of the full scope of the techniques used in woody plant management and enable them to understand the practical and legal constraints of this work. Delivery methods should be varied and could include lectures, group discussions, seminar presentations, practical demonstrations and supervised practical work to stimulate and motivate learners. Guided and independent research is important to develop learners' abilities as independent learners and self-managers. Site visits are useful to enable learners to experience trees and shrubs of different ages and conditions and to appreciate the opportunities and constraints offered by different locations. Visits could be to important woody plant collections, public open spaces or even to urban streets and highways which feature amenity planting.

Visiting expert speakers could be useful in helping learners to place subjects within a relevant, 'real life' context. For example, a local authority tree officer, an arboricultural consultant or contractor could talk about their work, the situations they face and the methods they use.

Health and safety issues relating to working around unhealthy or structurally unsound trees must be stressed and reinforced regularly, and risk assessments must be undertaken before any practical activities or fieldwork. Appropriate personal protective equipment must be provided and used following the production and implementation of suitable risk assessments.

Work placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities are undertaken, so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to assess unhealthy or structurally unsound trees in their workplace for maintenance work and they should ask for observation records and/or witness statements to be provided as evidence of this. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Learning outcome 1 is likely to be delivered through formal lectures, discussions, site visits, demonstrations, supervised practice and independent learner research. Learners will understand the use of pruning as a means of maintaining woody plants and the biological processes which underpin pruning practices. Due to the seasonal nature and timing of events, learners could be given the opportunity to examine pruned and overgrown trees and shrubs in both the growing and the dormant season.

Learning outcome 2 is likely to be delivered through demonstration and practical pruning exercises. Learners must have the opportunity to work on both trees and shrubs and should be given sufficient time and material to achieve the required level of practical competence. To this end, it may be useful to contact a voluntary organisation (for example Help the Aged or The British Trust for Conservation Volunteers) whose remit includes the care of gardens or other green spaces.

Learning outcome 3 is likely to be delivered through formal lectures, discussions, site visits, supervised practical work, and guided and independent learner research. Learners will develop an ability to assess trees and woody plants for potential failure and take appropriate remedial action.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value.**

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction to unit and overview of unit content, delivery and assessment methods.
Presentation and discussion on health and safety issues surrounding the pruning of trees and shrubs.
Assignment 1: The Theory and Practice of Woody Plant Pruning (P1, P2, P3, P4, M1, M2, D1, D2). Lecture on aims and techniques for routine pruning of trees and shrubs.
Site visit. Demonstration and practise of pruning techniques.
Lecture on biological principles that underpin pruning practices.
Guided research towards Assignment 1.
Independent learner research towards Assignment 1.
Assignment 2: The Prevention and Remedy of Failure in Trees and Shrubs (P7, P8, P9). Lecture on causes of potential failure, its prevention and remedies.
Site visit to inspect plants at risk from potential failure. Discussion of site visit.
Guided research towards Assignment 2.
Independent learner research towards Assignment 2.
Learners present verbal report for Assignment 2.
Assignment 3: Practical Pruning of Trees and Shrubs (P5, P6, P10, M3, D3)
Learners inspect trees and shrubs and assess pruning requirements.
Learners present their assessment of pruning requirements.
Practical assessment of pruning techniques.
Unit review.

Assessment

For P1, P2, P3 and P4, learners could produce a report which explains why woody plants require pruning, considers the factors influencing pruning (for example species, location and client requirements) and evaluates the techniques that could be used to carry out the work. The report should also describe the aspects of plant biology that underpin pruning (for example plant anatomy, apical dominance, monopodial and sympodial growth, internal compartmentalisation, callusing and wound healing) and the possible consequences of not pruning. It should also summarise legislation relevant to pruning and maintenance. Appropriate illustrations (diagrammatic and/or photographic) should be used to support the written material.

For M1 and M2, learners must explain how specific management aims or client requirements (for example reduction in plant size, encouragement of flowering/fruiting) will influence pruning practices.

For D1 and D2, learners must provide information on how pruning practices and techniques may be influenced by the context in which the plant is being grown (for example private garden, public green space, school playground, urban street, wildlife area). Evidence could be as part of a report on pruning and maintenance.

For P7, P8 and P9, learners will inspect trees and shrubs and assess them for potential failure. They should be able to describe why failure is possible and suggest ways in which such failure may be prevented or remedied. The assessment and learner conclusions may be given verbally but should be backed up by a written report in sufficient detail to inform future pruning assessments and any necessary remedial actions. Learners on work placements may use examples found at the placement, in which case evidence must be supported by witness statements from their manager or supervisor.

For P5, P6 and P10, learners will assess the pruning requirements of trees and shrubs and then carry out the necessary work in a safe, efficient and effective manner. The pruning assessment may be given verbally and practical work should be observed throughout. Learners should be asked to reflect on the results of their work. Learners on work placements may make use of examples found at the placement, in which case evidence must be supported by witness statements from their manager or supervisor. To ensure fairness, tutors must ensure that the size and complexity of the task is the same for all learners. Tutors must also ensure that the practical tasks do not require learners to undertake activities for which they are not trained or qualified (for example tree climbing and chainsaw use). Because of the seasonal nature of many pruning tasks, the assessment of this part of the unit may be spread over a period of time.

For M3, learners must produce a plan which indicates the pruning requirements of plants in the future (for example where crown reduction needs to be carried out over a number of years to prevent undue shock to a tree).

For D3, learners must produce a plan which takes account of possible changes in land use and management aims (for example change from private to public ownership, changes required by the needs of growing children). These changes should be discussed and agreed with learners before assessment.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, M1, M2, D1, D2	The Theory and Practice of Woody Plant Pruning	Learners will produce a written, illustrated report explaining the aims and techniques used when pruning woody plants. The report will include a description of the biological processes which underpin pruning and consider the possible consequences of not pruning.	Written report supported by diagrams and illustrations.

Criteria covered	Assignment title	Scenario	Assessment method
P7, P8, P9	The Prevention and Remedy of Failure in Trees and Shrubs	Learners will assess trees and shrubs for potential failure. They will explain why trees and shrubs are at risk and describe the actions to be taken to prevent or remedy such failure. They will present their assessment orally and also produce a written report summarising their conclusions and detailing the work which should be undertaken.	Verbal report. Written report.
P5, P6, P10, M3, D3	Practical Pruning of Trees and Shrubs	Learners will inspect trees and shrubs to assess their pruning requirements. They will carry out maintenance and remedial pruning in line with their assessment.	Verbal report. Practical assessment.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Land-based sector suite. This unit has particular links with:

Level 2	Level 3
Participate in Providing Estate Maintenance	T22 Support arboriculture operations T23 Dispose of residues from treework operations T26 Carry out off ground arboriculture operations T27 Install structural supports for trees T29 Access tree crowns using Mobile Elevated Platforms
Undertake Work Related Experience in the Land-based Industries	Understand and Carry out Identification, Planting and Care of Trees
	Understand the Principles and Identify the Signs of Pests and Diseases of Trees

Essential resources

Learners will need access to suitable sites to carry out practical work and to appropriate personal protective equipment (PPE).

They will also need access to pruning tools, such as pole saws, chainsaws, hedge trimmers, hand saws, secateurs and loppers, and to equipment and materials for propping, guying and bracing.

Survey and inspection equipment, such as decay detection equipment, binoculars, diameter at breast height (DBH) tapes, linear tape measures, callipers, clinometers and relascopes, should be available.

Learners will also need access to the internet and a library with multiple copies of specialist texts.

Employer engagement and vocational contexts

This unit focuses on the practical skills required to assess the pruning requirements of woody plants and to carry out this work in a safe, efficient and effective manner. Centres offering this unit are encouraged to form links with local businesses engaged in arboricultural work and with the relevant department within their local authority. Such links may give learners opportunities to gain first-hand experience in assessing pruning requirements and to learn from the experience of professionals either formally (for example guest speakers) or informally (by personal questioning). Links with professional bodies, such as the Arboricultural Association, will also be fruitful as such bodies produce a wealth of information relevant to learners' studies. Work placements are also valuable to broaden learners' experience. These placements should be carefully structured and monitored regularly in order to ensure the quality of the learning experience. It would be essential for learners and supervisors to be aware of the requirements of this unit before any work-related activities are undertaken so that naturally occurring evidence can be collected at the time.

Indicative reading for learners

Textbooks

Arboricultural Association – *A Guide to Tree Pruning* (Arboriculture Association, 1994) ISBN 090097821X

Bradshaw A, Hunt B, Walmsley T – *Trees in the Urban Landscape* (E & FN Spon, 1995) ISBN 0419201009

British Standard – *BS 5837: 2005 Trees in Relation to Construction Guidelines: Recommendations* (British Standards Institute, 2005) ISBN 978-0580464188

British Standard – *Recommendations for Tree Work* (British Standards Institute, 1989) ISBN 0580171701

Brown G – *The Pruning of Trees, Shrubs and Conifers, 2nd Edition* (Timber Press, 2004) ISBN 978-0881926132

Council of Tree and Landscape Appraisers – *Guide for Plant Appraisal* (International Society of Arboriculture, 2000) ISBN 1881956253

Lonsdale D – *Hazards from Trees* (The Stationery Office Books, 2000) ISBN 0855385146

Lonsdale D – *The Principles of Tree Hazard Assessment and Management* (The Stationery Office Books, 1999) ISBN 978-0117533554

Matheny N and Clark J – *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas* (International Society of Arboriculture, 1993) ISBN 1881956040

Mattheck C and Breloer H – *The Body Language of Trees: A Handbook for Failure Analysis* (The Stationery Office Books, 1995) ISBN 978-0117530676

Mynors C – *The Law of Trees, Forests and Hedgerows* (Sweet and Maxwell, 2002) ISBN 978-0421590403

Roberts J, Jackson N, Smith M – *Tree Roots in The Built Environment* (Renouf Publishing Company Ltd, 2006) ISBN 9780117536203

Shigo A L – *Tree Pruning: a Worldwide Photo Guide* (Shigo and Trees Associates, 1989) ISBN 978-0943563084

Strouts R and Winter T – *Diagnosis of Ill-health in Trees, Second Edition* (The Stationery Office Books, 2000) ISBN 978-0117535459

Journals

Arboriculture Journal

Quarterly Journal of Forestry

Websites

www.communities.gov.uk	Communities and local government - planning regulations, tree roots etc
www.forestry.com.uk	Forestry Commission
www.na.fs.fed.us	US Department of Agriculture, Forestry Service
www.rfs.org.uk	Royal Forestry Society
www.trees.org.uk	Arboricultural Association

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
Independent enquirers	identifying and evaluating UK legislation relating to the maintenance and management of trees and shrubs
Creative thinkers	assessing the pruning requirements of trees and shrubs
Reflective learners	assessing the pruning requirements of trees and shrubs carrying out and evaluating the result of practical pruning tasks
Self-managers	assessing pruning requirements.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	engaged in independent research, planning and evaluating the results of that research
Creative thinkers	discussing pruning requirements
Reflective learners	setting realistic goals for their research with a clear idea of what constitutes success
Team workers	cooperating with other learners to gather information during site visits
Self-managers	organising and managing their time effectively identifying and organising the resources required for their research prioritising research objectives.

Functional Skills — Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using the internet to undertake independent research
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	assessing pruning requirements
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	presenting their pruning assessment.
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	