



Small Scale Irrigation Development Level I

Model TTLM

Learning Guide #4

Unit of Competence: Support Nursery for Irrigation work

Module Title: Supporting Nursery for Irrigation work

LG code: AGR SSI1 M04 LO1-LO4

TTLM Code: AGR SSI1 TTLM 1218V2

Nominal Duration: 20 Hours

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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- ♣ Prepare materials, tools and equipment for nursery work
- ♣ Undertake nursery work as directed
- ♣ Store and stockpile materials A
- ♣ Clean up on completion of nursery work

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to identify: –

- ♣ the ability to prepare materials, tools and equipment for irrigated nursery work,
- ♣ Support undertaking nursery work activities, store and stockpile materials, and clean up on completion of work.
- ♣ Support nursery work with safe work practices, nursery hygiene and quality control, nursery plant maintenance activities, basic stock control procedures and propagation techniques.

Learning Activities

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets**1-4**”.
3. Accomplish the “Self-check” at the end of each learning outcome.
4. If you earned a satisfactory evaluation proceed to the next “Information Sheet”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to the Learning Activity.
5. Submit your accomplished Self-check. This will form part of your training portfolio.

Introduction

- *Material*
 - ♣ Is anything used to making something else.
 - ♣ It may include irrigation system components, glues, welds, and construction and backfill materials.
- *Equipment*
 - ♣ Is the thing needed for particular purpose.
 - ♣ It includes pumps, motors, flow meters, pressure gauges, spray equipment’s etc.
- *Tools*
 - ♣ Is any physical item that is used to achieve a goal
 - ♣ Is a device intended to make a task easier
 - ♣ Is something which is handled to perform operation
 - ♣ Is multi-purposes

1.1 Identifying the required materials, tools and Equipments

Different kinds of tools are required in the nursery to carry out various kinds of operations:

Essential operations in the nursery are:

- Site selection
- Site clearing
- Digging
- Pruning
- Seed collection
- Hoeing
- Raking
- Watering
- Spraying

A) Tools required for site selection

- Ranging pole
 - String rope
 - Water bubble or level
 - Compass -used to determine the direction of bed in nursery site.
 - Meter –used to measure distances
- } used to determine slope of nursery site.

B) Tools required for working on the soil

- Pickaxe** --- used to break up hard and stony ground
- Traditional hoe** --- for loosening the soil
- Shovel** --- for moving earth, sieving soil and soil mixing
- Flat pronged fork** --- for loosening the soil
 - To lift bare-rooted seedlings and to turn over compost
- Rake** --- break up and level the soil; and it has a row of 10-16 teeth and is kitted up with a 1.80 m handle

C) Tools required for layout

- Tracing line** --- thin hemp or nylon cord 10m long (with knots at 1m intervals), attached to 30~50 cm long pegs at each end, and used to trace straight lines.

E.g. boards of seedbeds or pot beds to measure distance



Figure 1.1: Tracing line

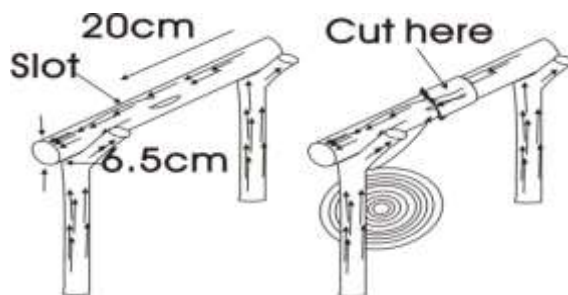
Preparation of soil for Pot filling

- **Sieve**—soil for seed beds and for potting should not contain large-size particles, stones, pieces of weed or something alike.
 - sieve size approx. 1.5m
 - Dimension 1×1.5m
- **Funnel**---- for speeding up pot filling if inserted in the polythene tube
- **Scoop** - made of metal sheet, it is an efficient tool for filling and compacting soils in pots



Figure 1.2: Potting funnel

- **Pot cutting roll**---- a simple cutting gauge which permits rapid cutting of the tube into pots of standard length (15, 20 or 30cm).It can be made locally. To obtain pots in 20cm length, the piece of rounded tube has to have diameter of 6.5cm and of 9.5cm for 30cm long.



Figure

D) Tools

1.3: Pot cutting roll required for watering

- **Watering can**----it can be made of metal or plastic; and it should have a capacity of 10-12L; kitted up with fined-perforated sprinkler to avoid damage to young plants and dentition of root from splashing water.

E) Tools required for transport within Nursery

- **Wheel barrow**- for transporting all kinds of materials in the nursery: potting soil, seedling ready for delivery...etc.

F) Tools required for tending seedlings

- **pruning knives, shears** → Used to prune the roots that grow out of
- **trowels** → pots into the ground of the pot bed
- **Flexible steel wire**
- **Machete** ---- long knife which can be used for many purpose such as cutting fence posts, removing weedy fences, trimming living fences, Chopping left-over seedlings for composing...etc.

G) Tools required for weeding

Simple tools like a pointed piece of stick, with strong hammered flat at one end and a handle at the other, are useful for weeding on seedbeds & potted stock.

H) Tool required for pricking

- A small shovel, a flat piece of wood, or simply a spoon is useful to lift germinated seedlings for pots transplanting without damaging their roots.

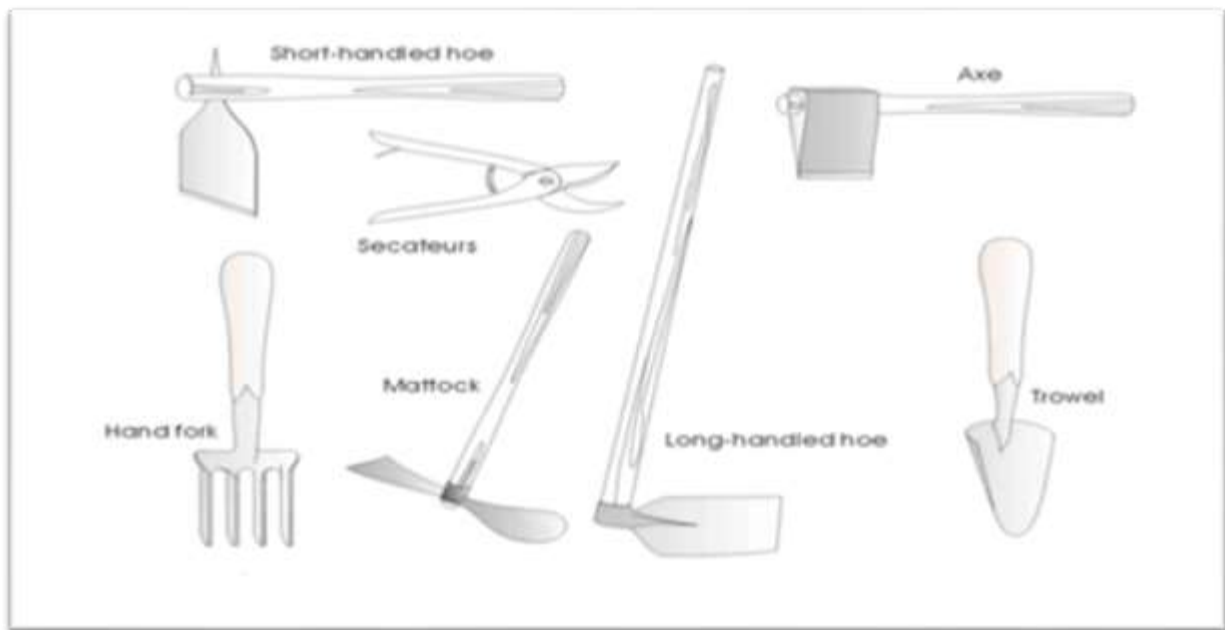


Figure1. 4: some hand tools used in cultivation operation

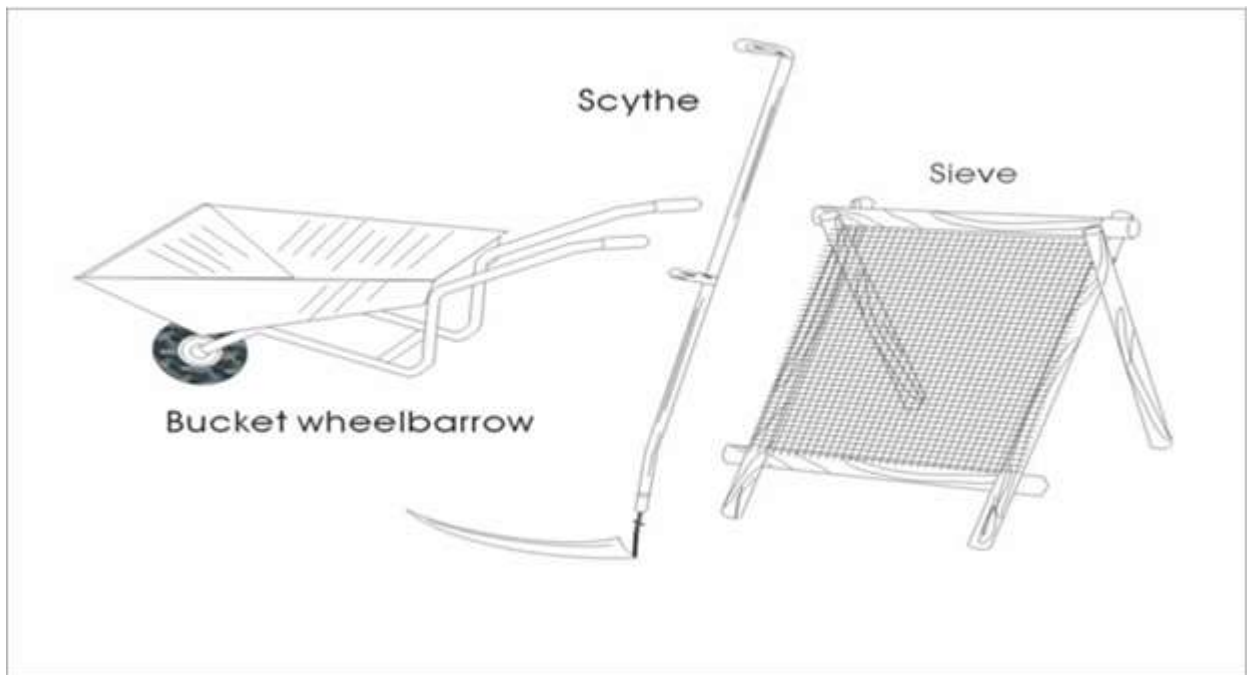


Figure1. 5: some hand tools used in cultivation operation

1.2 Conducting Checks on all materials, tools and equipment

It is essential to check irrigation system, tools and equipments for damage or malfunction and shall report damage or malfunction to the authorized representative in written form. If failed to maintain the broken or malfunctioning irrigation system components within few days of the breakage or malfunction, there will be a loss due to damages resulting from the broken irrigation system component.

Hence, it is necessary to check the system, materials and equipments. In addition, maintenance of the system has to be carried out regularly.

1.3 Techniques for Loading and unloading Materials

The techniques used when loading and unloading materials should demonstrate correct manual handling and minimize damage to the load and the vehicle while transporting nursery tools and equipments.

Purpose

The purpose of this Procedure is to reduce the risk of injury or incident during the loading or unloading of material or equipment whilst on nursery work. This Procedure describes the standards necessary to ensure all employees fully understand their responsibilities and necessary actions required for safely loading and unloading materials from vehicles such as trucks, motor trolleys.

For safe loading and unloading

- Man Use correct lifting methods when you are lifting plants, tools and equipment. Team lifts anything that is too heavy for one person.
- Do not overload wheelbarrows and trolleys with soil or plants.

Manual handling

All activities, which require individuals to use any form of manual handling, shall be conducted in accordance with procedure.

Individual personnel should not attempt repetitive, frequent or heavy lifting. Mechanical lifting equipment shall be made available for identified specific tasks as required. Mechanical lifting devices include, but are not limited to

What are manual tasks?

Manual tasks are activities requiring the use of force exerted by a person to lift, lower, push, pull, carry or otherwise move.

Some of the most common tasks causing injuries in nursery and garden centers are:

- Pushing and pulling heavy trolleys
- Lifting and carrying bags and plants
- Loading and unloading tools and equipments

Loading and unloading nursery stock

- It is helpful to have more than one or two people to load and Unload stock.
- Repetitive movement over a long period of time is detrimental to health.
- Try and use the trolleys where appropriate to alleviate strain and stress.
- Orders should be kept together in the trailer.
- When moving plants to growing on areas or sale areas, try to move them batch by batch and type by type so as to order the work activity, save space and avoid double handling at a later a date.

Factors affecting nursery work

- Weather

Weather patterns for both regional and local conditions have the potential to impact upon loading and unloading operations conducted throughout the nursery work.

- Topography
- Labor availability
- Physical fitness
- Techniques
- Designated Loading and Unloading Areas

To ensure loading and unloading operations are conducted without interference from adjacent activities, mobile machinery, plant and personnel a designated area shall be established where possible.

Inspection

- ♣ Check loading and unloading equipment regularly for leaks, including valves, pumps, flanges and connections.
- ♣ Look for dust or fumes during loading or unloading operations.

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1.4 Selecting and checking suitable personal protective equipment (PPE)

Any irrigation activity that requires squirting, spraying, or pressure release of fluid requires personal protective equipment that includes gloves, gown, mask with eye shield to prevent exposure to debris and aerosolization of microorganisms. Splash shield devices will still require wearing of gowns, and face protection due to splash potential.

Personal protective equipment (PPE) is used to protect an individual from hazards associated with their work tasks or environment. Specific types of personal protective equipment include *protective clothing, eyewear, respiratory devices, protective shields, gloves, and hearing protection*. Personal protective equipment is not a substitute for engineering controls such as chemical fume hoods and bio safety cabinets, or for administrative controls and good work practices. PPE is used in conjunction with these controls to provide safety and maintain health.

Some of the commonly used PPE include the following:

Eye protection

It is required to use eye protection equipments like goggle, eye shield, to protect our eye from dusts, chemicals etc. by all workers engaged in hazardous activities or are exposed to identify eye hazards.

Hand Protection

It is required to use appropriate hand protection when hands are exposed to hazards, such as:

- ♣ Skin absorption from harmful substances
- ♣ Cuts, lacerations or abrasions
- ♣ Chemical exposure
- ♣ Thermal burns and/or temperature extremes
- ♣ Potentially infectious material.

Body Protection

- **Chemical Resistant Clothing:** Protective apparel designed to provide a barrier against a variety of chemical hazards. Chemical resistive clothing may be required for tasks where chemical splashing is anticipated or large volume transfers are conducted. Prior to selection of chemical resistant clothing, EH&S should be consulted;
- **Laboratory Apparel and Scrub Suits:** A wide variety of styles and materials are available to protect employees during laboratory operations. The selected type of lab coat or other apparel is designed to protect the wearer against accidental splashes or day-to-day handling of chemicals;
- **Clean room Apparel:** Clean room apparel is designed and classified to meet federal requirements for the control of airborne particles
- **overalls**

Personal Protection Equipments:-

- Steel capped boots/shoes, Gloves, Sun hat, Sunscreen lotion, Safety goggles and Face mask.

1.5 Providing Nursery support for Irrigation work

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Irrigation is the application of water to soil for the purpose of supplying the moisture essential for plant growth. Irrigation plays a vital role in increasing crop yields and stabilizing production.

Provide nursery plant care including watering, weeding, removing dead materials, staking, trimming, and potting on of plants.

- ✓ site selection
- ✓ site clearing
- ✓ nursery lay out
- ✓ seed bed preparation
- ✓ sowing

The major activities after sowing in the nursery management are:

- Watering
- Mulching, shading
- Applying fertilizers
- Weeding
- Thinning and Root pruning
- Control insect pests and diseases

Watering

Water is the essence of life, watering ensures better survival and growth of any seedlings. A good supply of water is very important for the growth of young seedlings in the nursery Water should be

- ✚ PH value less than 7
- ✚ low salt content

The newly-sown container, seed tray (box) or nursery beds must never dry out, but keep moist continually (not soaking wet). There is no fixed rule about the intervals between watering and quantity of water required, because this varies with

- species
- soil condition
- age of the seedlings
- Weather conditions...etc.

A very appropriate recommendation for total amount of watering per day is equivalent to 8mm rainfall. This means 8 liters of water/of seed bed.

Frequency of watering

Watering should be done frequency at least twice a day in small quantities. For instance, if watering is done twice a day, four liters/sq.m should be applied in each watering time.

Time of watering

The watering should be done early in the morning, before 10:00 and 4:00 after pm. This will enable the seedlings to utilize efficiently with the water sprayed onto them without being left.

Fine-host watering cans must be used in watering seed bed without grass mulch for buffer. If the cans are not available, try to use grass mulch.

Seedlings are watered immediately after transplanting. Therefore, light watering is carried out 2~4 times a day depending on the progress of the seedlings.

Correct watering supplies the seedlings with just enough water for unrestricted growth.

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Well watered seedlings look healthy and vigorous.

Excessive watering may result in tender, over grown, succulent plants, sometimes of yellowish in color. Sufficient watering becomes obvious through wilting and stunted growth, however, the slight wilting of young leaves during the middle of the day, when transpiration is highest.

Some important facts

Bare roots require more water than container seedlings.

Watering almost every day till hardening off for bare roots.

- **watering requirement depends on:**

- Bed (soil texture)
- Solar radiation
- Species
- Wind, growth stage...etc.

Correct watering schedule determined by experiment

Watering is done twice at the beginning preferable early in the morning and late in the afternoon, then lower watering gradually. Care to be taken during watering.

- ★ avoid damaging the seedlings (plants) & beds
- ★ avoid over watering

Weeding

A weed is a growing plant where it is not wanted in the nursery.

Growing weeds compete with seedlings in taking of available nutrient in the soil mixture through root system. Fast growing weeds may suppress the seedlings in badly affecting the health and growth of seedlings. Weeds are serious in initial stage when the plants are small. They also harbor insects or diseases. Regular weeding program should be worked out for the removal of weed.

Weed elimination techniques

Weed can be eliminated manually by hand, mechanically or chemically

1. Hand weeding

- ✓ Weeding by hand should be limited to plant containers or germination beds where the weeds cannot be reached by tools without disturbing or damaging the tree seedlings. In all other cases, weeding hoes, cultivators, etc. may be used.

2. Mechanical weeding (cultural)

- ✓ Mechanical weed control by motor cultivators, tillers and rotary hoes attached to a tractor is limited to large level nurseries producing bare-rooted plant stocks

3. Chemical weed control

- ✓ Weed-killing chemicals are called herbicides. They are widely used in agricultural and land clearing before planting.
- ✓ The use of herbicides should be restricted to large nurseries raising mainly conifer seedlings and to nurseries where labor is expensive or not available

4. Biological method

- ✓ Use of animals and plants

Applications of fertilizers

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Importance of applying fertilizers to nursery plants

- ❖ To replace the lost nutrients (nutrient deficiency)
- ❖ To maintain high level of fertility in the nursery bed and to produce good quality nursery seedlings

Type of fertilizers: there are two types of fertilizers

1. Organic fertilizers
2. Inorganic fertilizers

Nutrient deficiency symptoms

Stunted growth & Discolored leaves

Application methods: application of fertilizers (commercial) fertilizer replaces mainly the three primary nutrients N, P, K.

The major method in application of solid fertilizers is:

- 1) Broad cast broad casting at planting and top dressing
- 2) Placement

Three types:

- ✓ Plough sole or deep placement
- ✓ Band placement
- ✓ Side dressing

1.6 Identifying and reporting occupational health safety (OHS) hazards

Hazard identification

Hazard identification is a process used to identify all possible situations where people may be exposed to injury, illness or disease, the type of injury or illness that may result from these and the way in which work is organized and managed. It is the first part of a risk management strategy described in Occupational Health & Safety Management System (OHSMS).

Workplace Health and Safety Regulations require employers to ensure that appropriate measures are undertaken to identify all hazards and to manage risk in the workplace.

Hazard: a situation at the workplace capable of causing harm (i.e. capable of causing personal injury, occupationally related disease or death).

Risk: the chance of a hazard actually causing injury or disease. It is measured in terms of consequences and likelihood.

Risk Management: the overall process of risk identification, risk analysis, control of risks and risk evaluation.

Risk Control: that part of risk management which involves the implementation of policies, standards, procedures and physical changes to eliminate or minimize adverse risks.

Reporting Hazards and Accidents

Employees are required to report any situation or occurrence in the workplace that may present a risk or have the potential to affect the health and safety of employees or others in the workplace.

It is required that all injuries, incidents and hazards are properly reported, investigated and recorded in accordance with the procedures detailed below.

An **incident** is any unplanned event resulting in or having the potential for injury, ill health, damage or loss.

A **hazard** is a source or a situation with the potential for harm in terms of human injury or ill

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health.

Injury Reporting

In the event of an injury the person involved should;

1. seek first aid or medical attention as required;
2. inform their supervisor as soon as possible;
3. complete the Confidential Incident / Injury Report Form
4. Assist their supervisor in the investigation and reporting on the incident or accident.

The Supervisor of the person(s) involved in the incident is required to;

1. ensure that any injured person is promptly attended to;
2. conduct an initial investigation into the cause of the incident;
3. complete the Confidential Incident / Injury Report Form and ensure that it reaches the Safety and Health; and
4. Notify and liaise with the local Safety & Health Representative and line management in relation to the incident.
5. Ensure that all serious injuries are reported to the Safety and Health immediately after hours of assistance.

On identifying a hazard, staff must act as quickly as possible to eliminate it. This may mean a simple alteration, substitution or removal of the hazard or even talking to the people involved to enlighten them of their hazardous practices.

Self-Check 1	Written Test
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Name: _____

Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. write the difference between materials, tools and equipments(5points)
2. Write some of the tools and equipments used in irrigation work? (5 pts.)
3. what are the essential operations in nursery site?(5points)
4. what are the guide lines for loading and unloading materials?(5points)
5. List irrigation PPEs? (5pts)
6. write the conditions that should be met for farming irrigation to be success (5points)
7. write the difference between hazard, risk and accident(5points)
8. Write few OHS hazards? (5pts)

Note: Satisfactory rating – 20 points and above Unsatisfactory - below 20 points

You can ask your teacher for the copy of the correct answer

Operation sheet-1	Identify tools for irrigation work
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1. Irrigation tools and equipment

Identification of drip irrigation tools and equipment, due to that student will enable how to handle materials and equipment, develop skills include the ability to prepare materials, tools and equipment for irrigation work, work with a range of materials including plastic and metal pipes and components using hand tools commonly used in irrigation work.

1. Water tank (Roto)
2. T-PICES
3. Connectors
4. Laterals lines
5. On-line Emitters
6. Filter
7. Drain outlet 3/4"
8. Ball valve 3/4" female
9. Comp. Elbow
10. Comp. Tee
11. Barbed Tee
12. Line end 16mm
13. Puncher 16mm
14. Puncher 9mm

Tools and equipment may include

Leveling equipment, wheelbarrow, string lines, tape measures, marking gauges, spades, shovels, crow bars, rakes, brooms, sanding blocks and hacksaws are needed

Operation Sheet 2	Providing nursery support
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Procedures of nursery support:

- Show practically how to carry out activity of site preparation.
- perform different nursery activities like:

- Sowing

Procedure

- Select site
- Clear the site
- Lay out
- Prepare a bed
- Snow the seed
- Irrigate
- Prune the root &/or shoot
- Weed

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- Fertilize (both inorganic and organic)
- Spray chemicals
- Mix compost with soil

Lap Test	Practical Demonstration
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Name: _____

Date: _____

Time started: _____

Time finished: _____

Instructions:

Task1: You are required to perform any of the following:

1.1 Request your teacher tools and equipment for irrigation work then perform the following task in front of your teacher-

- ♣ Identify the tools and equipments
- ♣ Identify for what purpose do the tools and equipment used in irrigation

Task 2: Show practically how to carry out different nursery activity expected and needed for a newly established and the progressive management providing nursery support.

Introduction

Nursery is a place where plants are propagated and grown to usable size. They include *retail nurseries* which sell to the general public, *wholesale nurseries* which sell only to business such as other nurseries and to commercialize.

2.1 Following Instructions and Directions and seeking Clarification

Following Instructions and directions provided by supervisor

Why follow supervisor instructions

- ♣ To correct all mistakes and plagiarism/illegal use
- ♣ To improve outcomes
- ♣ For looking new technologies
- ♣ To avoid any risk injury
- ♣ To learn how to follow instructions

2.2 Undertaking nursery work for irrigation in environmentally appropriate manner.

2.2.1. Site clearing and cultivation

Objectives of site clearing and cultivation:

1. Increasing the water containing capability of the soil, decreasing soil water Evaporations; Improving soil's water conditions.
2. Enlarging soil porous degree; increasing soil temperature; enhancing micro-Organism activities in soil; accelerating soil weathering in order to release the potential nutrients of the soil.
3. Destroying weeds and insect pests.
4. Effectively improve the relationship of water, fertility, aeration, heat in soil; Provide good circumstances for seed-germination and root-growth.

2.2.1.1 Methods of Site clearing

- *Manual clearing*
- *Burning (fire)*
- *Machine clearing*
- *Chemical*

The methods depend on

- The type of vegetation
- Environmental condition (topography, soil type...)

a) Manual methods are applied if:

- Labor is available and cost effective
- The terrain is inaccessible
- Vegetation is very light in terms of density (like shrub, grasses)

b) Mechanical clearing

- Used to clear large shrub and tree
- Site can be cleared with bulldozer, brush cutters.

c) Chemical methods

- By applied chemicals (herbicide, Sodium Arsenate)
- After killed the plant through application of chemical, then burning

Disadvantage

- ✓ The application is complex.
- ✓ Difficulty to remove the plant, which is killed by the chemicals.

d) Burning

- The cheapest method, the vegetation removed without any doubt.

Consideration during burning

- First, provide fire line (firebreak) perpetually erected to wind direction.
- Calm weather 10~15cm/ hr wind speed.
- The vegetation is simple or only grass.
- The topography cannot be steep, erodible areas.

Before making the beds, the land should be cleared by labor or machine. You can do it by using **bulldozer** or **brush cutter** to clear the land first. Then hire some labors to clear the rest small materials by hand. If the conditions allow you to use chemical products for killing the wild weeds, we suggest that you buy **Sodium Arsenate** for spraying on the fresh leaves so that it is very cheap and convenient. But you should consider the poison effects for other crops and animals.

NB.

- Early survival and growth of seed depends on site preparation.
- Clearing the land includes two objectives:
 - ✓ Removal of existing vegetation to reduce the competition of nursery growing species from weed, facilitating planting operation.
 - ✓ For ground preparation- cultivation of the soil to enhance, water percolation, to reduce weed growth, to reduce erosion.

2.2.1.2 Methods of cultivation:

Four major types of cultivations/ploughs:

1) **Shallow plough** to clear weeds (crops) and forages. The depths depend on different land types: for crop field or bed 4~7cm; for deserted land 10~15cm.

(Advantage: destroy weeds, diseases, and insect pests, facilitate the coming up plough.)

2) **Deep plough**: major step of the land- clearing. Half month late after 1st step.

Plough depth depends on different materials: seeds bed 20~25cm, cutting beds 25~35cm.

The time of plough depends on the water content of the soil: if the soil water content is about 50~60%, the land is more suitable for plough. It can be tested like: taking a handful of soil; making it a dumpling first and then let it fall down at 1m height; if the dumpling is smashed, it is good for plough. The purpose of plough is to loose the lower layer and turn over the upper layer.

3) **Harrow** to break clod; cover fertilizer; layer soils; keep water and clear away weeds in order to improve soils. (Do not harrow excessively in case of disturbing soil structure)

4) **Firm the soil** to improve the **capillary of the soil**. It can be done before or after the sowing.

When soil is muddy or soil water content is high, firming may give rise to hardening of the soil.

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2.2.2. Seed bed Preparation

2.2.2.1 Types of Seed Bed

Seedbeds should be 1-meter wide and 10-meter length, with a 60 cm path between them. The bed surface should be level with a low earth embankment along the margin of the bed to prevent the irrigation water from running off and washing away soil, seed or mulch.

Best germination results are obtained if the seeds can readily absorb water, easily extend their roots and break the surface of the bed with little resistance. A germinating seed must not dry up even temporarily because this would kill it. Stagnant water and permanent high humidity, on the other hand, increase the risk of diseases, particularly damping off.

To obtain optimum conditions, the ideal seedbed consists of the three layers:

- i. Gravel to ensure good drainage,
- ii. Humus rich soil holding water,
- iii. Soil and sand mixture easy to penetrate and well drained.

Bed can be classified based on purposes, (germination and transplanted bed), seedling produced (bare rooted and potted seedling), and **climatic condition** (raised, level and sunken).

In **high rainfall** areas where water logging occurs frequently, **raised** seedbeds should be used.

In **dry, hot** climates and well drained soils (sands, gravel), **sunken** seedbeds are convenient to protect the pots from excessive heating.

In moderate moisture area, the level bed should be constructed.

2.2.2.2. Layout/design

The seedling bed can be considered as the basic unit within the nursery layout. Its dimension should not exceed a width of **1 m** and its length is usually **10 to 15 m**. Access paths between the beds have a width of 60 cm up to 1 m. In groups of **10 to 20**, these beds form compartments separated by paths of **2 to 4 m** width, depending on the transport system used. These compartments are called 'blocks' and are the main productive units of the nursery. Nursery blocks are described by means of the dimensions of their seedling beds – length l (m) and width w (m) – and the number of beds in the block n .

The block definition has the following formula

$$(l \times w) \times n$$

A block consisting of 20 beds with a length of 10 meter and a width of 1 meter each is thus defined as a $(10 \times 1) \times 20$ blocks.

Demarcation of blocks for bed preparation

Compartment division

- The basic production unit is the compartment with beds running parallel to the shortest side. Each bed should be 1m wide and 0.4~0.6m apart for working path, enabling laborers to reach the center of the beds during watering and weeding on both sides.
- One compartment can hold 10~20 beds. It is good if a single compartment can contain 10 beds to shorten the walking distance.
- Germination compartment building, as well as soil storage occupies one compartment each.

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- For management purpose, several compartments can be combined to form blocks that can be framed by hedges.

2.2.2.3. Bed construction

- Seedbeds are mostly 1m wide, which enables people to reach the center of the beds during weeding and watering operations.
- The length of the bed could be vary from 5 - 20 m.
- Usually **0.4~0.6** m paths are left in between the beds.

2.3. Soil Mixture preparation

The standard soil mixture varies from country to country, but the mixture used will normally contain:

- 1) Humus-rich soil as found under trees or in forest
- 2) Ordinary agriculture soil or top soil as found in crop fields, garden, or fallows
- 3) Sand soil

If the soil contains too much clay that they are heavy and crack when they are dry. If the soil is not rich, enough in humus, well-rotten manure / compost are added.

Since the mixture depends very much on the quality of the soil available. No standard is given it varies from locality to locality.

E.g. 3:1:1 ratio

Three parts agricultural soil

One part forest soil/ humus

One part sand. But this ratio is not fixed it depends on the fertility of top soil.

The suitable mixing proportion should be determined by experiment or experience. Hence, every nursery develops its own standard soil mixture.

E.g., the nursery uses forest soil, compost, and sand at a ratio of 5:2:1

Potting the soil mixture

Potting is filling pots with soil. When the soil, sand, manure, or compost have been obtained, they are sieved and mixed thoroughly, the mixture is moist to become humid but not wet.

Potting procedure:

- a) Bring the required quantities of each soil component
 - b) Screen each component thoroughly using sieves.
 - c) Mix the components thoroughly and store them to each potting shed
 - d) Cut the plastic tubes into individual containers of the required size/ length (12~15cm)
 - e) The soil mixture is then moist to become humid but not wet.
 - f) Fill the container using hands or funnels
- ✓ When filling the layer 1/3 portion of the pot should be compacted rather firmly to keep the soil from falling out easily.
 - ✓ Then the upper 2/3 portion of the pot compacted gently, as the root develops moves easily.

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- ✓ The pot size to be used varies depending on the tree species to be raised, from place to place, planting size, and some extent means of propagation and seed size.
- ✓ Avoid any air pockets inside the pot during filling as this can hamper root development.
- ✓ Potted seedlings are best suited in the tropics where rainfall is limited factor and the site is poor.

Placing the pots in blocks/ beds

- placing pots on beds in a proper manner is very important
- Pots are placed in upright position. They can't be squeezed but keep round
- pot space is to be left for rain and excessive water to be drained off easily
- it should be placed in a straight row

Effects of improper placing of pot in beds are:

- Deformity of pots
- Insufficient space for drainage
- Distortion of root growth
- distorted growth of the nursery stocks

Making rows on the seedbed

- ★ What is the advantage of making rows on the seedbed?
- ★ To ensure each nursery stock has the same available area.
- ★ it makes weeding operation easily
- ★ it also makes watering easily (if ditches are made b/n the rows of plants)

Sowing methods/ techniques

There are three major techniques of sowing

Namely:

- 1) Broad cast sowing into seedbeds
- 2) Drill sowing
- 3) Direct sowing into pots

1. Broad cast sowing into seedbeds

It is a method of sowing by which seeds are distributed across the seedbeds by hands

It is most common method and used for sowing seeds of all sizes, but best suited to small seeds.

Steps for broad cast sowing

- ✓ It should be done after leveling the beds.
- ✓ Water the beds the day before sowing to attain the right moisture conditions
- ✓ The seeds are broadcast as evenly as possible.
- ✓ The seeds are then covered with seedbeds soil or sand.

Avoid any air pockets b/n the seeds and soil by pressing the soil gently.

2. Drill sowing method

It is sowing method by which seeds are planted in rows with a seed-drilling (making holes)

This method has been practical mainly with species having medium to large seeds

Procedure:

- ✓ Make a hole on the seed bed by drilling
- ✓ The seeds are placed into drills covered with seed bed soil mixture

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- ✓ Then water the bed carefully, by using fine watering can.

Note: if drill-sowing by hand, the sowing direction should be erected to the bed direction in order that the seedling can get best sunshine.

Generally, seedbed sowing should be done when:

- Seed is expensive /scarce
- Germination % is not known
- Seeds take longer time to germinate

3. Direct sowing on to pots (polythene pots)

This is placing seeds into the pots in the specific depth and density, and it is a method of sowing which is used commonly in recent period because:

- It helps to eliminate the time consuming operation of transplanting that can cause slow growth and even death of seedlings sometimes.(It saves transplanting cost)

Steps for Direct Sowing Method:-

Water the pot the day before sowing

Make a hole at the center of the pot by using a dibble

Then place the seed in the hole and cover with soil

Alternatively, Seeds are placed in the middle of the pot and pressed down and covered with soil.

- ❖ The number of seeds direction sown into the container is related to germination percentage.

E.g. If the germination is b/n 35~50%, 3~5 seeds are sown

If the germination percentage of seed is 80%, sow 1~3 seeds per individual container.

Environmental Condition Necessary for seed Germination

Environmental conditions are essential for successful seed germination and seedling growth

- Adequate moisture

- It initiates the activities of enzymes
- It makes swell up and soften of then ruptures of the hard seed coat

- **Optimum moisture**; it facilitate the function of enzymes.

- **Good aeration**, oxygen is necessary for respiration process

- **Light**, in some seed require light for tier germination

Definition: germination is defined, as it is the process by which the dormant embryo wakes up then grows out of the seed and establishes itself as a seedling

Germination percentage is the percentage of germinated seed from un germinated one

It can be calculated as the following

$$\text{Germination \%} = \frac{\text{Total no of germinated seeds}}{\text{Total no of seed sown}} \times 100$$

2.4 Managing Nursery Activities

The overall objective of any nursery is to raise good quality, healthy seedlings at the lowest cost.

The success of such nursery operations depend on many factors, these are:

- Efficient supervision (management) and administration
- Use of well-prepared cultural methods and useful protection from pests, disease and other damage.
- Way of care and conditioning of seedlings.

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The major activities after sowing in the nursery management are:

- Watering
- Mulching, shading
- Applying fertilizers
- Weeding
- Thinning and Root pruning
- Control insect pests and diseases...etc.

Some important facts

- **watering requirement depends on:**

- Bed (soil texture)
- Solar radiation
- Species
- Wind, growth stage...etc.

Correct watering schedule determined by experiment

Watering is done twice at the beginning preferable early in the morning and late in the afternoon, then lower watering gradually. Care to be taken during watering.

- ★ avoid damaging the seedlings (plants) & beds
- ★ avoid over watering

2.5 Applications of fertilizers

Importance of applying fertilizers to nursery plants

- ❖ To replace the lost nutrients (nutrient deficiency)
- ❖ To maintain high level of fertility in the nursery bed and to produce good quality nursery seedlings

Nutrient deficiency symptoms

Stunted growth & Discolored leaves

Type of fertilizers: there are two types of fertilizers based on type of nutrients

a) Straight fertilizers

Supply only one of three major nutrients (Nitrogen, phosphorous, potassium or mg)

b) Compound fertilizers

Supply two or more of the nutrients (NPK)

Application methods: application of fertilizers (commercial) fertilizer replaces mainly the three primary nutrients N, P, K.

The major method in application of solid fertilizers is:

- 1) Broad cast broad casting at planting and top dressing
- 2) Placement

Three types:

- ✓ Plough sole or deep placement
- ✓ Band placement
- ✓ Side dressing

The amount of fertilizers to apply depends on;

- ✓ Growing media

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- ✓ Degree of fertilizer
- ✓ Species type

Application methods for liquid fertilizers / starter solutions

- ✓ Foliar application
- ✓ Direct applications
- ✓ Application through irrigation water

Organic manures (organic fertilizers)

- ✓ Not commercial
- ✓ Source; from animal, and plant origin or residue

There are two class (category) organic manures

A) Bulky organic manure

- ✓ farm yard manure
- ✓ compost: Well decomposed organic matter
- ✓ green manure: Decomposed green plant

B) concentrated organic manures

- ✓ oil cakes
- ✓ blood meal
- ✓ fish manure
- ✓ meat meal
- ✓ cotton and wood waste

Its application is just mixed with the soil in desire

Measure to be taken before fertilizer application

- ✓ check PH value
- ✓ finding out which element needs urgently
- ✓ if mycorrhizal is absent, inoculate it

2.3 Carrying out Interactions with other staff and customers

The term “customer interaction” may have several definitions. Let’s define it as communication between one of staff members and the customer. We still need to improve at the basics; smile, make eye contact, slow down, be sincere, focus on your customer, tell the truth now, make promises and keep them, ask good questions then shut up and listen. Do not take these for granted. We all tend to get wrapped up in our busy days and we slip a little further away from what we know is right without intention. Watch your people execute these fundamentals daily.

“Ask the customer what they want and give it to them” has long been our premise for doing business but that is no longer enough. Interaction for its own sake falls short; it must fit our customers’ desires. We must now learn our customers as individuals and anticipate their wants and needs. This includes how they wish to interact with us on a personal level, how often, in how much detail and method.

Positive interactions with staff help create an atmosphere which is calming and safe, especially it encourage treating each other with kindness and respect.

An environment where staff relationships are positive, where staffs are able to express their emotions appropriately and where staffs feel satisfaction within their job helps create an ideal environment. High quality interactions lead to meaningful experiences on both sides.

An environment with clear boundaries that is rich in open ended materials allows to actively and independently engage in activities lends it to positive interactions.

To achieve quality interactions you need time, with minimal disruption. Creating interaction times will enable staff to have meaningful connections with the children in their care, leading to high quality experiences on both sides of any quality service.

Effective communication allows people of all ages to give direction, praise, show respect, display emotion, and tell a story! Talking, listening and body language are important components of communication. As an adult, our role in the conversation is to ask open-ended questions while keeping the conversation flowing.

2.4 Observing Nursery policy, procedures and OHS hazard Requirements

A workplace observation is a planned walk through a selected areas or locations of a workplace. Inspections are needed to critically examine all factors (equipment, processes, materials, buildings, procedures) that have the potential to cause injury or illness, and to identify where action is necessary to control hazards. A schedule of planned inspections is an essential element of a health and safety program in which standards are established and compliance monitored.

Who should Conduct Inspections?

Ontario's *Occupational Health and Safety Act* places responsibility on a worker health and safety representative to conduct an inspection of physical conditions. However, the employer still has the prime responsibility for providing a healthy and safe workplace. The implementation of effective and regular inspections is one way in which an employer's general legal duties may be met. However, a joint inspection, consisting of both management and worker representatives, would be in keeping with the participative approach of the *Act*.

How often should Inspections be conducted?

The worker health and safety representative must inspect the workplace at least once a month. However, if this is not practical, he or she shall inspect the physical condition of the workplace at least once a year, inspecting at least a part of it every month. The inspection must be conducted according to a schedule set by the joint health and safety committee or, in smaller workplaces of 6 to 19 employees, by the employer and health and safety representative. In drawing up the schedule, consider: the number of different processes or operations; hazardous equipment that must be inspected at set intervals and, in some cases, as determined by legislation (for example, cranes and slings); processes with high hazard potential that may require separate and more frequent inspections; the number of shifts – inspections should not be confined only to one particular shift because the nature of the activity may vary from one shift to another; special inspections whenever a new process or piece of machinery is introduced into the workplace.

Preparing for the Inspection

The success of workplace inspections depends on having the necessary information. There should also be an overall system of management controls which is flexible enough to allow for changes to be made, for example in equipment or work practices, when needed.

To properly identify hazards, the person or persons conducting the inspection should have the necessary training, which should include: the plant layout – a floor plan is helpful in preparing for the inspection, and recording findings; the potential hazards associated with the various machinery, equipment, materials, and processes; existing controls, applicable standards and

regulations; how to use the information from: Ministry of Labor inspection reports/orders; results of previous inspections; accident data; maintenance reports.

Conducting the Inspection

To ensure that all items are covered during the inspection, it is useful to develop checklists which contains reference, in point form, to all potential hazards. These checklists should never be considered as permanent lists. They should be reviewed and added to or revised as necessary –for example, when machinery or processes are changed or when accident experience reveals previously unsuspected hazards.

Policy objective

The primary objective of the policy is to reduce the number of work-related accidents and diseases. This requires the adoption and implementation of a culture of prevention by government, employers and workers. The effective prevention of work-related accidents and ill-health will have enormous social and economic benefits. These include improvements in productivity and competitiveness and the quality of life of the working population. The effective management of many safety hazards will contribute to improved levels of public safety. The effective control at source in workplaces of hazardous substances will improve levels of public health and minimize environmental pollution.

The secondary objective of the policy is to provide equitable compensation benefits to those who are injured in work-related accidents or who contract occupational diseases. These compensation benefits include medical aid, financial compensation and access to rehabilitation services. The compensation system, in particular the contributions paid by employers, must be sensitive to an employer’s OHS performance so as to act as an incentive for improved performance

Policy principles

The core principles informing the policy are -

- ♣ universal coverage – OHS legislation must cover workers and employers in all sectors of the economy and in all forms of employment relationships;
- ♣ universal application of core rights and duties – the core rights and duties of employers and workers must be spelt out in legislation;
- ♣ the prioritization of prevention and the promotion of a culture of prevention – all accidents and health incidents are preventable;
- ♣ appropriate and fair compensation and rehabilitation benefits –the provision of meaningful, accessible and equitable compensation and rehabilitation to workers in all sectors of the economy and in all forms of employment relationships;
- ♣ application of the “polluter pays” principle - employers bear the cost of accidents and disease in their workplaces, including the cost of medical treatment, compensation and rehabilitation

Nursery hygiene

Keeping the nursery clean and tidy is important for appearance and organization but also helps to reduce weeds, infection, fungus and pests.

Procedure and practice

Separating weeding and pruning activities from potting and propagation is very important to minimize the spread of weeds, fungus, disease and pests .

At the end of each work activity:

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- ✓ Wash down benches
- ✓ Clear dead plant parts away quickly
- ✓ Wash out kidney trays and seed soaking containers after use
- ✓ Wash used utensils including secateurs in bleach
- ✓ Remove used perlite and soil

At the end of the day:

- ✓ Clean up pots and trays under tables
- ✓ Remove unused clean soil from potting table
- ✓ Put things away in their storage places
- ✓ Remove rubbish
- ✓ Store used perlite and soil in closed bags always:
 - Wash used pots and trays and utensils in diluted bleach, vinegar or detergent
 - Keep cigarettes and food away from production areas
 - Separate recycling
 - Compost leftover food and seed flesh into the worm farm or composting bin
 - Compost, water soak and rot or burn infected plant parts quickly

2.5 Reporting problems or Difficulties in completing work

Work problem or difficulties reports must be submitted to the supervisor in completion of irrigation work.

The reports shall include;

- ♣ Environmental problems
- ♣ Working area problems
- ♣ If there is any scarcity of materials for the undertaking activities
- ♣ If there is any difficulty at the time of work etc. problems should be reported to the concerned body.

Self-Check 1	Written Test
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Name: _____

Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. What is the aim of following supervisor's instructions (4 point)
2. What are the considerations to given for bringing sustainable development by giving attention to the working environment (5 point)
3. What is the aim of carrying out interaction with customers (5point)

Satisfactory Rating: 14 and above point **unsatisfactory Rating:** below 14point

You can ask your teacher for the copy of the correct answer

Direction: undertaking nursery work as directed

Procedures:

1. Following instructions and directions given by your practical assistant
 - ✓ For site clearing
 - ✓ For bed preparation
 - ✓ For seed collection
 - ✓ For seed sowing
 - ✓ For trans planting
 - ✓ For fertilizer application
2. Observe the nursery policy, procedures and OHs requirement should be undertaken by you
3. Under take the nursery work as directed
4. Report problems or any difficulties to your assistant

INTRODUCTION

The materials and equipment that are used in nursery work must be stored and maintained in appropriate ways.

Safety Precautions in Using tool & materials

The following directions should enable the person responsible for equipment, and the person who actually uses the equipment, to anticipate and avoid operational hazards -

Do Not Use the equipment -

- without reading the manual of instructions
- outside of the intended limit
- disabling safety system and removal of hazard notices
- modification and conversion of the instrument (for some sensitive materials)
- open with instruments / tools, unless specified or required
- use of accessories from other manufacturers without approval (for some sensitive materials)

Care and Support

- When dispatching the instrument make sure it is complete package always
- When transporting the instruments make sure it is protected from shock and vibration (for some sensitive materials)

Storage

- Store the instrument inside the vehicle when not in use in the field.
- Make sure the instrument is dry before storing.
- Damp instrument must be unpacked

3.1 Storing plant debris and waste material

- ♣ All wastes have the potential to pollute the environment if not handle or store properly
- ♣ Store all waste materials safely and securely in suitable containers
- ♣ Label containers clearly with their contents
- ♣ Separate hazardous wastes from other types of wastes and keep different types of hazardous waste separately
- ♣ Prevent liquid wastes and pollutants from escaping into drains, watercourses or surrounding ground.
- ♣ Ensure that your storage facilities are secure against vandalism, theft and accidental damage
- ♣ When transporting, maintain safe distance from all heavy equipment
- ♣ Be aware of operators blind spots and park in areas where vehicle is easily seen

- ♣ Regular inspections must be carried out

3.2 Preparing and processing plant Debris and waste materials

- ♣ Maintain equipments and tools regularly
- ♣ Arrange equipments for the purpose of safety and ease in maintenance
- ♣ Store tools in proper storage areas
- ♣ Remove defective hand and power tools from storage area for repair
- ♣ Tune off power equipment when not in use
- ♣ Keep tools and equipments clean in good working condition

3.3 Stockpile Surplus materials for Removal

Any materials that are in surplus or not available should be avoided or removed from the working site. Before transporting it the disposal area, it must be stored in some storage area. Finally, by using transport machine it has to be taken to the disposal area. If they area left over around the working area, they may halt or inhibit the working conditions to be not safe.

3.4 Maintaining a clean and safe work site

Poor housekeeping on the job site a frequent cause of workplace incidents and worker injuries

- ♣ These incidents can be easily prevented by keeping the workplace clean
- ♣ Good housekeeping makes more efficient and safe.
- ♣ Keep all of the materials stored on the job site in a neat and orderly way.
- ♣ Clean up scraps, debris, and trash as the work progresses.
- ♣ Focus on keeping walkways, ramps, ladder platforms, scaffolds and stairways free from materials, scrap and debris.

Site maintenance

- 1) The job site shall be kept in a neat, clean, and orderly condition at all times during the installation process.
- 2) All scrap and excess materials are to be regularly removed from the site and not buried in trenches.
- 3) Trenching, laying pipe and backfilling shall be continuous so that the amount of open trench at the end of each work day is minimized. Any open trench or other excavations shall be barricaded and marked with high visibility flagging tape.

Next to tidiness, cleanliness is one of the most essential elements in maintaining a healthy and safe work environment. Not only does a clean workplace reflect the professionalism of a business or facility and help motivate employees, it also promotes a healthy workforce as a clean environment prevents accidents and the spread of germs.

Many office managers strive to maintain a clear work site policy, few succeed. However, each employee should be responsible for keeping their individual work area tidy and clean. It takes very little time to adopt a “clean and tidy as you go” policy and it needn’t hinder work performance. Furthermore, there is no reason why employees shouldn’t contribute to keeping the common work areas clean and tidy. Simple acts such as putting rubbish in the correct bin, placing cups in the dish-washer or washing them up and putting them away would contribute greatly to achieving a better working environment.

Like Health & Safety, maintaining a clean work environment is the responsibility of everyone..

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However, there is only so much cleaning the team can do during each shift and in such cost conscious times it makes sense for employees to adopt some simple good housekeeping practices and allow the cleaning team to concentrate on hygiene and deep cleaning tasks. Preventing mess as well as clearing up as you go along helps create a healthy workplace and provides the professional cleaning teams with a good platform to make effective use of their time on-site, allowing them to concentrate on hygiene, germ containment, recycling and deep cleaning. Working together we can all contribute to creating a safe and healthy workplace and a professional looking facility for employees, visitors and customer.

Self-Check 3	Written Test
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Name: _____ **Date:** _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. what is the aim of storing plant debris and waste materials(5points)
2. Why do you need to clean your working area? . (5 pts)
3. write the material handling equipment classification(5points)
4. How could you dispose waste materials produced in irrigation work? (5pts)
5. Write how you transport and handle equipments? (5pts)
6. Why maintenance is needed?(5points)
7. List some irrigation wastes? (4pts)

Note: Satisfactory rating - 17 points and above Unsatisfactory - below 17 points

You can ask your teacher for the copy of the correct answers

Operation sheet-3	Store Stockpile materials
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Purpose: to familiarize trainees with to store or stockpile materials for irrigation work

Conditions or situations for the operation: provided the needed materials and tools to the trainees. The trains will perform the task within 3hr

Tools and equipments: micro sprinkler set

Procedure

- ♣ Use PPE
- ♣ Prepare tools and equipments
- ♣ Observe and list materials and equipment

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- ♣ Clean and store the tool and equipments of the systems

Precaution:

- ♣ wear PPE
- ♣ check tools and equipments before the work is starting and after the work is completed if they are in good condition
- ♣ dispose wastes safely

Quality criteria: keep safeties of the components/careful not to damage the components

LAP Test/ Job Sheet	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

1. You are required to perform the following activity:

- Request your teacher to arrange materials, tools and equipments used in irrigation work, in order to handle materials and equipment.
- Request your teacher for evaluation and feedback.

Information Sheet 4	Clean up on completion of irrigation activities
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Introduction

Following a one-time irrigation, remove equipment. Dispose of used equipment properly .if equipment is kept at the bedside for repeated irrigation at scheduled intervals, rinse syringe in tap water and keep syringe and solution bowl between folds of the wrapper. Replace with clean equipment daily.

4.1 Storing plant and Debris

Irrigation practices generate waste materials, such as catch basin sludge and street sweeping debris. Virtually all irrigation practices generate waste by-products. Typical wastes include:

- ♣ **Slurry** from road repair and resurfacing activities and right-of-way utility work.
- ♣ **Base material** and gravels from road base and shoulder repair activities.
- ♣ **Sludge’s, sediment, and debris** from streets, parking lots, catch basins, and storm drain lines which are picked up with mechanical sweepers, vacuum/air sweepers, vacuum equipment, or by hand.
- ♣ **Dredged sludge materials** from channel, stream and detention pond maintenance.
- ♣ **Dropped leaves** that are collected seasonally.

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- ♣ **Other vegetation** such as grass clippings, woody debris and dead plants and shrubs, that are collected by crews maintaining streamside areas, roadsides, medians, parks and other vegetated public areas.

- ♣ **Deicing sands and gravels** from road and bridge snow and ice control operations.

Currently there are several options for recycling some of the waste materials described above. Leaf and other vegetative debris can be made into compost for use at public park facilities, or sold to suppliers in the local area (see Case Study later in this chapter). Sand and gravels can be collected and washed for reuse as deicing materials, or used “as-is” for trench backfill and for road base and shoulder material.

Dewatering practices

Dewatering is commonly used by most agencies to reduce the volume and weight of debris to be recycled or land filled. Dewatering facilities should be contained (e.g., concrete pad, berms and roof if possible) and should be plumbed to the sanitary sewer system, not to the storm sewer or nearby streams.

4.2 Cleaning, maintaining and storing tools and equipment

The equipments used in irrigation work require cleaning, maintaining and storing properly after use. Maintenance and storing of equipments has been discussed before.

Cleaning is one of the most essential elements in maintaining a safe tool and equipment. Some of the equipments commonly used for cleaning purpose are listed below.

- ♣ air freshener dispenser
- ♣ sealer applicators, rubbish bins, waste bins, large industrial bins, tidy bins
- ♣ brooms, handles, buckets, mop buckets, window cleaning buckets, brushes, Bannister, flue, bottle brush, bricks brushes, dairy scrub, deck scrub, grout brush, kitchen brush, lint roller, nail brush, shoe brush, spirit brush, scrubbing brush,
- ♣ wire brush, toilet brush, toilet set, dust pans, duster, lamb’s wool duster, feather duster, mops, mop heads, carpet bonnets, nippers,
- ♣ rubbish picking up tools, wall washers, wall washing, warning sign, safety signs,
- ♣ wet floor sign, tool holders

4.3 Reporting work outcomes

Work outcome reports must be submitted to the supervisor after completion of irrigation work.

The reports shall include;

- (i) Specification of the quantity and each of the principal work accomplished
- (ii) The results of the environmental monitoring program
- (iii) A summary of disposal unit survey and maintenance activities
- (iv) A summary, by waste class, of activities and quantities of waste disposed of
- (v) Any instances in which observed site characteristics were significantly different from those described in the application; and
- (vi) Any other information the Commission may require.

Self-Check 4	Written Test
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Name: _____ **Date:** _____

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Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. How could you dispose wastes? Explain it. (10pts)
2. Why cleaning, maintaining and storing of tools and equipments needed for? (5pts)
3. How do you report work outcomes? (5pts)

Note: Satisfactory rating - 10 points and above Unsatisfactory - below 10 points

You can ask your teacher for the copy of the correct answers

References

- 1.Occupational standard: *support nursery for Irrigation work*
- 2.Model curriculum :*support nursery for Irrigation work*
- 4.TVET Guideline titled: *Nursery establishment and management* August 2002 Addis Ababa Ethiopia
- 5.Nan king Forestry school *Garden plants cultivation 19191* Chinese forestry publishing house
- 6.Internet materials

