

Arborist Apprenticeship Assessment Plan Appendix 2

Training Specification

August 2016

1. Introduction

The aim of this document is to set out for training providers and assessors in more detail what the employers mean by the competencies in the standard to ensure that the training and assessment meet their needs precisely.

This is not a mandatory part of the standard and assessment plan development process however; its adoption is important in explaining to anyone wishing to deliver an apprenticeship in the future the requirements. This information will be made freely and readily available to everyone concerned with the arboricultural trailblazer apprenticeship.

Training providers shall be expected to provide holistic training related to all the subject material so that apprentices shall be familiar with the topics at testing time.

2. End Point Assessment Evidence

For the end point assessment apprentices shall present the following evidence:

- 2.1 Mandatory licence to practice qualification certificates completed during the apprenticeship period required to pass through the gateway.
- 2.2 Portfolio containing the following evidence:
 - Quarterly reports, if carried out, produced by themselves to indicate their development.
 - Quarterly appraisals if conducted by the employer illustrating the application of knowledge, skills and behaviours. Employers shall ideally use a quarterly appraisal system to monitor the progress of the apprentice, provide feedback and guide development. The appraisals shall include particular reference to apprentice development of skills following passing the licence to practice qualifications.
 - Knowledge tests undertaken during the apprenticeship period. Knowledge tests related to seasonal aspects to include tree and shrub identification (50 specimens), principal decay fungi identification (20 specimens), important and common pest/disease/disorder identification (20 specimens). These shall be graded using a percentage marking scheme by either the employer or the training provider.
 - Tree and shrub identification (50 specimens) locally native, naturalised and commonly found local exotic species by scientific name. Identify 4 values/features (arb significances) of each specimen. Live specimens to be used.
 - Principal decay fungi identification (20 specimens) found locally by scientific name. Live specimens or pictures/photographs can be used. Identify the colonisation strategy, type of rot, part of tree decayed and significance.
 - Important and common pest/disease/disorder identification (20 specimens) potentially found locally by either common or scientific name. Examples: Important – Chalara, Oak Processionary Moth(OPM), Asian Longhorn Beetle (ALB), common – Anthracnose of London plane, tar spot on sycamore, honey dew on lime. Live specimens or pictures/photographs can be used. Identify the significance and any control measure applicable.

- Any other training courses attendance certificates and any assessment results as applicable and which illustrate their development e.g. first aid, bat awareness, manufacturers devised and run events.

3. Holistic Project

- 3.1 The holistic project shall present evidence from testing knowledge that is specified in the standard as being required by the apprentice. The project is designed to test an apprentice's knowledge and its application across many areas of the standard. The subject areas included cover the following:
- Principles of tree and shrub growth including requirements for optimum growth
 - Compartmentalisation of decay in trees
 - Colonisation of woody tissues by principal decay causing fungi
 - Types of rot caused by wood decaying fungi
- 3.2 The apprentice shall produce a presentation that illustrates and explains the following concepts related to woody vegetation. The presentation can be made up of models, samples of tree, power point, leaflets, photographs etc
- The arrangement and function of the main cells of the tree stem, root and leaf - parenchyma, vascular cambium, phloem, xylem, tracheids, rays, cork cambium, bark, green layer (photosynthetic), lenticel, resin duct, annual ring, sapwood and heartwood.
 - Tree Structure as an undamaged, self-optimised structure, axiom of uniform stress and the principle of the minimum lever arm.
 - Mechanisms of defence – chemical measures, phenolic compounds resin and gum production. Compartmentalisation of decay in trees (CODIT) walls 1-3 Reaction Zone and wall 4 Barrier Zone.
 - Fungal colonisation strategies - heartrot, sapwood intact, sapwood exposed and active pathogenesis. Types of rot – white rot (selective delignification and simultaneous), brown rot and soft rot.
- 3.3 Using knowledge gained from understanding the principles of tree growth the apprentice shall demonstrate knowledge of preparing to plant trees, provide support, protection and aftercare for a given scenario. The site must include a minimum of one specific problem ground issue and one problem environmental/social/pest issue locally encountered and include a standard 8-10cm girth bare rooted tree, a 40-60cm in height bare rooted whip and a 2 litre containerised shrub.

4. Practical Tests

4.1 A number of real work end practical tests shall be developed to test the knowledge and skills learnt by apprentices during their apprenticeship and not tested elsewhere in the assessment process.

- identify saw chain defects, any 5 – blunt cutters, sharpened incorrectly, broken or missing tooth(s), cracked tie strap, depth gauges incorrect height, stiff rivets (bearing) movement, over heated chain, drive link damage.
- Identify guidebar defects, any 3 – worn on one side, narrow or wide rails, burrs, sprocket defect, over heated, warped
- Identify a drive sprocket defect 1 only - worn
- replace a starter cord
- set and replace a spark plug in a chainsaw
- select a replacement saw chain for a given saw and guidebar length.
- tie knots, any 5 from timber hitch, running bowline, bowline on a bight, marline spike, double fisherman's, blake's hitch, sheet bend and state a situation of use.

5. Structured Interview

5.1 The interview of the apprentice shall take place under controlled conditions at a location agreed between the assessment provider and the employer. There will be a structured discussion between the apprentice and their independent assessor of approximately 60 minutes duration, focusing on the apprentice's portfolio and the holistic project. It shall cover both what the apprentice has done, the standard of their work, and also how they have done it. This enables the assessment to include a broad range of skills and behaviours, such as the apprentices:

- approach to health and safety
- professionalism and work ethic
- communication skills
- understanding of tree care
- understanding of legislation (wildlife and protected trees) affecting tree work

5.2 The purpose of the interview is to:

- question the apprentice based on the portfolio
- ratify that the holistic project is the apprentice's work
- confirm and validate judgements about the quality of work
- explore aspects and knowledge of tree work in more detail
- provide a basis for the independent assessor to make a holistic decision about the grade to be awarded

5.3 A structured interview brief shall be developed for the assessment organisation to support the discussion. This will ensure that consistent and reliable approaches are taken and that all key areas are appropriately explored.

6. Online Multiple Choice Knowledge Tests

6.1 Test 1

A number of online tests shall be developed to test the knowledge of apprentices covering the areas not covered by the other forms of assessment, these include: Principles of tree care as described in the British Standard 3998 Tree Work – Recommendations. A range of multi-choice questions covering the following areas.

- Tree work – safety and planning
- Pruning and related work
- Deadwood
- Formative pruning
- Crown thinning
- Crown lifting
- Crown reduction / reshaping
- Selective pruning
- Pruning for infrastructure
- Pollarding
- Treatment of wounds and other injuries
- Dry cavities
- Wet cavities / water pockets
- Management of weak structures
- Inspection and maintenance of restraint and support systems
- Disposal, utilisation, retention of arisings

A bank of 60 questions shall be maintained and 40 chosen at random per test session. The pass mark will be 60% with distinction at 80%.

6.2 Test 2

- The principles and importance of identifying trees by genus, species, variety, cultivar, intergeneric and interspecific hybrids and the value of using and writing their scientific names correctly.
- Environmental and wildlife legislation covering the implications of the Wildlife and Countryside Act, Countryside Rights of Way Act and The Conservation of Habitats and Species Regulations for tree surgeons.
- Legislation relating statute law i.e. tree preservation orders and conservation areas and the implications for tree work. What the legislation aims to prevent, application for works and penalties for breach of the legislation.
- Common law situation regarding over hanging branches, trespassing roots and dangerous trees related to the tree surgeon.
- Electrical safety for working in the vicinity of power lines – licences and safe distances.

Bank of 50 questions to be maintained and 30 used at random per test session. The pass mark will be 60% with distinction at 80%.

Indicative Content – Trailblazer Apprenticeship in Arboriculture

1. Principles of tree and shrub growth including requirements for optimum growth

Photosynthesis, respiration, transpiration, transportation, defence, storage, reproduction, cell division/growth and anchorage.

Structure of a monocotyledon and dicotyledon - Pith, parenchyma, vascular cambium, phloem, xylem, tracheids, rays, cork cambium, bark, green layer (photosynthetic), lenticel, resin duct, annual ring, sapwood and heartwood. Identify the functions of each cell. Identify the differences in ring and diffuse porous and conifers xylem size and position within the annual growth, xylem to tracheids and resin ducts in conifers.

Environmental factors affecting growth - sunlight, temperature extremes, pollution, water availability, wind, oxygen and carbon dioxide levels.

Functions of roots – anchorage, uptake of water, uptake of nutrients, respiration, storage, to form symbiotic relationships. Forms – lateral, lateral with droppers/sinker, lateral and tap, sloping, vertical, two tiered. Shape – tap, heart and surface root systems. Root distribution

Tree Structure as an undamaged, self-optimised structure. Axiom of uniform stress and the minimum lever arm (body language of trees). Compression and tensile forces, slenderness, bulges, fibre buckling, cracks, ribs, hazard beam and hollowness.

Requirements for growth - Oxygen, water, nutrients – major and minor, good soil structure, good drainage and the presence of beneficial soil organisms, space above and below ground

2. Compartmentalisation of decay in trees

Walls 1-3 Reaction Zone and wall 4 Barrier Zone. Describe woundwood and distinguish it from callus.

3. Colonisation of woody tissues by principal decay causing fungi and types of rot

Heartrot, sapwood intact, sapwood exposed and active pathogenesis. Types of rot – white rot (selective delignification and simultaneous), brown rot and soft rot.

4. Knowledge of preparing to plant trees, provide support, protection and aftercare

Ref to BS 8545. Transplant, (1+0, 1+1, 1+1u1) whip, multi-stemmed, feathered, standard standard and extra heavy standard as in BS 3936 Nursery Stock. Planting spear, notch and pit. Staking – one third high, conventional one stake, double stake, underground guying. Backfilling – layers of original soil compressed with the ball of the foot not the heel, no use of organic materials at the base of a planting pit (O₂ is used up by soil organisms leading to asphyxiation of

tree roots). Organic and inorganic mulch materials. Reasons for mulching – reduce water evaporation from the soil, prevent weed growth competition – aimed at helping establishment.

Unfavourable site choice - weedy, wet, dry, poor soil structure, clay, reclaimed brown field site.

Aboveground support, underground support and guards. Rabbits and deer individually or by fences – take account of height or type of deer.

3 year after care programme to include tree/shrub replacement, re-firming, watering, mulch maintenance, formative pruning to BS 3998, tie and stake adjustment, weed control, pest and disease control.

5. Practical tests – skills required

Identify saw chain defects, any 5 – blunt cutters, sharpened incorrectly, broken or missing tooth(s), cracked tie strap, depth gauges incorrect height, stiff rivets (bearing) movement, over heated chain, drive link damage.

Identify guidebar defects, any 3 – worn on one side, narrow or wide rails, burrs, sprocket defect, over heated, warped

Identify a drive sprocket defect 1 only - worn

Replace a starter cord

Set and replace a spark plug in a chainsaw

Select a replacement saw chain for a given saw and guidebar length.

Tie knots, any 5 from timber hitch, running bowline, bowline on a bight, marline spike, double fisherman's, blake's hitch, sheet bend. Knowledge of their uses.

6. Structured Interview

6.1. Health and safety

Health and Safety at Work Act, Management of Health and Safety at Work regulations, First Aid at Work regulations, Working at Height regulations, Lifting Operations and Lifting Equipment regulations, Provision and Use of Work Equipment regulations, Personal Protective Equipment regulations, Manual Handling regulations, Reporting of Injuries, Diseases and Dangerous Occurrences regulations, relevant AFAG and FISA codes of practice.

6.2. Professionalism and work ethic

6.3. Communication skills

6.4. Understanding of tree care

Potential and kinetic energy. Dynamic (living and functional) and static mass (dead or dysfunctional). Phenology – timing of natural processes 5 main periods - onset of growth, expansion of leaves and needles, high photosynthetic period, wood production and storage and dormancy. Critical periods – bud break and leaf fall. Timing of pruning work e.g. cherry, walnut, birch and maples. Natural target pruning. Avoiding damage to trees during tree surgery operations.

7. Knowledge Tests

7.1. Tree surgery operations as defined and described in BS 3998

Tree work – safety and planning
Pruning and related work
Deadwood
Formative pruning
Crown thinning
Crown lifting
Crown reduction / reshaping
Selective pruning
Pruning for infrastructure
Pollarding
Treatment of wounds and other injuries
Dry cavities
Wet cavities / water pockets
Management of weak structures
Inspection and maintenance of restraint and support systems
Disposal, utilisation, retention of arisings

7.2. Tree Identification

The principles and importance of identifying trees by genus, species, variety, cultivar, intergeneric and interspecific hybrids and the value of using and writing their scientific names correctly.

The International Code of Nomenclature for algae, fungi, and plants. The set of rules and recommendations dealing with the formal botanical names that are given to plants, fungi and a few other groups of organisms, all those "traditionally treated as algae, fungi, or plants. It helps to ensure:

- Global uniformity in the classifying (classification), grouping (taxonomy) and naming (nomenclature) of plants
- The use of a single, simple and precise system in all countries – periodically updated
- Parity and consistency of all terms used and names given
- One internationally recognised reference system for all those involved with plants
- Showing how plants are linked

The preamble to the Code states that botany requires a precise and simple system of nomenclature used by botanists in all countries, dealing on the one hand with the terms which denote the ranks of taxonomic groups or units, and on the other hand with the scientific names which are applied to the individual taxonomic groups of plants. The purpose of giving a name to a taxonomic group is not to indicate its characters or history, but to supply a means of referring to it and to indicate its taxonomic rank. This *Code* aims at the provision of a stable method of naming taxonomic groups, avoiding and rejecting the use of names which may cause error or ambiguity or throw science into confusion.

Scientific names written in italics.

Genus

Group of plants whose components have similarity in characteristics of the flowers and fruit, also roots, stems, buds leaves than other groups of genera in the same family.

Example *Quercus* – initial capital letter and written in italics

species

A group of individuals that adhere to essential identification characteristics but display sufficient variation so as not to be the same.

Example *robur* – written lower case and italics

variety

A group or class subordinate to the species arising naturally. var. often a result of geographical isolation.

Illustrative example var. *fastigiata* – written in lower case and italics. NB var is not written in italics.

Cultivar

An assemblage of plants arising in cultivation that differ in a characteristics such as form, colour etc.

Example – 'Fastigiata' initial capital letter, not italicised but written inside single quotation marks.

Interspecific hybrid

A sexual cross of two different species from the same genus and denoted by x in front of the species

Example – *Platanus x hispanica*

Intergeneric hybrid

A sexual cross of two different genera from the same family and denoted by x in front of the genus

Example – *X Cupressocyparis leylandii*

The importance of writing plant names correctly is professionalism and being specialists in the field.

7.3. Understanding of legislation (wildlife and protected trees) affecting tree work

Trees

Common law- arising from a court case where a precedent is set – higher courts. Dangerous trees (as in unsafe), overhanging branches, trespassing roots, poisonous trees and the right to light.

Statute law – made by an Act of parliament.

Tree preservation orders (TPO) current regulations, conservation area designation current Act.

TPO permission from Local Planning Authority (LPA) required.
5 days notice for emergency works to LPA.
Complete an application form for TPO works. When technical reports are required.
Penalties to include fines and tree replacement.
LPA need to determine application within 8 weeks taking opinion into account.

Conservation Area (CA) notice (section 211) of intention to carryout works required to be given to LPA.

CA no permission is required but LPA have 6 weeks to decide if tree warrants TPO and cannot condition notice of intent. Penalties to include fines and tree replacement.

Wildlife

Wildlife & Countryside Act – intentional, Countryside and Rights of Way Act – reckless and Conservation of Habitat Regs – deliberate. Identify the key implications – destruction, killing, harming, disturbing, taking or having in possession any derivative of a protected species. Identify the current penalties for offences – fines, imprisonment and confiscation of equipment. Implication - undertake a risk assessment prior to tree work looking for signs and presence of a protected species, if suspected dismantle tree carefully, if at any time presence confirmed STOP work and inform Statutory Nature Conservation Organisation (SNCO).

Example: If bat species disturbed during work STOP work, inform SNCO and local bat group, in summer allow bats to fly off, retain any injured or dead bats for collection. In winter retain all bats in darkness in container with oxygen for collection.

7.4. Electrical Safety

Electricity at Work Regulations 1989 and memorandum HSR25, FISA 804, GS6 Avoiding danger from overhead power lines

When arboricultural (aerial and ground) works are proposed within 10m (measured at ground level horizontally from below the nearest wire) of overhead power lines a risk based approach needs to be adopted. In practice this means that you should seek specialist advice and guidance from the owner of the power line (Network Operator) before undertaking any work within this distance.

Reg 4 – every work activity shall be carried out in such a way as to avoid danger, as far as is reasonably practicable

Reg 14 – no work near live conductors, unless:

- It is unreasonable for it to be dead
- It is reasonable for the worker to work in close proximity to live conductors
- Suitable precautions have been taken to prevent injury – PPE etc.

Carefully plan:

The worksite

Access routes in the worksite

Tree-felling/pruning operations

Timber extraction
Arb / Forestry guidelines

- When felling – two tree lengths clearance required
- The edge trees need to be marked so they are obvious
- Any closer felling – only after consultation with the owner of the line
- For arb. work – consult owner if any part of the tree is closer than 9m (poles) or 15m (pylons)
- Follow any code of practice issued by line owner in terms of clearance

7.5. Working near overhead power lines

When you need to work near overhead power lines (OHPL), you need to agree with the owner of the line, usually the network operator (NO) for the power lines to be disconnected.

Those working in the utility sector require competence certificates in line clearance. (A C&Gs/NPTC Level 3 Certificate of Competence in Utility Arboriculture - Prune Trees (Aerial))