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**GENERAL CERTIFICATE IN ORNAMENTAL
HORTICULTURE LEVEL 1**

Workbook :

**Plant and establish ornamental plants
from containers into open ground**

**Plant and Establish Ornamental Plants
from Containers into Open Ground
Learner Workbook**

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A c k n o w l e d g e m e n t s

Developed by

Lifestyle College

With special thanks to:

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Study Session Overview

Purpose

The purpose of this study session is to equip you with the skills and knowledge necessary to choose plants for planting, place plants at the right spacing, remove plants from containers with due care, plant at the correct depth and give appropriate care to new plants.

This study session forms part of the General Certificate in Horticulture, NQF level 1 and is aligned with the Unit Standard: plant and establish ornamental containers into open ground, which carries 5 credits.

Who is it for?

This study session and unit standard form the knowledge base for people working with plants within the ornamental horticulture or landscaping industry and gives the learner the skills and knowledge necessary to:

- Select plants from stock holding or the nursery and prepare for planting.
- Arrange plants in the areas where they are to be planted.
- Prepare a suitable hole to receive the plant.
- Remove the plant from its container and place it in the hole at the correct level.
- Backfill and complete planting.
- Prepare bedding area and plant annuals.

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What's in it for you?

The skills acquired in this study session will equip you with the skills and knowledge needed to be able to control weeds by hand. These skills and knowledge form the basis of your horticultural studies and help you to:

- Explain the criteria to be used when selecting plants for planting out.
- Explain the reasons for soaking plants before planting.
- Demonstrate the correct moisture content of the growing media for planting.
- Describe the factors that influence the planting density of various plant types.
- Demonstrate the appropriate spacing of common annual seedlings.
- Demonstrate the proper use and care of tools.
- Demonstrate the preparation of a suitable hole for the plant.
- Describe the procedures for the enrichment of the base and backfill material for planting.
- Demonstrate the correct method of removing the plant from the container.
- Demonstrate the correct method of handling the plant when planting.
- Explain the importance of planting at the correct level.
- Explain the necessity of keeping the plant vertical when backfilling.
- Demonstrate the correct backfilling around the plant, to prevent the burying of the leaves and branches.
- Demonstrate the firming of the soil around the root ball.
- Demonstrate the tiling and addition of soil enrichments to the bedding area.
- Demonstrate the correct spacing and hollowing out of the holes for the annuals.
- Demonstrate the placing of an annual and the firming of the soil around it.

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What about assessment?

If you can:

- Demonstrate the proper use and care of tools.
- Plant and establish plants from containers into the open ground.
- Answer all the knowledge questions.

You will receive credits for a competent rating on your assessments.

These credits contribute 1 unit standard and 5 credits towards the General Certificate in Ornamental Horticulture, at NQF Level 1.

The laid down policies and procedures with regard to assessment, moderation, RPL and appeals govern this assessment.

You will be rated "Competent" or "Not Yet Competent" against the assessment criteria.

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Unit Standard

Title	Plant and Establish Ornamental Plants from Containers into Open Ground
Number	119706
Level	1
Credits	5
Field	Agriculture and Nature Conservation
Sub field	Horticulture
Issue date	2006-02-09
Learning assumed to be in place	Demonstrate knowledge of communication and Numeracy at Abet level 1.

Specific Outcomes	Assessment Criteria
1. Select plants from stock holding or the nursery and prepare for planting.	1.1. Explain the criteria to be used when selecting plants for planting out. 1.2. Explain the reasons for soaking plants before planting. 1.3. Demonstrate the correct moisture content of the growing media for planting.
2. Arrange plants in the areas where they are to be planted.	2.1. Describe the factors that influence the planting density of various plant types. 2.2. Demonstrate the appropriate spacing of common annual seedlings.
3. Prepare a suitable hole to receive the plants.	3.1. Demonstrate the proper use and care of tools. 3.2. Demonstrate the preparation of a suitable hole for the plant. 3.3. Describe the procedures for the enrichment of the base and backfill material for planting.

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Specific Outcomes	Assessment Criteria
4. Remove the plant from its container and place it in the hole at the correct level.	4.1. Demonstrate the correct method of removing the plant from the container. 4.2. Demonstrate the correct method of handling the plant when planting. 4.3. Explain the importance of planting at the correct level.
5. Backfill and complete planting.	5.1. Explain the necessity of keeping the plant vertical when backfilling. 5.2. Demonstrate the correct backfilling around the plant, to prevent the burying of the leaves and branches. 5.3. Demonstrate the firming of the soil around the root ball.
6. Prepare bedding area and plant annuals.	6.1. Demonstrate the tilling and addition of soil enrichments to the bedding area. 6.2. Demonstrate the correct spacing and hollowing out of the holes for the annuals. 6.3. Demonstrate the placing of an annual and the firming of the soil around it.

Embedded Knowledge

Embedded knowledge is reflected within the assessment criteria of each specific outcome and must be assessed in its own right, through oral and written evidence. Observation cannot be the only assessment.

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Critical Cross Field Outcomes

- Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made – specific outcome 1, 2, 3, 4, 5 and 6.
- Work effectively with others as a member of a team, group, organisation or community. Specific outcome embedded in the learning for this level of learner.
- Organise and manage oneself and one's activities responsibly and effectively. Specific outcome 1, 2, 3, 4, 5 and 6.
- Collect, analyse, organise and critically evaluate information. Specific outcome 1, 2, 3, 4, 5 and 6.
- Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation. Specific outcome embedded in the learning for this level of learner.
- Use science and technology effectively and critically, showing responsibility toward the environment and health of others. Specific outcome 3, 5 and 6.
- Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation. Specific outcome 1, 3, 5 and 6.

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**Unit Standard Accreditation and Moderation
Options**

1. Internal moderation.
2. External moderation.
3. Moderation of assessment will be overseen by the relevant ETQA, according to the moderation guidelines in the relevant qualification the agreed ETQA procedures.
4. Internal assessment.
5. External assessment with the relevant registered/accredited industry body/ETQA.
6. An Assessor accredited by the relevant ETQA, will assess the Learner's competency.
7. Formative and summative assessment of qualifying Learners against this unit standard should be in alignment with the requirements of the NSB.
8. Practical assessment activities will be used that are appropriate to the contents in which the qualifying Learners are working.
9. Assessment will include self and peer assessment, practical and oral assessment, observations, questions and answers, etc.
10. Direct observation is required in simulated or actual work conditions.
11. Reporting skills are demonstrated by effective communication, using verbal and/or writing skills.
12. Assessment is to be structured to include formative and summative component, as well as the submission of a Portfolio of Evidence.
13. The assessment should ensure that all the specific outcomes, critical cross field outcomes and embedded knowledge are assessed.

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14. Specific outcomes must be assessed in their own right, through oral and practical evidence and cannot be assessed by observation only.
Essential embedded knowledge must be assessed in their own right, through oral and practical evidence and cannot be assessed by observation only.
15. Special outcomes and essential embedded knowledge must be assessed in relation to each other.
16. If qualifying Learners are able to explain the essential embedded knowledge, but are unable to perform the specific outcomes, then they should not be assessed as competent.
17. If qualifying Learners are able to perform specific outcomes, but are unable to explain the essential embedded knowledge, they should not be assessed as competent.
18. Evidence of the specified critical cross-field outcomes should be found, both in performance and in essential embedded knowledge.
19. Assessment activities must be fair, so that all Learners have equal opportunities. Activities must be free of gender, ethnic or other bias.
20. This unit standard can be assessed together with any other relevant registered unit standard.

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Who does what?

You are expected to actively take part in the lessons by:

- Asking questions.
- Planning and preparing for your training and assessment.
- Completing the assessment tasks that you are given.
- Telling your trainer when you need help or don't understand.

Your learning will be supported in the following ways:

- Your trainer will provide you with all the necessary training material.
- Your trainer will manage the learning process during the training.
- The assessor will plan and prepare you for assessment, assess your competence and provide feedback to you and arrange any follow up assessments that may be necessary.

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Introduction

There is more to planting than just digging holes and placing plants in them.
To grow into healthy, strong plants, plants need:

- Water.
- Nutrients.
- Air/oxygen.
- Space between soil particles for the roots to grow.

And how you go about:

- Choosing your plants.
- Placing your plants.
- Preparing your soil for planting.
- Planting.

Will determine in the end:

- How healthy your plants are.
- How fast your plants grow and develop.
- How nice your landscaped area looks.
- How much maintenance you need to do.

Let's begin by learning which plants to choose!

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Lesson 1 : Choose Plants

Specific outcomes of this lesson :

Select plants from stock holding or the nursery and prepare for planting.

After you have worked through Lesson 1, you should be able to:

- Explain the criteria to be used when selecting plants for planting out.

What do I look for when I choose plants?

Whether you get your plants from a nursery or the stockholding area you need to check that the plants you are choosing are healthy and in good condition before you plant them into open ground. To do this you need to:

- **Check that the plant has healthy leaves:**

Plants need healthy leaves to produce food for the plant, so choose plants that have healthy leaves and strong new leaves and buds because this shows that the plant is in good health. Don't choose plants which have yellowing or brown leaves.

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- **Check that the plant has healthy roots:**

Plants need a good root system to grow into strong, healthy plants, so you need to choose plants that have healthy roots.

Don't be afraid to gently lift a tree or shrub in a container off the ground by the stem. If the roots and the compost remain firm, your first check is good. If the roots and compost look like they are going to come out of the container, then the plant has not been in the pot long enough to form a strong root system.

Look at the bottom of the container, if there are a lot of roots pushing through the air holes, the plant is probably root bound, this means that the roots of the plant could be growing in circles because the plant has been in the container for too long. The growth and development of root bound plants will be affected and these plants sometimes will grow more slowly than other plants.

Other signs that the plant is probably root bound are roots sticking out above the soil level.

Check the size of the plant. If the plant looks too small for the container it could be still be too young and so will not yet have form a strong root system, or the growth of the plant could be stunted because of poor health of some kind. If your plant is too large for the container it could also be root bound.

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- **Check that the plant is free of pests:**

Plants that have pests will not look good and can already have been harmed by these pests and so will not be strong, healthy plants.

Pests on plants can also be carried into your planting area and cause damage to your other plants.

- **Check that the plant is free of diseases:**

Plants that are diseased will be unhealthy and could die.

Diseased plants will pass on diseases to your other plants in your planting area.

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Your Turn

ACTIVITY 1
Walk around a nursery or stock holding area and collect a trolley full of healthy plants:
Group 1 – collect seedlings. Group 2 – collect herbaceous perennials. Group 3 – collect shrubs. Group 4 – collect trees.

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Your Turn

ACTIVITY 2

Explain to the group, why you chose these plants.

(Explain the criteria to be used when selecting plants for planting out).

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Type of plant:	Check:
Seedlings	<ul style="list-style-type: none">• A well-branched plant that is stocky and not tall and leggy. (Leggy plants often have thin and bent stems).• Strong new growth.• Healthy coloured foliage.• Disease and pest free.
Herbaceous perennials	<ul style="list-style-type: none">• A bushy plant with a strong crown of healthy leaves.• Strong new season's growth,• Healthy coloured foliage,• Disease and pest free,
Shrubs	<ul style="list-style-type: none">• Evergreen shrubs should be bushy and not tall and leggy.• Deciduous shrubs should have a balanced shape.• Strong new season's growth and no dead branches.• Remember that if the plant is too large or too small for the container size then there could be problems with the plants growth (Too large – could be root-bound; too small – could be stunted or have an underdeveloped root system).• Healthy coloured foliage.• Disease and pest free.

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Type of plant:	Check:
Trees	<ul style="list-style-type: none">• A strong main stem, (or stems in the case of multi-stem trees) with good branching. In the case of a single stem – the stem should be straight (and preferably staked).• Strong new season's growth (especially on the main stem/s) and no dead branches.• Healthy coloured foliage.• Disease and pest free.

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Lesson Checkpoint

Now that you have worked through this lesson, please check that you are able to do all the specific outcomes and meet the assessment criteria:

- I can explain the criteria to be used when selecting plants for planting out.

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Lesson 2 : Place Plants

Specific outcomes of this lesson :

Arranging plants in the areas where they are to be planted.

After you have worked through Lesson 2, you should be able to:

- Describe the factors that influence the planting density of various plant types.
- Demonstrate the appropriate spacing of common annual seedlings.

Introduction

Once you have chosen your plants, the next decision you need to make is how to place your plants to make sure that your plants get the right amount of space and light in which to grow.

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<p>If you plant your plants with the right amount of space between the plants, they will:</p>	<ul style="list-style-type: none">• Develop strong, healthy root systems.• Grow into strong and healthy plants.• Look good in your area.
<p>If you plant your plants too close together, they will:</p>	<ul style="list-style-type: none">• Compete with other plants growing in this area for light and where the plants overlap they will have sparse growth and in many cases drop their leaves because they don't have enough light.• Compete with other plants growing in this area for root space, water and nutrients and this encourages leggy growth, lack of flowering and diseases in the plants.• Be difficult to maintain.• Not reach their full growth and flowering ability and so will not look good in the area.• Be more prone to diseases because they are not getting the air circulation that they need.• Grow leggy and be sparsely branched.
<p>If you plant your plants too far away from each other:</p>	<ul style="list-style-type: none">• The planting area can look empty and this does not look good.

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So how must I place my plants?

As you have already seen, plants need to be planted at the correct spacing from each other to allow the plants to get enough light to grow and develop into healthy plants.

Most plants bought from a nursery or grower will have a label on them. This label tells you how big the plant will grow in width and height. Use these measurements to work out how far away to place the plants so that they do not grow into each other.

Other factors that affect planting spacing

Type of plant:	Check:
Seedlings	Seedlings usually grow and mature in one season and don't like to be moved once planted in the soil. The recommended spacing on the label allows the plants to grow and develop to their full size during this time without becoming overcrowded and makes sure that the planted area of flowering seedlings will give a good show of colour in the landscaped area and not show too much soil. With vegetable seedling's the recommended spacing on the label will allow for the amount of space needed by the plant to produce vegetables without overcrowding.

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Type of plant:	Check:
Herbaceous perennials	Herbaceous perennials usually grow and mature in two or more seasons. The recommended spacing of herbaceous perennials should allow the plant to reach its full size and to multiply and form new plants during this time.
Shrubs	The size given on the label works out how big the shrub will grow to reach its full size and is usually worked out on a ten year growing period, especially with conifers. If you are planting a hedge, you will need to plant these plants much closer together.
Trees	The size given on the label of trees allows enough space for the tree's roots to grow properly, without competition and allows for enough space for the growth and development of the tree's crown /canopy. Some trees are planted in groves/forests like the <i>Betula alba</i> (silver birch) to mimic nature. In this case the plants grow taller, faster because they are competing for light and are usually more sparsely branched.

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Your Turn

ACTIVITY 3
Name the factors that affect the planting density of various plant types.

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Your Turn

ACTIVITY 4

Look at the plants that you choose from the nursery.

Group 1 –

Read the planting instructions label and then correctly space the seedlings in the area you have been given.

Group 2 –

Read the planting instructions label and then correctly space the herbaceous perennials in the area you have been given.

Group 3 –

Read the planting instructions label and then correctly space the shrubs in the area you have been given.

Group 4 –

Read the planting instructions label and then correctly space the trees in the area you have been given.

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Spacing of Annual Seedlings

Now that you have learnt how much space to leave between your annual seedlings, let's take a look at how to place your annual seedlings to get the best effect and coverage for your area.

Annual seedlings give the best effect and coverage required, if they are planted in a zigzag or triangle pattern. So if the recommended plant spacing is 20 cm apart:

- Place your first plants in a straight line about 10 cm from the edge of the planting area (since their full spread is about 20 cm) and 20 cm apart.
- Use a ruler or measured piece of stick to help guide you.
- Place the next row of plants 20 cm from the first but this time place them like bricks in a wall or checkerboard style i.e. in line with the middle point between the last row of seedlings.

Each row will be opposite to the last – meaning that every second row will be in line with one another like a checkerboard.

If the display is to be shorter than the full season's growth and you want a full, quick show of colour then you can place the plants closer together.

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Your Turn

ACTIVITY 5
Read the planting instructions label on the annual seedlings and then correctly space the seedlings in the area you have been given.

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Lesson Checkpoint

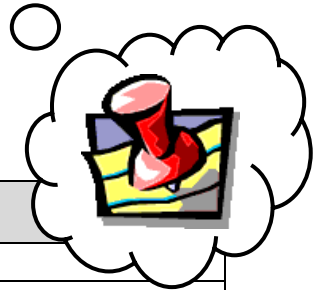
Now that you have worked through this lesson, please check that you are able to do all the specific outcomes and meet the assessment criteria:

- I can describe the factors that influence the planting density of various plant types.
- I can properly space common annual seedlings.

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Notes:

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Lesson 3 : Prepare for Planting

Specific outcomes of this lesson :

Select plants from stockholding or the nursery and prepare for planting.

Prepare a suitable hole to receive the plant.

After you have worked through Lesson 3, you should be able to:

- Explain the reasons for soaking plants before planting.
- Demonstrate the correct moisture content of the growing media for planting.
- Demonstrate the proper use and care of tools.
- Demonstrate the preparation of a suitable hole for the plant.
- Describe the procedures for the enrichment of the base and backfill material for planting.

Introduction

Before you can begin planting, you need to:

- Choose your tools for planting.
- Check your tools are in a safe, good working condition.
- Give your plants a good watering.
- Prepare your planting hole.

Let's take a look at how to do each of these steps in detail.

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Choose your tools for planting

Tool:	Use:
Spades:	<p>Spades are used to dig small to medium sized holes where the soil is not too hard.</p> <ul style="list-style-type: none">• A square-ended spade is used for digging as well as edging and cultivating. This tool is easy to use and can break up soil clods by using a chopping motion.• A round ended spade is often better for digging but is not easily used for edging. <p>Make sure that when you are using a spade that you place the spade upright and then add pressure to the back of the head of the spade with your foot. Do not push the spade into the ground at an angle because this will make digging the hole harder and can weaken or break the spade.</p>
Shovels:	<p>Shovels either with a round or square head are often used to remove the soil from the hole once the hole has been dug using the spade, pick or garden fork.</p>

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Tool:	Use:
	<p>If your soil is very easy to dig you can use a shovel to dig the hole because it has a larger head and is able to remove more soil than a spade.</p>
Picks:	<p>Picks have two different sides. One side is pointed and the other side is more flat.</p> <p>The pointed side of the pick is used to break up rocky or very hard soil and the flatter side of the pick is used to dig soil that is not as difficult to dig, but too difficult to dig with a garden fork or spade.</p>
Garden Forks:	<p>A garden fork has tines which can vary in size from 17 cm to 25 cm and are used to:</p> <ul style="list-style-type: none">• Break up and dig rocky or heavy soil.• Loosen soil at the bottom of the hole.• Dig out plants. A garden fork causes very little damage to the plants roots.• Break up clods of soil by chopping down on them with the flat side of the tines.

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Tool:	Use:
Planting trowels (hand trowels):	Trowels are used for planting smaller plants, like seedlings, bulbs and small perennials. Always try to buy a trowel that fits comfortably in your hand and is strongly made because some trowels bend easily when used in heavy soils.

Check your tools

Before you begin planting check that your tools are:

- Sharp.
- Clean – sterilize with alcohol or spirits to prevent spreading plant diseases.
- Rust free.
- Not broken – have no chipped blades or unsafe mechanisms. Check all wooden handles for splits and splinters in the wood.

Report all damage to the tools according to your workplace procedures.

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Your Turn

ACTIVITY 6
Describe the proper use of all the different types of planting tools.

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Water your plants

Plants just like people need water to survive, so before you can begin planting you need to deep water your plants which are in containers, to:

- Make sure that the roots of the plant stay moist during the planting process, when the roots may be exposed to the open air.
- Make sure that the roots of the plant which take some time to grow into the surrounding soil, have water.
- Make sure that the bark mixtures which are often used as growing media can absorb water from the soil. These mixtures don't absorb water easily once they are dried out and this will make it difficult to wet the root ball of the plant once the plant has been planted.
- Make sure that the plant doesn't suffer during the transplanting process.

Once you have deep watered your plants, don't leave them lying in the sun before planting.

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Your Turn

ACTIVITY 7
Why do you need to soak plants in their containers before your plant them?

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Prepare the planting hole

Before you can start working your soil you need to check the soil moisture content first. Do this by taking a handful of soil and squeezing it in the palm of your hand.

- If your **soil crumbles** into a powder it is too dry to properly prepare a planting hole. Water deeply and allow to the soil to dry for a few days and then test again.
- If your **soil sticks** together into a solid lump it is too wet to properly prepare a planting hole. Never plant in muddy or wet soil as the soil is likely to become compacted and affect the plant growth. Allow the soil to dry for a few days and then test again.
- If your **soil breaks apart into small clumps** it has the right moisture content and you can begin preparing a planting hole.

If you can't wait for a few days, you can change the nature of your soil by adding into the soil, organic material which will:

- Help the dry soil to hold moisture.
- Help the wet soil to dry out.

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Your Turn

ACTIVITY 8

Test the soil moisture of the three trays of soil you have been given.

Which tray holds the correct moisture content for planting? Give reasons for your answer.

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Dig a planting hole

Different people have different ideas about what shape and how large a good planting hole should be.

- Some experts say a round hole encourages any plant roots that are already circling in the plant container to continue circling, especially if the surrounding soil is too hard for the plant roots to penetrate. These experts believe that a square hole is better for root development and long-term plant growth.
- Some experts say a square hole is not correct and that plants should be planted in a hole that resembles a soup bowl (wider and shallower).

But many people still like to dig **square planting holes**, so let's take a look at how to dig a square planting hole:.

Step 1 :	<p>Because you will be digging a planting hole for your plant, you need to take a look at what type of root system your plant has, for example:</p> <ul style="list-style-type: none">• An Azalea has a flat, surface rooting system and will not need a very deep hole. (If you take this plant out of the soil you will see that the root system looks like the shape of a dinner plate).• Other plants with large tap roots will need a deeper hole, especially if your soil is hard or rocky because this will give the roots a better chance to grow deeply into the soil.
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	<p>As a generally rule, dig a hole that is at least:</p> <ul style="list-style-type: none">▪ Twice the width of your plant's container.▪ Half the depth deeper than your plant's container. <p>For example:</p> <ul style="list-style-type: none">• If the container is 20 cm wide the hole should be at least 40 cm wide.• If the container is 30 cm high the hole should be at least 45 cm deep.
Step 2:	<p>While you are digging your planting hole, make sure that you keep the soil close to the hole. Remember topsoil is very valuable and should not be thrown away. If you are digging down into subsoil make sure that you do not mix the topsoil and subsoil together.</p>
Step 3:	<p>While you are digging your planting hole, make sure that you break up any earth clods.</p>
Step 4:	<p>Loosen the soil at the bottom of your planting hole, using your garden fork.</p>

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Improving your soil

Soil is the “home” of plants and it is from the soil that the plant’s roots get:

- The water needed by the plant to grow.
- The space and air between soil particles for the roots to grow.
- A medium for the roots to anchor in.
- Nutrients.

The most common reason that plants don’t grow well is because the soil has not been properly prepared before planting. By improving the soil in your planting hole you will help your plants to grow strong and healthy by adding organic material into the soil which will:

- Absorb and hold lots of water, this is called the water holding capacity of the soil. A high water holding capacity helps the plant to get the water that they need in order to grow.
- Hold nutrients that help the plant to grow.
- Improve the aeration in the soil and allows for more air spaces in the soil. This helps the plant’s roots to get the air/oxygen that they need.
- Make the soil loose and easy for the plant’s roots to move into.
- Improves the drainage of the soil, so that the plant doesn’t drown.

This is why in landscaping we have this saying:

“Never plant a R50 plant into a 50 cent hole.”

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How much organic material you need to add and what type of mixture you will use to improve your soil will depend on:

- **The type of soil you have.**

A simple and cheap way to test which soil type you are working with, is to pick up a handful of soil, wet the soil slightly and then try to roll your handful of soil into a sausage shape, this is called the sausage test.

Sandy Soils	<p>With sandy soils you will not be able to form a sausage shape at all and the soil will feel gritty and rough in your hand.</p> <p>This soil is light, easy to dig and difficult to compact.</p> <p>Sandy soil has good aeration and drainage so water flows through the soil easily.</p> <p>This soil has low water holding ability and water and nutrients are therefore washed down into the soil which causes poor nutrition and a shortage of water for the plants.</p> <p>By adding organic material into this soil you will increase the soils water holding ability and the amount of available nutrients to the plant.</p>
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<p>Clay Soils</p>	<p>With clay soils you will be able to form a sausage that holds its shape and the soil will feel smooth and sticky in your hand. Dry clay soils will feel powdery in your hand.</p> <p>This heavy soil is difficult to dig and compacts easily.</p> <p>Clay soil has poor aeration and drainage so water flows slowly through the soil. This soils high water holding ability can lead to the soil becoming water logged which leads to lack of air for the plant's roots and may cause plant drowning.</p> <p>By adding organic material into this soil you will help the soil particles to clump together and allow for better air and water movements to the plants.</p>
<p>Loam Soils</p>	<p>With loam sands you will be able to form a sausage shape but it will keep breaking apart and the soil will won't feel very rough or very smooth in your hand.</p> <p>This soil is fairly easy to dig.</p> <p>This soil holds a medium amount of air/oxygen and allows water to flow through the soil at a medium rate, so this soil has moderate drainage.</p> <p>By adding organic material into this soil you will increase the soils water holding ability and the amount of available nutrients to the plant.</p>

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- **Your soils pH levels.**

pH is the measurement of the amount of acidity or alkalinity in the soil. Most garden plants like slightly acid to neutral soils but there are some that require alkaline or acid soils to grow and develop well. By learning about what type of soils different plants like and by testing your soil you can find out if your soil pH suits your plants. Garden soil can be made more acidic by adding acid compost, peat moss or ammonium sulphate. Several sprinkles of agricultural lime over a period of time will make your garden soil more alkaline.

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**Add organic material and/or inorganic
fertilizers to your soil**

Divide the soil from when you dug your planting hole into two piles, let's call these two piles of soil, pile A and pile B. This is especially necessary if you have to separate the subsoil and the topsoil.

Now add the recommended amount of plant starters (root stimulants like Bone Meal or Superphosphate) to soil pile B. Mix the soil and the plant starters together very well. Remember all inorganic fertilizers need to be mixed very well into your soil because if your plant roots come into direct contact with the fertilizer they can suffer fertilizer burn.

Add your organic matter which could be either compost, kraal manure or even peatmoss/acid compost for acid-loving plants. Mix together with your soil pile B. An easy way to remember how much organic mixture to put back into your planting hole is to add 1 part organics to two parts of soil. In other words, add half as much organic material as the size of the soil from your planting hole.

You will be adding this soil into the bottom of your planting hole.

Now add your organic material to soil pile A. Mix the soil and the organic material together well. You will be adding this soil around your plant in the planting hole.

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Your Turn

ACTIVITY 9
Prepare a planting hole, for the plant you have been given.

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Lesson Checkpoint

Now that you have worked through this lesson, please check that you are able to do all the specific outcomes and meet the assessment criteria:

- I can explain the reasons for soaking plants before planting.
- I can demonstrate the correct moisture content of the growing media for planting.
- I can demonstrate the proper use and care of tools.
- I can demonstrate the preparation of a suitable hole for the plant.
- I can describe the procedures for the enrichment of the base and backfill material for planting.

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Lesson 4 : Planting

Specific outcomes of this lesson :

Remove the plant from its container and place it in the hole at the correct level.

Backfill and complete planting.

Prepare bedding area and plant annuals.

After you have worked through Lesson 4, you should be able to:

- Demonstrate the correct method of removing the plant from the container.
- Demonstrate the correct method of handling the plant when planting.
- Explain the importance of planting at the correct level.
- Explain the necessity of keeping the plant vertical when backfilling.
- Demonstrate the correct backfilling around the plant, to prevent the burying of the leaves and branches.
- Demonstrate the tilling and addition of soil enrichments to the bedding area.
- Demonstrate the correct spacing and hollowing out of the holes for the annuals.
- Demonstrate the placing of an annual and the firming of the soil around it.

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Introduction

Now that you have properly prepared your planting hole, let's take a look at how to plant your plant from the container into the open ground.

Remove the plant from its container

Begin by watering the plant well in the container before removing it from its container.

Type of Container	Removing the plant from the container
Seedling and plug trays:	<p>There are two different methods for removing plants from seedling and plug trays:</p> <ul style="list-style-type: none">• With plastic trays it is often easy to push on the bottom of the hollow space and push the seedling out of the top of the tray.• The other way to remove your plants is to cut the tray open carefully and remove each seedling. <p>Place the plant between your index and middle fingers when removing it from the tray. Do not pull on the plant.</p>

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Type of Container	Removing the plant from the container
Plastic Pots:	<p>Hold the plastic pot carefully and knock on the outsides of the pot with your hand or a blunt object while turning it around at the same time.</p> <p>Once you have knocked the pot on all sides do the same to the bottom. Then carefully tilt the pot and your plant should slide easily out of the pot. If the plant and pot are small enough turn the plant upside down holding the stem of the plant between your fingers and supporting the soil in your hand.</p> <p>If the plant doesn't easily slide out of the pot, you can slit the opposite sides of the plastic pot with a knife and carefully remove your plant.</p> <p>While you are removing your plant, support your plant by placing your hand over the top of the pot with the plant stem held between your index and middle finger. Support the bottom of the root ball with your other hand trying not to allow soil to fall away from the roots.</p> <p>NEVER lift or carry a plant by holding the stem or a bunch of leaves as you can cause damage to the plant.</p>

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Type of Container	Removing the plant from the container
Plastic Bag:	<p>Cut the sides of the plastic bag after you have placed your plant in your planting hole. This stops the soil from falling away from your plant's roots.</p> <p>While you are removing your plant from the plastic bag, support your plant by placing your hand over the top of the plastic bag with the plant stem held between your index and middle finger and tilt your plant out of the bag. Support the bottom of the root ball with your other hand.</p> <p>Don't ever plant your plants into the soil in their plastic bags.</p>
Wire baskets:	<p>Wire baskets usually come in 50 liter plant sizes and larger.</p> <p>Remove the wire basket by cutting through the wire on opposite sides of the basket and then cut the plastic liner which is on the inside of the mesh.</p> <p>Place the plant (by carefully rolling or sliding it), onto a piece of canvas (or any other piece of strong material) and then lower the material and plant into your planting hole. Slide the cloth out from under your plant once the plant is in the planting hole.</p>

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Type of Container	Removing the plant from the container
Metal drum:	<p>Cut the opposite sides of the drum with an angle grinder or similar tool making sure that you cut the thick rim of the metal drum base along the same line.</p> <p>Carefully pry open the drum.</p> <p>Place your plant (by carefully rolling or sliding it), onto a piece of canvas (or any other piece of strong material) and then lower the material and plant into your planting hole. Slide the cloth out from under the plant once the plant is in the hole.</p>

Prepare the plant for planting by checking the root system. If the plant is root bound or the roots are in poor condition remove the damaged or dead roots, loosen the soil mass and tease out the roots that encircle the root ball (for better soil penetration) without breaking the root ball.

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**Place your plant into the planting hole at the
right level**

Plant plants that have been grown in plant containers at exactly the same level in the soil that the plant was at in the container. If you are not sure, look for the watermark on stem of the plant. This is very important because if you plant the plant:

- **Higher** than it was in its container you will expose the plant's roots which could dry out and die. The plant may also not be stable in the ground.
- **Lower** than it was in its container, you could bury some of the plant's stem/trunk. Many plants are very sensitive and too little air together with dampness on the stem/trunk will cause rot and most plants will die.

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Your Turn

ACTIVITY 10
Why it is important to plant your plants at the right level in the ground?

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Backfilling the planting hole

Once your organic and inorganic soil improvement has been mixed with your soil, you can start to fill your planting hole with this soil once you have loosened the soil at the bottom of the planting hole with a garden fork.

Add the soil mixture (which has the plant starters) from pile B which came from the bottom of your hole, to the bottom of your planting hole, until the soil is at the right planting level for the plant that you are planning. Remember the level of the plant has to be exactly at the same level with the ground level as it was in the bag.

Place your plant into the planting hole and then add the soil mixture (which has the organics) from pile A around the plant, this is called backfilling.

While you are backfilling hold your plant upright with one hand and backfill with your other hand, to make sure that you keep your plant upright in your planting hole and not skew.

If the plant is too big for you to hold while you are backfill your planting hole, you will need to ask someone to help you. If you are planting trees or standard shrubs you will need place a stake firming into the soil and tie the tree or shrub securely to the stake according to your work place procedures.

If you start backfilling and then realize that your plant is higher or lower than the surrounding ground level you will need to adjust the soil level.

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So if you have planted:

- **Too high**, remove the plant and dig some soil out of the planting hole. When you think the hole is now deep enough, replace your plant at the right level.
- **Too low**, place your hands underneath your plant's roots and gently rock the plant backwards and forwards as you pull the plant upwards.

To make sure that you have not covered any leaves or branches with soil, run your fingers around the base of the plant stem at soil level. This will help you to feel for any buried branches or leaves. If you find any buried branches or leaves, gently lift them above the soil and rinse the leaves with water.

Another way to plant easy-to-handle small to medium plants that are in plastic containers (and specifically transplanting indoor or patio plants to larger pots) is to carefully remove the plant from its container. Then use the container as a dummy plant by backfilling around the empty plastic pot, instead of your plant. Remove the empty pot and the plant will slip straight into its place.

Once your plant is in the right position you need to firm the soil around the plant to remove undesirable air pockets in the soil and to allow the soil to achieve good soil to root contact.

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To firm the soil press your fingers into the soil for smaller plants and the heel of your foot for larger plants, don't stamp the soil heavily because you will compact the soil and restrict the plant's root growth.

Now deep water your plants. If there are air pockets the water will also help to wash soil into these pockets and so you may find that the plant will drop down into the planting hole a little. If this happens re-adjust the depth of your plant.

If possible, especially in the case of large trees and shrubs or where there is no irrigation system, use the extra soil to make a dam around your plant. This shallow basin/dam should be angled towards the plant and will allow the water to be channeled to your plant's root system.

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Your Turn

ACTIVITY 11

Plant the plants you have been given into the planting hole you have dug, using the planting summary on the next page as your guide.

During this activity, your teacher will be watching how you:

- **Improve your soil.**
- **Remove the plants from their containers.**
- **Handle the plants.**
- **Backfill your planting hole.**
- **Place the plant at the right level in the hole.**
- **Firm the soil around the root ball.**
- **Deep water the plant.**

To make sure that you can do all these actions properly.

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Workbook :

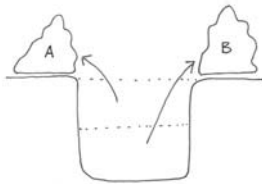
**Plant and establish ornamental plants
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Planting Summary



Step 1:

After selecting a healthy plant, check the moisture content of the soil.



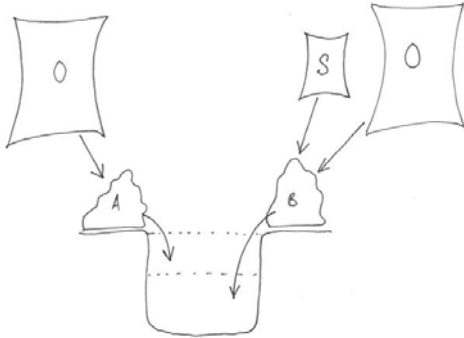
Step 2:

Select the right tools and dig a hole that is the correct size. Make 2 piles of soil.

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Step 3:

Add the plant starter (S= plant starter), or the root stimulant fertilizer like superphosphate or bone meal and the organics (O= organics – this is usually compost and sometimes manure, or peatmoss/acid compost for acid-loving plants), to pile B and mix well

Add organics (O= organics – see information mentioned before) and mix well

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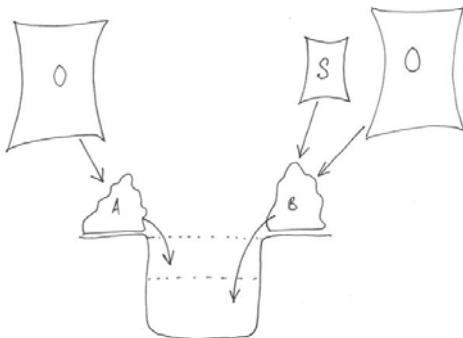
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Step 4.

Water the plant in its container



Step 5:

Loosen the soil at the bottom of the hole. Start adding pile B back into the hole because this soil came from the bottom of the hole. When the soil is at the right level, remove the plant from its container, handle it carefully, and place it in the hole at the correct level – adjust it if necessary to get it to the correct planting depth

Continue filling with soil pile B, holding the plant upright. Once pile B is finished, continue filling with pile A. Do not bury any plant branches or leaves
Firm the soil around the plant

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Step 6:

Use the left over soil to form a dam around the plant (where relevant to mostly larger plants).

Water the plant well

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Your Turn

ACTIVITY 12
Why do you need to keep the plant vertical when you are backfilling?

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Prepare a bedding area to plant annuals

Place your seedling trays in the shade or cover the trays if there is not shade.

Water the seedlings in their trays just before planting.

To prepare a bedding area to plant annuals, you need to till the soil. The word tilling means to turn the soil over either by hand or by using a mechanical method such as rotavating. Often a generous layer of organic matter is applied to the top of the soil before tilling so that it can be turned in at the same time.

Tilling normally turns the soil to a **depth of between 25 cm and 30 cm** depending on the purpose of tilling.

To manually till:

- Use a spade or a garden fork (if the soil is not too heavy).
- Insert the spade or garden fork straight into dry soil and not at an angle. Don't till wet soils, especially clay soils as this can damage the structure of the soil and cause soil pans especially if you are using a mechanical tool.
- Now turn the soil over. As you turn the soil over, break up all the clods.

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- When you are finished turning over the soil, use the head of a garden rake to firm the soil so that you don't leave behind big air pockets in the soil.
- Now you can use a hoe or the back of a garden rake to push and pull the soil to break any remaining clods into finer particles and create good tilth.
- Spread a layer of about 5 cm of compost over the tilled area and dig the compost into the soil. (If you prefer to use manure make sure that it is well rotted and you should ideally prepare your bed at least a week in advance of planting).
- Add and work into the soil the recommended amount of superphosphate/ bone meal or any other plant starter used in your workplace.

The soil has now been tilled in preparation for planting.

Plant annuals

Hold the seedling in one hand. Remember not to pull at the seedling because you could break some of the plant's roots.

Hold the seedling between your index and middle fingers. With the other hand use a trowel or a dibber to dig the holes – making sure that the hole is deep enough for the roots of the seedling and that the roots will not be folded over or squashed into a flattened shape in the hole.

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Use a ruler or any marked object to set the spacing you require for the seedlings as per the planting label spacing instructions.

Dig holes in the checkerboard pattern, you learnt previously.

Place the seedling in the hole and firm the sowing media with the dibber or your fingers. Avoid pressing down with your thumbs when firming the soil around the seedlings.

Water the seedlings soon after planting with a fine water rose, making sure that the water pressure is low enough not to disturb the planted seedlings or wash them out of the soil.

Try to plant seedlings in the late afternoon so that they have the night to recover (and water them again first thing in the morning too).

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Your Turn

ACTIVITY 13

Prepare a bedding area and plant annuals.

During this activity, your teacher will be watching how you:

- **Till the soil.**
- **Improve your soil.**
- **Remove the plants from their containers.**
- **Handle the plants.**
- **Correctly space the annuals.**
- **Hollow out the holes for the annuals.**
- **Place the plant at the right level in the hole.**
- **Firm the soil around the root ball.**
- **Deep water the plant.**

To make sure that you can do all these actions properly.

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Caring for tools after use

All the tools you use should be carefully washed after use and then dried and sterilized with either alcohol or methylated spirits.

Where necessary rub oil into tool blades to prevent them from rusting.

After use all tools must be cleaned and packed away in a cool, dry area under lock and key, with blades facing into the shelf to prevent injury to anyone entering into the area.

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Your Turn

ACTIVITY 14
Describe the proper care of tools.

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Lesson Checkpoint

Now that you have worked through this lesson, please check that you are able to do all the specific outcomes and meet the assessment criteria:

- I can demonstrate the correct method of removing the plant from the container.
- I can demonstrate the correct method of handling the plant when planting.
- I can explain the importance of planting at the correct level.
- I can explain the necessity of keeping the plant vertical when backfilling.
- I can demonstrate the correct backfilling around the plant, to prevent the burying of the leaves and branches.
- I can demonstrate the firming of the soil around the root ball.
- I can demonstrate the tilling and the addition of soil enrichments to the bedding area.
- I can demonstrate the correct spacing and hollowing out of the holes for the annuals.
- I can demonstrate the placing of an annual and the firming of the soil around it.

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