

Unit 23: Undertake Arboricultural Skills

Unit code:	J/601/1823
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 the arboricultural skills (aerial) and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

● Unit introduction

The care and management of amenity trees is core to the arboricultural industry. Tree climbing, pruning and dismantling are all skills which practitioners in this field need to develop and eventually become proficient in. Knowing about risks, legislation, equipment, techniques and operations is fundamental in order to achieve this unit. Throughout the unit, emphasis will be placed on developing specific practical skills in accordance with industry best practice.

● Learning outcomes

On completion of this unit a learner should:

- 1 Be able to use a chainsaw in a tree to carry out branch removal
- 2 Be able to prune and dismantle small to medium trees
- 3 Know the requirements for using a chainsaw for aerial work in trees
- 4 Understand the legal and safety implications
- 5 Be able to support tree climbing operations.

Unit content

1 Be able to use a chainsaw in a tree to carry out branch removal

Pre-climbing tree inspection: root plate inspection, stem and scaffold branch inspection, canopy inspection; electrical hazards, site specific risks

Tree climbing equipment: throw lines and bags, ropes, harnesses, climbing hardware (eg karabiners, micro-pulleys, friction devices), knots, personal protective equipment (PPE), wire core ropes, aerial rescue equipment, performance criteria of climbing equipment; health and safety

Tree access and climbing techniques: climbing rope installation, body thrusting, changing anchor points, foot-locking, use of ladders, use of mobile elevated work platforms (MEWP), branch walking, use of climbing spikes; health and safety

Personal protective equipment for aerial chainsaw operations: chainsaw boots, chainsaw trousers, eye protection, hearing protection, head protection

Chainsaw selection and maintenance: top-handled chainsaws, chainsaw maintenance tasks, pre-start checks

Branch removal: free fall techniques, the use of natural and false anchors for rigging systems, equipment selection, use of lowering ropes, use of lowering devices; health and safety

Practical skills development: knowledge of relevant industry competencies

2 Be able to prune and dismantle small to medium trees

Fundamentals of branch anatomy and attachment: branch collar, branch bark ridge, included bark

Tree pruning equipment and techniques: secateurs, handsaws, pole pruners, chainsaws, natural target pruning, reduction cuts, pruning of co-dominant stems, pruning dead wood; health and safety

Work positioning and anchor point selection

Tree pruning operations: crown cleaning, crown thinning, crown raising, crown reduction; health and safety

Tree dismantling: systematic approaches to tree removal, specialist equipment selection, use of lowering lines, section felling; health and safety

Basic rigging operations: rope selection for rigging operations, using natural and false anchors, lowering devices; health and safety

Practical skills development: knowledge of relevant industry competencies

3 Know the requirements for using a chainsaw for aerial work in trees

Work site management: work site set-up, emergency planning; professionalism on an arboricultural work site; health and safety

Practical skills development: knowledge of relevant industry competencies

4 Understand the legal and safety implications

Legislation relating to arboricultural skills and operations: management of Health and Safety at Work Regulations, Lifting Operations and Lifting Equipment Regulations, Provision and Use of Work Equipment Regulations, Work at Height Regulations

Industry best practice: Arboriculture and Forestry Advisory Group (AFAG) guides; A Guide to Good Climbing Practice (Arboricultural Association); A Guide to the Use of MEWPs in Arboriculture (Arboricultural Association)

Protected trees: tree preservation orders (TPO), legal protection and applying for permission to work on a protected tree; conservation areas (CA) legal protection and applying for permission to work on a tree within a CA

Professional insurance for tree work

5 Be able to support tree climbing operations

Aerial rescue: rescue of a climber with an undamaged climbing rope, rescue of a climber with a damaged climbing rope, rescue of a climber from a standing stem, rescue using a belay rope

Arboricultural ground work: work site safety, management of debris, lowering operations, work site communication, use of chippers, use of stump grinders, site clean up

Practical skills development: knowledge of relevant industry competencies

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 carry out a risk assessment [IE]	M1 demonstrate the use of a chainsaw from a rope and harness to meet a pruning specification	D1 demonstrate tree dismantling using rigging equipment competently
P2 select and use safely appropriate equipment [SM]		
P3 climb safely and efficiently to the required working positions [SM, RL]		
P4 remove branches leaving the tree to the required specification [TW, SM]		
P5 work with ground staff to achieve a safe working environment [TW, EP]		

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:
P6 carry out simple pruning operations on small trees [TW, SM]	M2 demonstrate tree dismantling operations	D2 evaluate in detail an arboricultural operation.
P7 understand how to dismantle small to medium trees [CT, RL, TW, SM]		
P8 define the terms Target pruning; Branch bark collar; Branch bark ridge		
P9 describe pruning and branch lowering techniques		
P10 identify the equipment available for pruning and dismantling		
P11 explain the legal and safety implications associated with tree pruning and dismantling	M3 explain the responsibilities of a groundworker in supporting aerial arboricultural operations.	
P12 demonstrate climbing and aerial rescue techniques [CT, RL, TW, SM]		
P13 assist from the ground in tree pruning and removal operations [TW, SM]		
P14 dispose of arisings in accordance with safe working practices and environmental considerations. [SM]		

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 CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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Essential guidance for tutors

Delivery

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

Tutors are encouraged to use a wide range of delivery methods, including lectures, discussions, seminar presentations, site visits, practical workshops, internet and/or library-based research. Learners should also have access to a virtual learning environment (VLE) which will promote independent learning, provide a vehicle for learner differentiation, a store for lecture notes, self-assessment activities and links to online resources. Delivery should stimulate, motivate and educate learners.

Visiting expert speakers, either internal or external, should form part of the delivery. For example, speakers could include an arboricultural contractor, equipment manufacturer or representative from a trade association.

Health and safety issues relating to the inspection, pruning and removal of trees must be stressed and reinforced regularly. Risk assessments must be undertaken before any site visits or practical activities with items of equipment. Adequate personal protective equipment (PPE) must be provided if this is required by industry best practice.

Access to a range of practical sites will be required to ensure learners experience realistic work-based scenarios in order to develop their skills. A lead unit tutor should be supported by experienced instructors if necessary. The tutor/instructor: learner ratio should be maintained at $\leq 1:6$.

Due to the seasonal nature of tree growth processes and development, learners should be given the opportunity to work with trees throughout the year. Approaches to inspection, pruning and dismantling operations can be modified by canopy status.

Tutors are encouraged to consider integrating the delivery, private study and assessment for this unit with other relevant units and assessment instruments learners are taking as part of their programme of study.

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
Health and safety in arboriculture: core lecture followed by scenario-based workshop. To include pre-climbing tree inspection.
Legislation and best practice in arboricultural operations: seminar to include applying to work on protected trees and best practices guides.
Assignment 1: Fundamental Arboricultural Skills (P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14)
Core skills for tree climbing: seminar on knots, equipment selection and climbing systems.
Tree access techniques: practical workshop with demonstrations and individual work skills development.

Topic and suggested assignments/activities and/assessment
Tree climbing techniques: practical workshop with demonstrations and individual work skills development.
Aerial rescue: practical workshops involving demonstration and supervised individual work skills development.
Use of a chainsaw from a rope and harness: practical workshop including demonstration from tutors/instructors followed by closely supervised individual work skills development.
Assignment 2: Arboricultural Skills Development (M1, M2, M3, D1)
Tree pruning operations: core lecture followed by supervised individual work skills development.
Use of lowering systems in tree work: practical workshop including demonstrations and individual work skills development.
Groundwork in arboricultural operations: practical workshop and industrial experience.
Tree dismantling: practical workshop with demonstrations and individual work skills development.
Assignment 3: Evaluation of a Specific Arboricultural Operation (D2)
Reflective practice and evaluating arboricultural operations: seminar and personal work relating to particular arboricultural operations.
Unit review.

Assessment

For P1, learners must carry out a site specific risk assessment for an arboricultural operation. The risk assessment must cite specific hazards and establish suitable control measures. Best practice guides should be referred to where appropriate.

For P2, learners must independently select and safely use all equipment relevant to an identified arboricultural task safely. Learners should justify their selection.

For P3, learners must climb a tree safely and in accordance with industry best practice. Assessment should allow the climber (learner) to demonstrate their ability to achieve work positions in at least three different regions of the canopy.

For P4, learners must remove branches, identified by a supervisor, safely and efficiently. The branches should require different work positioning, ie it is not adequate for the climber (learner) to remove a series of branches from the same position within the tree. Branches do not need to be removed with a chainsaw.

For P5, learners must work with ground staff to ensure the work site is safe for members of their own work team and the public. Emphasis should be placed on correct signs and continued communication throughout the operation.

For P6, learners must complete a simple pruning operation on small trees (formative pruning/crown raise) which meets industry standards (BS 3998) and client specification.

For P7, learners must demonstrate an understanding of how to dismantle a small to medium tree. A realistic scenario should be given to learners so straight felling is not an option. Learners can be assessed orally or asked to produce a report outlining their intended actions and how they will result in the safe removal of the tree.

For P8, learners must define orally or in writing 'target pruning', 'branch bark collar'/'branch collar' and 'branch bark ridge'.

For P9, learners must describe orally or in writing pruning and branch lowering techniques. This should include crown raising, crown cleaning and crown reduction. Descriptions of lowering techniques must include reference to rope and anchor selection.

For P10, learners must identify the equipment available for pruning and dismantling and outline the role of each item in pruning and/or dismantling operations must be outlined.

For P11, learners must explain orally or in writing the process by which trees can be legally protected (TPO, CA), legislation relating to health and safety on arboricultural work sites and equipment used in arboricultural operations. It is also essential that learners explain, in broad terms, the consequences of working without permission on a protected tree.

For P12, learners must perform aerial rescue in accordance with industry best practice. Climbers (learners) should demonstrate at least two forms of aerial rescue.

For P13, learners must support pruning and dismantling operations from the ground. This must include organising debris, attaching tools to a work line safely, lowering operations and work site clean up.

For P14, learners must demonstrate competence in chipping operations and/or organised habitat piles. Learners should provide oral or written commentary to justify their approach to the disposal of arboricultural arisings.

For M1, learners need to demonstrate the consistent, safe use of a chainsaw from a rope and harness. All operations must be in accordance with industry best practice and achieve specific pruning objectives.

For M2, learners must demonstrate the safe, systematic and sequential removal of branches and/or stems. Learners should have the opportunity to use free fall techniques and lower branches. All operations must be in accordance with industry best practice.

For M3, learners must explain the responsibilities of a groundworker in supporting aerial arboricultural operations. This must include the need to deliver tools to the climber efficiently, tending the climber's rope, managing rigging lines, organising debris, work site safety and effective communication.

For D1, learners must demonstrate safe dismantling of a tree using rigging equipment competently. The climber (learner) must select and use natural and false anchors for lowering limbs/stem sections, coordinate the use of lowering devices where applicable and communicating effectively with groundstaff.

For D2, learners must evaluate, in detail, a specific arboricultural operation (pruning or dismantling) based on individual experience. This must include learner reflection on safety and efficiency. Learners should comment on potential improvements to operations using specific examples. The evaluation must be comprehensive and include all elements required for successful completion of the operation.

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, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14	Fundamental Arboricultural Skills	You will be assessed in work-based scenarios on aerial arboricultural operations without chainsaws. This may either be as part of work experience with an arboricultural contractor or in supervised practical workshops.	Tutor/instructor observation. Practical workshops. Questions and answers. Photographs/video.

Criteria covered	Assignment title	Scenario	Assessment method
M1, M2, M3, D1	Arboricultural Skills Development	You will be assessed in a work-based scenario on aerial arboricultural operations with a chainsaw. You will systematically dismantle a tree and explain the responsibilities of a groundworker in supporting aerial operations. This may either be as part of work experience with an arboricultural contractor or in supervised practical workshops. Emphasis should be placed on consistently observing safe working practice and an ability to provide appropriate commentary on arboricultural operations when asked.	Tutor observation.
D2	Evaluation of a Specific Arboricultural Operation	You must provide a detailed evaluation of an arboricultural operation identifying best practice and providing suggestions for improving safety, efficiency and quality, where applicable.	A report or presentation based on an individual experience.

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
Introduction to Practical Forestry Skills	TW26 Carry out off ground arboriculture operations TW31 Carry out advanced off ground arboricultural operations

Essential resources

- Access to a wide range of trees on practical work sites.
- A range of climbing kits which have been inspected in accordance with the Lifting Operations and Lifting Equipment Regulations
- Personal protective equipment to meet industry best practice requirements
- Rigging equipment
- Multiple handsaws and top handled chainsaws
- Multiple ground chainsaws
- A chipper
- Skilled and experienced staff.

Employer engagement and vocational contexts

Contractors with a proven track record of delivering a range of high quality arboricultural operations should be invited to share their experiences with learners. Trade associations may be invited to discuss industry best practice. Learners are encouraged to attend important industry trade fairs.

Indicative reading for learners

Textbooks

Arboricultural Association – *A Guide to the Use of MEWPs in Arboriculture* (Arboricultural Association, 2008) ISBN 9780900978449

Blair D – *Arborist Equipment: A Guide to the Tools and Equipment of Tree Maintenance and Removal, 2nd edition* (International Society of Arboriculture, 1999) ISBN 9781881956136

British Standard 3998 – *Recommendations for Tree Work* (British Standards Institute) ISBN 0580171701

Brown G E – *The Pruning of Trees, Shrubs and Conifers, 2nd edition with revisions and additions by Tony Kirkham* (Timber Press, 2009) ISBN 978-1604690026

Cottam M, McKeown L and White C – *A Guide to Good Climbing Practice* (Arboricultural Association, 2005) ISBN 9780900978395

European Arboricultural Council – *European Tree Worker* (Patzner Verlag, 2005) ISBN 3876171091

Gilman E – *An Illustrated Guide to Pruning, 2nd edition* (Delmar Thomson Learning, 2001) ISBN 9780766822719
Also available as an ebook on www.ebrary.com

Harris R W, Clark J R and Matheny N P – *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines, 4th edition* (Prentice Hall, 2003) ISBN 0130888822

Hartman J R, Sall M A and Pirone T P – *Tree Maintenance* (Oxford University Press, 2000) ISBN 9780195119916

Jepson J – *To Fell a Tree: A Complete Guide to Successful Tree Felling and Woodcutting Methods* (Beaver Tree Publishing, 2009) ISBN 9780975525296

Jepson J – *The Tree Climber's Companion* (Beaver Tree Publishing, 2000) ISBN 9780615112909

Lilly S J and Kotwica B – *Tree Climber's Guide, 3rd edition* (International Society of Arboriculture, Printec Press, 2005) ASIN B000VT3FTI

Lilly S J and Donzelli P S – *The Art and Science of Practical Rigging* (International Society of Arboriculture, 2001) ISBN 9781881956280

Lingens D – *Tree Climbers Knotbook* (Schlauverlag, 2006) ISBN 3981041712

Shigo A L – *Tree Pruning: A Worldwide Photo Guide* (Shigo and Trees Associates, 1989) ISBN 9780943563084

Shigo A L – *Modern Arboriculture* (Shigo and Trees Associates, 1991) ISBN 9780943563091

Journals

Arboricultural Journal

Arboricultural Newsletter

Arboriculture and Urban Forestry

Arborist News

Essential Arb

Tree Care Industry

Websites

www.aie.org.uk

www.arbtalk.co.uk

www.ewebmagazine.co.uk

www.forestry.gov.uk

www.hse.gov.uk/agriculture/forestry.htm

www.hse.gov.uk/treework/

www.isa-arbor.com

www.treecareindustry.org

www.trees.org.uk

Arboricultural Information Exchange

Arb Talk Discussion Forum for Arborists

eWorld of Trees Magazine

Forestry Commission

Health and Safety Executive: Tree Work Information

Health and Safety Executive: Tree Work Health and Safety

International Society of Arboriculture

Tree Care Industry Association

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	carrying out risk assessments for arboricultural operations
Creative thinkers	discussing how to dismantle trees and demonstrating aerial rescue techniques
Reflective learners	building on experience of aerial arboricultural operations
Team workers	working with a team to meet particular arboricultural goals in a work environment
Self-managers	selecting equipment and carrying out arboricultural tasks such as pruning.

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	evaluating the effectiveness of specific arboricultural operations
Creative thinkers	developing expertise in arboricultural operations
Reflective learners	developing expertise in arboricultural operations and evaluating the effectiveness of specific arboricultural operations
Team workers	developing expertise in arboricultural operations
Self-managers	developing expertise in arboricultural operations
Effective participators	evaluating the effectiveness of specific arboricultural operations.

● Functional Skills — Level 2

Skill	When learners are ...
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	planning arboricultural operations and use of equipment
Identify the situation or problem and the mathematical methods needed to tackle it	planning arboricultural operations and use of equipment
Select and apply a range of skills to find solutions	planning arboricultural operations and use of equipment
Use appropriate checking procedures and evaluate their effectiveness at each stage	planning arboricultural operations and use of equipment
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	planning arboricultural operations and use of equipment
Draw conclusions and provide mathematical justifications	planning arboricultural operations and use of equipment
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	explaining the responsibilities of a groundworker in supporting aerial operations.