



# **LEVEL 4 AWARD, CERTIFICATE AND DIPLOMA IN ARBORICULTURE**

## **QUALIFICATION GUIDANCE**

**Level 4 Award – [60024902]  
Level 4 Certificate – [60026984]  
Level 4 Diploma – [60025827]**

## About ABC Awards

ABC Awards (ABC) is one of the largest vocational awarding bodies in the United Kingdom with an established reputation for quality and customer service. ABC is recognised by the regulatory authorities. ABC is a Component Awarding Body (CAB) for 14-19 Diplomas

The ABC portfolio of qualifications includes National Vocational Qualifications (NVQs) and Vocationally Related Qualifications (VRQs)

ABC's VRQs may also be

- Technical Certificates
- Additional and/or Specialist Learning for the 14-19 Diplomas
- Included within Foundation Learning

ABC's national operation is supported through its regional offices which provide support to centres and a full range of assessment services. ABC has a team of dedicated staff who can offer advice and guidance on the full Portfolio, Examination and Moderation services including e-Assessment offered by ABC, as well as the full range of ABC training events and conferences. The team is committed to helping you in the way that suits your requirements and is available to visit you at your convenience

ABC encourages centres to use its on-line registration service. Registration facilities are available through our web site – <http://www.abcawards.co.uk/secure/register.php>

## Sources of Additional Information

The ABC web site [www.abcawards.co.uk](http://www.abcawards.co.uk) provides access to a wide variety of information

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## Qualification Summary

### ABC Awards Level 4 Award, Certificate and Diploma in Arboriculture

|  |  |
|--|--|
| <b>Qualifications</b>  |  |
| Level 4 Award in Arboriculture<br>Level 4 Certificate in Arboriculture<br>Level 4 Diploma in Arboriculture |  |
| <b>Assessment</b>  | Internal assessment, internal and external moderation  |
| <b>Grading</b>   | Pass   |
| <b>Progression</b>   | Learners could progress from these Level 4 qualifications onto the Level 6 Certificate or Diploma in Arboriculture. Centres should be aware that Reasonable Adjustments which may be permitted for assessment may in some instances limit a learner's progression into the sector. Centres must, therefore, inform learners of any limits their learning difficulty may impose on future progression |
| <b>Operational Start Date</b>  | 01/08/2011   |
| <b>Review Date</b>   | 31/08/2014   |
| <b>ABC Sector</b>  | Land Based / Environmental   |
| <b>SSA Sector</b>  | 03.2 Horticulture and Forestry   |
| <b>Support from sector bodies</b>  | These qualifications are supported by Lantra, the Sector Skills Council for environmental and land-based industries  |
| <b>ABC Administering Office</b>  | Additional guidance and advice to support these qualifications and units is freely available to approved ABC centres<br>See ABC web site for the contact details of the administering office   |

### Level 4 Award in Arboriculture

Rules of Combination: Learners must achieve a minimum of 9 credits and a maximum of 12 credits from any of the units below. A minimum of 7 credits must be at Level 4 or above.

| Unit  | Level | Credit Value | GLH | Page No. |
|---|-------|--------------|-----|----------|
| Pest, disease and disorder identification [M/503/3322]  | 3     | 5            | 24  | 7        |
| Principles of woodland establishment and management [F/503/3325]  | 3     | 5            | 25  | 12       |
| Tree biomechanics and maintenance [M/503/3319]  | 4     | 7            | 40  | 18       |
| Tree development and protection [A/503/3324]  | 4     | 5            | 25  | 23       |
| Tree related damage to built structures [L/502/3327]  | 4     | 4            | 20  | 27       |
| Woody vegetation formation and physiology [D/503/3316]  | 4     | 6            | 35  | 32       |
| Principles of tree management [T/503/3323]  | 5     | 9            | 45  | 39       |
| Selection, planting and design with hardy nursery stock for amenity and landscape purposes [L/503/3330] | 5     | 8            | 40  | 45       |

Numbers in box brackets indicate QCF unit Number

If learners achieve credits from units of the same title (or linked titles) at more than one level, they cannot count credits achieved from both units towards the credit target of a qualification

|                                  |   |
|----------------------------------|---|
| <b>Entry Requirements</b>        | 16+   |
| <b>Section 96/97</b>             | <b>Pre 16</b> <b>16 – 18</b> ✓ <b>19 +</b> ✓  |
| <b>LAD Aim Reference</b>         | 60024902  |
| <b>Recommended GLH</b>           | Minimum of 44 GLH   |
| <b>Points Score</b>              | See ABC web site / Qualifications Directory   |
| <b>Contribution to Threshold</b> | See ABC Qualifications Directory  |
| <b>ASL Option</b>                | TBC   |
| <b>Foundation Learning</b>       | N/A   |
| <b>Type of Funding Available</b> | See LAD (Learning Aims Database)  |
| <b>Minimum Qualification Fee</b> | See ABC web site for current fees and charges   |
| <b>Unit Fee</b>                  | Unit fees are based upon a unit's individual credit value. Please see the ABC web site for the current fee charged per credit |
| <b>Additional Information</b>    | Please see ABC web site for qualifications that are eligible for Credit Transfer/RPL/Exemption                                |

### Level 4 Certificate in Arboriculture

Rules of Combination: Learners must achieve a minimum of 31 credits. This must include 27 credits from the mandatory units.

| Unit  | Level | Credit Value | GLH | Page No. |
|---|-------|--------------|-----|----------|
| <b>Mandatory Units</b>  |       |              |     |          |
| Pest, disease and disorder identification [M/503/3322]  | 3     | 5            | 24  | 7        |
| Tree biomechanics and maintenance [M/503/3319]  | 4     | 7            | 40  | 18       |
| Woody vegetation formation and physiology [D/503/3316]  | 4     | 6            | 35  | 32       |
| Principles of tree management [T/503/3323]  | 5     | 9            | 45  | 39       |
| <b>Optional Units</b>   |       |              |     |          |
| Principles of woodland establishment and management [F/503/3325]  | 3     | 5            | 25  | 12       |
| Tree development and protection [A/503/3324]  | 4     | 5            | 25  | 23       |
| Tree related damage to built structures [L/502/3327]  | 4     | 4            | 20  | 27       |
| Selection, planting and design with hardy nursery stock for amenity and landscape purposes [L/503/3330] | 5     | 8            | 40  | 45       |

Numbers in box brackets indicate QCF unit Number

If learners achieve credits from units of the same title (or linked titles) at more than one level, they cannot count credits achieved from both units towards the credit target of a qualification

|                                  |   |  |                |   |             |   |
|----------------------------------|---|--|----------------|---|-------------|---|
| <b>Entry Requirements</b>        | 16+   |  |                |   |             |   |
| <b>Section 96/97</b>             | <b>Pre 16</b>   |  | <b>16 – 18</b> | ✓ | <b>19 +</b> | ✓ |
| <b>LAD Aim Reference</b>         | 60026984  |  |                |   |             |   |
| <b>Recommended GLH</b>           | Minimum of 164 GLH  |  |                |   |             |   |
| <b>Points Score</b>              | See ABC web site / Qualifications Directory   |  |                |   |             |   |
| <b>Contribution to Threshold</b> | See ABC Qualifications Directory  |  |                |   |             |   |
| <b>ASL Option</b>                | N/A   |  |                |   |             |   |
| <b>Foundation Learning</b>       | N/A   |  |                |   |             |   |
| <b>Type of Funding Available</b> | See LAD (Learning Aims Database)  |  |                |   |             |   |
| <b>Minimum Qualification Fee</b> | See ABC web site for current fees and charges   |  |                |   |             |   |
| <b>Unit Fee</b>                  | Unit fees are based upon a unit's individual credit value. Please see the ABC web site for the current fee charged per credit |  |                |   |             |   |
| <b>Additional Information</b>    | Please see ABC web site for qualifications that are eligible for Credit Transfer/RPL/Exemption                                |  |                |   |             |   |

## Level 4 Diploma in Arboriculture

Rules of Combination: Learners must achieve a minimum of 49 credits. This must include 40 credits from the mandatory units.

| Unit  | Level | Credit Value | GLH | Page No. |
|---|-------|--------------|-----|----------|
| <b>Mandatory Units</b>  |       |              |     |          |
| Pest, disease and disorder identification [M/503/3322]  | 3     | 5            | 24  | 7        |
| Tree biomechanics and maintenance [M/503/3319]  | 4     | 7            | 40  | 18       |
| Tree development and protection [A/503/3324]  | 4     | 5            | 25  | 23       |
| Woody vegetation formation and physiology [D/503/3316]  | 4     | 6            | 35  | 32       |
| Principles of tree management [T/503/3323]  | 5     | 9            | 45  | 39       |
| Selection, planting and design with hardy nursery stock for amenity and landscape purposes [L/503/3330] | 5     | 8            | 40  | 45       |
| <b>Optional Units</b>   |       |              |     |          |
| Principles of woodland establishment and management [F/503/3325]  | 3     | 5            | 25  | 12       |
| Tree related damage to built structures [L/502/3327]  | 4     | 4            | 20  | 27       |

Numbers in box brackets indicate QCF unit Number

If learners achieve credits from units of the same title (or linked titles) at more than one level, they cannot count credits achieved from both units towards the credit target of a qualification

|                                  |   |  |                |   |             |   |
|----------------------------------|---|--|----------------|---|-------------|---|
| <b>Entry Requirements</b>        | 16+   |  |                |   |             |   |
| <b>Section 96/97</b>             | <b>Pre 16</b>   |  | <b>16 – 18</b> | ✓ | <b>19 +</b> | ✓ |
| <b>LAD Aim Reference</b>         | 60025827  |  |                |   |             |   |
| <b>Recommended GLH</b>           | Minimum of 254 GLH  |  |                |   |             |   |
| <b>Points Score</b>              | See ABC web site / Qualifications Directory   |  |                |   |             |   |
| <b>Contribution to Threshold</b> | See ABC Qualifications Directory  |  |                |   |             |   |
| <b>ASL Option</b>                | N/A   |  |                |   |             |   |
| <b>Foundation Learning</b>       | N/A   |  |                |   |             |   |
| <b>Type of Funding Available</b> | See LAD (Learning Aims Database)  |  |                |   |             |   |
| <b>Minimum Qualification Fee</b> | See ABC web site for current fees and charges   |  |                |   |             |   |
| <b>Unit Fee</b>                  | Unit fees are based upon a unit's individual credit value. Please see the ABC web site for the current fee charged per credit |  |                |   |             |   |
| <b>Additional Information</b>    | Please see ABC web site for qualifications that are eligible for Credit Transfer/RPL/Exemption                                |  |                |   |             |   |

## **Introduction**

The Level 4 Award, Certificate and Diploma in Arboriculture are designed for those people working in arboriculture, in both the public and private sectors, to complement their training and experience, and to provide evidence of their knowledge of arboriculture.

They have been developed in collaboration with industry, providers and Lantra, the Sector Skills Council for the Land based industries

The Level 4 Award will be put forward for inclusion on the ASL catalogue. Please check the ABC Awards website for the current status of this qualification.

## **Aims**

The ABC Level 4 Award, Certificate and Diploma in Arboriculture aim to

- improve job prospects
- encourage knowledge and application of current arboricultural industry best practice
- encourage learners to follow a programme of structured continuing professional development (CPD)
- facilitate access to higher level management qualifications

## **Target Group**

These qualifications are designed for those learners who

- have been involved in the practical side of the industry and wish to progress into a more managerial role
- work in related disciplines such as horticulture, forestry, countryside management, landscape architecture and planning and wish to increase their knowledge of arboriculture
- are currently working as tree officers, technicians and those involved in tree survey works who wish to achieve a recognised vocational qualification

ABC expects approved centres to recruit with integrity on the basis of a learner's ability to contribute to and successfully complete all the requirements of a unit(s) or the full qualification

## **Progression Opportunities**

These qualifications provide suitable skills and experience to progress to other higher level qualifications such as the ABC Awards Level 6 Certificate or Diploma in Arboriculture.

In addition, achievement of these qualifications should provide a solid foundation of skills supporting progression to higher levels of responsibility and opening up the possibility of entrepreneurial activities such as starting one's own business



Centres should be aware that Reasonable Adjustments which may be permitted for assessment may in some instances limit a learner's progression into the sector. Centres must, therefore, inform learners of any limits their learning difficulty may impose on future progression

## Unit Details

|   |   |
|---|---|
| <b>Unit Title</b>   | <b>M/503/3322 Pest, disease and disorder identification</b>   |
| <b>Level</b>  | <b>3</b>  |
| <b>Credit Value</b>   | <b>5</b>  |
| <b>Guided Learning Hours</b>  | <b>24</b>   |
| <b>Unit Summary</b>   | This unit covers the identification, diagnosis, understanding, implications and treatment of present diseases and disorders that are a threat to woody vegetation populations in GB   |
| <b>Learning Outcomes (1 to 5)</b><br><i>The learner will</i>  | <b>Assessment Criteria (1.1 to 5.3)</b><br><i>The learner can</i>   |
| <b>1.</b> Know the legislation that regulates pest and disease control                                    | <p><b>1.1</b> Identify the main bodies that regulate pest and disease control</p> <ul style="list-style-type: none"> <li>• Internationally</li> <li>• European wide</li> <li>• within Great Britain</li> </ul> <p><b>1.2</b> Describe how domestic legislation would operate for a named pest or disease which is subject to a plant health order</p> <p><b>1.3</b> Explain the purposes of the following</p> <ul style="list-style-type: none"> <li>• Plant Health Order</li> <li>• Plant passport</li> <li>• Phytosanitary certificate</li> </ul> |
| <b>2.</b> Know how to undertake an investigation to establish the presence of a pest, disease or disorder | <p><b>2.1</b> Identify five each from the following from signs or symptoms present on woody vegetation</p> <ul style="list-style-type: none"> <li>• bacteria</li> <li>• mammals</li> <li>• insects</li> <li>• disorders</li> </ul> <p><b>2.2</b> Clarify how to confirm the identity of a named pest, disease or disorder</p>   |
| <b>3.</b> Know what preventative or remedial treatments are available                                     | <p><b>3.1</b> Prescribe an appropriate treatment, and justify your selection, for each of the following identified in 2.1</p> <ul style="list-style-type: none"> <li>• bacteria</li> <li>• mammals</li> <li>• insects</li> <li>• disorders</li> </ul>   |

|   |   |
|---|---|
| <p><b>4.</b> Know how to undertake diagnosis of ill health with the aid of specialist equipment</p> | <p><b>4.1</b> Describe the principles of operation of a</p> <ul style="list-style-type: none"> <li>• chlorophyll activity test</li> <li>• starch indicator test</li> </ul>  |
| <p><b>5.</b> Understand how fungi colonise woody tissues</p>  | <p><b>5.1</b> Describe the four principal strategies employed by tree decay fungi to colonise woody tissues</p> <p><b>5.2</b> Describe each of the following types of rot and give an example of a fungus for each</p> <ul style="list-style-type: none"> <li>• white – selective</li> <li>• white simultaneous</li> <li>• brown</li> <li>• soft</li> </ul> <p><b>5.3</b> For 20 principal decay fungi identify the following aspects</p> <ul style="list-style-type: none"> <li>• common host</li> <li>• colonisation strategy</li> <li>• type of rot caused</li> <li>• arboricultural significance</li> <li>• part of host affected</li> <li>• any preventative measures/treatment</li> </ul> |

# SUPPORTING UNIT INFORMATION

## M/503/3322 Pest, disease and disorder identification – Level 3

### INDICATIVE CONTENT

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

#### ***Learning Outcome 1. Know the legislation that regulates pest and disease control***

World Trade Organisation (WTO), International Plant Protection Convention (IPPC), European and Mediterranean Plant Protection Organisation (EPPO), European instruments and GB national legislation. Plant passports, phytosanitary certificates, EPPO lists, Plant Health Orders. Abiotic and biotic disorders present in, and threatening GB.

#### ***Learning Outcome 2. Know how to undertake an investigation to establish the presence of a pest, disease or disorder***

Laboratory testing, expert advice, Arboricultural Advisory and Information Service (AAIS)

#### ***Learning Outcome 3. Know what preventative or remedial treatments are available***

Timing and extent of operations, equipment disinfection, biological controls, chemical treatments, sanitation felling, treatment of arisings, physical protection, repellents, population control

#### ***Learning Outcome 4. Know how to undertake diagnosis of ill health with the aid of specialist equipment***

Chlorophyll fluorescence testing, starch tests.

#### ***Learning Outcome 5. Understand how fungi colonise woody tissues***

Heart rot, Sapwood exposed (Unspecialised opportunists) Sapwood intact (latent decay) (specialist opportunists) and Active pathogenesis (Fungal Induced dysfunction)  
Brown rot, selective delignification, simultaneous white rot, soft rot  
Host / fungus interrelationships, significances and controls

### TEACHING STRATEGIES AND LEARNING ACTIVITIES

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

### METHODS OF ASSESSMENT

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

**Minimum requirements when assessing this unit**

ABC expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

**It is important that practical assessment activities are supervised appropriately**

**EVIDENCE OF ACHIEVEMENT**

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the ABC web site).

## **ADDITIONAL INFORMATION**

### **Useful sources of reference**

- “Principles of Tree Hazard Assessment and Management” by David Lonsdale - ‘Research for Amenity Trees No.7 - *ISBN 0-11-753355-6*
- “Diagnosis of Ill-Health in Trees” - ‘Research for Amenity Trees No.2’ - *ISBN 0-11-752919-2*
- “Diagnosis and Prognosis of the Development of Wood Decay in Urban Trees” by Francis W. M. R. Schwarze - *ISBN 978-0-646-49144-8*

**See ABC website for further information**

|  |  |
|--|--|
| <b>Unit Title</b>  | <b>F/503/3325 Principles of woodland establishment and management</b>  |
| <b>Level</b>   | <b>3</b>   |
| <b>Credit Value</b>  | <b>5</b>   |
| <b>Guided Learning Hours</b>                                 | <b>25</b>  |
| <b>Unit Summary</b>  | This unit covers the maintenance of existing woodland and establishment of new amenity woodlands which are open to public access and where the main aims of management feature public enjoyment, conservation of wildlife and landscape value  |
| <b>Learning Outcomes (1 to 5)</b><br><i>The learner will</i> | <b>Assessment Criteria (1.1 to 5.4)</b><br><i>The learner can</i>  |
| <b>1.</b> Understand the principles of silviculture          | <p><b>1.1</b> Describe the main principles of one silvicultural system from all of the following</p> <ul style="list-style-type: none"> <li>• Clear fell</li> <li>• Selection <ul style="list-style-type: none"> <li>- Single</li> <li>- Group</li> </ul> </li> <li>• Shelterwood <ul style="list-style-type: none"> <li>- Group</li> <li>- Irregular</li> </ul> </li> </ul> <p><b>1.2</b> Evaluate the application of one continuous cover system for use where the primary aims include wildlife conservation, recreation and landscape value</p>  |
| <b>2.</b> Know the different types of woodland present in GB | <p><b>2.1</b> Distinguish the main characteristics of the following</p> <ul style="list-style-type: none"> <li>• ancient woodland</li> <li>• ancient semi-natural woodland</li> <li>• plantation on ancient woodland site</li> <li>• semi-natural woodland</li> <li>• recent semi-natural</li> <li>• new native woodland</li> <li>• pasture woodland</li> <li>• coppice with standards</li> <li>• coppice</li> </ul> <p><b>2.2</b> Summarise the main principles of managing five of the following</p> <ul style="list-style-type: none"> <li>• ancient woodland</li> <li>• ancient semi-natural woodland</li> <li>• plantation on ancient woodland site</li> <li>• semi-natural woodland</li> </ul> |

|   |  |
|---|--|
|   | <ul style="list-style-type: none"> <li>• recent semi-natural</li> <li>• new native woodland</li> <li>• pasture woodland</li> <li>• coppice with standards</li> <li>• coppice</li> </ul>  |
| <p><b>3.</b> Know what sources and types of grant are available to assist woodland management and establishment</p> | <p><b>3.1</b> Identify the main sources of grant aid</p> <p><b>3.2</b> Describe the application of six grants/sources of funding aimed at different aspects of woodland management</p>   |
| <p><b>4.</b> Understand the processes of forming a woodland management plan</p>                                     | <p><b>4.1</b> Identify the significant information to be collected as part of an existing woodland site assessment and justify how the information contributes to forming a plan</p> <p><b>4.2</b> Explain the purpose of the following when written in to a plan</p> <ul style="list-style-type: none"> <li>• aims</li> <li>• objectives</li> <li>• operations statements</li> </ul> <p><b>4.3</b> Analyse four given objectives and four given operation statements that cover the following two aims</p> <ul style="list-style-type: none"> <li>• wildlife conservation</li> <li>• recreation</li> </ul> <p><b>4.4</b> Explain the value of a monitoring and review process</p> <p><b>4.5</b> Explain how to implement a monitoring and review process</p>        |
| <p><b>5.</b> Understand the processes involved in establishing a new woodland</p>                                   | <p><b>5.1</b> Identify the significant information to be collected as part of a site assessment and justify how each item of information contributes to forming a plan of operations</p> <p><b>5.2</b> Provide and justify realistic and economic solutions for the following site constraints</p> <ul style="list-style-type: none"> <li>• low nutrient levels particularly nitrogen</li> <li>• compacted slopes of 40 year old mining spoil</li> <li>• improved grassland</li> </ul> <p><b>5.3</b> Provide solutions to the threats to tree establishment posed by one from each of the following groups</p> <ul style="list-style-type: none"> <li>• mammals</li> <li>• mechanical damage</li> <li>• excessive weed growth</li> <li>• lack of moisture</li> </ul> |



|   |   |
|---|---|
|   | <p><b>5.4</b> Justify their choice of the following to be used in the establishment of a new amenity woodland on a given site</p> <ul style="list-style-type: none"> <li>• five main canopy trees</li> <li>• three understory shrub species</li> <li>• five woodland edge species</li> </ul>  |
| <p><b>6.</b> Understand the concept of woodland ecology</p>           | <p><b>6.1</b> Describe a basic food chain related to trees that covers the four levels of the recognised pyramid of four trophic levels</p> <p><b>6.2</b> Define the terms ecosystem and ecotone</p> <p><b>6.3</b> Describe each of the following and explain their ecological inter-relationship</p> <ul style="list-style-type: none"> <li>• plant subsystem</li> <li>• herbivore/carnivore subsystem</li> <li>• decomposition subsystem</li> </ul> <p><b>6.4</b> Define each of the following and explain their importance to woodland ecology</p> <ul style="list-style-type: none"> <li>• saproxylic invertebrates</li> <li>• red data book species</li> <li>• wood decay fungi</li> <li>• deadwood</li> <li>• phoenix regeneration</li> </ul> |
| <p><b>7.</b> Understand plant survival or 'ecological' strategies</p> | <p><b>7.1</b> Describe the r-K continuum and explain why it contributes to an understanding of plant communities</p> <p><b>7.2</b> Define the term competition as used in connection with plant communities</p> <p><b>7.3</b> Identify and explain how four features of named trees contribute to competitive ability</p> <p><b>7.4</b> Define biodiversity and explain why it is important to the success and survival of a woodland community</p>   |

# SUPPORTING UNIT INFORMATION

## F/503/3325 Principles of woodland establishment and management – Level 3

### INDICATIVE CONTENT

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

#### ***Learning Outcome 1. Understand the principles of silviculture***

Clear fell, Selection – Single, Group. Shelterwood – Uniform, Group, Irregular.

#### ***Learning Outcome 2. Know the different types of woodland present in GB***

Ancient woodland, Ancient semi-natural woodland, Plantations on ancient woodland sites, Semi-natural woodland, New native woodland, Pasture woodland, Coppice with standards, Coppice

#### ***Learning Outcome 3. Know what sources and types of grant are available to assist woodland management and establishment***

FC grants, woodland trust, Local Authority, other sources of funding.

#### ***Learning Outcome 4. Understand the processes of forming a woodland management plan***

Survey information, such as - ownership, age, size / shape, topography, designations, current usage, neighbouring land use, boundaries, rights of way, flora / fauna etc. Management aims, objectives and operations – monitoring and reviewing

#### ***Learning Outcome 5. Understand the processes involved in establishing a new woodland***

Site survey information such as - site history, existing ground vegetation, existing woody vegetation, soil characteristics, evidence of damaging agents, exposure and frost, surrounding land uses, existing uses of site, features of cultural or archaeological value, landform / visual analysis etc.

Difficult sites such as, brownfield, ex industry, agricultural land etc.

Biotic and abiotic threats to establishment such as pests, soil problems, poor management practices, competition etc.

Species selection

#### ***Learning Outcome 6. Understand the concept of woodland ecology***

Ecosystem and ecotone, niche habitats. Plant subsystem, Herbivore/Carnivore subsystem, Decomposition subsystem. Saproxyllic invertebrates, Red data book species, Wood decay fungi, Deadwood, Phoenix regeneration.

#### ***Learning Outcome 7. Understand plant survival or 'ecological' strategies***

r-species and K-species. r-K continuum of MacArthur and Wilson. Competition (Grime 1979) tall structure, growth form, high maximum potential relative growth rate (RGR) and litter density. Biodiversity.

## **TEACHING STRATEGIES AND LEARNING ACTIVITIES**

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## **METHODS OF ASSESSMENT**

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### **Minimum requirements when assessing this unit**

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**It is important that practical assessment activities are supervised appropriately**

## **EVIDENCE OF ACHIEVEMENT**

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

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All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the ABC web site).

## **ADDITIONAL INFORMATION**

### **Useful sources of reference**

- “Woodland Management – A Practical Guide” by Chris Starr - *ISBN 1 86126 789-4*
- “Urban Forestry Practice” – Forestry Commission Handbook 5 - *ISBN 0-11-710273-3*
- “Creating and Managing Woodlands Around Towns” - Forestry Commission Handbook 11 - *ISBN 0-11-710328-4*
- “Wildlife Conservation in Managed Woodlands and Forests” E. and J. Harris - *ISBN 0 86380 206 0*
- “Woodland Conservation and Management” by George Peterken - *ISBN 0-412-55730-4*

[www.forestry.gov](http://www.forestry.gov)

for a multitude of useful downloads, including:

‘The Management of Semi-natural woodlands – Practice Guides’ – Nos. 1 to 8

**See ABC website for further information**

|   |  |
|---|--|
| <b>Unit Title</b>   | <b>M/503/3319 Tree biomechanics and maintenance</b>  |
| <b>Level</b>  | <b>4</b>   |
| <b>Credit Value</b>   | <b>7</b>   |
| <b>Guided Learning Hours</b>  | <b>40</b>  |
| <b>Unit Summary</b>   | This unit covers the inspection of trees related to their condition and remedial actions that may be required as a result of finding defects   |
| <b>Learning Outcomes (1 to 4)</b><br><i>The learner will</i>                  | <b>Assessment Criteria (1.1 to 4.4)</b><br><i>The learner can</i>  |
| <b>1.</b> Understand tree form as an ideal structure                          | <p><b>1.1</b> Explain each of the following principles</p> <ul style="list-style-type: none"> <li>• the distribution of a tree's external and internal stresses</li> <li>• the axiom of uniform stress</li> <li>• self-optimisation of the undamaged tree</li> <li>• 'self-healing' in the tree following mechanical wounding</li> <li>• the law of the minimal lever arm and the strategy of flexibility</li> </ul> <p><b>1.2</b> Explain why trees might break despite their optimal form</p> <p><b>1.3</b> Describe the ways that a tree or parts of can fracture using five different examples</p> |
| <b>2.</b> Be able to recognise warning symptoms of impending failure in trees | <p><b>2.1</b> Identify ten symptoms of mechanical defects and explain how each defect can lead to failure</p> <p><b>2.2</b> Undertake a systematic inspection of five trees</p> <ul style="list-style-type: none"> <li>• record any defects found</li> <li>• evaluate the defects, without the use of specialised equipment, and draw conclusions regarding the potential risk posed by each tree</li> <li>• present the findings in an appropriate format</li> </ul> <p><b>2.3</b> Describe three theories that claim to calculate the point at which hollow tree failure occurs</p>                  |
| <b>3.</b> Understand the treatment of defects in trees                        | <p><b>3.1</b> Describe each of the following in relation to risk management</p> <ul style="list-style-type: none"> <li>• formative pruning</li> <li>• crown reduction</li> <li>• crown thinning</li> <li>• selective branch removal</li> </ul>   |

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|   | <ul style="list-style-type: none"> <li>• pollarding</li> <li>• monolithing</li> <li>• treatment of significant decay/cavities</li> <li>• treatment of weak structures</li> </ul> <p><b>3.2</b> Prescribe an appropriate treatment for each of five given tree conditions in accordance with best practice</p> <p><b>3.3</b> Evaluate the effectiveness of each treatment prescribed in 3.2</p>   |
| <p><b>4.</b> Understand the principles of operation of specialised devices used to assist tree inspection</p> | <p><b>4.1</b> Describe the principle of operation of each of the following categories of specialist equipment</p> <ul style="list-style-type: none"> <li>• sonic or ultrasonic</li> <li>• computerised tomography</li> <li>• micro-drills</li> <li>• fractometer 1 and 11</li> <li>• thermal imagery</li> </ul> <p><b>4.2</b> Prescribe the use of an appropriate device to a given range of three tree conditions and justify the decision</p> <p><b>4.3</b> Evaluate the use of specialist equipment listed in one of the following categories identifying four strengths and four weaknesses</p> <ul style="list-style-type: none"> <li>• sonic or ultrasonic</li> <li>• computerised tomography</li> <li>• micro-drills</li> <li>• fractometer</li> <li>• thermal imagery</li> </ul> <p><b>4.4</b> Evaluate the use of invasive devices and draw conclusions in relation to</p> <ul style="list-style-type: none"> <li>• wounding of woody tissues</li> <li>• providing a pathway for colonisation by fungi</li> <li>• cost of their use versus the benefits</li> </ul> <p><b>4.5</b> Demonstrate the application of one specialist item of equipment used to undertake an investigation of symptoms or signs of ill health from the following</p> <ul style="list-style-type: none"> <li>• sonic or ultrasonic</li> <li>• computerised tomography</li> <li>• micro-drills</li> <li>• fractometer</li> </ul> |

# SUPPORTING UNIT INFORMATION

## M/503/3319 Tree biomechanics and maintenance – Level 4

### INDICATIVE CONTENT

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

#### ***Learning Outcome 1. Understand tree form as an ideal structure***

The Axiom of Uniform Stress, the Law of the Minimal Lever Arm. Phototropism, geotropism. Reaction wood – tension and compression - Branch unions, bending fracture of a solid trunk, cross sectional flattening of a hollow stem, t/R ratio, shell buckling of an open cavity, 'harp tree' fractures, shear stress trunk fracture, trunk torsion fractures, 'hazard beam' fractures, root delamination, compression fork fractures. Safety margins.

#### ***Learning Outcome 2. Be able to recognise warning symptoms of impending failure in trees***

Loss of vitality, dead material, decay, exudates, pathogen colonisation, swelling, bulges, ribs, cracks, cavities, fibre buckling, included bark, bark anomalies and adaptive growth.

Visual Tree Assessment (VTA), use of sounding mallet and probe, systematic approach, relevant data – collection, recording and presentation

3 theories – Mattheck and Breloer - hollow tree and open cross section. Wessolly and Erb - Static Integrated analysis. Anyone of the American theories Wagener, Coder, Smiley and Fraedrich.

#### ***Learning Outcome 3. Understand the treatment of defects in trees***

BS 3998, formative pruning, crown reduction, crown thinning, selective branch removal, pollarding, monolithing, treatment of significant decay/cavities, treatment of weak structures. Structural problems such as compression forks, co-dominant stems, rubbing branches, hollow areas etc.

#### ***Learning Outcome 4. Understand the principles of operation of specialised devices used to assist tree inspection***

Arbosonic, stress wave timer, micro hammer. Tomography – picus and arbotom, Drills – Sibtec Micro-probe, IML resistograph, Rinntech resistograph. Shigometer Increment corer, Fractometer 1 & II. Ground Penetrating Radar, Gamma Radiation, Thermal Imagery and Chlorophyll activity testing devices.

### TEACHING STRATEGIES AND LEARNING ACTIVITIES

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## **METHODS OF ASSESSMENT**

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### **Minimum requirements when assessing this unit**

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**It is important that practical assessment activities are supervised appropriately**

## **EVIDENCE OF ACHIEVEMENT**

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- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
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- Taped evidence (video or audio)
- Photographic evidence
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- Interview/professional discussion
- Site risk assessment
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## **ADDITIONAL INFORMATION**

### **Useful sources of reference**

- “The Body Language of Trees: A Handbook for Failure Analysis” by Claus Mattheck and Helge Breloer - ‘Research for Amenity Trees No.4’ - *ISBN 0-11-753067-0*
- “Principles of Tree Hazard Assessment and Management” by David Lonsdale - ‘Research for Amenity Trees No.7’ - *ISBN 0-11-753355-6*
- British Standard 3998:2010 ‘Tree Work – Recommendations’

**See ABC website for further information**

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|--|--|
| <b>Unit Title</b>  | <b>A/503/3324 Tree development and protection</b>  |
| <b>Level</b>   | <b>4</b>   |
| <b>Credit Value</b>  | <b>5</b>   |
| <b>Guided Learning Hours</b>   | <b>25</b>  |
| <b>Unit Summary</b>  | This unit covers the arboricultural aspects of site development and tree protection and how this is managed through planning policies, legislation and best practice   |
| <b>Learning Outcomes<br/>(1 to 3)<br/><i>The learner will</i></b>                          | <b>Assessment Criteria<br/>(1.1 to 3.6)<br/><i>The learner can</i></b>   |
| 1. Understand the impacts on trees of development and how this may be mitigated or reduced | <p><b>1.1</b> Explain how to determine the following aspects of development using best practice</p> <ul style="list-style-type: none"> <li>• selection of trees to be retained on a development site</li> <li>• constraints posed by trees on a site</li> <li>• importance of protecting retained trees</li> </ul> <p><b>1.2</b> Identify what data is required in order to</p> <ul style="list-style-type: none"> <li>• determine the value and quality of the woody vegetation on and around the site</li> <li>• identify the constraints posed by the vegetation to development</li> <li>• identify the likely impacts of development on the vegetation and vice versa</li> <li>• produce a tree protection plan</li> </ul> <p><b>1.3</b> Describe an appropriate measure which mitigates or eliminates each of the following impacts on trees within a root protection area</p> <ul style="list-style-type: none"> <li>• ground compaction and asphyxiation of roots</li> <li>• severance of roots for foundation construction</li> <li>• severance of roots for construction of a utility service</li> </ul> <p><b>1.4</b> Describe an appropriate measure which mitigates or eliminates each of the following impacts on trees on a development site</p> <ul style="list-style-type: none"> <li>• mixing of materials</li> <li>• use of cranes</li> <li>• hard landscaping</li> <li>• soft landscaping</li> <li>• storage of materials</li> <li>• entry by contractors to a Construction Exclusion Zone (CEZ)</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>• post development requests for pruning due to a shading issue</li> <li>• impacts on new tree planting</li> </ul> <p><b>1.5</b> Evaluate the following mitigation measures for their effectiveness in preventing damage to trees from occurring</p> <ul style="list-style-type: none"> <li>• fence protection as described in BS 5837</li> <li>• pile foundations</li> <li>• National Joint Utilities Group published guidance</li> <li>• the size requirement of the Root Protection Area (RPA) as recommended by BS 5837</li> <li>• driveway construction as described in the current Arboricultural Practice Note</li> </ul>  |
| <p><b>2.</b> Understand planning policy and guidance</p>           | <p><b>2.1</b> Summarise the aims of national, regional and local planning policies and legislation as used by local planning authorities to both plan for development and control development</p>   |
| <p><b>3.</b> Understand how tree protection mechanisms operate</p> | <p><b>3.1</b> Distinguish between the purposes of each of the following</p> <ul style="list-style-type: none"> <li>• Tree Preservation Order (TPO)</li> <li>• Designated Conservation Area (CA)</li> <li>• Forestry Act felling licence</li> </ul> <p><b>3.2</b> Identify</p> <ul style="list-style-type: none"> <li>• three situations when it is expedient to serve a TPO</li> <li>• two situations when it is not expedient (exclude dead, dying and dangerous)</li> </ul> <p><b>3.3</b> Identify the information that must be present on a</p> <ul style="list-style-type: none"> <li>• completed TPO document</li> <li>• Regulation 3 notice</li> </ul> <p><b>3.4</b> Describe the procedure, with timescales as appropriate, of processing a TPO from site visit to completion of serving the documents on a tree owner</p> <p><b>3.5</b> Distinguish how the administration mechanisms for managing trees in a CA differ to that of a TPO</p> <p><b>3.6</b> Evaluate the implementation of the Forestry Act with regard to tree protection</p> |

# SUPPORTING UNIT INFORMATION

## A/503/3324 Tree development and protection – Level 4

### INDICATIVE CONTENT

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

***Learning Outcome 1. Understand the impacts on trees of development and how this may be mitigated or reduced***

BS 5837, National Joint Utilities Group (NJUG) Vol 4, Arboricultural Practice Note 12.

***Learning Outcome 2. Understand planning policy and guidance***

National, Regional, Local planning policies, planning policy guidance notes and statements.

***Learning Outcome 3. Understand how tree protection mechanisms operate***

Town and Country Planning Acts, Town and Country Planning (Trees) Regs, Planning (Listed Buildings and Conservation Areas) Act, Forestry Act

### TEACHING STRATEGIES AND LEARNING ACTIVITIES

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### METHODS OF ASSESSMENT

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## **EVIDENCE OF ACHIEVEMENT**

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- Product evidence
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- Oral/written questions and answers
- Reports/notes
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- Interview/professional discussion
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## **ADDITIONAL INFORMATION**

### **Useful sources of reference**

- British Standard 5837: 2005 - 'Trees in Relation to Construction'
- National House Building Council (NHBC) Chapter 4.2 – 'Building near Trees'
- British Standard 3998 : 2010 – 'Tree Work – Recommendations'
- National Joint Utilities Group (NJUG) Vol 4 – 'Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees'
- Arboricultural Practice Note 4 – "Root Barriers and Building Subsidence"
- Arboricultural Practice Note 5 – "Shaded by Trees?"
- Arboricultural Practice Note 12 – "Through the Trees to Construction"
- "The Law of Trees, Forests and Hedgerows" – by Charles Mynors - ISBN 0-421-59040-8
- 'Tree Preservation Orders: A guide to the Law and Good Practice'

**See ABC website for further information**

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|--|---|
| <b>Unit Title</b>  | <b>L/502/3327 Tree related damage to built structures</b>   |
| <b>Level</b>   | <b>4</b>  |
| <b>Credit Value</b>  | <b>4</b>  |
| <b>Guided Learning Hours</b>   | <b>20</b>   |
| <b>Unit Summary</b>  | Learners will gain a theoretical knowledge of how trees can cause damage to built structures by direct and indirect means and what possible solutions are available to reduce, mitigate or remediate the problem  |
| <b>Learning Outcomes (1 to 4)</b><br><i>The learner will</i>   | <b>Assessment Criteria (1.1 to 4.1)</b><br><i>The learner can</i>   |
| <b>1.</b> Understand the interaction and relationship between roots, clay soils and built structures | <b>1.1</b> Describe the following <ul style="list-style-type: none"> <li>• a shrinkable clay soil</li> <li>• a desiccated clay soil</li> <li>• modified plasticity index</li> <li>• plastic limit</li> <li>• liquid limit</li> </ul> <b>1.2</b> Explain the main factors that contribute to woody vegetation causing damage to built structures by <ul style="list-style-type: none"> <li>• direct means (contact)</li> <li>• blockage of drainage pipes</li> <li>• indirect means (subsidence)</li> <li>• heave</li> </ul> <b>1.3</b> Briefly describe eight other possible causes of damage to built structures that are not woody vegetation related |
| <b>2.</b> Know what investigations are appropriate to inform actions                                 | <b>2.1</b> Identify the sources of information and the data required in order to carry out an investigation of <ul style="list-style-type: none"> <li>• direct damage</li> <li>• subsidence damage</li> </ul>   |
| <b>3.</b> Know what solutions are available related to structural damage                             | <b>3.1</b> Evaluate four arboricultural solutions for each of the following <ul style="list-style-type: none"> <li>• direct damage</li> <li>• indirect damage</li> </ul> <b>3.2</b> Describe one engineering solution for each of the following <ul style="list-style-type: none"> <li>• house subsidence damage</li> <li>• pavement damage</li> </ul>  |

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|  | <ul style="list-style-type: none"> <li>• a pushed up brick wall</li> <li>• blocked sewer pipe</li> </ul> <p><b>3.3</b> Identify two strengths and two weakness for each engineering solution</p> |
| <p><b>4.</b> Understand the theories and concept of the rate of water use by trees</p> | <p><b>4.1</b> Research the concept of 'water use' by trees in GB and present their findings in an appropriate format</p>   |

# SUPPORTING UNIT INFORMATION

## L/502/3327 Tree related damage to built structures – Level 4

### INDICATIVE CONTENT

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

#### ***Learning Outcome 1. Understand the interaction and relationship between roots, clay soils and built structures***

A shrinkable clay soil, a desiccated clay soil, modified plasticity index, plastic limit, liquid limit  
Shrinkable clay soil, volume change, desiccation, soil water movement, water uptake by roots, specie types, rooting zones, rainfall patterns, foundation depths and type, condensation and structure failure.

Mining, landfill, cut and fill, vibration, soil erosion, chemical deterioration of concrete, earthquake, poor construction, inadequate foundation depths, partial underpinning, non-tied extension, old clay pipes, pipe joint failure.

#### ***Learning Outcome 2. Know what investigations are appropriate to inform actions***

Structural engineers, soil analysis, root identification / analysis, site data, tree data, meteorological data, crack or level monitoring records

#### ***Learning Outcome 3. Know what solutions are available related to structural damage***

Removal, crown reduction, root pruning alone, and in combination with a root barrier.  
Underpinning, bridges or ramps, stronger and thicker materials, flexible surfaces, reinforced concrete, raised surface, use of break out zones, lintel, replace with modern materials, HDPE (high density polyethylene) insertion of the old pipe.

#### ***Learning Outcome 4. Understand the theories and concept of the rate of water use by trees***

The rate of water uptake from a soil medium during the growing season

### TEACHING STRATEGIES AND LEARNING ACTIVITIES

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### METHODS OF ASSESSMENT

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**Minimum requirements when assessing this unit**

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**It is important that practical assessment activities are supervised appropriately**

**EVIDENCE OF ACHIEVEMENT**

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**ADDITIONAL INFORMATION**

**Useful sources of reference**

- National House Building Council (NHBC) Chapter 4.2 – ‘Building near Trees’
- “Has Your House Got Cracks?” by Freeman, Driscoll and Littlejohn - *ISBN 0-7277-3089-4*

- “Subsidence Damage to Domestic Buildings” by Driscoll and Skinner - *ISBN 978-1-86081-977-3*
- “The Subsidence Handbook – A Practical Guide to Subsidence in Domestic Property” by The Subsidence Forum - no ISBN

**See ABC website for further information**

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|--|---|
| <b>Unit Title</b>  | <b>D/503/3316 Woody vegetation formation and physiology</b>   |
| <b>Level</b>   | <b>4</b>  |
| <b>Credit Value</b>  | <b>6</b>  |
| <b>Guided Learning Hours</b>   | <b>35</b>   |
| <b>Unit Summary</b>  | This unit covers the physiological function of woody vegetation and the application to arboriculture. The learner will understand the effects on the tree system when conditions are not at their optimum for growth and how conditions may be prevented or improved  |
| <b>Learning Outcomes (1 to 11)</b><br><i>The learner will</i>                      | <b>Assessment Criteria (1.1 to 11.3)</b><br><i>The learner can</i>  |
| <b>1.</b> Understand the makeup of woody cell connections                          | <b>1.1</b> Identify the component parts of the symplast and appoplast connections present within the living tree<br><br><b>1.2</b> Explain the symplastic movement that occurs in the tree  |
| <b>2.</b> Understand the relationship between mass and energy                      | <b>2.1</b> Explain how a tree regulates its mass/energy ratio as it gets older<br><br><b>2.2</b> Identify six clearly distinguishable commonly occurring conditions under which an urban tree may be forced prematurely to reduce its mass<br><br><b>2.3</b> Describe how the tree is adversely affected and why this leads to a situation of static mass for each condition identified in 2.2<br><br><b>2.4</b> Describe three clearly different reasons of how tree work is likely to reduce potential energy levels in a tree<br><br><b>2.5</b> Analyse five ways in which the impact of tree work on potential energy levels can be reduced |
| <b>3.</b> Understand how the efficiency of a tree system can be adversely affected | <b>3.1</b> Describe the significant effects on the tree system of <ul style="list-style-type: none"> <li>• carrying out any operation as named in BS 3998</li> <li>• a named abiotic disorder excluding climatic</li> <li>• a named climatic condition</li> <li>• a named pest attacking the foliage</li> <li>• a named pest attacking the vascular system</li> <li>• a named pathogen attacking the root system</li> <li>• a 'complex' decline (combination of problems)</li> </ul>  |

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|  | <p><b>3.2</b> Describe the principal requirements to ensure an urban tree attains a healthy full term life</p> <p><b>3.3</b> Describe how each requirement can be achieved in practice</p>   |
| <p><b>4.</b> Understand the process of photosynthesis related to chlorophyll fluorescence analysis</p> | <p><b>4.1</b> Outline the makeup of the chlorophyll molecule</p> <p><b>4.2</b> List the two major processes of photosynthesis and state what occurs in those sets of reactions</p> <p><b>4.3</b> Explain the significance of the Adenosine Triphosphate (ATP) and Adenosine with two phosphates (ADP)</p> <p><b>4.4</b> Describe the role that chlorophyll and the other pigments found in chloroplasts play to initiate the light-dependent reactions</p> <p><b>4.5</b> Define the process known as Photophosphorylation</p> <p><b>4.6</b> Summarise the concept of measuring chlorophyll activity as a means of determining tree health</p>                                      |
| <p><b>5.</b> Understand the makeup and operation of leaves and stomata</p>                             | <p><b>5.1</b> Summarise</p> <ul style="list-style-type: none"> <li>• the difference in makeup and operation of shade and sun leaves</li> <li>• how water loss is controlled by leaves</li> <li>• two elements other than a gas taken in by leaves</li> <li>• the distinction between juvenile and mature foliage</li> </ul> <p><b>5.2</b> Identify one benefit to the plant of each of the following adaptation groups</p> <ul style="list-style-type: none"> <li>• needles and scales</li> <li>• cladodes</li> <li>• stipules</li> </ul>  |
| <p><b>6.</b> Understand branch formation and shedding</p>  | <p><b>6.1</b> Analyse the findings of the latest research regarding branch formation and attachment</p> <p><b>6.2</b> Describe the formation of co-dominant stems</p> <p><b>6.3</b> Explain the significant structural weaknesses in branch and co-dominant stem formation which can lead to failure</p> <p><b>6.4</b> Describe effective measures that can reduce the incidence of branch or co-dominant stem failure</p> <p><b>6.5</b> Describe the processes involved in natural branch shedding (cladotopsis) giving two reasons why this occurs</p> <p><b>6.6</b> List four unsound arboricultural practices explaining how these can increase the risk of branch failure</p> |

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| <p><b>7.</b> Understand how water is moved up a tree</p>  | <p><b>7.1</b> Explain each of the following related to water movement</p> <ul style="list-style-type: none"> <li>• root pressure (pushed up)</li> <li>• tension-cohesion theory (pulled up)</li> </ul>  |
| <p><b>8.</b> Understand how root growth may be affected by different conditions in the soil</p> | <p><b>8.1</b> Describe the principal effects on root growth of each of the following soil factors</p> <ul style="list-style-type: none"> <li>• hydraulic conductivity</li> <li>• bulk density</li> <li>• soil aeration</li> <li>• soil temperature</li> <li>• chemical properties</li> </ul>  |
| <p><b>9.</b> Understand how a tree protects and defends itself</p>                              | <p><b>9.1</b> Describe the main mechanisms used by the tree to provide protection from the following</p> <ul style="list-style-type: none"> <li>• heat</li> <li>• frost/ice</li> <li>• a named defoliating insect</li> <li>• bacterial canker</li> <li>• sapwood exposed fungal pathogens</li> </ul> <p><b>9.2</b> Evaluate the typical physiological changes that a tree goes through following wounding</p> <p><b>9.3</b> Explain why some species are not good at compartmentalisation of wounds</p> <p><b>9.4</b> Give two examples of each of the following</p> <ul style="list-style-type: none"> <li>• good compartmentalisers</li> <li>• poor compartmentalisers</li> </ul> <p><b>9.5</b> Describe three practices that can be adopted at the time of carrying out tree surgery operations that may assist a tree to form barriers as represented in the Compartmentalisation Of Decay in Trees (CODIT) model</p> <p><b>9.6</b> Justify each of the above practices</p> |
| <p><b>10.</b> Understand the benefits of trees forming symbiotic relationships</p>              | <p><b>10.1</b> Evaluate the symbiotic relationship formed between trees and</p> <ul style="list-style-type: none"> <li>• fungi</li> <li>• bacteria</li> </ul> <p><b>10.2</b> Describe how the above relationships can be encouraged to develop by cultural practices</p>  |
| <p><b>11.</b> Understand the carbon cycle as related to the terrestrial biosphere</p>           | <p><b>11.1</b> Evaluate the view that green plants may be viewed as 'carbon sinks'</p>  |

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|  | <p><b>11.2</b> Describe the main possible effects on the future of forests of</p> <ul style="list-style-type: none"><li>• 'acid rain' formation</li><li>• increased levels of carbon dioxide in the air</li><li>• carbon offset programmes</li></ul> <p><b>11.3</b> Identify the basic requirements of complying with the Woodland Carbon Code in respect of</p> <ul style="list-style-type: none"><li>• compliance</li><li>• requirements</li><li>• working for everybody</li></ul> |
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# SUPPORTING UNIT INFORMATION

## D/503/3316 Woody vegetation formation and physiology – Level 4

### INDICATIVE CONTENT

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

#### ***Learning Outcome 1. Understand the makeup of woody cell connections***

Symplastic and apoplastic routes; the Casparian strip and plasmodesmata. Size and distribution of xylem vessels and tracheids. Axial and radial parenchyma.

#### ***Learning Outcome 2. Understand the relationship between mass and energy***

Dynamic and static mass. Compaction, drought, flooding, de-icing salts, nutrient deficiency, gas, toxic substances, extremes of temperature, dust/pollution, disease, insects pests, mammalian pests, competition. The possible implications of tree work and the appropriate mitigation.

#### ***Learning Outcome 3. Understand how the efficiency of a tree system can be adversely affected***

The requirements for successful photosynthesis, respiration, transpiration, transportation, storage, defence, reproduction, growth/cell division, and how they can be met. The possible effects of biotic and abiotic factors on those processes; including complex declines.

#### ***Learning Outcome 4. Understand the process of photosynthesis related to chlorophyll fluorescence analysis***

Green and accessory pigments, chlorophyll a and b, carotenoids. Light dependent process (Light Reactions) Light independent process (Dark Reactions). ATP/ADP cycle. Photophosphorylation, Chlorophyll fluorescence analysis.

#### ***Learning Outcome 5. Understand the makeup and operation of leaves and stomata***

Sun and shade leaves and leaf orientation. Stomatal operation, reduction in stomata density, hairs, cuticle thickness. Juvenile and mature foliage. Needles and scales, cladodes and stipules. The role of moisture and nutrients, particularly nitrogen.

#### ***Learning Outcome 6. Understand branch formation and shedding***

Branch attachment and reasons for branch failure / shedding. Compression fork and co-dominant stem formation. Included bark, epicormic origin. **Unhelpful practices** - neighbouring tree removal, over thinning, topping / lopping leading to epicormic shoots and or die back, removal of lower limbs, 'lion-tailing', inappropriate bracing / propping. **Helpful practices** - formative pruning, appropriate bracing or propping, lever arm reduction

#### ***Learning Outcome 7. Understand how water is moved up a tree***

Water pushed and pulled up theories. Osmosis, capillary movement, cohesion, transpiration

#### ***Learning Outcome 8. Understand how root growth may be affected by different conditions in the soil***

Hydraulic conductivity, Bulk density, Soil aeration, Soil temperature, Chemical properties.

***Learning Outcome 9. Understand how a tree protects and defends itself***

Defence mechanisms – cell structure and contents – substances present and produced; epidermis, pigmentation, cell walls, turgidity, cytoplasm, sugars, gums, resins, phenolic compounds. Compartmentalisation of Decay in Trees (CODIT) - generic / specific variations. Timing of pruning (seasonal and age of tree), position, size and number of cuts, sequence of cuts for large branch removal, amount of material removed, energy reserves

***Learning Outcome 10. Understand the benefits of trees forming symbiotic relationships***

Mycorrhizal fungi and nitrifying bacteria. Root hairs, nodules, substance assimilation. Decomposition / aeration, organic mulches / additives, inoculation, species selection

***Learning Outcome 11. Understand the carbon cycle as related to the terrestrial biosphere***

Removal of carbon from the air and fixing it into organic chemicals. Acid rain fall. Positive and negative effects of increased concentrations of carbon. Biosequestration, Kyoto protocol, carbon capture and storage, carbon offset, global warming, greenhouse gas, deforestation, afforestation, reforestation, The Industrial Emissions Directive (integrated pollution prevention and control) IPPC, Woodland Carbon Code

**TEACHING STRATEGIES AND LEARNING ACTIVITIES**

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

**METHODS OF ASSESSMENT**

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

**Minimum requirements when assessing this unit**

ABC expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

**It is important that practical assessment activities are supervised appropriately**

**EVIDENCE OF ACHIEVEMENT**

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence



- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the ABC web site).

## **ADDITIONAL INFORMATION**

### **Useful sources of reference**

- “Modern Arboriculture” by Alex Shigo - *ISBN 0-943563-09-7*
- “Trees: Their Natural History” by Peter Thomas - *ISBN 0-521-45963-X*
- “Photosynthesis” by D. O. Hall and K. K. Rao - *ISBN 0-521-64497-6*
- “Tree Roots in the Built Environment” – ‘Research for Amenity Trees No.8’ - *ISBN 0-11-753620-2*
- “Field Guide: The Identification of Soils for Forest Management” – Forestry Commission - *ISBN 0 85538 559 6*
- “Soil Types: A Field Identification Guide” by Stephen Trudgill, Field Studies Council - *ISBN 1 58153 196 3*
- “Up by Roots: Healthy Soils and Trees in the Built Environment” by James Urban - *ISBN 1-881956-65-2*

**See ABC website for further information**

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| <b>Unit Title</b>   | <b>T/503/3323 Principles of tree management</b>  |
| <b>Level</b>  | <b>5</b>   |
| <b>Credit Value</b>   | <b>9</b>   |
| <b>Guided Learning Hours</b>  | <b>45</b>  |
| <b>Unit Summary</b>   | This unit covers management aspects of trees, legislation and common laws that apply to working practices  |
| <b>Learning Outcomes<br/>(1 to 9)<br/><i>The learner will</i></b>     | <b>Assessment Criteria<br/>(1.1 to 9.3)<br/><i>The learner can</i></b>   |
| <b>1. Know the value of trees</b>                                     | <p><b>1.1</b> Describe six principal values and four drawbacks of trees under each of the following headings</p> <ul style="list-style-type: none"> <li>• environmental</li> <li>• ecological</li> <li>• social/economic</li> <li>• amenity/landscape value</li> </ul> <p><b>1.2</b> Carry out an amenity evaluation of a tree using a recognised methodology and draw conclusions</p> <p><b>1.3</b> Evaluate the strengths and weaknesses of the methodology used</p> <p><b>1.4</b> Outline the principal concepts of attributing a monetary value to a tree related to compensation for loss</p>         |
| <b>2. Understand how common law precedent may be applied to trees</b> | <p><b>2.1</b> Extrapolate the current case precedent of common law related to the following</p> <ul style="list-style-type: none"> <li>• overhanging branches</li> <li>• trespassing roots</li> <li>• poisonous trees</li> <li>• dangerous trees</li> <li>• rights to light</li> </ul> <p><b>2.2</b> Evaluate how effective case law is in providing solutions to neighbour disputes involving each of the following</p> <ul style="list-style-type: none"> <li>• overhanging branches</li> <li>• trespassing roots</li> <li>• dangerous trees</li> <li>• poisonous trees adjacent to farm land</li> </ul> |

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| <p><b>3. Understand the implications of statutes related to trees</b></p>  | <p><b>3.1</b> Interpret statute law related to each of the following scenarios</p> <ul style="list-style-type: none"> <li>• management of height clearance of highway trees</li> <li>• a dangerous tree within falling distance of a public bridleway</li> <li>• high evergreen boundary hedge between house owners</li> <li>• removal of an important hedge in the countryside</li> <li>• movement of waste materials</li> <li>• application of a systemic weed killer</li> <li>• a protected species harmed by the actions of a tree surgeon</li> <li>• the habitat of a protected species destroyed by tree removal</li> </ul> <p><b>3.2</b> Evaluate the effectiveness of the following statutes in making provisions for the protection of habitat</p> <ul style="list-style-type: none"> <li>• Wildlife and Countryside Act (as amended)</li> <li>• Countryside and Rights of Way Act</li> <li>• Conservation of Habitats and Species Regulations</li> <li>• Hedgerow Regulations</li> </ul>   |
| <p><b>4. Understand the implications of Health and Safety legislation and best practice related to tree work</b></p> | <p><b>4.1</b> Interpret statutes or best practice as applied to each of the following scenarios</p> <ul style="list-style-type: none"> <li>• the manual lifting of wood</li> <li>• the use of work equipment</li> <li>• the use of noisy machinery</li> <li>• the use of hazardous substance</li> <li>• working at height</li> <li>• the use of equipment used for lifting purposes</li> <li>• the requirement to have a first aid assistance</li> <li>• an accident at work carrying out tree work</li> <li>• the use of machinery that can vibrate</li> <li>• carrying out tree work alongside a highway</li> <li>• working near electric utility lines</li> </ul> <p><b>4.2</b> Identify the duties, rights, or responsibilities of the Management of Health and Safety at Work Regulations for</p> <ul style="list-style-type: none"> <li>• employer</li> <li>• employee</li> <li>• self-employed</li> </ul> <p><b>4.3</b> Prepare a site specific risk assessment for a given tree surgery operation that conforms to the requirements of the regulations</p> <p><b>4.4</b> Prepare a method statement for dismantling trees on a construction site that conforms to the requirements of the Construction (Design and Management) Regulations</p> |

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| <p><b>5.</b> Understand the application and implications of pruning methods to tree management, excluding risk management</p> | <p><b>5.1</b> Evaluate each of the following range of pruning methods available to manage trees, including named examples of tree species</p> <ul style="list-style-type: none"> <li>• formative pruning</li> <li>• crown reduction</li> <li>• crown thinning</li> <li>• selective branch removal</li> <li>• pollarding</li> </ul>  |
| <p><b>6.</b> Understand the advantages of pro-actively managing tree populations</p>  | <p><b>6.1</b> Contrast the pro-active and re-active management of a population of trees and form a conclusion</p> <p><b>6.2</b> Identify the values of preparing a tree renewal programme for over-mature lime trees in a street</p> <p><b>6.3</b> Identify two suitable replacement species of different genera and justify the choices</p>  |
| <p><b>7.</b> Understand the values of Ancient and Veteran trees</p>   | <p><b>7.1</b> Identify the characteristics that establish if a tree is an</p> <ul style="list-style-type: none"> <li>• Ancient tree</li> <li>• Veteran tree</li> </ul> <p><b>7.2</b> Identify twelve reasons why a veteran or an ancient tree is recognised to be 'special'</p> <p><b>7.3</b> Outline ten principles of management of Ancient/Veteran trees and justify why each principle contributes to enhancing the special aspects of those trees</p> <p><b>7.4</b> Describe the processes involved in 'veteranising' a tree and evaluate the potential results</p> <p><b>7.5</b> Describe the treatment required for a 'lapsed pollard' that is to be retained as a pollard and identify the threats to its continued survival as a result of the treatment</p> |

# SUPPORTING UNIT INFORMATION

## T/503/3323 Principles of tree management – Level 5

### INDICATIVE CONTENT

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

#### ***Learning Outcome 1. Know the value of trees***

Environmental, Ecological, Social / economic, Amenity / landscape values and drawbacks. Recognised methodologies for evaluating amenity of trees with or without a monetary value. E.G. Helliwell, Capital Asset Valuation of Amenity Trees (CAVAT), Council of Tree and Landscape Appraisers (CTLA) etc

#### ***Learning Outcome 2. Understand how common law precedent may be applied to trees***

Common law, duty of care - overhanging branches, trespassing roots, hazardous trees, trees with injurious characteristics, rights to light

#### ***Learning Outcome 3. Understand the implications of statutes related to trees***

Statute law. Highways Act, Miscellaneous Provisions, Access to Neighbouring Lands, Occupiers' Liability, Waste Carrying, The Environmental Protection Act, The Food and Environmental Protection Act, New Roads and Street Works Act, High Hedges, Electricity Act, Wildlife and Countryside Act (as amended), Countryside and Rights of Way Act, Conservation of Habitats and Species Regulations, Hedgerow Regulations - applicable Regulations for each Act, Applicable European Directives. Industry Lead Body best practice

#### ***Learning Outcome 4. Understand the implications of Health and Safety legislation and best practice related to tree work***

Health and Safety at Work Act. Management of Health and Safety at Work Regulations, The Corporate Manslaughter and Corporate Homicide Act, Health and Safety (Offences) Act, The Health and Safety (First-Aid) Regulations, Manual Handling Operations Regulations, Personal Protective Equipment at Work Regulations, Control of Substances Hazardous to Health Regulations – COSHH, The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations – RIDDOR, Lifting Operations and Lifting Equipment Regulations LOLER, Provision and Use of Work Equipment Regulations PUWER, Work at Height Regulations, The Control of Vibration at Work Regulations, The Control of Noise at Work Regulations Risk Assessments, Method Statements

#### ***Learning Outcome 5. Understand the application and implications of pruning methods to tree management, excluding risk management***

BS 3998 – formative pruning, crown thinning, crown lifting, crown reduction / reshaping, selective pruning, pollarding

#### ***Learning Outcome 6. Understand the advantages of pro-actively managing tree populations***

Tree management strategies, tree renewal, avenue management

**Learning Outcome 7. Understand the values of Ancient and Veteran trees**

Ancient and Veteran trees. Retrenchment, natural fracture techniques, 'coronet cuts', Veteranisation, BS3998.

**TEACHING STRATEGIES AND LEARNING ACTIVITIES**

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**METHODS OF ASSESSMENT**

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

**Minimum requirements when assessing this unit**

ABC expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

**It is important that practical assessment activities are supervised appropriately**

**EVIDENCE OF ACHIEVEMENT**

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules

- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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## **ADDITIONAL INFORMATION**

### **Useful sources of reference**

- Arboricultural Association Guidance Note 4 – “Visual Amenity Valuation of Trees and Woodlands – The Helliwell System” 2008
- Capital Asset Value for Amenity Trees (CAVAT) by Christopher Neilan
- British Standard 3998:2010 ‘Tree Work – Recommendations’
- “The Law of Trees, Forests and Hedgerows” – by Charles Mynors - *ISBN 042159040-8*
- Arboricultural Practice Note 11 – “Trees and Hedges in Dispute”
- [www.communities.gov](http://www.communities.gov) – various downloads:
  - ‘Tree Preservation Orders: A guide to the Law and Good Practice’
  - ‘Hedge Height and Light Loss’
- ‘Health and Safety Package’ – produced by the Arboricultural Association
  - *ISBN 0 900978 40 6*
- ‘Safety at Street Works and Road Works – A Code of Practice’ – *ISBN 011551958-0*
- [www.hse.gov](http://www.hse.gov) - free downloads available for:
  - information relating to all health and safety legislation
  - industry best practice - AFAG leaflets
- [www.businessballs.com](http://www.businessballs.com) - free downloads available for all aspects of management
- “Veteran Trees: A guide to Good Management” by Helen Read - *ISBN 1 85716 474 1*
- “Veteran Trees: A guide to Risk and Responsibility” - *ISBN 1 85716 508 X*

**See ABC website for further information**

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| <b>Unit Title</b>  | <b>L/503/3330 Selection, planting and design with hardy nursery stock for amenity and landscape purposes</b>   |
| <b>Level</b>   | <b>5</b>   |
| <b>Credit Value</b>  | <b>8</b>   |
| <b>Guided Learning Hours</b>   | <b>40</b>  |
| <b>Unit Summary</b>  | Learners will cover nomenclature, tree and shrub identification, nursery selection, plant selection, transportation, planting, protection, production, after care, planning, uses and design principles for planted hardy nursery stock used in amenity landscapes   |
| <b>Learning Outcomes (1 to 8)</b><br><i>The learner will</i>   | <b>Assessment Criteria (1.1 to 6.3)</b><br><i>The learner can</i>  |
| 1. Understand nomenclature and how to use a botanical key and other sources to identify trees and shrubs | <p><b>1.1</b> Define the purpose of the International Code for Plant Nomenclature</p> <p><b>1.2</b> Explain the following terms and give two examples of each</p> <ul style="list-style-type: none"> <li>• Family</li> <li>• Genus</li> <li>• Species</li> <li>• Variety</li> <li>• Cultivar</li> <li>• Clone</li> <li>• Common name</li> <li>• Interspecific hybrid</li> <li>• Intergeneric hybrid</li> <li>• Chimera</li> </ul> <p><b>1.3</b> Present plants names used in 1.2 in accordance with the International code for plant naming</p> <p><b>1.4</b> Demonstrate the use of a botanical key and two other sources to identify a species</p> <p><b>1.5</b> Identify 100 trees or shrubs by their characteristics and features to include a minimum of 15 each from</p> <ul style="list-style-type: none"> <li>• evergreen broadleaved</li> <li>• deciduous</li> <li>• conifer</li> <li>• shrubs</li> </ul> |



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|  | <p><b>1.6</b> For each tree or shrub identified in 1.5 state their main arboricultural</p> <ul style="list-style-type: none"> <li>• attributes</li> <li>• uses</li> <li>• limitations</li> </ul> <p>in urban, rural and woodland landscapes</p>   |
| <p><b>2.</b> Know what species to select for any set of conditions or requirements</p> | <p><b>2.1</b> Prepare and present advice with justifications for clients on species choice related to three sets of different site conditions/use</p> <p><b>2.2</b> Critically evaluate a tree and shrub planting scheme preparing advice for a client in line with current professional practice</p>   |
| <p><b>3.</b> Know what woody plant stock size and type is available</p>                | <p><b>3.1</b> Identify woody plant stock sizes in accordance with British Standards and describe the features of each</p> <p><b>3.2</b> Specify an appropriate stock size, type and appropriate protection of plant for each of the following sites, justifying the selection</p> <ul style="list-style-type: none"> <li>• city street</li> <li>• amenity woodland</li> <li>• motorway embankment</li> <li>• public open space</li> <li>• prestigious development</li> <li>• shrubs for mass planting adjacent to a highway</li> </ul> <p><b>3.3</b> Critically evaluate the selection of each of the following stock types for planting</p> <ul style="list-style-type: none"> <li>• bare rooted</li> <li>• cell grown</li> <li>• one from air pot, spring ring or black pot</li> </ul> <p><b>3.4</b> Evaluate the quality of one sample of purchased stock against British Standards and the HTA plant specification manual</p> |
| <p><b>4.</b> Understand current methods of tree and shrub production</p>               | <p><b>4.1</b> For each of the following outline a production method used by nursery growers to produce one named ornamental tree to a standard standard size</p> <ul style="list-style-type: none"> <li>• worked (budded or grafted) tree</li> <li>• tree from seed</li> </ul> <p><b>4.2</b> Outline a production method used by nursery growers to produce one named containerised shrub or conifer from a semi-ripe cutting to a 2 litre size</p> <p><b>4.3</b> Analyse current research work aimed at improving tree stock and draw conclusions in relation to disease resistance</p>  |

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| <p><b>5. Know how to select hardy nursery stock and have it delivered in good condition</b></p> | <p><b>5.1 Evaluate</b></p> <ul style="list-style-type: none"> <li>• nursery supplier suitability as an approved supplier</li> <li>• stock type</li> <li>• stock quality at the time of selection</li> <li>• stock quality and condition on delivery</li> </ul> <p><b>5.2 Specify the measures required to get stock delivered at the planting site in good condition in accordance with the JCLI code of practice for plant handling</b></p> <p><b>5.3 Prepare a schedule of purchase using accepted standards and guidance as produced by the Horticultural Trades Association (HTA)</b></p>  |
| <p><b>6. Know how to prepare site for planting</b></p>  | <p><b>6.1 Conduct a preliminary site survey and undertake a basic soil analysis drawing conclusions</b></p> <p><b>6.2 Apply survey and analysis findings to the required preparation of a planting site or be able to identify further analysis requirements</b></p> <p><b>6.3 Describe site preparations or the need for tree pit ameliorants required pre-planting for</b></p> <ul style="list-style-type: none"> <li>• whips in a large scale planting in grass</li> <li>• a standard tree in compacted ground conditions</li> </ul>  |
| <p><b>7. Know how to plant, protect and care for newly planted trees and shrubs</b></p>         | <p><b>7.1 Describe an appropriate planting method for each of the following in a given situation</b></p> <ul style="list-style-type: none"> <li>• 40-60 transplant</li> <li>• bare-rooted standard tree</li> <li>• container grown shrub</li> <li>• semi-mature tree</li> </ul> <p><b>7.2 Evaluate four given methods/materials for each of the following practices drawing conclusions</b></p> <ul style="list-style-type: none"> <li>• support systems</li> <li>• protection methods</li> <li>• moisture control methods</li> <li>• soil ameliorants</li> </ul> <p><b>7.3 Describe the post planting aftercare requirements for each in a given situation</b></p> <ul style="list-style-type: none"> <li>• 40-60 transplant</li> <li>• bare-rooted standard tree</li> <li>• container grown shrub</li> <li>• semi-mature tree</li> </ul> <p><b>7.4 Cost the stock and materials for the following</b></p> <ul style="list-style-type: none"> <li>• whip in a tree shelter</li> <li>• standard tree with stake requiring rabbit protection</li> </ul> |

|   |   |
|---|---|
|   | <ul style="list-style-type: none"> <li>• 2 litre shrub with a strimmer/mower guard</li> </ul> <p><b>7.5</b> Critically evaluate post-planting conditions on a newly planted site (more than ten trees), draw conclusions and make management recommendations</p> <p><b>7.6</b> Carry out an investigation where a newly planted tree has failed preparing advice for a client in line with current professional practice</p> <p><b>7.7</b> Critically evaluate and draw conclusions related to the nationally accepted poor establishment rates of amenity tree planting schemes in the UK</p>  |
| <p><b>8.</b> Understand the principles of designing a landscape with woody vegetation</p> | <p><b>8.1</b> Examine a given purposely designed tree/shrub landscape scheme and evaluate the following aspects</p> <ul style="list-style-type: none"> <li>• spatial characteristics of the plants present</li> <li>• plant assemblages/structure</li> <li>• planting patterns/grouping</li> <li>• plant associations of those present</li> <li>• visual composition</li> <li>• unity and diversity</li> </ul> <p><b>8.2</b> Identify any special values of the landscape evaluated and suggest any design improvements that could be made</p> <p><b>8.3</b> Specify an appropriate professional design procedure for a new landscape involving large scale urban tree planting</p> |

# SUPPORTING UNIT INFORMATION

## L/503/3330 Selection, planting and design with hardy nursery stock for amenity and landscape purposes – Level 5

### INDICATIVE CONTENT

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

#### ***Learning Outcome 1. Understand nomenclature and how to use a botanical key and other sources to identify trees and shrubs***

Botanical key, botanical records, reference books, Royal Horticultural Society, Kew gardens. Family, Genus, Species, Variety, Cultivar, Clone, Common name, Interspecific hybrid, Intergeneric hybrid and Chimera.

Arboricultural significances, such as attractive flowers, good autumn colour, dappled shade, pollution resistance, tolerant of poor soil etc.

#### ***Learning Outcome 2. Know what species to select for any set of conditions or requirements***

Urban paved, supermarket car park, wide or narrow city/town street/road, motorway embankment, industrial reclaimed, landfill, coastal exposed, transitional, wet, clay soil, acid soil, shallow over chalk soil, ornamental features, specimen, native, drought tolerant, avenue, screen, hedge.

Species requirements / tolerances – such as soil type, moisture availability, sun v. shade etc. Site usage – visual appeal, seasonal interest, sensory requirements, wildlife benefit etc.

#### ***Learning Outcome 3. Know what woody plant stock size and type is available***

Seedling, cutting, transplant, undercut seedling / cutting, maiden, whip, feathered tree, standard trees, semi-mature tree, multi-stem trees, shrubs – container grown and containerised

Bare root, cell grown, pot, spring ring, air pot, root balled/wrapped, white bag BS3936, Horticultural Trades Association National Plant Specification (HTA NPS)

#### ***Learning Outcome 4. Understand current methods of tree and shrub production***

Seed sowing, cuttings, grafting, budding, micro-propagation, genetic modification

#### ***Learning Outcome 5. Know how to select hardy nursery stock and have it delivered in good condition***

BS3936, HTA NPS and 'Handling and Establishing Landscape Plants'. . Stock type – seedling to semi-mature. Bare root, containerised (cell grown, spring ring, air pots, Barcham white bag), root-balled.

#### ***Learning Outcome 6. Know how to prepare site for planting***

Type, structure, texture, drainage, pH, organic matter, depth, micro-organism activity, species present, threats, exposure, on-site soil testing equipment, laboratory tests

Cultural operations such as soil replacement, herbicide application, drainage, decompaction etc.

Amelioration with organic material, artificial fertilisers, green manure, sugars etc.

***Learning Outcome 7. Know how to plant, protect and care for newly planted trees and shrubs***

Notch and pit planting techniques, over and underground support systems, BS4043, Protection from biotic and abiotic agents of damage including rabbits, deer, vandals, strimmers, mowers, vehicles, chemicals etc.

Aftercare operations including irrigation, weed control, formative pruning etc.

'Trees in Towns II'

***Learning Outcome 8. Understand the principles of designing a landscape with woody vegetation***

Plant communities and structure both vertical and horizontal. Planting patterns, spacing, grouping, single plants and drifts. Plant associations – growth requirements, relative competitiveness, mode of spread, habit, longevity, life cycle, light demanding/shade tolerant and maintenance. Visual composition – Harmony, contrast, balance, emphasis/accent, scale, sequence, symmetry/asymmetry, form, colour, texture, seasonal, taxonomic and natural.

Scent, sound and touch.

Professional design processes and surveys from initial contact with the client through brief, survey, landscape assessment, planning policies, design concept, outline planting proposals, detailed planting design to specifications.

**TEACHING STRATEGIES AND LEARNING ACTIVITIES**

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

**METHODS OF ASSESSMENT**

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

**Minimum requirements when assessing this unit**

ABC expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

**It is important that practical assessment activities are supervised appropriately**

## **EVIDENCE OF ACHIEVEMENT**

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the ABC web site).

## **ADDITIONAL INFORMATION**

### **Useful sources of reference**

- A Field Guide to the Trees of Britain and Northern Europe by Alan Mitchell - *ISBN 0 00 219213 6*
- Trees in Britain, Europe and North America by Roger Phillips - *ISBN 0 330 25480 4*
- The Tree and Shrub Expert by Dr. D.G. Hessayon - *ISBN 0-903505-17-7*
- Hillier's Manual of Trees and Shrub - *ISBN 0-7153-8302-7*
- British Standard 3936 Part 1 – 'Specification for Trees and Shrubs'
- Horticultural Trades Association – 'National Plant Specification' and 'Handling and Establishing Landscape Plants'
- Principles and Practice of Planting Trees and Shrubs by Gary Watson and E.B. Himelick – ISA - *ISBN 1-881956-18-0*
- The Planting Design Handbook 2<sup>nd</sup> edition by Nick Robinson - *ISBN 0-7546-3035-8*

**See ABC website for further information**

## **Recognition of Prior Learning (RPL), Exemption and Credit Transfer**

ABC encourages its centres to recognise the previous achievements of learners through Recognition of Prior Learning (RPL), Exemption and Credit Transfer. Prior achievements may have resulted from past or present employment, previous study or voluntary activities. Centres should provide advice and guidance to the learner on what is appropriate evidence and present that evidence to the external moderator in the usual way

## **Certification**

Learners will be certificated for all units and qualifications that are achieved and claimed

ABC's policies and procedures are available on the ABC web site in the Examination Officers' Guide