VOCATIONAL TRAINING PROGRAMME
for people with Intellectual Disability

HORTICULTURE COURSE
Step-by-Step Manual

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12/05
This basic, step-by-step manual was specifically designed for teachers, instructors, therapists and all those responsible for the training of people with intellectual disability (E.S.N., E.M.R.).

Users are requested to assist in future revisions by communicating their reactions to the Programme Development Team, Vocational Training Centre, Cork Polio and General After-Care Association, Bonnington, Montenotte, Cork, Ireland.

1987
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SAFETY  

SECTION 1

OBJECTIVES:
The Trainee will
1.1 Obey the General Rules
1.2 Follow the Safety Guidelines

GENERAL RULES OF CONDUCT AND SAFETY
1 Attendance – reason(s) for absence from the Centre must be given by parent/guardian or doctor.
2 Punctuality – report to training session at correct time.
3 Don't leave the training area without permission.
4 Show respect for staff and for other trainees.
5 No bad language.
6 No horseplay.
7 Don't run – walk.
8 Show respect for other people’s property.
9 Keep the training area and the grounds tidy.
10 No smoking – except in canteen or out of doors.
11 Put coats and other belongings in the cloakroom.
12 Obey Safety Regulations.
13 Obey Fire Regulations.
14 Report any accident to the Instructor.

SAFETY GUIDELINES – HORTICULTURE DEPARTMENT
• Keep hands clear of blades.
• Do not set aside tools so that they are dangerous.
• Be careful when walking over uneven terrain, wet surfaces etc.
• When working on or near roadways, face oncoming traffic.
• No horseplay in the vicinity of gardening equipment.
• Put on your rainwear in inclement weather.
• Wear rubber gloves when handling chemicals.
• Wear a face-mask when spraying.
• Wear steel-toed footwear when operating lawnmowers.
• Do not leave a machine running when not in use.
• Do not operate machinery or equipment too close to another person.
• Disconnect the spark plug lead when inspecting or storing power machinery.

continued
• No smoking near fuel storage tanks or near machines containing fuel (petrol, diesel, paraffin, propane gas).
• When digging do not try to lift too much soil with each spadeful.
• Cover the tines of forks and rakes securely when not in use to avoid injury.
OBJECTIVES:
The Trainee will

2.1 Locate the specified areas of the nursery.
2.2 State the functions of the
   (a) Tool and Potting Shed
   (b) Glasshouse
   (c) Polythene Tunnels
   (d) Net-covered Tunnels
   (e) Capillary Beds
   (f) Open Ground Area
   (g) Sales Area
2.3 Explain the terms in the Glossary

<table>
<thead>
<tr>
<th>AREA</th>
<th>FUNCTION</th>
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</thead>
<tbody>
<tr>
<td>The Tool and Potting Shed</td>
<td>is the building in which the Gardening tools, equipment, chemicals,</td>
</tr>
<tr>
<td></td>
<td>containers and compost media are stored. It is here also that compost</td>
</tr>
<tr>
<td></td>
<td>making and initial propagation take place.</td>
</tr>
<tr>
<td>The Glasshouse</td>
<td>is the building where plants requiring protection are grown.</td>
</tr>
<tr>
<td></td>
<td>Potting is carried out here, too, in cold weather. The glasshouse may</td>
</tr>
<tr>
<td></td>
<td>be heated.</td>
</tr>
<tr>
<td>The Polythene-covered Tunnels</td>
<td>are the structures in which cuttings are rooted in trays placed within</td>
</tr>
<tr>
<td></td>
<td>low-level ‘milky white’ polythene tunnels.</td>
</tr>
<tr>
<td>In the Net-covered Tunnels</td>
<td>rooted cuttings are hardened off prior to potting on. Shade-loving</td>
</tr>
<tr>
<td></td>
<td>plants are grown-on here also.</td>
</tr>
<tr>
<td>The Capillary Beds</td>
<td>are constructed of sand on which container grown plants are grown-on.</td>
</tr>
<tr>
<td></td>
<td>The plants are watered by means of the capillary properties of the</td>
</tr>
<tr>
<td></td>
<td>sand – the water soaks upwards to the plants.</td>
</tr>
<tr>
<td>The Open Ground Area</td>
<td>is where hardwood cuttings mostly are propagated, such as hedging</td>
</tr>
<tr>
<td></td>
<td>material, and grown-on directly in the open ground. Climbing plants</td>
</tr>
<tr>
<td></td>
<td>are plunged in the open ground also.</td>
</tr>
<tr>
<td>The Sales Area</td>
<td>is where plants are grouped and displayed for sale.</td>
</tr>
</tbody>
</table>
LAYOUT PLAN
PLANT NURSERY SECTION
HORTICULTURAL TRAINING CENTRE

CODE
(a) = Tool & Potting Shed  (b) = Glasshouse
(c) = Polythene Tunnels  (d) = Net Covered Tunnels
(e) = Capillary Beds  (f) = Open Ground Areas
(g) = Sales Areas  " " = Banks & Sloping Ground

0  10  20 METRES
GLOSSARY OF HORTICULTURAL TERMS

Acid: Describes soil with a pH of less than 7. A ‘sour’ soil, suitable for growing only certain plants e.g. azaleas.

Alkaline: Describes soil with a pH over 7. A ‘sweet’ soil.

Alpine: A plant suitable for growing in rock gardens, includes dwarf forms of shrubs and conifers, derives from plants growing naturally in the Alps or similar conditions.

Annual: A plant which germinates, grows, flowers and sets seed within the space of one growing season.

Base Dressing: Fertilizer applied immediately before sowing or planting.

Bed: A clearly defined plot of cultivated ground.

Bedding Plants: Any plants raised in quantity for a temporary garden display.

Biennial: A plant that completes its life-cycle in the space of two growing seasons.

Bud: The embryonic growing point of a shoot from which leaves or flowers will develop.

Bulb: A swollen underground bud with fleshy scales.

Capillary: A system of watering through which potted plants soak up or extract the water they need from a bed, usually of sand.

Climber: A plant which ascends towards the light, it may attach itself to walls, fences, trellises etc.

Compost: A prepared medium for propagating or establishing plants, there are various preparations for specific purposes.

Conifer: A shrub or tree which bears its seeds in cones.

Corm: A swollen underground stem, often confused with a bulb but is shorter and broader.

Cutting: A separated piece of plant specially prepared to propagate a new plant, the cutting may be a piece of stem or root or leaf.

Deciduous: Refers to plants which shed their leaves in winter.

Ericaceous: Refers to plants, such as heathers, which are lime-hating.

Evergreen: Refers to plants which retain their leaves throughout the year.

Fertilizer: A substance which supplies food for plants.

Foliar Feeding: Spraying liquid fertilizer onto the leaves through which it is partially absorbed.

Fungicide: A chemical that kills fungal diseases like blight, damping off, mildew etc.

Half-hardy: A plant that cannot withstand frost.

Harden-off: Gradually accustomising a plant raised indoors to outdoor conditions.
Hardy: A plant which can withstand frost during a normal winter.
Heel-in: Temporary storage of plants in open ground. The plants, stems, cuttings are placed together in an upright or inclined position in a shallow trench which is then filled with soil and firmed with the heel.
Herbaceous: A plant which produces soft, non-woody growth, which usually dies down in winter and grows again the following spring.
Herbicide: A chemical that kills plants, normally refers to weedkillers.
Humidity: The amount of water vapour in the atmosphere.
Insecticide: A chemical that kills insects.
Line Out: To plant out young plants or cuttings in temporary positions.
Liner: A pot-grown young plant in a 7cm pot.
Mulch: A top dressing of organic or inorganic matter applied to the soil around a plant.
Node: The joint on a stem from which a leaf or bud emerges.
Organic matter: Matter consisting of or derived from living things, e.g. leaf mould, farmyard manure.
Perennial: A plant which lives and flowers for more than two years.
Plunge: To bury container-grown plants to the rim in the ground or in peat, sand, ash.
Pricking Out: Transplanting and spacing out of seedlings.
Propagate: Increase of plants, the main methods are by way of seeds and cuttings.
Pruning: Cutting back woody plants to remove damaged wood, improve the quality of flowers or seeds, or to regulate growth.
Rooting Hormone: A chemical which promotes the development of roots, usually applied to cuttings.
Seedling: A young plant with a single, soft and unbranched stem.
Shrub: A plant with woody stems or branches but with no central trunk.
Staking: Supporting a plant with a post to keep it steady and upright.
Thinning: Reducing the number of seedlings, buds, flowers or branches.
Tilth: A fine crumbly surface layer of soil, produced by weathering or cultivation.
Trace Elements: Food materials required by plants only in very small amounts.
Tree: A plant with a central woody trunk or main stem.
OBJECTIVES:
The Trainee will

3.1 Identify the tools and equipment listed
3.2 State the uses of the tools and equipment
3.3 Store these tools and equipment

TOOL USE

Brush: Garden brush used to sweep up leaves and other debris.
Dibbers: Hand tools of varying sizes for making planting holes.
Forks: In surface cultivation, a fine tilth may be achieved by breaking up lumps of soil with the back of the fork, also used to aerate compacted soil, to lift a plant including its roots. As the tines are potentially dangerous the implement should be handled and stored with care.
Hoes: The Dutch Hoe is used in a push-pull action, the Draw Hoe with a chopping action. Both are used for general weeding and for cultivating the soil between plants.
Hoses: Generally of plastic or rubber, to convey water to various locations in the garden.
Incinerator: A container in which waste material is burned.
Knives: Used to prepare cuttings for propagation.
Labels: Available in a wide variety of materials, can be marked permanently with a special pencil, for recording details of plants, such as name, date etc.
Lawn Edgers: A cutting tool with a half-moon shaped blade, used to cut vertical edges on lawns, beds.
Lines: String used stretched between canes to mark out beds, lines of plants etc.
Measuring Rod: A stick with notches or marks at fixed spaces along it, used when spacing out plants.
Mowers: The powered mowers used to cut the lawns in the department are of two types - cylinder cutters and rotary blades. Special training is given.
Pots: Containers in which plants, seeds, cuttings are grown. Available in a variety of materials; plastic, clay, polythene and in a variety of sizes.
Presser Board: A piece of flat wood with a handle, used to firm and level compost.
TOOL USE

Rakes: For general seed bed preparation, for levelling soil, cleaning up debris such as fallen leaves, moss, grass cuttings from lawns. The tines are dangerous – don’t set it aside with tines sticking up.

Secateurs: For cutting parts of plants for the purpose of taking cuttings or pruning.

Seed Boxes: Plastic Trays in which seeds are sown in a seed compost

Shears: Used to clip or trim hedges.

Sieve: A type of screen used in the preparation of fine soil or compost material.

Spades: For digging or trenching, for making holes into which trees and shrubs may be planted and also used to mix compost.

Sprayers: Used to apply insecticide, or fungicide, or weedkiller. May also be used to spray liquid fertilizer.

Sprinklers: Used in association with the hose to direct water sprays over wide areas.

Thermometers: For measuring temperature, especially in the glasshouse.

Ties: Material used for tying plants in order to support them, may be twine, raffia, plastic.

Trowels: Hand tools for planting out small plants

Watering Cans: For applying water to seed beds, growing plants.

Wheelbarrow: To transport tools, equipment, compost etc., from place to place.

STORAGE

Garden tools must be cleaned immediately after use and then wiped with an oily rag.

Every tool and piece of equipment has a specific storage place and after use must be returned to its assigned place.

Report any damage to the Instructor.
BASIC GARDENING ACTIVITIES

OBJECTIVES:
The Trainee will

4.1 Dig garden beds
4.2 Cultivate soil with the rake
4.3 Weed beds with the hoe
4.4 Sweep up debris
4.5 Trim established hedges
4.6 Edge and trim grass verges
4.7 State the purposes of mulching
4.8 Spread mulch around plants

DIGGING. The two main purposes of digging are (a) to break up the soil thus creating a better place for plants to grow and (b) to destroy annual weeds by burying them. Digging also affords an opportunity of incorporating organic material into the topsoil and of removing larger stones and rubble.

Wear loose fitting clothes when digging to allow for plenty of movement. Wear stout boots or wellingtons. Tuck trouser bottoms inside socks or wellingtons. If you are right handed, dig the trenches from right to left.

Step 1. The first trench is intended to go along the edge of the lined area. Grip the spade in a comfortable manner, aim to cut two sides of the first spadeful slightly wider than the width of the blade. Cut the sides to a depth of about 5cm by pushing the blade into the surface.

Step 2. Hold the spade with the blade vertical, place the blade evenly between the two side cuts so that a comfortable amount of soil may be taken (too much can lead to fatigue, back strain or breaking the shaft).

Step 3. Press the blade into the ground by hand then drive it down vertically to the full depth of the blade (called a spit) by pushing the instep of the left foot on the footrest.

Step 4. Lift the foot from the footrest and replace it on the ground to the left of the spade. Tilt the shaft forward slightly and then pull it back to loosen the soil.

Step 5. Keeping the body well balanced, lever the shaft back and down, and slide the left hand down the shaft.

Step 6. Lift the spadeful, no higher than is necessary and turn it upside-down into the trench.

Step 7. Break any large lumps in the inverted spadeful by slicing the spade through them.

Step 8. Move to the left and cut the left side of the next spadeful, again slightly wider than the width of the blade and continue the above steps.
RAKING. Work the teeth (tines) of the rake, back and forth, over the soil which has already been dug and loosened, until the soil surface has been broken down into smaller particles called a tilth. Move the rake in a sweeping action first in one direction, and then at right angles to ensure an even finish.

HOEING. The purpose of hoeing is to cut off weeds and prevent them from growing. It is recommended that hoeing be carried out when weed seedlings are small and preferably also on a dry day.

Dutch Hoe:- Skim the blade forward and backward just below the surface. Cut off the weed stems rather than drag them out by the roots. Step backwards, in this way the cultivated ground is not trodden on, and leave the weeds to dry and die on the surface.

Draw Hoe:- This hoe is more widely used commercially because it is easier to operate in heavy soil and is easier to control close to plants. Chop the soil and pull it slightly towards you, scrape the weeds off the surface and pull them aside. Unfortunately, you must walk over the cultivated soil but avoid walking on the weeds.

General:- Do not hoe close to plants as you may damage their root system, pull these weeds out by hand.
Annual weeds only should be hoed, perennial weeds should be forked out by their roots.
Avoid walking on hoed-off weeds as you might inadvertently replant them.

SWEEPING. Clean up any debris, papers, litter, fallen leaves etc., from roadways and other surfaced areas, by sweeping with the brush. Shovel the material collected into the wheelbarrow for disposal.

HEDGE TRIMMING. For most formal hedges twice yearly clipping is necessary, May and August are the best times to carry out this operation. Aim to create a hedge which is slightly narrower at the top than at the base so that light is allowed to reach the lower branches and snow is shed more easily.

Step 1. Lay a line, fixed to canes, at intervals along the desired height.

Step 2. With the shears cut off all the extension growth above the line.

Step 3. Cut all side growths to maintain the basic shape i.e. wider at base, narrower at top.

Step 4. Check over the hedge and cut out, with the secateurs, any damaged, diseased or dead wood.

Step 5. Gather up and burn all the clippings as soon as the job is finished.
EDGING. (a) Anytime between November and March, set a line between canes along the grass verge as a guide. Hold the half-moon blade edger with both hands, lay the blade under and parallel to the line, press the blade with the hands and one foot, and leave a neat sharply defined edge. Repeat along the verge.

(b) During the growing season, at fortnightly intervals, trim off any grass or excessive growth which overhangs the verge with the long-handled shears.

MULCHING. A mulch is a dressing of organic or inorganic material applied to the soil around plants. The purposes served by mulching are (a) organic material will slowly decompose and enrich the soil. (b) It will suppress weeds and (c) will conserve moisture in the soil. Depending on availability, the most common mulching materials are spent mushroom compost, leaf mould, farmyard manure and other organic waste products, however, black polythene film which is inorganic may also be applied. Mulches are best applied in spring and the soil should be moist. Spread the organic material with the shovel. Fork it over the soil, not on the plants, leaving a layer about 5 to 10cm thick on the surface.
## CONTAINERS

### OBJECTIVES:
The Trainee will

1. Identify tray and pot sizes
2. State the uses of trays and pots
3. State the reasons for hygiene
4. Disinfect containers
5. Store Containers

### SEED TRAYS

Seed trays come in a variety of materials but plastic has the advantages of durability and can be cleaned more effectively. The sizes in use in this department are 35 x 22cm and 58 x 30cm, and these are 6cm deep. They are used for propagating (a) seed and (b) cuttings. A third, larger tray called a handling tray is bigger and stronger, and is used for transporting a number of pots at a time. An essential feature of all these trays is a set of drainage holes.

### POTS

Pots are available in plastic, compressed peat, compressed paper, clay (to a decreasing extent) and also in lay-flat black polythene (to an increasing extent). In this department only plastic, because they are easily cleaned, and polythene, because they are disposable, are used. The sizes of the plastic pots used are 7, 9 and 11cm and these are used for initial growing-on. Subsequently, potted and rooted cuttings are potted-on in polythene pots of varying sizes from 1 litre to 10 litres. Sizes are marked on the base of trays and plastic pots (in imperial and metric scales). Black polythene pots do not have the size marked on them.

### HYGIENE

It is essential that containers be kept scrupulously clean. Propagation of seedlings and cuttings often fails because of pests and diseases. A high standard of hygiene is essential right through the entire propagation cycle beginning with the containers themselves. They must be cleaned thoroughly of fungal spores, diseases and weed seeds. In the case of containers which have been used previously the main source of infection is the crusty layer of soil and chemicals that occurs as a 'tidemark'.

### DISINFECTING AND STORING CONTAINERS

Disinfected containers prevent and help to eradicate pests and diseases, they are easier to use and safer to handle.

Step 1. Fill the wash tank with water (180L).
Step 2. Put on rubber gloves.
Step 3. Add 300ml detergent and 200ml disinfectant to the water and stir it with a cane.
Step 4. Place previously used containers in the tank and allow to soak for 30 minutes.
Step 5. Brush out each container thoroughly, inside and outside, including the crevices. Remove all crusty material from the sides of pots.
Step 6. Remove the containers from the tank and stack them neatly, according to size, on the draining pallets.
Step 7. Hose them down with clean fresh water, allow them to drain and return them to their place in the potting shed.
PLANT IDENTIFICATION

OBJECTIVES:
The Trainee will

6.1 Identify the genera listed
6.2 Select suitable sites for these genera
6.3 Explain the ‘species’ terms

The classification of cultivated plants is controlled by an internationally recognised code. Latin, and sometimes Greek, names are preferred because common names differ from place to place. All plants are grouped according to genus, species and variety.

PLANT GROUPINGS

GENUS (plural genera) is the basic unit. It is the collective name given to a group of closely-related plants. The genus is conventionally written with a capital initial and is always a noun.

A genus includes a number of SPECIES which refers to a description of the plant’s region of origin, habitat, description of the plant or a particular feature, name commemorating people etc. The species is written in small lettering immediately after the genus, and is an adjective.

Each species includes a number of VARIETIES or variants which may have arisen either naturally or as a result of selection (a man-made variety is referred to as a cultivar). Variety usually refers to the specific name chosen by the international nomenclature body, or it may include the name of the person who first described it, or it may be a further description of the uniqueness of that particular variety. Variety is usually written in small lettering following the species but in the case of cultivars with a capital initial and enclosed in single quotation marks e.g. Pyracantha (genus) coccinea (species) ‘Lalandei’ (cultivar).

Identification of plants is made mainly by way of our channels of sight, touch and smell. The general size, shape and form of the plant is examined – it may be upright, big, small, compact, prostrate, climbing etc. The colour, shape, size, texture and fragrance of the leaves are taken into account together with the size, colour, shape, fragrance, quantity of the flowers.

The selection of plants for propagation and growth in the nursery in a given season is determined by (a) what will sell and the specific needs relating to landscaping requirement (b) what the physical resources can support effectively and (c) what has been found from experience to have a sound and relevant training value.
The following list of genera is comprised, in the main, of hardy nursery stock and also includes some half-hardy flowers as well as trees, shrubs, conifers and climbers. The common name, where applicable, is given together with a brief description and suitable planting positions

<table>
<thead>
<tr>
<th>PLANT</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Abelia:</td>
<td>flowering shrubs in both deciduous and evergreen forms, sunny position.</td>
</tr>
<tr>
<td>Abutilon:</td>
<td>shrubs, hardy only in mild districts, near south wall.</td>
</tr>
<tr>
<td>Betula:</td>
<td>'Birch', deciduous native trees, notable for stem colour and attractive yellow leaves in Autumn, good landscape or roadside trees.</td>
</tr>
<tr>
<td>Buddleia:</td>
<td>'Butterfly Bush', tall shrubs, attract butterflies, sunny place.</td>
</tr>
<tr>
<td>Buxus:</td>
<td>'Box', evergreen shrubs, for hedging or tubs, any position.</td>
</tr>
<tr>
<td>Camelia:</td>
<td>hardy flowering evergreen, sheltered conditions, acid soil.</td>
</tr>
<tr>
<td>Ceanothus:</td>
<td>'Californian Lilac', large round habit, wall shrubs or free-standing.</td>
</tr>
<tr>
<td>Chaenomeles:</td>
<td>'Quince', ornamental flowering shrubs, fruits suitable for jelly-making, open border or low wall.</td>
</tr>
<tr>
<td>Chamaecyparis:</td>
<td>'Cypress', conifers of widely varying sizes, moist well-drained soil.</td>
</tr>
<tr>
<td>Cheiranthus:</td>
<td>'Wallflower', sweet-smelling, biennial and perennial bedding plants.</td>
</tr>
<tr>
<td>Cistus:</td>
<td>'Rock Rose', low-growing shrubs, sunny location on dry bank or rock garden.</td>
</tr>
<tr>
<td>Clematis:</td>
<td>'Traveller's Joy', native deciduous climbers, 'head in sun, feet in shade'.</td>
</tr>
<tr>
<td>Clianthus:</td>
<td>'Lobster Claw', wall shrubs, sunny position.</td>
</tr>
<tr>
<td>Cornus:</td>
<td>'Dogwood', shrubs grown mainly for attractive, coloured stems, moist conditions.</td>
</tr>
<tr>
<td>Cotoneaster:</td>
<td>hardy, ornamental shrubs, flowers in summer — berries in autumn, all soil conditions.</td>
</tr>
<tr>
<td>Crinodendron:</td>
<td>'Lantern Tree', large evergreen shrubs, lime-free soil and partial shade.</td>
</tr>
<tr>
<td>Cytisus:</td>
<td>'Broom', small to medium evergreen shrubs, require sun.</td>
</tr>
<tr>
<td>Erica:</td>
<td>'Heather', a large genus, ground clover, prefer acid soil.</td>
</tr>
<tr>
<td>Escallonia:</td>
<td>evergreen shrubs, suitable for hedging, well-drained soil, particularly suited to coastal areas.</td>
</tr>
<tr>
<td>Euryops:</td>
<td>evergreen shrubs with grey leaves, sunny position.</td>
</tr>
<tr>
<td>Forsythia:</td>
<td>very common spring-flowering shrubs, any position.</td>
</tr>
<tr>
<td>Fuchsia:</td>
<td>semi-evergreen shrubs, sun or shade, common on hedgerows in Cork and Kerry.</td>
</tr>
<tr>
<td>PLANT</td>
<td>DESCRIPTION</td>
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</tr>
<tr>
<td>Genista:</td>
<td>flowering shrubs, require sun.</td>
</tr>
<tr>
<td>Griselinia:</td>
<td>evergreen, grown mainly as hedging, suited to coastal areas.</td>
</tr>
<tr>
<td>Hebe:</td>
<td>formerly Veronica, evergreen flowering shrubs, widely grown at the seaside and industrial zones.</td>
</tr>
<tr>
<td>Hedera:</td>
<td>'Ivy', evergreen climbers, withstand atmospheric pollution.</td>
</tr>
<tr>
<td>Helianthemum:</td>
<td>'Sun Rose', dwarf evergreen shrubs, abundant flowers, hot dry situation.</td>
</tr>
<tr>
<td>Hydrangea:</td>
<td>deciduous bushy shrubs, flower colours dependant on pH (acidity) of soil.</td>
</tr>
<tr>
<td>Hypericum:</td>
<td>'St. John's Wort', flowering shrubs, rock garden or border.</td>
</tr>
<tr>
<td>Jasminum:</td>
<td>'Jasmine', shrubby flowering climbers, against a wall facing east, south or south-west.</td>
</tr>
<tr>
<td>Juniperus:</td>
<td>'Juniper', conifers of widely varying sizes and forms, fruits used in manufacture of gin, associates well with heathers.</td>
</tr>
<tr>
<td>Kniphofia:</td>
<td>'Red Hot Poker', hardy perennial plants conspicuous scarlet and yellow flowers, border.</td>
</tr>
<tr>
<td>Lavandula:</td>
<td>'Lavender', dwarf aromatic shrubs, sunny position.</td>
</tr>
<tr>
<td>Lavatera:</td>
<td>'Mallow', flowering shrubs, warm sunny position.</td>
</tr>
<tr>
<td>Ligustrum:</td>
<td>'Privet', fast growing evergreen, useful for hedging.</td>
</tr>
<tr>
<td>Lonicera:</td>
<td>'Honeysuckle' or 'Woodbine', available in both shrub and climbing forms, scented flowers.</td>
</tr>
<tr>
<td>Myrtus:</td>
<td>'Myrtle', evergreen shrubs, aromatic foliage, for mild localities or at the foot of a south wall.</td>
</tr>
<tr>
<td>Olearia:</td>
<td>'Daisy Bush', evergreen shrubs, useful in coastal areas, sandy soil.</td>
</tr>
<tr>
<td>Parthenocissus:</td>
<td>'Virginia Creeper', high-climbing, self-clinging, for autumn colour.</td>
</tr>
<tr>
<td>Pelargonium:</td>
<td>'Geranium', popular houseplant, vividly coloured flowers.</td>
</tr>
<tr>
<td>Philadelphus:</td>
<td>'Mock Orange', tall deciduous shrubs, fragrant flowers.</td>
</tr>
<tr>
<td>Phormium:</td>
<td>'New Zealand Flax', semi-woody, evergreen perennial with sword-like leaves, maritime and industrial locations.</td>
</tr>
<tr>
<td>Pittosporum:</td>
<td>large genus of evergreen trees and shrubs, foliage useful in Floristry, thrives well near the sea and in mild districts.</td>
</tr>
<tr>
<td>Polygonum:</td>
<td>large genus but 'Russian Vine' is a rampant climber.</td>
</tr>
<tr>
<td>Populus:</td>
<td>'Poplar', fast growing trees, surface rooting, needs open space.</td>
</tr>
<tr>
<td>Potentilla:</td>
<td>dwarf to medium shrubs, long flowering season, any soil, sun or partial shade.</td>
</tr>
<tr>
<td>Pyracantha:</td>
<td>'Fire Thorn', thorny wall shrubs, abundant flowers followed by brilliant berries, tolerant of exposure.</td>
</tr>
</tbody>
</table>
PLANT DESCRIPTION
Ribes: 'Flowering Currant', evergreen shrubs, all types of soil, hardy.
Rosmarinus: 'Rosemary', evergreen aromatic shrubs, full sun.
Santolina: 'Lavender Cotton', dwarf sub-shrubs, aromatic foliage, for mounds or ground cover, sunny position.
Sarcococca: 'Christmas Box', low-growing evergreen shrubs, sweet-scented flowers in late spring, thrive even in shade.
Skimmia: low-growing evergreen shrubs, fragrant flowers followed by long-lasting berries, plant both sexes to ensure fruit, shady position.
Spiraea: a large genus of hardy flowering shrubs, any soil, sunny position.
Tagetes: 'Marigold', hardy and half-hardy annual flowers, bedding plants.
Thuja: 'Arbor Vitae', evergreen conifers, widely used for hedges and screens, any soil which is well drained.
Ulex: 'Gorse' or 'Furze', a number of native species, grow well on poor, dry soil, in sunny position.
Viburnum: available in both deciduous and evergreen forms, thrive well in rich, moist soil.
Vinca: 'Periwinkle', vigorous evergreen trailing shrubs, ground cover, sun or shade.
Weigela: hardy flowering shrubs, grow well in industrial and urban areas.

The SPECIES terms are adjectival and are descriptive of the plant's region of origin, its habitat, colour, shape, habit, size, leaves, flowers, collectors etc. The gender of the noun in Latin affects the suffix of the adjective, for example, japonicus (masculine) becomes japonica (feminine) or japonicum (neuter). For the sake of brevity the feminine form only is given here.

Terms describing region of origin:
- chinensa or sinense (of China)
- italica (of Italy)
- lusitanica (of Portugal)
- australis (southern)
- occidentale (western)
- europaea (European)

Terms describing habitat:
- alpina (alpine regions)
- sylvestra (of woodlands)
- fluminensis (of the river)
- hortensis (of the garden)
- montana (of mountains)
- maritima (of the sea)
- campestre (of the plains)
- littorale (of the seashore).
Terms describing habit:
- pendula (hanging)
- erecta (erect)
- stricta (upright)
- fastigiata (erect branches)
- horizontala (spreading)
- prostrata (prostrate)
- congesta (congested)
- procer (very tall, high).

Terms describing leaves: (phylla and folia = leaf)
- dentata (toothed)
- palmata (like palm of hand)
- microphylla (small leaved)
- macrophylla (large leaved)
- polyphylla (many leaved).

Terms describing flowers:
- floribunda (free flowering)
- grandiflora (large flowered)
- triflora (flowers in threes)
- uniflora (single flowered)
- polyantha, multilora (many flowered)
- multiflora (many flowered)
- umbellata (umbell-shaped flowers).

Terms describing colour:
- alba (white)
- nigra (black)
- rosea (rose-coloured)
- argentea (silvery)
- aurea (golden)
- purpurea (purple)
- glauca (blue/green)
- cinerea (ash grey)
- flava (yellow)
- coccinea (scarlet)
- rubra (red)
- viride (green)
- variegata (two-coloured).

Terms describing scent:
- aromatica (aromatic)
- fragrans (fragrant)
- odorata (sweet scented)
- graveolens (strong smelling).

Terms describing collectors: (frequently species are called after the collector who first catalogued and described a species.)
- hookerii (Hooker)
- simonsii (Simons)
- sargentii (Sargent)
- lawsoniana (Lawson)
- forrestii (Forrest)
- delavayi (Delavay)
- farrerii (Farrer)
- ingramii (Ingram)
- henryana (Henry).

Other adjectives:
- granda (great size)
- armata (thorny)
- nana (dwarf)
- speciosa (showy)
- hybrida (hybrid)
- amabila (lovely)
- vernale (spring)
- praecox (appearing early)
- vulgare (common)
- autunnale (autumn).

Varietal names, because they are unique and do not lend themselves to classification, are not included here.
COMPOST MAKING

OBJECTIVES:
The Trainee will
7.1 State the reasons for using standardized composts
7.2 Make up compost for rooting cuttings
7.3 Make up compost for growing-on non-ericaceous plants
7.4 Make up compost for growing-on ericaceous plants

Ordinary garden soil is not a suitable medium for the systematic production of plants, propagated either by seed or other means, because it is generally deficient in essential nutrients, compacts to an excessive extent and often contains pests and diseases. Special standardized blends of sterile ingredients are far more effective and there are a number of blends which can be made, each for a particular purpose. These composts should contain the precise balance of nutrients for the needs of the plant, they should be water and air retentive yet have adequate drainage and should be free of pests and diseases. The acidity (pH value) must be considered also because some genera, e.g. camelia, do not tolerate lime. The compost for such plants is known as ericaceous compost.

The types of compost used in the nursery are:
(1) for germinating seedlings (a proprietary compost is used – not mixed by trainee)
(2) for rooting cuttings
(3) (a) for growing-on non-ericaceous plants
   (b) for growing-on ericaceous plants.

COMPOST for ROOTING CUTTINGS

Ingredients:
300 L. peat moss (a 300 L. bale)
100 L. washed sharp sand (approx. 2 barrows)

Peat moss absorbs moisture and keeps compost open, it allows the formation of good root growth. Peat moss is available in compressed form, in bales, and it must be broken up first.

Sand ensures free drainage and aerates the compost.

Step 1. Sweep and clean the floor of the potting shed.
Step 2. Empty out the bale of peat moss onto the floor and break up any lumps with the back of the shovel.
Step 3. Add the sand.
Step 4. Using the shovel turn over the peat and sand together from one area of the floor to an adjoining area from left to right.

Step 5. Add 4 L. water from the watering can to the mixture.

Step 6. Turn over the mixture from right to left and add another 4 L. water.

Step 7. Mix and turn 5 times altogether adding 4 L. water each time (to obtain an even, uniform blend).

Step 8. Test for moisture level by squeezing a random fistful and aim for just a gentle oozing through the fingers.

Step 9. Shovel and sweep the finished compost into the bay.

COMPOST for GROWING-ON NON-ERICACEOUS PLANTS

Ingredients:
300 L. peat moss
100 L. sharp sand
2 Kg. ground limestone
1.5 Kg. Osmocote
200 g. Frit 253 A.

Limestone, a grey sticky powder, is an essential plant food in itself, it neutralizes soil acidity and also helps to release other nutrients.

Osmocote, in light brown granular form, is an inorganic compound fertilizer which is released slowly over a period up to 8/9 months. Frit 253 A, in brown gritty powder form, is an inorganic compound fertilizer containing essential trace elements.

Step 1. Clean the floor area to be used, empty out the bale of peat moss, add the sand and mix together.

Step 2. Measure out the other ingredients and lightly scatter these over the peat/sand mix.

Step 3. Mix and turn 5 times, adding 4 L. of water each time.

Step 4. Check the moisture level.

Step 5. Shovel and sweep the compost into the bay.

COMPOST for GROWING-ON ERICACEOUS PLANTS

Ingredients:
300 L. peat moss
100 L. sharp sand
80 L. “Brown Gold”
500 g. Osmocote

“Brown Gold” is a proprietary peat-based soil enricher, which is lime-free but which is fortified with essential nutrients and trace elements. Mix as described above.
OBJECTIVES:
The Trainee will
8.1 Identify the pests and diseases listed
8.2 Handle chemicals safely
8.3 Mix systemic insecticide/fungicide
8.4 Spray systemic insecticide/fungicide
8.5 Identify the weeds listed
8.6 Manually control weeds

Plants can be damaged and destroyed by a variety of pests and diseases, and they must compete with weeds.

Pests may be described as those creatures, particularly insects, which attack plants. Most of these pests carry disease which will spread if not checked. Diseases, in this context, are plant troubles caused by tiny bacteria in the form of fungi – other diseases caused by viruses are not dealt with here.

Weeds are plants growing where they are not wanted.

Prevention is better than cure and hygiene in all activities is the greatest preventive measure.

1. Start with healthy plants, cuttings and seeds from reputable sources.
2. Use sterile seed and potting composts.
3. Learn to identify pests, diseases and weeds and how to control them.
4. Remove weeds and debris.
5. Avoid overcrowding of plants.
6. At the first sign of trouble apply the control measures.
7. Keep all equipment clean.
8. Keep plants well watered and fertilized because plants under stress are more vulnerable.

PESTS

The most common pests encountered are

(a) Aphids – including greenfly and blackfly, small plump insects which suck the sap of the plant and also spread fungus disease. They usually gather in large numbers on the underside of a leaf or on the growing tip of a new shoot causing the leaf to curl and the shoot growth to stop and discolor. Controlled by insecticide.

continued
(b) Whitefly - small moth-like insects, they gather in greenhouses where they cluster densely on the undersides of leaves and feed on foliage. The leaves turn mottled and yellow. Controlled by insecticide.

(c) Red Spider Mite - so tiny they are difficult to see. These tiny red spiders feed on the sap of plants and damage the foliage, the leaves turn a rusty colour and drop off. Thorough scrubbing of all propagating containers in winter reduces their population at their hibernation stage.

(d) Slugs and Snails - these slimy creatures feed on seedlings, foliage, stems and roots and cause widespread damage to most plants. They feed at night and hide by day under stones, rubbish or in any dark, moist place. They leave a tell-tale trail of slime behind them. Controlled by laying a poisoned bait, known generally as slug pellets. As this bait is harmful to pets and to birds it should be set in small heaps covered with a tile or slate so that only slugs and snails have access to it.

(e) Vine Weevil - small active beetle, the adult feeds at night on foliage and the larvae feed on roots. Small u-shaped notches cut out of the leaf edges indicate the presence of the pest. Controlled with a solution of Aldrex.

(f) Caterpillars - the larvae of butterflies and moths, come in a variety of sizes and colours, they feed mainly on foliage. Controlled with Derris Dust.

DISEASES

The most common diseases encountered at this centre are

(a) Damping off - a common disease which attacks young seedlings, the fungus attacks the seedlings at ground level, they collapse and die. To control this disease use only sterile seed compost, avoid cold wet soils and crowded conditions, water with 'Cheshunt Compound' and give plenty of light, air and warmth.

(b) Botrytis - also known as grey mould, particularly active in the glasshouse but can attack almost any plant, covering the infected parts with soft grey fluff. It is encouraged in cold wet conditions and thrives on rotted vegetation. To control this disease spray with fungicide. Keep containers and beds clear of debris and destroy any badly affected plants, increase ventilation.

(c) Mildew - infects many plants, shows as a white powdery coating on foliage and stems consisting of spores and threads which suck sap, later the coating turns brown and is covered with tiny black dots. Remove infected shoots, spray with fungicide, avoid crowded conditions and ventilate well.
(d) Black Spot – a common disease of rose trees, dark brown or black spots appear on the leaves causing the leaves to fall and general loss of vigour in the plant. The disease is encouraged in warm wet weather. To control give two sprays of fungicide a week apart when leaf buds begin to open and repeat the treatment if the spores appear.

(e) Blight – a common fungal disease resulting in serious leaf damage, the first signs are brown blotches at the tips of leaves, warm damp weather favours the spread of the disease, spraying at 3-weekly intervals (depending on weather conditions) with fungicide from mid June to August will control blight.

SAFE HANDLING OF CHEMICALS

1. Adhere strictly to manufacturer’s directions in relation to the handling of chemicals, and to the rate and timing of applications.

2. Keep separate watering cans and sprayers – one for weedkillers and others for non-weedkillers.

3. Keep chemicals off the skin, wear rubber gloves when handling chemicals and wear a face mask when spraying.

4. After using chemicals wash hands thoroughly with soap and water.

5. In the event of splashes on the skin wash off immediately.

6. Wash out watering cans and sprayers thoroughly after use.

7. Keep chemicals in their original containers tightly closed.

SYSTEMIC INSECTICIDE/FUNGICIDE.

Modern systemic insecticide/fungicides protect plants against sap-sucking pests and fungal diseases. The dose, applied to the foliage, goes into the plant system, is carried into the sap and administers a lethal dose to the insects or fungus. Sprayed on every fortnight from April to July this substance gives protection.

‘Roseclear’, in concentrated liquid form, controls sap-sucking pests and fungal diseases without affecting bees, ladybirds or other beneficial insects.

Do not spray plants in bright sunlight or on a windy day. Put on rubber gloves. Shake the bottle well. Pour 4 capfuls of ‘Roseclear’ into a clean jar add some water and stir briskly.

Remove the cap from the container of the knapsack sprayer and pour about 12 litres of water into it followed by the contents of the jar through the filter. Fill up (it takes 17 litres) with water, replace the cap and agitate the container. Put on the face mask. Spray the plants thoroughly including the undersides of the leaves.
WEEDS

A weed is a plant growing where it is not wanted. Weeds compete with plants for food, water, space and light, and they create situations where diseases and pests are encouraged. Annual weeds are those that germinate, grow, flower and set seeds within the space of one growing season. Perennial weeds live from year to year and usually have roots which enable them to store food and survive the winter.

The most common ANNUAL Weeds are
(a) Groundsel – very common, bears yellow flowers followed by fluffy seed heads.
(b) Chickweed – common, white flower.
(c) Shepherd’s Purse – white flowers, long tapering root.
(d) Scarlet Pimpernel – small red flowers from June to August, spreading habit.

The most common PERENNIAL Weeds are
(a) Dandelion – yellow flower followed by the familiar fluffy seedhead, thick penetrating taproot.
(b) Speedwell – tiny blue flowers with white eyes, very invasive, creeping root system.
(c) Dock – large dark green leaves, fleshy yellow taproots.
(d) Scutch – coarse grass, long wiry creeping roots or rhizomes.
(e) Nettle – stinging plant, creeping yellow roots just below the soil surface.
(f) Bindweed – fast growing climbing plant, pink or white flowers, white fleshy root system.

CONTROLLING WEEDS
1. Annual weeds are distributed on the wind so handweed them, either by pulling or hoeing, before they produce seeds.
2. Examine containers from time to time during the growing season and pull out any weeds – remove them entirely because in the case of perennial weeds even the smallest piece of root remaining will regenerate.
3. Between November and February go through all the containerized plants and carefully weed each one.
4. Eliminate weeds in and around the nursery as a preventive measure against weeds coming in and spreading.
5. Hoe beds regularly during the growing season to control weeds. Annual weeds may be left to rot after hoeing – perennial weeds to be forked out and burned.
OBJECTIVES:
The Trainee will
9.1 State the reasons for propagation
9.2 State the methods of propagating plants
9.3 Sow seeds in containers
9.4 Prick out seedlings
9.5 Harden off seedlings
9.6 Divide plants
9.7 State when to take soft, semihard and hardwood cuttings
9.8 Prepare nodal cuttings
9.9 Prepare internodal cuttings
9.10 Prepare basal cuttings
9.11 Prepare heel cuttings
9.12 Prepare leaf bud cuttings
9.13 Insert cuttings
9.14 Harden off cuttings

Plants are propagated primarily to increase their numbers but also to ensure the survival of particular genera, species or varieties.

METHODS OF PROPAGATION
The methods of propagating plants fall into two main categories
(a) seminal production, which involves the sowing of seed, and
(b) vegetative production, which involves propagation from cuttings of roots, stems or leaves.

PROPAGATION FROM SEED
In nature only a tiny proportion of the seeds produced by a parent plant survive to maturity, for a variety of reasons. It is necessary, therefore, for the grower to recognise and control all the limiting factors, including inappropriate levels of temperature, moisture, air or light, in order to propagate successfully from seed.

A seed is produced from the fertilization of a female flower by pollen from a male flower (or female part by a male part of the same flower) and, as such, produces a plant which exhibits characteristics which vary from the parent plant(s). As a rule seeds may be used for propagating genera, species and varieties – the seed from cultivars will not breed true to type.

Seeds vary greatly in size and larger seeds tend to germinate readily while smaller seeds have a lower germination rate.

continued
There are a number of stages in the propagation of plants from seed:

(i) Germination – breaking dormancy, provision of warmth, air and moisture. Generally, the warmer the seeds are kept after sowing, the sooner they will germinate. Air is vital to starting the germination process and to the subsequent well-being of the seedling. The germinating seed has a large oxygen requirement which can be provided only by a suitable compost.

(ii) Pricking Out – as soon as the seedlings can be handled they must be transplanted, leaving enough space between them for unrestricted growth.

(iii) Hardening Off – after the seedlings have been pricked out they must be gradually weaned to a stage when they can be planted out and survive in normal temperatures, fluctuating water supplies and withstand the effects of the wind.

**SOWING SEEDS IN CONTAINERS**

**Step 1.** Fill a 35 x 22cm tray with seed compost until it is above the rim.

**Step 2.** Firm the compost into the tray by pressing lightly with the finger tips, paying particular attention to the corners.

**Step 3.** With the edge of the presser board skim off the compost level with the top of the tray.

**Step 4.** With the face of the presser board lightly firm the compost to 6-9mm below the rim.

**Step 5.** Sow the seed thinly and evenly over the surface:
   (a) if the seeds are large enough to handle sow them separately by station
   (b) if they are small gently shake them directly from the packet keeping the packet low over the surface to avoid bouncing
   (c) if they are very fine, mix some dry sand into the packet of seed and then gently shake the contents evenly over the surface.

**Step 6.** Put a couple of fistfuls of compost into the sieve. Then keeping the sieve low over the seeds shake it in order to cover the seeds with a uniform layer of compost. Generally, seeds should be covered to a depth which is equal to their own thickness.

**Step 7.** Write the plant name, date and trainee’s initials on a label and stick the label into the edge of the compost.

**Step 8.** Water in the seeds with rainwater using a fine rose on the watering can. Do this by starting to pour away from the tray and as soon as an even flow is obtained direct it over the entire surface of the compost. Move the water flow beyond the container before stopping. This avoids washing the seed out of the compost.

**Step 9.** Cover the tray with a sheet of glass and place a sheet of newspaper over the glass to reduce fluctuations in temperature. Leave it in the glasshouse.

**Step 10.** Inspect daily and as soon as the seedlings appear remove the glass and paper. Place the tray in a well-lit area.
Step 11. Spray the seedlings regularly with water but do not allow the compost to become water-logged, spray with fungicide to prevent damping-off. Don't spray in strong sunshine as the seedlings would be liable to be scorched.

PRICKING OUT SEEDLINGS

Step 1. Fill a second tray with fresh seed compost, level and firm in preparation for transplanting the seedlings.

Step 2. As soon as the seedlings in the first tray can be handled, knock the side of the tray against the work bench to loosen the compost and seedlings.

Step 3. Loosen the compost further with the dibber lifting a clump of seedlings.

Step 4. Hold one seedling by its seed leaves – never by the stem – and gently tease it free from the clump.

Step 5. Holding the seedling in one hand, make a hole with the dibber, held in the other hand, big enough to take the roots, in the second tray of fresh compost. Make this hole about 3 to 4cm in from one corner.

Step 6. Place the roots of the seedling in the hole and firm the compost back around the roots with the dibber.

Step 7. Repeat steps 4, 5 and 6 for each seedling, spacing about 40 per tray (about 3 to 4cm apart each way).

Step 8. When the new tray has been filled with seedlings, get a label and write the plant name, date and your initials on it. Then water and return it to the glasshouse.

HARDENING OFF

Most seedlings are germinated in the protection of the glasshouse during spring in preparation for planting out as soon as the danger of frost has passed, which in this locality is around mid-May. After the pricked-out seedlings have re-established themselves, (this varies from 1 to 3 weeks approx.) move the trays to a cooler part of the glasshouse and later, into the net-covered tunnels where cooler conditions and greater ventilation prevail.

Because of the increasing density of the growing seedlings they are susceptible to fungal diseases of the stems, leaves and roots and they should be sprayed regularly with fungicide. Later still, remove the net cover for final weaning.

DIVIDING PLANTS

Plant division is a common method of propagation. Many herbaceous perennials, such as Kniphofia and semi-woody perennials e.g. Phormium are propagated this way either during the dormant period or at the beginning of the growing season.

Step 1. Lift the parent plant with the fork after it has flowered and shake off as much soil as possible from the roots.
Step 2. Wash the crown and roots in a bucket of water to clean off as much residual soil as possible.

Step 3. With the secateurs cut back all long stems to about 20 to 30cm

Step 4. From the periphery of the crown break off several clumps, each with a root system and young shoots or buds. Avoid the centre as this tends to be woody and has diminished regenerative properties.

Step 5. Plant out the new clumps separately as quickly as possible, either in prepared holes in the border or in polythene containers of growing-on compost.

Step 6. Label (name of plant, date, initials), water thoroughly.

PROPAGATION FROM STEM CUTTINGS

Propagation from stem cuttings is the most popular method of vegetative production, other vegetative techniques such as grafting, layering and leaf propagation are not dealt with in this course.

The main difference between propagation from stem cuttings on the one hand and from seed and division on the other is that the stem cutting has no support system once it has been separated from the parent plant. The necessary support must be provided to ensure the survival of the cutting while it develops roots and until it is self-supporting.

There are several phases, in addition to the actual insertion phase, in this system of propagation.

(i) Selection of material – only the best forms and colours of parent plants should be considered, they must be healthy, disease-free, young stock (the capacity to generate roots decreases with age), material of the current year’s growth will regenerate more readily.

(ii) Preparation of material – so that it will be at its maximum capacity to regenerate, techniques include the trimming off of leaves and the making of various types of cuts in the stem.

(iii) Provision of suitable environmental conditions – absolute hygiene in relation to tools and equipment, protection from pests and diseases, stimulation of the regenerative process through appropriate compost and control of ventilation, temperature, light and moisture.

(iv) Hardening off – as soon as the plant material has regenerated it must be weaned from its controlled environment.

STEM CONDITIONS

During the growing season stem growth takes place continuously and as it matures the stem gradually hardens and becomes woody (referred to as lignification). ‘Softwood’ cuttings are taken in April, May or June, soon after the buds or shoots have commenced to grow. They must be propagated in conditions where the compost is warm and the air around the stem is cool and moist. Softwood cuttings will generally root in 2 to 3 weeks.
'Semi-hardwood' cuttings are taken between July and October, when the new growth has started to firm up at the base. They are propagated in conditions similar to those for softwood cuttings. Semi-hardwood cuttings will take 3 to 6 weeks to form roots.

'Hardwood' cuttings are taken in November, December, when the current year's growth has become woody. These cuttings are inserted outdoors and do not form roots until the following spring.

PREPARATION OF CUTTINGS

There are a number of ways of preparing cuttings for insertion and the most appropriate form of preparation to suit the growth habits of each genus has been established over many years of trials and experiments. The preparation techniques employed in the propagation of the stock grown for the nursery are given in table 9.1 at the end of this section, and include Nodal, Internodal, Basal, Heel and Leaf Bud cuttings.

All cuttings should be placed, as soon as they have been taken, in a clean 'milky-white' polythene bag which should be kept shaded to avoid drying out the stems. The bag of cuttings should be brought to the potting shed for preparation as soon as possible.

Types of Cuttings -

NODAL: make a cut in the young stem about 3mm below a bud (joint or node) at right angles to the stem, such that the final length is about 10cm. If the growing tip of the cutting is soft, pinch it off between thumb and forefinger; remove all the leaves from the lower third of the cutting, immerse in a solution of fungicide for three minutes, then shake off excess; dip the base cut in rooting hormone.

INTERNODAL: make a cut in the stem about midway between two buds; if the growing tip is soft pinch it off; immerse in fungicide solution, shake off excess; dip the base cut in rooting hormone.

BASAL: with a sharp knife cut through the base of the young shoot where it joins the parent branch (at this point there is usually a slight swelling); slice through this swelling squarely; trim the leaves from the lower third; if the growing tip is soft pinch it off; immerse in fungicide solution, shake off excess; dip the base cut in rooting hormone.

HEEL: strip away a young side-shoot, about 10cm in length, from its parent stem by holding the bottom of the stem between thumb and forefinger and pull away sharply (it comes away with a triangular piece of older wood, called a heel); trim the triangular heel with a sharp blade; trim off the leaves from the lower third of the cutting; if the growing tip is soft pinch it off; immerse in fungicide solution, shake off excess; dip the heel in rooting hormone.
LEAF BUD: each cutting consists of a single leaf, a bud at the leaf axil (the angle between the leaf stalk and the stem) and a very short piece of stem; select a stem with an undamaged leaf which has expanded fully and which has a bud at its axil; depending on the hardness of the stem make a clean cut with either a razor blade or sharp knife or secateurs 2 to 3mm above the bud; make another cut 2 to 3mm below the bud; immerse the cutting in fungicide solution, shake off excess; do NOT dip in rooting hormone unless specifically instructed, as generally if rooting hormone is used close to a bud it will tend to delay subsequent root development.

INSERTING CUTTINGS:
Preferably, all cuttings of the same genus should be of uniform size and of the same age, and they should be inserted together in the same environmental conditions. Only in this way can a smooth production line be expected, with all cuttings rooting at the same time and proceeding together through the other stages of growth.

A. Softwood and Semi-hardwood Cuttings.
Step 1. Fill a tray with rooting compost and firm it to within 9mm of the rim.
Step 2. Insert the cutting, up to its leaves, in the compost.
Step 3. Repeat step 2 for the other cuttings of the same genus and space them so that their leaves do not touch.
Step 4. Label (name of plant, date and initials), water thoroughly with a solution of fungicide.
Step 5. Place the tray on the capillary bed in the polythene tunnel, cover with a low-level tunnel of ‘milky-white’ polythene and seal.
Step 6. After one month roll back the low-level polythene and see if roots are appearing through the drainage holes of the trays.
Step 7. As soon as the roots appear through the drainage holes, commence the hardening off stage by gradually weaning the cuttings from their controlled environment. Initially, remove the low-level tunnel and later, transfer the trays of rooted cuttings to the net-covered tunnel – do this on an overcast day.

B. Hardwood Cuttings.
Hardwood cuttings should, as a rule, be 20 to 30cm in length, depending on the species. The growth must have lignified fully otherwise they will not withstand winter conditions. Generally, the hardwood cutting remains dormant throughout the winter though it will have formed a callus shortly after being taken from the parent (callus is an irregular growth of new tissue, a type of healing at the face of the wound). As spring approaches new roots will form.
Step 1. Dig a raised bed about 45cm high in the open ground area of the nursery about 1.5m wide, leaving a furrow between beds.
Step 2. Insert the cuttings vertically about 20cm deep and about 10 to 20cm apart depending on the species, keeping them in a straight line and spacing each line about 12cm apart by means of the spacing board.

Step 3. When a line has been completed firm the soil around the cuttings.

Step 4. Attach a label (plant name, date and initials) to the cutting at the start of the line.

### TABLE 9.1

**NURSERY STOCK AND PROPAGATION METHODS**

*(Abbreviations: sw = softwood; shw = semi-hardwood; hw = hardwood; n = nodal; i = internodal; b = basal; h = heel; lb = leafbud; d = division)*

<table>
<thead>
<tr>
<th>GENUS</th>
<th>METHOD</th>
<th>GENUS</th>
<th>METHOD</th>
<th>GENUS</th>
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<tr>
<td>Abelia</td>
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<td>Euryops</td>
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<td>Phormium</td>
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<td>hw, n</td>
<td>Genista</td>
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<td>Pittosporum</td>
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<td>Populus</td>
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<td>Skimmia</td>
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<td>shw, n or d</td>
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<tr>
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<td>Parthenocissus</td>
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<td>Weigela</td>
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OBJECTIVES:
The Trainee will
10.1 State when cuttings are ready for potting
10.2 Pot on rooted cuttings to 'liner' stage
10.3 State when final potting should be carried out
10.4 Pot on 'liner' to final stage

The aim of growing on (also referred to as potting on and potting up) is to produce a young plant where root and shoot growth develop together in a balanced way and which, in time, results in a saleable plant.

Generally, spring-germinated seedlings which are hardened off either in the net-covered tunnel or in the open are ready for potting on about one week after hardening off.

In the case of soft-wood cuttings inserted into trays in April, May or June, these will have formed roots within 2/3 weeks, will have been hardened off in a further week and will be ready for potting on after another week, approximately 1 month after insertion.

Semi-hardwood cuttings, which are inserted into trays sometime between July and October will have formed roots in 3 to 6 weeks, are overwintered in the net-covered tunnel and potting on commences the following February, depending on species.

Hardwood cuttings, inserted outdoors in raised beds in November/December, remain there undisturbed until the following November when they are lifted and potted on.

POTTING ON ROOTED CUTTINGS TO 'LINER' STAGE

A. Seedlings, softwood and semi-hardwood cuttings.

Step 1. Inspect each tray of cuttings (or seedlings) and discard any unrooted or damaged material.

Step 2. Load the workbench with
(a) growing on compost in the centre
(b) plants to be lifted to the left
(c) a stack of 7cm pots (known as liner pots) to the right
(d) a handling tray further to the right.
Step 3. Tap the tray of cuttings against the bench to loosen the cuttings and compost.

Step 4. Half-fill a pot with compost.

Step 5. Gently remove a cutting from the tray by inserting your index finger under it and lever it up. Avoid disturbing the roots or the compost adhering to them.

Step 6. Place the rootball in the centre of the liner pot.

Step 7. Hold up the bottom leaves with one hand, and with the other fill in more compost around the roots and fill up to the rim. Make sure the leaves are clear of the compost.

Step 8. Tap the base of the pot on the bench to settle the compost into any air pockets that may have formed.

Step 9. Firm the compost around the roots with the fingers and add more compost if necessary leaving a space approximately 12mm between the compost and the rim of the pot.

Step 10. Place the potted plant in the handling tray.

Step 11. Repeat steps 4 to 10 for the other cuttings.

Step 12. When the handling tray is full (40 potted plants) carry it to the capillary beds in the nursery.

Step 13. Place the pots securely in the sand, in a line, and keep all the plants of the same variety together.

Step 14. Label, at the start of the line.

Step 15. Water, using a fine hose on the watering can with rainwater from one of the barrels.

(In some instances, especially semi-hardwood cuttings potted on in early spring, the potted plants are grown-on in the net-covered tunnel until severe weather conditions have passed.)

B. Hardwood cuttings.
In November, the hardwood cuttings inserted approximately 1 year previously should be lifted carefully with a fork and potted into either plastic or black polythene pots of growing-on compost of sufficient size to take the roots.
FINAL POTTING

Potted plants need potting on, i.e. transplanted to larger pots, to prevent their roots becoming pot-bound. If this occurs, they will suffer from food deficiency; there is a danger of drying out and their growth will be set back. Rooted plants may be inspected at any time to see whether they require repotting in larger containers.

Step 1. Remove the plant from its pot by holding pot and plant together with the fingers spread over the surface of the compost and around the stem. Turn it upside down and tap the rim of the pot. The rootball should slide out intact into your hand.

Step 2. If the roots have penetrated to the outside of the rootball the plant is ready for repotting (otherwise replace the plant in its pot).

Step 3. Half-fill a 1 litre black polythene pot with growing-on compost.

Step 4. Place the rootball in the centre, and fill and firm in the way described earlier.

Step 5. Repeat steps 1 to 4 for the other potted plants and place the repotted ones in the handling tray.

Step 6. Convey these to the capillary bed, sit each one firmly in contact with the sand. Label and water thoroughly with rainwater.
WATERING AND FEEDING

OBJECTIVES:
The Trainee will

11.1 Recognise when a plant needs water
11.2 Recognise when a plant needs feeding
11.3 Use the watering can to water plants
11.4 Use the hose pipes to water plants
11.5 Use the sprinkler to water plants
11.6 Apply top dressing
11.7 Spray foliar feeding

All living things need food to stay alive and remain healthy. Without a regular supply of essential foods plants would soon die. All soils have some food in them but because plants absorb these foods and rain washes them away they must be replaced from time to time.

Plants cannot absorb food in solid form, it must be dissolved in water. They absorb food, in water, through their roots mainly and to a lesser extent through their foliage.

In this climate the soil in outdoor situations usually contains sufficient moisture for the needs of the plants grown in it, except in prolonged, very dry spells.

Container-grown plants are more vulnerable to drying out (their nutrient needs are met by the blend of ingredients, including the slow release fertilizers, in the compost). The capillary beds are used to provide a constant supply of water and each container of compost must be in full contact with the sand. When initially placed on the bed each plant must be watered thoroughly by means of the hose pipes to start off the capillary action. Afterwards check that the system is functioning and that each container of compost is moist. Any pots which have dried out should be watered well to restart the capillary action.

SIGNS OF DRYING OUT

During the life of a plant it should be kept in a turgid condition i.e. with its full complement of water, standing upright with no signs of wilting or stress. This is achieved by keeping the compost moist. If its water supply runs out the plant wilts, feels limp, its growth is halted and if water is not made available soon the plant will die. Plants under stress from lack of water are more prone to attack from pests and diseases.

continued
1. Inspect the compost in which containerized plants are grown, if the surface of the peat-based compost has lightened in colour then remove the plant from the pot to see whether the rest of the compost in the rootball has dried out – if it feels moist to the touch, adheres slightly to the fingers and is dark brown in colour then all is well, but if it feels dry and has lightened in colour watering is needed. With practice the weight of the pot will also give an indication as to its water content.

2. Other signs of drying out include (a) browning or shrivelling of the leaves (b) early leaf fall and (c) flowering ceases.

3. Beds and borders against walls, or under trees, or beside hedges are particularly prone to drying out.

Note: Too much watering can also result in delayed growth and eventually causing the death of the plant. The signs of overwatering are a yellowing and wilting of the leaves, especially the lower leaves and sometimes the surface of the compost is covered with a green slime.

SIGNS OF FOOD DEFICIENCY
The major plant foods are (i) nitrogen (the leaf-maker), which promotes above-ground growth including dark-green foliage. A lack of this substance is indicated when leaves turn pale green and general growth is stunted; (ii) phosphate (the root-maker), a substance which is essential for root development, a lack of phosphate causes stunted growth and foliage turns a dull green or purple; (iii) potash (the fruit-maker), essential for the production of flowers and fruit, lack of potash shows in brown scorch-marks on the edges of leaves, poorly coloured flowers and fruit, and undersized fruit. These deficiencies are corrected by applying a compound fertilizer at the recommended rate e.g. 10: 10: 20 at 60g per m².

Acid-loving plants are liable to a shortage of iron, which is indicated when the leaves begin to turn yellow in the areas between the veins. This is treated by providing a chelated iron compound in the fertilizer.

Nearly all plants require a BASE FERTILIZER before or at the time of planting out i.e. incorporated into the soil, its purpose being to provide a steady supply of plant food during the months following and this is given in the form of a slow release fertilizer.

During the growing season many plants including trees and shrubs require a TOP DRESSING i.e. extra nutrients applied to the moist surface of the soil in the form of quick-acting fertilizer.

During the growing season some plants, notably bedding plants and roses benefit from FOLIAR FEEDING i.e. applied in solution to the foliage through which it gets quickly into the sap stream of the plant.
USING THE WATERING CAN
When watering plants grown under protection the water should be taken from a barrel kept in the protected setting, it will then be at the right temperature. When watering ericaceous plants, rainwater rather than tap-water should be used. When watering seedlings or cuttings fit a fine rose to the spout. Begin pouring to one side of the tray of plants and as soon as a steady flow is obtained pass the rose low over the seedlings or cuttings. This avoids sudden surges of water which could dislodge plants or displace compost. After planting out trees or shrubs water them well to settle soil around the roots, with the rose removed. When watering established plants in borders or beds, remove the rose and pour the water from the spout onto the soil at the base of the plants, keeping the spout very low to the ground and water well to make sure the moisture soaks down to the roots.

USING HOSE-PIPES
Wherever water on tap is available, the use of hose-pipes cuts down on the work involved in filling and carrying a watering can. The hose-pipe may be fitted with a rose just like a watering can. Do not use the hose-pipes to water seedlings or rooting cuttings. Established plants may be watered, using the hose-pipes, in the same manner as with the watering can, taking care not to allow a strong flow under the mains pressure which would wash away the soil and expose the roots. If not using a rose the distribution of the water may be controlled by putting the thumb over the end of the hose.

USING THE SPRINKLER
The oscillating sprinkler connected to a hosepipe rocks backwards and forwards, and distributes water over a wider area. It may be moved and set to cover a given area. This system is labour-saving where many plants need watering during a dry spell. This system is not suited to watering plants with heavy foliage as the water is deflected by the foliage or plants in flower which could be weighed down and damaged by the water.

APPLYING TOP DRESSING
Hardwood cuttings inserted outdoors are left in situ until the following November. During the growing season these require a top dressing in order to increase their extension growth. Apply on dressing of 10: 10: 20 – a compound inorganic fertilizer in granular form – at the rate of 60g per square metre in July or August. Established trees and shrubs also require a top dressing at the same rate to maintain the plants in a healthy condition. Don’t apply a top dressing in windy weather. Choose a calm day and when the soil is moist. Wear rubber gloves. One fistful measures approximately 60g. Scatter evenly on the soil surface and gently hoe in.
SPRAYING ON FOLIAR FEEDING

The main features of the Knapsack Sprayer are:

1. the container which holds the fluid
2. carrying harness
3. screw-cap which must be open to fill the container and closed when operating
4. strainer – inside the screw-cap, it filters the fluid when the container is being filled
5. operating lever, which is pumped to build up pressure.
6. trigger valve, which when pressed releases the pressurized liquid out through the
7. lance – a 23cm long brass tube and out through the
8. nozzle in the form of spray.

Note: A Pressure Relief Valve is fitted which safeguards against overloading caused by excessive pumping.

Foliar feeding is the most recently developed form of plant feeding. The fertilizer is based on the major plant foods nitrogen, phosphate and potash with trace elements added, and these substances are absorbed through the leaves. They begin to show results quickly.

‘Phostrogen’ is a fine powder which dissolves easily in water and the standard solution is 4.5g (or one level teaspoonful) to 9 litres of water. Foliar feeding should be carried out preferably on a dull evening, never in strong sunshine. Three applications spaced out equally over the months of May to July are recommended.

Step 1. Remove the screw-cap from the container of the sprayer.
Step 2. Pour in about 12 litres of water through the strainer.
Step 3. Put 2 level teaspoons of Phostrogen into a clean jar, add some water and stir briskly until the powder is dissolved.
Step 4. Pour the contents of the jar through the strainer into the container.
Step 5. Agitate the container, fill up to the 17 litres mark with water and replace the screw-cap.
Step 6. Put on the container and adjust the harness so that the sprayer is as high as possible on your back.
Step 7. Pump 5 strokes of the operating lever slowly to build up pressure.
Step 8. Point the nozzle (at the end of the lance) at the foliage and press the trigger valve.
Step 9: Spray the foliage thoroughly and evenly, while walking backwards slowly through the rows of plants (this avoids the risk of clothes and footwear rubbing against and removing the feed from the foliage).
OBJECTIVES:
The Trainee will

12.1 Check the oil level in the lawnmower
12.2 Check the petrol level in the lawnmower
12.3 Set the cutting height
12.4 Start and stop the 4 str. rotary lawnmower
12.5 Mow the lawns
12.6 Follow the safety regulations
12.7 Clean the lawnmower
12.8 Wash out the air filter
12.9 Change the oil

CHECKING OIL LEVEL
Step 1. Set the machine on level ground.
Step 2. Unscrew and remove the oil dipstick. Wipe off the oil with a rag.
Step 3. Push back the dipstick and screw it in. Unscrew and remove again.
Step 4. Read off the oil level.
Step 5. Top up with engine oil to the ‘Full’ mark if the oil level is below this.

CHECKING PETROL LEVEL
Step 1. Never do this indoors and no smoking while carrying out this task.
Step 2. Set the machine on level ground out of doors.
Step 3. If the engine is hot, allow it to cool.
Step 4. Unscrew the petrol filler cap. Insert the funnel with gauze filter fitted.
Step 5. Fill up the petrol tank from your container.
Step 6. Replace the filler cap.

SETTING THE CUTTING HEIGHT
Before cutting a smooth, top-grade lawn, set a low cutting height. Uneven and second-grade lawns need a high cut to avoid bare patches and damage to the blades.
Step 1. Disconnect the spark plug lead.
Step 2. Move the height adjusting lever, located just inside the left rear wheel, to the required cutting height, by slackening the locking knob and selecting the height - move the lever forward for a low cut, move it towards the rear for a high cut. All four wheels are adjusted by this single lever through connecting linkages.
STARTING AND STOPPING THE 4-STROKE ROTARY LAWNMOWER

Set the mower on level ground. Check the oil level every time before starting and top up with engine oil if necessary.

Step 1. Connect the spark plug lead.
Step 2. Open the fuel shut-off valve.
Step 3. Move the throttle control to 'Start'.
Step 4. Turn the on-off switch to 'On'.
Step 5. Place your dominant foot on the starting foot-pad to hold the machine steady. This is located on the machine housing on the side opposite the grass ejector.
Step 6. Catch the starting handle and pull it upwards a full arm extension (never pull the starter while the engine is running).
Step 7. The cord will recoil so hold the handle until it has recoiled fully.
Step 8. If it has not started after 6 pulls, inform the Instructor.
Step 9. As soon as it starts go around behind the handles and hold both of them.
Step 10. To stop the machine turn the on-off switch to 'Off' and disconnect the spark plug lead if the mower is left unattended.

MOWING THE LAWNS

Step 1. Push the lawnmower to the lawn area to be cut and leave it there for the moment.
Step 2. Walk over the lawn area and look out for any stones, sticks or other foreign objects. Remove these as they could be thrown by the blades or could damage the blades.
Step 3. Turn the mower so that the grass ejector or chute is facing inwards to the lawn, not facing roadways or beds.
Step 4. Start the mower. Push the blade speed control to 'medium'.
Step 5. Start cutting close to and parallel to one edge, continue round each corner and along the other edges until the starting point is reached.
Step 6. Move inwards by the width of the first swath and mow parallel to this.
Step 7. Continue in this way until the centre is reached. (On subsequent mowings operate the machine in the opposite direction).
Step 8. Try to avoid missing areas and avoid cutting any spot more than once.
Step 9. When mowing around a tree, lamp-post, manhole or other obstruction, turn the chute away from the obstruction as the guard may strike and damage it or be damaged by the obstruction.
SAFETY GUIDELINES

· Wear steel-toed footwear.
· Keep hands and feet well away from the blades.
· Remember that the blades continue to rotate for a few seconds after the engine is switched off.
· Never use the mower unless the rear flap and the safety guard are fitted.
· Do not lift the rear flap while the engine is running.
· Don’t operate the mower near other people – if someone approaches keep the chute side of the machine turned away from them.
· Stop the engine before pushing it across gravel drives, walks or roadways.
· If you strike an object stop the machine, remove the spark plug lead, allow the blades to stop, inspect for damage and report any damage to the Instructor.
· If the machine starts to vibrate abnormally stop the engine and report to the Instructor.
· Never mow up or down a slope – mow across the face of the slope taking extreme precautions when changing direction.
· Do not mow slopes when the grass is wet.
· Always turn the lawnmower away from any obstruction before attempting to remove it.
· Do not leave a machine unattended unless you have stopped the engine.
· No smoking in the vicinity of the lawnmower.
· Turn the engine off and allow it to cool before refuelling.
· After use, disconnect the spark plug lead before storing.

CLEANING THE MOWER

Step 1. When finished mowing for the day disconnect the spark plug lead.
Step 2. Turn the mower over so that the silencer side of the engine is upward.
Step 3. Hose off any grass clippings adhering to the underside of the housing and around the blades.
Step 4. Turn the mower back to the upright position.
Step 5. With a rag wipe off any grass, leaves, other debris or oil on the housing.
WASHING THE AIR FILTER

The engine output is reduced by a dirty air filter. It is recommended that the air filter be washed after every 25 hours running.

Step 1. Remove the air filter case from the machine by unscrewing the retaining bolt. Don’t allow any dirt to fall into the carburettor.

Step 2. Open the lid of the air filter case.

Step 3. Carefully take out the plastic foam filter element.

Step 4. Wash it in liquid detergent and water.

Step 5. Dry it out by squeezing it thoroughly.

Step 6. Pour a little engine oil on the filter element and squeeze it in.

Step 7. Refit the element and bolt on the case.

CHANGING THE ENGINE OIL

After every 25 hours running the engine oil should be changed and it is better to do this while the engine is warm.

Step 1. Disconnect the spark plug lead. Take the machine to the storage shed.

Step 2. With a helper lift the machine onto the stand. Put a can under the stand to catch the waste oil.

Step 3. Using a spanner remove the drain plug, which is located under the housing – near the blade.

Step 4. Catch the waste oil in the can.

Step 5. Screw the drain plug back again.

Step 6. Fill up with engine oil to the ‘Full’ mark on the dipstick.
OBJECTIVES:
The Trainee will
13.1 Prepare a site for a lawn
13.2 Estimate the quantity of grass seed needed to sow a lawn of given dimensions
13.3 Sow a lawn
13.4 Prepare a marked out bed
13.5 Plant out container-grown plants
13.6 Stake trees

PREPARING A SITE FOR A LAWN

Preparatory work for sowing a lawn begins about 2 months before the planned sowing. This allows for settlement of the soil and for weeds to be controlled. The best time to plan for seed sowing is from mid-August to mid-September.

Site Clearance: Remove any debris such as stones, rubble, bricks, heaps of subsoil, fallen branches, briars etc. Dig out any tree stumps.

Grading: Generally only major surface irregularities require elimination. First remove the topsoil from the mounds (the top 15 to 25cm approx.) by the barrow-load and heap it at a location just clear of the site. Level out the subsoil and replace the topsoil to a uniform depth. Minor surface irregularities can be corrected by skimming some topsoil from the mounds and adding it to the depressions. Be careful – don’t bring any subsoil to the surface. Try to have a layer about 15 to 25cm of topsoil.

Digging: Digging is one of the critical stages in the preparation of a site for sowing a lawn. It affords an opportunity to improve the texture of the soil, improves surface drainage and relieves compaction. With the spade dig out a trench, one spit deep, along the width of the proposed lawn. Fork over the bottom of the trench. Add any organic material available e.g. farmyard manure, garden compost, or peat. Fill in this trench when digging the next trench and continue in this way until the entire area has been dug. Break up any large lumps by slicing the spade through them. Remove any stones or debris that came to the surface during digging.

Levelling: This stage of preparation involves the creation of a firm, even surface and seed-bed. If carried out a couple of months in advance of sowing it will allow weeds to germinate which can then be killed off by hoeing. Break down clods and lumps with the back of the garden fork. Use a heavy rake to create a fine tilth.

continued
Firm the surface by lightly treading over all the area while raking, making sure that any soft spots are located, filled and firmed. After firming, rake the surface again in different directions and, again, remove any stones and debris.

About seven days before the planned sowing spread a compound fertilizer (e.g. 5: 5: 10 at the rate of 60g per square metre – about 1 fistful) to the seed bed and lightly rake this into the surface.

ESTIMATING THE QUANTITY OF GRASS-SEED NEEDED

Step 1. With a tape, measure (a) the length and (b) the width of the proposed lawn, to the nearest metre.
Step 2. Multiply the length by the width, this gives the area in square metres.
Step 3. Multiply the area by 40 (40g of seed per square metre is the recommended rate of application). The product gives the quantity, expressed in grams.
Step 4. Divide this by 1000 to convert to Kilograms.
Step 5. Ask the Instructor to check your estimate.

Example: (a) length 22 metres. (b) width 12 metres
multiply (a) x (b) = 22 x 12 = 264 square metres
multiply 264 x 40 = 10560 grams
divide by 1000 = 10.56 Kilograms.

SOWING A LAWN

Choose a dry, calm day when the surface is dry and does not adhere to boots.
Step 1. Calculate the quantity of seed required and weigh it out.
Step 2. Divide the seed into two equal parts and put these into separate buckets.
Step 3. With lines set one metre apart, mark out the site into parallel strips.
Step 4. Take one bucket of seed in one hand and 'broadcast' or scatter a fistful of seed along one of the strips, between the lines spreading approx. 20g of seed per square metre.
Step 5. After you have sown one metre ask the Instructor to check the rate of application.
Step 6. When the Instructor is satisfied with your rate of application continue broadcasting the first half of the seed, walking backwards along each strip in turn.
Step 7. When the first half of the seed has been sown, shift the lines and set them at right angles to the initial strips, again at one metre intervals.
Step 8. Take the second bucket of seed and broadcast this along the second set of strips at 20g per square metre. In this way a more even coverage is ensured than by broadcasting in one direction only.

Step 9. When all the seed has been sown, remove the lines and LIGHTLY rake the surface to cover the seeds.

PREPARING A MARKED-OUT BED

Annual weeds are generally shallow rooting and are easily controlled when the site is being dug. Perennial weeds are more difficult to eradicate, they must be dug out, removing the entire root system. If bindweed or horsetail are present – these have roots which penetrate too deeply to be dug out – then herbicide treatment is called for and this is best left to the Instructor. If all traces of perennial weeds are not eradicated the weeds will grow again and compete with the plants for food, water, space and light.

Dig over the marked out area to a depth of one spit, fork over the bottom of each trench as you go and add any organic material available. During digging remove any perennial weeds and any debris encountered. Break up large clods of soil.

Spread a compound fertilizer (e.g. 10:10:20) at the rate of 60g per square metre and work this into the topsoil with a fork or rake.

PLANTING OUT CONTAINER-GROWN PLANTS

The planting out of container-grown plants in prepared beds should be carried out when the soil is neither too wet nor too dry.

Step 1. Water the container-grown plant(s) well the day before planting out.

Step 2. Dig a planting-hole in the site selected, with a spade if planting a tree or shrub, with a trowel in the case of smaller plants.

Step 3. Make the planting hole slightly deeper and wider than the containerized roots.

Step 4. Cut the polythene pot with a penknife, pull it away from the rootball and try to avoid disturbing the rootball.

Step 5. Set the plant in the hole so that, in the case of trees or shrubs the soil mark on the stem is at ground level; or in the case of smaller plants the top of the rootball is just below ground level.

Step 6. Add a quantity of peat to the excavated soil (about 1:1 peat to soil) and the quantity of base dressing recommended by the manufacturers.

Step 7. Shovel the soil/peat mix in around the roots and firm it in. Shake the plant gently up and down to fill soil into any air pockets which may have formed around the roots.

Step 8. Add more soil and firm it in with the heel and continue this until ground level is reached.

Step 9. Water in the plant thoroughly, and label.
Newly planted trees need stakes to support them for their first few years, after which their established roots will be able to support them. Treated 5cm diam. wooden posts are standard. The length of the stake should be such that when inserted its top is just below the lowest branch.

After digging the planting hole to the appropriate dimensions for the rootball, knock a stake into the hole, off centre slightly, on the windward side (south-west), with a sledge until about one third of it is buried.

With the stake in place proceed to plant the tree.

Fix one tree-tie about 5cm from the top of the post and another about 30cm above soil level. These ties will support the tree in windy weather against the stake, with a buffer in between to prevent chafing.
SALES

SECTION 14

OBJECTIVES:
The Trainee will

14.1 Grade plants for sale
14.2 Sell plants to customers
14.3 Deal courteously with customers

The selling outlet i.e. the nursery, is open to the public for sales for two 2-month periods each year, one in spring and the other in the autumn. The merchandise is the plants produced at the nursery and the salesperson is the trainee.

LABELLING AND GRADING PLANTS FOR SALE

There is a risk of mixing up unlabelled plants once they are lifted from the production area so put a plant label on every finished plant. Write its full name and its price on the label and attach this to the stem.

Throughout the various handling stages in the plants' life i.e. seedling, rooted cutting, liner and final potting, any unrooted material will have been discarded. At this point if you note any damaged or infected material set them aside for appropriate treatment.

About one week before the commencement of a sale all healthy plants must be graded into two categories – Best and 2nd Grade. Best grade includes plants of uniform size, form, colour, vigour and health. Arrange all the Best grade plants of a given variety in the Sales Area.

Move the 2nd Grade plants to another part of the nursery for further treatment e.g. pruning. These are not offered for sale until they have been restored and reach Best grade.

At the head of each row of graded plants which have been arranged according to genus, species and variety fix a ‘Sales’ label – a weatherproof label on a metal stand giving essential information including name, habitat, expected height, growing requirements and a picture of the specimen.

PLANT INFORMATION

In order to deal effectively with customers' queries a thorough knowledge of the merchandise is essential.

Familiarize yourself with the stocks of plants in the nursery – every time you pass a plant test your knowledge by identifying the plant and checking against the label.

continued
Similarly, for each variety a certain type of planting location is recommended, consult the ‘Sales’ label or the wall chart when in doubt. The price of each item is quoted on the label also.

SELLING AND DEALING WITH CUSTOMERS

1. Wear your name badge.
2. Greet the customer in a friendly manner, say ‘Good morning, (afternoon) may I help you?’. Try to be helpful and pleasant.
3. Know your stock of plants and where they are located. Show the customer around so that an opportunity is given to view all the varieties produced. Say ‘Would you like to look around?’.
4. As soon as the customer approaches you give him/her your full attention – be sure to look at the customer. Don’t avoid the customer.
5. If the customer asks for advice tell him/her as best you can. If you are not sure don’t hesitate to say ‘I don’t know but I will find out for you’, then consult the sales label or ask the Instructor.
6. Refer any queries you can’t deal with to the Instructor.
7. As soon as the customer has made his/her selection, bring the plants to the check out. In your notebook, write down the price of each item selected and tot up the total. Check your answer.
8. Tell the customer the total cost of the items selected and collect this amount from him/her (calculate the change if necessary).
9. Give the customer a receipt showing the date, total money received and your signature.
10. Help the customer in handling the items purchased and don’t forget to thank him/her.
APPENDICES
# APPENDIX A

## HORTICULTURE EVALUATION FORM

**TRAINEE'S NAME:**

<table>
<thead>
<tr>
<th>Objective Code Numbers</th>
<th>Objective Summaries</th>
<th>Ratings</th>
<th>Objective Code Numbers</th>
<th>Objective Summaries</th>
<th>Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Obey General rules</td>
<td>9.6</td>
<td>divide plants</td>
<td></td>
<td></td>
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<tr>
<td>1.2</td>
<td>follow safety guidelines</td>
<td>9.7</td>
<td>state when to take s., sh. &amp; hw. ctgs.</td>
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<td></td>
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<tr>
<td>2.1</td>
<td>locate specified areas of nursery</td>
<td>9.8</td>
<td>prepare nodal cuttings</td>
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<td></td>
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<tr>
<td>2.2</td>
<td>state functions of specified areas</td>
<td>9.9</td>
<td>prepare internodal cuttings</td>
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<td></td>
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<tr>
<td>2.3</td>
<td>explain terms in Glossary</td>
<td>10.0</td>
<td>prepare basal cuttings</td>
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<td>3.1</td>
<td>identify tools &amp; equipment</td>
<td>10.1</td>
<td>prepare heel cuttings</td>
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<td>3.2</td>
<td>state uses of tools &amp; equipment</td>
<td>10.2</td>
<td>prepare leaf-bud cuttings</td>
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<td>3.3</td>
<td>store tools &amp; equipment</td>
<td>10.3</td>
<td>insert cuttings</td>
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<tr>
<td>4.1</td>
<td>dig garden beds</td>
<td>10.4</td>
<td>pot on to 'liner' stage</td>
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<td>4.2</td>
<td>cultivate soil with rake</td>
<td>10.5</td>
<td>state when ctgs. ready for potting</td>
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<tr>
<td>4.3</td>
<td>weed with hoe</td>
<td>10.6</td>
<td>pot on to final stage</td>
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<tr>
<td>4.4</td>
<td>sweep up debris</td>
<td>10.7</td>
<td>recog. when plants need water</td>
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<tr>
<td>4.5</td>
<td>trim established hedges</td>
<td>10.8</td>
<td>recog. when plants need feeding</td>
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<td>4.6</td>
<td>edge and trim grass verges</td>
<td>10.9</td>
<td>use the watering can</td>
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<td>4.7</td>
<td>state purposes of mulching</td>
<td>10.10</td>
<td>use hose-pipes</td>
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<tr>
<td>4.8</td>
<td>spread mulch around plants</td>
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<td>use the sprinkler</td>
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<td>5.1</td>
<td>identify tray and pot sizes</td>
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<td>apply top-dressing</td>
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<td>5.2</td>
<td>state uses of trays and pots</td>
<td>10.13</td>
<td>spray foliar feeding</td>
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<td>5.3</td>
<td>state the reasons for hygiene</td>
<td>10.14</td>
<td>check oil level in lawnmower</td>
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<tr>
<td>5.4</td>
<td>disinfect containers</td>
<td>10.15</td>
<td>check petrol level in lawnmower</td>
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<td>5.5</td>
<td>store containers</td>
<td>10.16</td>
<td>set cutting height</td>
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<tr>
<td>6.1</td>
<td>identify the genera listed</td>
<td>10.17</td>
<td>start and stop 4-stroke lawnmower</td>
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<td>6.2</td>
<td>select suitable planting sites</td>
<td>10.18</td>
<td>mow the lawns</td>
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<tr>
<td>6.3</td>
<td>explain 'species' terms</td>
<td>10.19</td>
<td>follow safety reg. re lawnmower</td>
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<td>7.1</td>
<td>state reasons for using st.composts</td>
<td>10.20</td>
<td>clean the lawnmower</td>
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<td>7.2</td>
<td>make comp. for rooting cuttings</td>
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<td>wash the air filter</td>
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<td>7.3</td>
<td>make comp. for growing-on non-eric. pl.</td>
<td>10.22</td>
<td>change the oil</td>
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<td>7.4</td>
<td>make comp. for growing-on eric. pl.</td>
<td>10.23</td>
<td>prepare site for lawn</td>
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<td>8.1</td>
<td>identify pests and diseases listed</td>
<td>13.1</td>
<td>estimate quantity of seed</td>
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<td>8.2</td>
<td>handle chemicals safely</td>
<td>13.2</td>
<td>sow a lawn</td>
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<td>8.3</td>
<td>mix systemic insect./fungicide</td>
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<td>prepare a marked bed</td>
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<td>spray systemic insect./fungicide</td>
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<td>9.2</td>
<td>state methods of propagating</td>
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<td>deal courteously with customers</td>
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<td>9.3</td>
<td>sow seeds in containers</td>
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<td>9.4</td>
<td>prick out seedlings</td>
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<td>harden off seedlings</td>
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<td>Sum of Ratings</td>
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<td>Percentage Equivalent</td>
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</table>

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**HORTICULTURE EVALUATION FORM**

Trainee is also evaluated on the following vocational behaviours:

**Job Performance.** (circle 1 or 0 as appropriate)

| JP. 1. | Endangers others because of carelessness | Yes 1 : No 0 |
| JP. 2. | Careless about tools/equipment | Yes 1 : No 0 |
| JP. 3. | Is a very slow worker | Yes 1 : No 0 |
| JP. 4. | Does sloppy, inaccurate work | Yes 1 : No 0 |

**Work Habits.** (circle 1 or 0 as appropriate)

| WH. 1. | Is often absent from training | Yes 1 : No 0 |
| WH. 2. | Is often late without good reason | Yes 1 : No 0 |
| WH. 3. | Requires constant encouragement | Yes 1 : No 0 |
| WH. 4. | Leaves work place without permission | Yes 1 : No 0 |
| WH. 5. | Grumbles or gripes about work | Yes 1 : No 0 |

Any other Observations (Competencies or Deficits)

__________________________
__________________________
__________________________

**Recommendation(s)**

__________________________
__________________________
__________________________

Instructor’s Signature: ____________________________
### APPENDIX B

#### CONVERSION TABLE

Percentage Equivalents for Horticulture Evaluation Scores

<table>
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APPENDIX C

Explanatory Notes on Scoring

The Evaluation Form (Appendix A) has been designed to aid the Instructor in evaluating the trainee’s behaviour. Each item is scored at one level of competency ranging from 1 to 5. The numerical value representing the level of competency estimated by the Instructor is entered next to the respective item on the Evaluation Form.

Interpretation of Ratings.

5 = Very Good = achieved objective to an acceptable standard (has reached a standard which is considered acceptable for open employment).

4 = Good = achieved objective to a standard which is approaching acceptable.

3 = Fair = achieved objective to a standard which is definitely below acceptable (but suitable for sheltered employment).

2 = Poor = achieved objective to a standard which is barely suitable for sheltered employment.

1 = Very Poor = completely unable to achieve objective (suitable for occupational activity).

For evaluation purposes the objectives are converted into questions

Example: Objective 7.2 "The Trainee will make up compost for rooting cuttings", is converted into the question "To what level of competency does the Trainee make up compost for rooting cuttings?"

Each objective has a two-numbered code, the numbers are separated by a full stop. The first number refers to the section of the course and the second number refers to the item within that section.

In the Evaluation Form (Appendix A) the code numbers of the objectives are listed, together with summaries of the objectives and spaces for recording the Instructor’s ratings.
Scoring. The Instructor rates the trainee's behaviour, using the 5-point scale, on each item and records the numerical value representing that level of competency next to the respective item on the Evaluation Form. When all items have been scored, the Instructor calculates the Sum of Ratings by adding up all the points accumulated, and enters this figure in the space provided. The Sum of Ratings is transformed into a percentage from the Conversion Table (Appendix B). This Conversion Table lists the Sum of Ratings in unequal increments and it may be necessary when transforming to percentages to look up the nearest score.

When a trainee, who has not completed the entire programme, is being evaluated the Conversion Table is not used. Instead, the Instructor evaluates the trainee only on those items of the programme in which he has been instructed.

1. Note the number of items in which the trainee has received instruction.

2. Add up the ratings and calculate the Sum of Ratings.

3. Divide the Sum of Ratings by the trainee's maximum possible score i.e. a score of 5 on all the evaluated items.

4. Multiply the figure derived by 100.

Example. A trainee has been instructed in only 42 items of the programme. The Sum of Ratings by the Instructor is 150.

Divide 150 by (5 x 42) i.e. 150 ÷ 5 x 42 = 150 ÷ 210 = 0.71

Multiply 0.71 x 100

Percentage Equivalent 71%