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**GENERAL CERTIFICATE IN ORNAMENTAL
HORTICULTURE LEVEL 1**

**Workbook :
Care for Ornamental Seedlings**

**Care for Ornamental Seedlings
Learner Workbook**

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**Workbook :
Care for Ornamental Seedlings**

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

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Study Session Overview

Purpose

The purpose of this study session is to equip you with the knowledge and skills necessary to care for ornamental seedlings and grown on seedlings in preparation for transplanting and the cultural practices for the care of the seedlings.

This study session forms part of the General Certificate in Horticulture, NQF level 1 and is aligned with the Unit Standard: Care for Ornamental Seedlings, which carries 4 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:

- Maintain newly germinated seedlings.
- Grow on seedlings.
- Prick out seedlings.
- Grow on plants to transplanting maturity.
- Control pests in seedlings.

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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 care for ornamental seedlings and grow on seedlings in preparation for transplanting. These skills and knowledge form the basis of your horticultural studies and help you to:

- Look after newly germinated seedlings.
- Explain why it is important to maintain a level of humidity in the seedling environment.
- Explain the effect on root development when you decrease the frequency of watering.
- Give reasons for increasing the light intensity.
- Explain how to increase the temperature ranges for acclimatization.
- Describe the environmental test procedures.
- Demonstrate the correct application of water to seedlings.
- Explain why seedlings need to be fertilised regularly.
- Demonstrate the procedures for the fertilizing of seedlings.
- Indicate the stage of maturity when 'pricking out' can be performed.
- Fill containers with growing medium.
- Hollow out a hole large enough to accommodate the roots of the plant.
- Correctly hold plants when pricking out.
- Give reasons why the growth medium must be firmed.
- Explain the reasons for 'hardening off' plants.
- Describe the hardening off procedures.
- Give reasons why the depth and frequency of watering is altered.
- Weed plant containers.
- Control pests in seedlings.

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- Describe the symptoms of bacterial and fungal diseases in seedlings.
- Describe the signs of a viral infection.
- Identify insect activity or damage to a plant.

What about assessment?

If you can successfully care for ornamental seedlings and answer all the knowledge questions in the summative assessment, you will receive credits for a competent rating on your assessments.

These credits contribute 1 unit standard and 4 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	Care for Ornamental Seedlings.
Number	119686
Level	1
Credits	4
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 3.

Specific Outcomes	Assessment Criteria
1. Maintain newly germinated seedlings.	<ul style="list-style-type: none">1.1. Explain the importance of maintaining a high level of humidity in the seedling environment,1.2. Explain the effect on root development, by decreasing the frequency of watering.1.3. Describe the reasons for increasing the light intensity.1.4. Explain the process of increasing temperature ranges for acclimatization.
2. Growing on of seedlings.	<ul style="list-style-type: none">2.1. Describe the environmental test procedures.2.2. Demonstrate the correct application of water to seedlings.2.3. Explain the need for regular fertilizing.2.4. Demonstrate the procedures for the fertilizing of seedlings.2.5. Indicate the stage of maturity, when 'pricking out' can be performed.

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Specific Outcomes	Assessment Criteria
3. Prick out seedlings.	<ul style="list-style-type: none">3.1. Demonstrate the filling of a container with growing medium.3.2. Demonstrate the hollowing out of a hole large enough to accommodate the roots of the plant.3.3. Demonstrate the correct method of holding the plant when pricking out.3.4. Explain the reasons for the firming of the growth medium after planting.
4. Grow on plants to transplanting maturity.	<ul style="list-style-type: none">4.1. Explain the reasons for 'hardening off' plants.4.2. Describe the hardening off procedures.4.3. Explain the reasons for altering the depth and frequency of watering.4.4. Demonstrate an effective method of weeding plant containers.
5. Control pests in seedlings.	<ul style="list-style-type: none">5.1. Describe the symptoms of bacterial and fungal diseases in seedlings.5.2. Describe the signs of a viral infection.5.3. Recognise the evidence of insect activity or damage to a plant.

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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.

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 3 and 5.
- 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 2 and 5
- Collect, analyse, organise and critically evaluate information. Specific outcome 1, 2 and 5.
- 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 1, 2, 3, 4 and 5.
- 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, 2, 3 and 5.

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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.
14. Specific outcomes must be assessed in their own right, through oral and practical evidence and cannot be assessed by observation only.

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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 any follow up assessments that may be necessary.

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Introduction

You looked after your seed very carefully and helped it to germinate by making sure that your seed had:

- **Enough water/moisture:**

Your seed needed moisture to begin the process of germination and as your seed took up water, it began to soften and swell and this helped the seed coat to split. The young root called the radicle then appeared.

If you gave your seed too little water/moisture your seed would have shriveled up and died. And if you gave your seed too much water/moisture your seed would have drowned.

- **Enough air:**

Your seeds needed air to breathe and air movement which helps to stop your seed from getting attacked by pest and diseases.

- **Enough light:**

Your seeds needed light to start germinating and some of your other seeds needed darkness to start germinating but once the young leaves appeared, all your seedlings needed light to make their own food and grow.

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- **Enough nutrients:**

Your seeds needed nutrients to grow and the first nutrients needed by your seeds to germinate were supplied by the seed's endosperm.

- **The right temperature and humidity that it needed for germination:**

Seeds that came from colder climates needed less heat than those that came from tropical climates and to make sure that lots of your seeds germinated you needed to control both the humidity and temperature conditions while your seed was germinating.

- **A medium to hold the plant upright and from which your seeds could draw nutrients as they were growing.**

Having got your seeds to germinate, your job is not over because how you look after your ornamental seedlings while they are growing will affect:

- How many of your seedlings will grow into flowering plants.
- How quickly your seedlings will grow into flowering plants.

Let's begin by taking a look at how to look after your seedlings after they have germinated, so that they grow into healthy plants.

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Lesson 1 : Pricking Out Seedlings

Specific outcomes of this lesson :

Growing on of seedlings.

Prick out seedlings.

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

- Indicate the stage of maturing, when 'pricking out' can be performed.
- Prick out seedlings.
- Fill a container with a growing medium.
- Hollow out a hole large enough to accommodate the roots of the plant.
- Hold the plant correctly, when 'pricking out'.
- Give reasons for firming the growth medium after planting.

Introduction

When you sowed your seeds into a container or tray, you will have found that sometimes more than one seed germinated in the same place. Because seedlings grow faster, develop better and are less prone to disease if they have plenty of space to grow and good soil to grow in, you will need to prick out your seedlings.

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What is pricking out?

Pricking out is the process of taking germinated seedlings out from one seed tray and placing them into another seed tray, so that there is an equal amount of space between the seedlings, for each seedling to grow.

Pricking out will give your seedlings:

- The space that they need in order to grow strong and healthy.
- Better air circulation.
- The stimulation that they need to grow bushier feeder roots.

Don't confuse this process with thinning out which is the process of removing excess plants or seedlings when you have sown in situ. During thinning out seedlings are removed in order to ease overcrowding and the removed plants are thrown away.

So when should you 'prick out'?

It is time to prick out and transplant your seedlings into containers as soon as your seedling's first set of true leaves appear, but not when your seedlings are so small or so large that their roots will become damaged.

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Your Turn...

ACTIVITY 1
Explain when you should 'prick out'.

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So how do you 'prick out'?

Begin by **preparing a new container and sowing mixture.**

- Choose a container or tray which has holes at the bottom, to allow for good drainage.
- Choose a growing medium that is similar to the growing medium in which your seedlings germinated. Your growing medium must allow for good drainage, good aeration and have a good water holding ability. A good transplant medium for your seedlings is – 3 parts of soil, mixed with 2 parts of compost, mixed with 1 part sand and 2 parts of bark potting mixture, but always use the growing medium recommended by your workplace because they know the best type of growing medium for your seedlings.
- Moisten your growing medium.
- Place coarse organic material over the holes of your container, so that your growing medium does not fall out of these holes.
- Fill your container or tray with your moist growing medium, leaving a space of about 0,5 cm to 1,5 cm between the top of your container and your growing medium.

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- Using your fingers, gently push your growing medium into the corners of your container and firm your growing medium down.
- Wet your growing medium.

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Your Turn...

ACTIVITY 2
Choose a container or tray and fill it with a growing medium.

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Once your container is ready, you can now **prick out your seedlings**. To do this you will need to:

- Gently knock the sides of the container on your workbench to loosen the sowing media and seedlings.
- Loosen the growing medium with a dibber and carefully lift your seedling. Try to lift the seedling with some of the soil medium still around the root ball of your seedling because this will reduce the shock of being transplanting, called root shock. Be careful how you hold your seedling because you don't want to damage or break the stem or any part of your seedling's roots. Damaged seedlings will seldom survive.
- Once your growing medium is loose and you can see the roots of your seedling, lift your seedling free of the growing medium by holding onto its leaves rather than its stem, with your index and middle finger. Don't pull your seedling, as this action can break or damage the stem or part of your seedlings roots.
- Hold your seedling in one hand.
- Make a hole in your new growing medium, using a dibber which is a small stick, shaped to make holes. Your hole must be big enough to hold the roots of your seedling.

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- Place the seedling in the hole and make sure that the roots of your seedling go into the hole straight or else the stem of your seedling could break above the roots. Position your seedlings at the same level in the new media as the level that they were growing at before.
- Again use your index and middle finger to gently firm the sowing media around the roots of your seedling.
- Make sure that the lower leaves of your seedling are not covered with growing medium. By doing this you will stop any of your seedlings leaves from rotting which can lead to your plants getting a disease.
- As you firm your growing medium around your seedling, make sure that there are no air pockets in your growing medium because air pockets prevent water from being taken up by the roots of the plant.
- Make sure that you have enough soil around the roots of your plant to stabilize (anchor the plant in the growing medium).

Keep on doing these steps for all the rest of your seedlings, making sure that your seedlings are pricked out in straight lines and that there is enough room for your seedlings to grow.

Once you have finished pricking out your seedlings, gently water your seedlings using a fine rose-watering can or mist spray and then place them in a the correct area.

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Your Turn...

ACTIVITY 3

Prick out a seedling, showing your lecturer how you:

- **Hollowed out a hole large enough to hold the roots of your seedling.**
- **Held your seedling, while you were pricking out.**

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Your Turn...

ACTIVITY 4
Explain why you need to firm the growing medium after you have planted your seedlings.

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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 prick out seedlings.
- I can correctly hold the plant while I am pricking out.
- I can fill a container with growing medium.
- I can hollow out a hole large enough to accommodate the roots of the plant.
- I can give reasons why I need to firm the growth medium after planting

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Lesson 2 : Growing On Seedlings

Specific outcomes of this lesson :

Maintain newly germinated seedlings.

Growing on of seedlings.

Grow on plants to transplanting maturity.

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

- Explain why it is important to maintain a level of humidity in the seedling environment.
- Explain the effect on root development, by decreasing the frequency of watering.
- Describe the reasons for increasing the light intensity.
- Explain the process of increasing temperature ranges for acclimatization.
- Describe the environmental test procedures.
- Demonstrate the correct application of water to seedlings.
- Explain the need for regular fertilizing.
- Demonstrate the procedures for the fertilizing of seedlings.
- Indicate the stage of maturity, when 'pricking out' can be performed.
- Explain the reasons for hardening off plants.
- Describe the hardening off procedures.
- Explain the reasons for altering the depth and frequency of watering.

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Introduction

Once your seedling is established in the seed tray, your job is still not finished. You can't just stop looking after your seedlings because they are used to a lot of tender loving care and so you need to slowly make them stronger and able to grow outside where they will be exposed to temperature changes and to the sun, wind and rain. This process is called hardening off of the seedlings.

To grow into healthy plants, your seedlings will need to be hardened off by slowly:

- Cutting down on the humidity levels of the area in which your seedlings are grown.
- Cutting down on how often you water your seedlings.
- Increasing the amount of light your seedlings get.
- Changing the temperature of your area so that your seedlings get used to different temperature ranges.

Let's take a look at each one of these points in detail.

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Your Turn...

ACTIVITY 5
Why do you need to harden off the plants?

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**Cutting down on the humidity levels of the area in
which your seedlings are grown:**

You need to slowly cut down on the humidity levels of the area in which your seedlings are grown, so that your seedlings become strong enough to grow outside of this area.

Lower humidity levels, means that the air is slightly drier and this encourages your seedling to take up more water and nutrients through their roots. This is necessary if you want to grow strong and healthy plants.

Water taken up by the roots can be lost through the leaves of your seedlings. This process is called transpiration and the rate at which a plant transpires is affected by temperature and humidity because both of these affect the rate at which water evaporates.

In a dry, hot environment (a lower humidity area) your seedlings will transpire more quickly than if they are in a moist, cool environment (a higher humidity area).

So can you see that in a lower humidity area your seedlings can lose moisture faster than their roots can replace it? And can you see that in a higher humidity area your plant will lose moisture more slowly?

Steady temperatures and humidity levels will help your plants to grow healthy and strong because they can transpire without losing too much moisture.

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A good rule to follow when you are deciding on the humidity level of your area, is that if the area feels too hot or muggy for you, then it is also unpleasant for your seedlings.

Most young seedlings and root cuttings grow best in an environment with a relative humidity of between 70 to 75 percent but more mature plants like a humidity of between 40 to 70 percent.

Because higher humidity areas are ideal environments for fungi to grow in, your seedlings can be attacked by the growth of mould, mildew and fungal diseases and by lowering the humidity level and making the air slightly drier there is also less chance of encouraging mould, mildew and fungal diseases to attack your seedlings.

Because humidity and temperature levels are so important to how your seedling will grow and develop you need to check both the moisture content and the temperatures of your area. To do this you will use a tool, called a hygrometer which measures how much moisture is actually in the air and a thermometer, which measures the air and/or soil temperature.

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So if you have:

- **A high moisture level and high temperature (above 30 degrees Celsius):**

This means that your area is moist and hot and has a high humidity level. In this humidity your seedlings are maintaining the right amount of water needed to grow but you are also creating an area in which diseases can spread easily and attack your seedlings.

- **A high moisture level and low temperature:**

This means that your area is moist and cool and has a good humidity level, so your seedlings are maintaining the right amount of water needed to grow strong and healthy.

- **A low moisture level and high temperature:**

This means that your area is dry and hot and has a low humidity level, so your seedlings are losing water faster than their roots can take up water. This can cause your seedlings to become wilted and eventually die.

- **A low moisture level and low temperature (below 15 degrees Celsius):**

This means that your area is dry and cold and your seedlings are losing water and will grow slowly, if at all because it is cold.

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If these tools (a hydrometer or your own comfort level) tell you that your humidity levels are:

- **Too high**, use a large fan to replace the warm, moist air with cooler, drier air.
- **Too low**, either wet the walls and floor of your area or place a humidifier into your area to add moisture into the air.

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Your Turn...

ACTIVITY 6

Explain why it is important to maintain a level of humidity in the seedling environment.

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Cutting down on how often you water your seedlings.

You need to slowly reduce how often you water your seedlings, once your seeds have germinated to encourage your seedling's roots to search for water because as your seedling's roots look for water they are forced to grow longer in length and to grow stronger.

If you only give your seedlings a shallow watering they will develop a shallow root system and this root system will not be able to support or anchor your plant once it is planted in the open.

While your seedlings are growing, the amount of water that you give them needs to be constant. Between watering, the soil mixture in which your seedlings are growing should dry out a little or else you are not encouraging the roots of your seedlings to grow.

If you give your seedlings too much water:

- They can get diseases and die. The most common disease a seedling gets from a soil mixture which is too wet is called damping off.
- Nutrients can be washed out of your growing medium and your seedlings will grow weak and can even die.
- There will be too little aeration and your seedling can drown.
- Algae can grow on your medium.

If you give your seedlings too little water they will wilt and die.

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So what is the right way to water your seedlings?

While it is better to water your seedlings from the bottom (sub irrigation) to encourage their roots to search for water, this is not always possible in a production nursery and so seedlings are watered from above either by mist irrigation or by using a hose pipe which has a very fine watering head.

Which ever way you choose to water your seedlings, watering must not be so strong that it can knock over your seedlings. Make sure that each seedling gets a deep watering.

The best time to water your seedlings is early in the day, so that your growing medium is not wet at night because this could lead to disease. So always put your plants to bed at night dry if you don't want them to get sick.

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Your Turn...

ACTIVITY 7
Water your seedlings.

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Your Turn...

ACTIVITY 8

Explain how you can encourage your seedling's roots to develop by cutting down on how often you water them.

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Your Turn...

ACTIVITY 9
Explain why you need to change the depth and frequency of watering your seedlings.

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Increasing the amount of light your seedlings get.

As soon as the stem of your seedling surfaces from the soil, it will start to grow towards a direct source of light, either fluorescent light or sunlight so that it can make its own food through a process called photosynthesis.

As you know without food you and I cannot grow and of course without food your seedling will also not be able to grow. So you need to make sure that your seedlings get between 14 to 16 hours of light per day to develop into healthy and strong plants.

Lack of light is the single, most common problem when raising seedlings and if your seedlings are left to grow in the low light of your germination area, they will keep trying to get to light and grow into tall and lanky plants. Lack of light will also cause your seedlings to become yellow

To get your seedlings used to growing outside, you can place them under a fibreglass or plastic structure for two to three weeks and then move them under a shade cloth area. In this way they will slowly get used to wind and temperature changes.

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Your Turn...

ACTIVITY 10

Explain why you need to increase the light intensity when you are looking after seedlings.

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**Changing the temperature of your area so that your
seedlings get used to different temperature ranges.**

Although your seed needed a nice warm environment in which to germinate, you will now have to change the temperature ranges that your seedling is growing in because research has shown that high temperatures cause your seedlings to develop into soft plants and also encourages diseases.

You also need to help your seedlings to adapt to life outside and low and moderate temperatures produce stronger and healthier plants.

The seedling will experience an increased temperature range when it is moved from the germination room where the environment is controlled to a tunnel where the environment is only semi-controlled.

Generally seedlings grow best between a day temperature of 18 to 25 degrees Celsius and this temperature can be decreased by 5 degrees at night.

Certain plants grow better in colder temperatures, for example lettuce, parsley and cabbage.

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Your Turn...

ACTIVITY 11
Explain the process of increasing temperature ranges for acclimatization.

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Air movement

Your seedlings will need to be moved to an area that has good air movement (ventilation), so that they can “breathe” and to prevent the fungal disease called damping off.

Moving air also helps to keep pests away and helps to strengthen your seedling’s stems and get them strong enough and used to outdoor breezes.

Fertilizing seedlings

While your seed was germinating, it got the nutrients it needed to grow from its endosperm but once your seed has germinated it takes up water and the nutrients which have been dissolved in the water.

If your growing medium has no nutrients in it then no nutrients can be dissolved in the water. Without nitrogen (N), phosphorus (P) and iron (Fe) the seedling can become yellow or even deformed, so you need to make sure that your growing medium has these nutrients in it.

When your seedling gets its second set of leaves or “true leaves” add a little liquid fertilizer to your water to make sure that your seedling is getting all the nutrients that it needs to grow into a strong and healthy plant. But, be careful, because this is the first time that your seedling is getting added fertilizer, don’t give it a full dose of fertilizer because this can burn your seedling and it can even die.

A good rule to follow is to give your seedlings a weak dose of fertilizer, at regular intervals, according to your workplace procedures.

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Your Turn...

ACTIVITY 12
Explain why you need to regularly fertilizer your seedlings.

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Your Turn...

ACTIVITY 13

Go back to your workplace and find out how regularly you need to fertilize your seedlings and with what type of fertilizer to use.

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To summarise:

So far you have learnt that you need to check the environment (area) in which your seedlings are growing and that you do this by:

- **Checking the temperature** of your growing medium or soil, every day. To check the temperature of your growing medium or soil, you will use a tool called a thermometer. Generally seedlings grow best between a day temperature of 18 to 25 degrees Celsius and this temperature can be cut down by 5 degrees at night.
- **Checking the moisture content** or humidity level of your seedling's environment (area), every day. To check the humidity level of your seedling's environment, you will use a tool called a hygrometer. Generally germinated seedlings grow best in a humidity level between 70 and 80 percent and plants grow best in a humidity level between 40 to 70 percent.
- **Checking that your seedling's environment is getting enough light.** Generally seedlings grow best if they have between 14 to 16 hours of light a day.

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Your Turn...

ACTIVITY 14
Describe the environmental test procedures.

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Your Turn...

ACTIVITY 15

Draw a picture that explains to a young child how to harden off their seedling.

Then using your picture, explain to your class the hardening off procedure.

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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 maintain newly germinated seedlings.
- I can explain why it is important to maintain a level of humidity in the seedling environment.
- I can explain how decreasing the frequency of watering effects the root development.
- I can give reasons for increase the light intensity.
- I can explain the process of increasing temperature ranges to acclimatize the seedlings.
- I can describe the environmental test procedures.
- I can demonstrate the correct application of water to seedlings.
- I can explain the need for regular fertilizing.
- I can demonstrate the procedures for the fertilizing of seedlings.
- I can describe the hardening off procedures.
- I can explain why you need to alter the depth and frequency of watering.

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Lesson 3 : Weeding Seedlings

Specific outcomes of this lesson :

Grow on plants to transplanting maturity.

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

- Weed plant containers.

What is a weed?

A weed can be defined as:

- Any plant which is growing where it is not wanted.

Weeds are troublesome plants that are very persistent and many weeds can spread and reproduce far better than the plants you are trying to grow.

Because of this, you will find weeds almost everywhere - there are weeds in gardens, on lawns, on sports fields, on golf courses, in parks and of course in your seedling trays or containers where they are competing with your seedlings.

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Why do we need to get rid of weeds?

- Weeds compete with your seedlings and if left alone some of these weeds will take over your container and kill your seedlings.
- Weeds take away from your seedlings - light, nutrients, water and space to grow and so slow down the growth of your seedlings.
- Weeds interfere with your seedlings air circulation.
- Weeds can serve as a breeding ground for pests and diseases and make your seedlings sick.

How do I get rid of weeds?

It is important to get rid of weeds when they are still young plants and to remove them before they form seed. Hand weeding is one of the most common ways of controlling weeds.

Hand weeding is a good way to control most types of weeds, as long as you take care to remove all of the weed as well as its roots.

The easiest time to dig out weeds is when they have just started growing, because as the weeds grow bigger you run the risk of damaging the nearby plant roots and of leaving pieces of the weed behind which can regenerate.

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To remove weeds by hand:

- Water before you weed. This will make the soil softer and lessen the chance of you causing any damage to the roots of your seedlings.
- Loosen the surface of the soil or growing medium before you pull up the weed because this will make it easier for you to remove the bulbs and roots of the weed and lessen the chance of pieces of the weed breaking off and staying behind and growing again.
- Loosen the soil around the stem of the weeds because this will make it easier for you to remove the weed and lessen the chance of pieces of the weed breaking off and staying behind to grow again.
- Wrap your hand firmly around the stem of the weed, close to the soil and gently tug on the weed until it comes loose from the soil.
- Check to make sure that all of the weed and its roots have come away and if necessary remove any broken pieces because some weeds can grow again, from these broken pieces.
- After you have removed the weeds, gently firm down your growing medium or soil around your seedlings and water your seedlings to settle your growing medium.

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Your Turn...

ACTIVITY 16
Weed your seedling containers or trays.

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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 weed plant containers.

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Lesson 4 : Controlling Pests and Diseases

Specific outcomes of this lesson :

Control pests in seedlings.

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

- Describe the symptoms of bacterial and fungal diseases in seedlings.
- Describe the signs of a viral infection.
- Identify insect activity or damage to a plant.

What are Plant Pests?

Pests can be defined as anything that attacks and eats plants. Pests can be divided into two categories:

▪ **Chewing pests:**

These pests chew the foliage of plants. Some examples of chewing pests are beetles, grasshoppers, cutworms, leaf miners and caterpillars.

▪ **Sucking pests:**

These pests suck out the plant juices. Some examples of sucking pests are aphids, scale insects, red spider and mealy bugs.

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In most cases, pests attack the youngest and newest growth of plants. So as you walk through your growing area, look at:

- The upper surface of your seedlings leaves.
- The underside of your seedling's leaves, where most insects and their eggs are located.
- The point where the leaves of your seedlings attach themselves to the stem your seedling.

And you will know that you have pests, if you find:

- Plant leaves chewed from the outside edges.
- Holes chewed in the leaves of plants.
- Wilting or discolouring of the plant's leaves.
- Discoloured speckles on the leaves.
- Curled leaves.

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Your Turn...

ACTIVITY 17
Look at the trays in front of you, which of them have signs of insect activity or damage to the seedlings. Give reasons for your answer.
Tray 1
Tray 2
Tray 3
Tray 4

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What are Plant Diseases?

Plants of all kinds are subject to disease which although you can see the symptoms of the disease you can't see the disease or virus.

Plant diseases are caused by:

- Fungi
- Bacteria
- Viruses

Plants can become diseased through:

- Contact with pests.
- The use of unsuitable compost.
- Poor growing conditions.
- Crowded seedlings.
- Lack of hygiene.
- Injury from fumes and sprays.

Because plant diseases spread quickly it is important that you learn how to see the signs of the disease in your seedlings, so that you can control them quickly.

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Bacterial diseases

Disease bacteria are microscopic organisms that cause trouble when they live in plants.

The bacteria that causes rot releases an enzyme that dissolves cell walls in leaves, stems and tubers.

Wilts are caused by bacteria that block a plant's water and storage transport system (called the vascular system).

Crown gall occurs when bacteria invade through plant wounds or bruises, and then give off substances that promote abnormal growths in the plant.