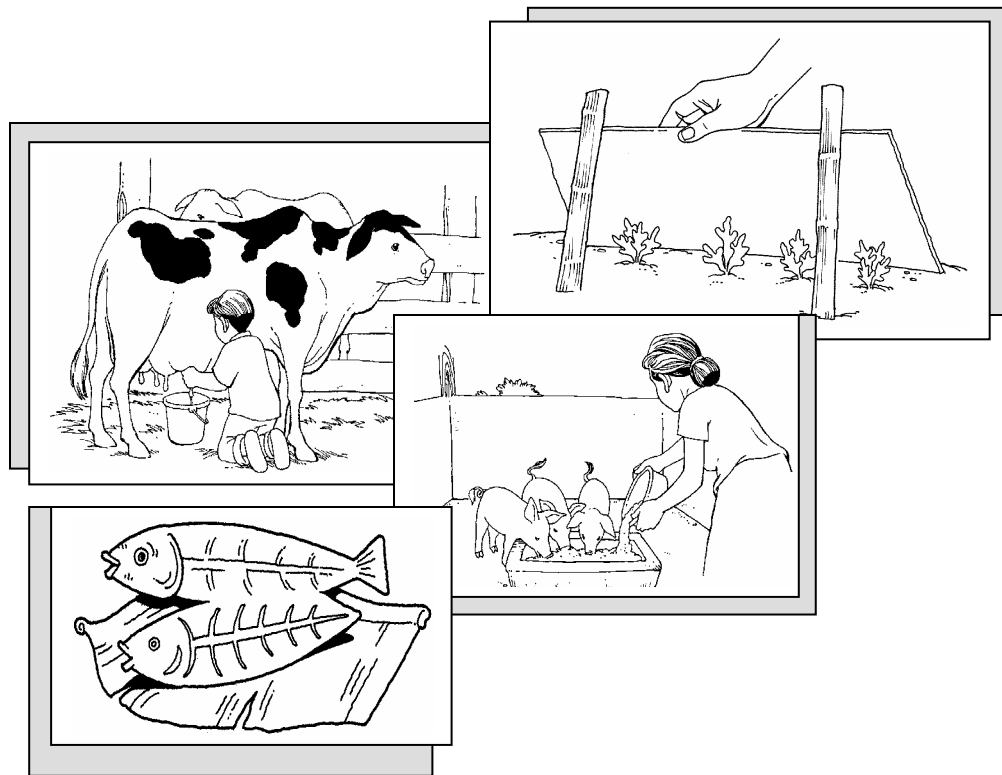


PROJECT EASE

Effective and Affordable Secondary Education

TECHNOLOGY AND LIVELIHOOD EDUCATION

Agriculture and Fishery Arts



MODULE 3

BUREAU OF SECONDARY EDUCATION

Department of Education
DepEd Complex, Meralco Avenue
Pasig City



Plant Crop Production

First Year

Module 3

Grow a Glorious Plant!



What this module is about

Congratulations! You are now working on Module 3. Are you still eager to learn more about plant crop production? Very good! It means you are keeping up with the objectives of this learning task.

After finding good seeds to sow and learning how to prepare the land for planting, it is good to know that plant crops grow well on properly prepared land. More so, if the land is rich in soil nutrients. To be sure that the seeds will grow, apply organic fertilizer before planting.

However, there are other things that you should know in order to grow plants successfully. Give life to your plants by starting the task right. How? You will know more if you read this material thoroughly. In this module, you will know how to prepare and grow seedlings or young plants before planting.



What to learn from this module

This module helps you perform these tasks well:

1. compare direct and indirect planting;
2. cite samples of seeds directly or indirectly planted;
3. discuss the advantages of observing proper distance, depth and rate of planting seeds and seedlings;
4. raise seedlings; and
5. plant vegetables adapted to your locality.



PRETEST

Before working on this module, answer the questions below to find out how much you already know about the topic. Write the letter of the correct answer on the blank before each number.

- _____ 1. Direct method of planting is growing plants in
- a permanent place
 - a seedbox or seedbed
 - a nursery house
 - its natural environment
- _____ 2. Growing plants in seedbeds or seedboxes is known as
- direct planting
 - indirect planting
 - transplanting
 - sowing
- _____ 3. Which of the following seeds is indirectly planted?
- cabbage
 - carrot
 - corn
 - cucumber
- _____ 4. The following seeds are directly planted, except one.
- squash; upo
 - okra; katuray
 - eggplant; pechay
 - beans; sayote
- _____ 5. It is the process of transplanting seedlings from one seedbox to another.
- hardening
 - pricking
 - sterilizing
 - withering
- _____ 6. Why should the soil in the seedbox be fertilized?
- to kill microorganisms
 - to give moisture to the seeds
 - to protect the seeds from wilting
 - to enhance the growth of the seeds
- _____ 7. What will happen to small seeds when buried deeper than the required depth of sowing?
- They will become dormant.
 - They will sprout slowly.
 - They will dry up.
 - They will germinate underground.

- _____ 8. Which of the following distances of planting is recommended for cabbage?
- a. 8-20 cm
 - b. 30-50 cm
 - c. 40-50 cm
 - d. 60-90 cm
- _____ 9. Which of the following tools is used to separate seedlings from the seedbox?
- a. dibble
 - b. trowel
 - c. crowbar
 - d. hoe
- _____ 10. The following fruit vegetables are commonly grown in our country, except one.
- a. tomatoes
 - b. pechay
 - c. okra
 - d. eggplant

Lesson 1

Direct and Indirect Planting

Plants are grown in two different ways. Through direct and indirect planting. The following situation will tell you how direct and indirect planting is done.



Mr. Sahorda: There are two methods of planting seeds, direct and indirect.

Romeo: What is direct planting, Sir?

Mr. Sahorda: In direct planting, the seeds are planted right into the soil in the field where they will grow, up to the time of harvesting. Like the corn plants and beans, they are planted directly in the field. Direct planting is usually done when plants have large seeds.

Danica: What about indirect planting, Sir?

Mr. Sahorda: In the indirect method of planting seeds, seeds are planted first in a seedbox or seedbed. As soon as the seedlings have grown three or more leaves, they are ready for transplanting. This is usually done to plants with tiny seeds such as pechay, mustard and other vegetables.

Romeo: We are very grateful to you, Sir. We shall share with our classmates what we have learned from you.

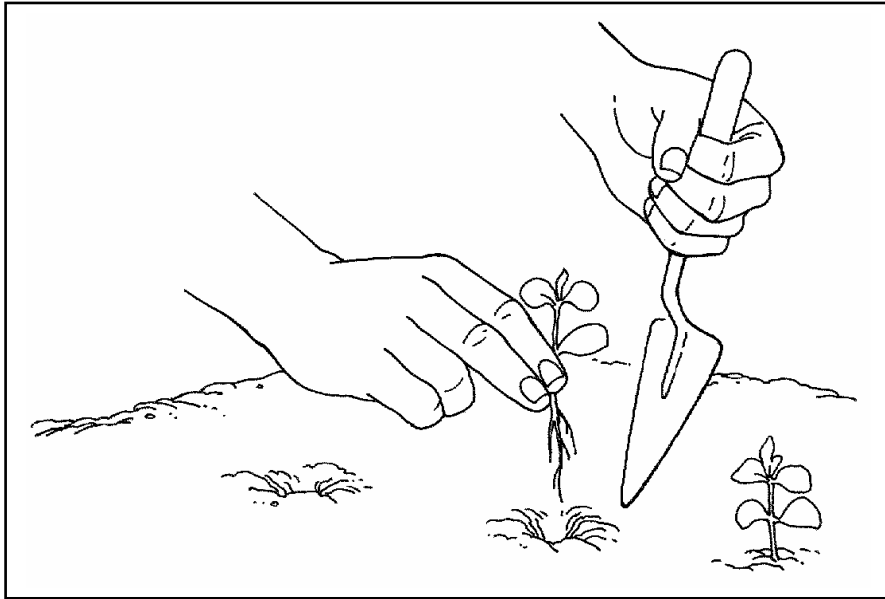
Danica: Now, I know the difference between the two methods of planting seeds.

Danica and Romeo left their teacher very much satisfied. They were certain about the answers to their questions and eager to apply their new knowledge as well as share this with others.

Let us now see what you have learned from the discussions. Work on the given activities.

Activity 1

Study the illustration below and identify the method of planting used.



Activity 2

Differentiate indirect from direct planting using the comparison alley between them.

M
E
T
H
O
D
S

O
F

P
L
A
N
T
I
N
G



Self-check:

In direct planting, seeds are _____ in a designated place where they grow until _____. Corn and beans are planted directly on the field. Plants with 1 _____ seeds are grown by direct planting.

In direct planting, seeds are first sown in a _____ or _____. As soon as the seedlings have grown three or more true leaves, they are ready for _____. This is usually done to plants with _____ like _____ and _____.

Lesson 2

Seeds Directly or Indirectly Planted

How well did you understand the previous lesson? Good! After learning the two methods of planting, the next task is to identify seeds that are directly and indirectly planted. This is a very important task, because seeds might not germinate if not planted properly.

Usually, seeds that are too small like the pechay and mustard are planted indirectly. Since you cannot place exactly the right number of seeds in the garden area, they might be buried underground when it rains hard.

Big seeds such as upo, patola, ampalaya, and beans, can be directly planted on the furrow. You can count exactly the number of seeds planted per hill or hole.

To know more about how vegetable seeds are planted, examine the table below.

Farm Crops Classified as to Methods of Planting

| Direct Planting | Indirect Planting |
|---|--|
| corn; watermelon cucumber; melon sayote; bataw carrot; upo squash; katuray okra; carrots patola; winged beans all peas and beans | onion; cabbage cauliflower; celery spinach; tomato lettuce; mustard eggplant; pechay sweet pepper |

Since you have already identified which plants are planted indirectly or directly, let us see if you can work on the exercise below.



Self-check:

Check (✓) the vegetable plants that are directly planted and cross (✕) those that are indirectly planted.

- _____ 1. pechay
- _____ 2. corn
- _____ 3. squash
- _____ 4. onion
- _____ 5. cabbage

- _____ 6. sweet pepper
- _____ 7. tomato
- _____ 8. carrot
- _____ 9. okra
- _____ 10. upo

Lesson 3

Indirectly Planted Seeds

In Lesson 2, you identified seeds that are directly planted. This lesson focuses on how indirectly planted seeds are prepared and grown in the seedbox or seedbed before transplanting.

Observe and find out how seeds are planted indirectly in the following situation:

Rhea and Tina want to raise pechay seedlings for their vegetable project in school. Let us read their conversation.



Below are the steps in raising seedlings:

1. The seedbox must be prepared for the purpose. The seedbox contain a soil medium. The soil medium should be free of weeds, fungus, spores, and garden pests. It should be porous enough to allow delicate rootlets to penetrate and let in air and moisture. A mixture of equal parts of sand, soil, and compost is recommended.
2. Sterilize the mixture by pouring boiling water.
3. Sow the seeds when the soil is already cold. Prepare drills along the seedbox.
4. Cover the seeds by sifting the soil medium through a fine sieve held above the seedbed. Fine seeds are not covered. They are merely pressed gently into the soil with a flat, level piece of wood. Water gently by misting.
5. The seedlings should be protected from temperature fluctuations. It is best to bring the seedbox in the open. However, it should be placed in an area where partial sunlight is available.
6. The seedlings should continue getting protection until the first true leaves grow. When one or two sets of true leaves have grown, the seedlings are ready for transplanting.
7. Pricking or thinning is the process of transplanting seedlings from their seedbox to another seedbox. During this step, the seedlings start developing roots and leaves. The seedlings should have grown into plants and should be pricked as soon as they have grown two sets of leaves.

Activity 3

Report to your teacher what you have done for practical application of what you have learned. Prepare the checklist below for checking if you have missed any steps.

| Procedure | Performed | Missed |
|---|-----------|--------|
| 1. Prepared a seedbox/ seedbed. 2. Mixed sand, compost, and soil. 3. Sterilized the soil medium. 4. Sowed seeds. 5. Watered the seedbed/ seedbox. 6. Placed in the plant nursery. | | |

Visit your project the next day to find out if the seeds have already germinated and to what extent. Exciting isn't it?



Self-check:

Arrange the following steps in growing seedlings. Write 1, for the first step, 2 for the second step, and so on to the last. Write your answers on the blanks provided.

- _____ 1. Prick to the other seedbox.
- _____ 2. Water gently by misting.
- _____ 3. Sterilize the soil.
- _____ 4. Prepare a seedbox.
- _____ 5. Add the soil medium.
- _____ 6. Sow the seeds.
- _____ 7. Press the soil gently.

Lesson 4

Distance, Depth, and Rate of Planting Seeds and Seedlings

Have you ever sown seeds on a seedbox? Very Good! Seeds can also be sown in seedbeds, particularly if it is a large crop production.

When plants are closely planted without considering distance, depth, and rate of planting, the growth of plants is also affected. Hence, distance, depth, and rate of planting must be considered to ensure the growth of plants.

Below is the continuation of Danica and Romeo's conversation with Mr. Sajorda.



Romeo: Sir, we have already sown the seeds in the seedbox. What about the seeds which are directly planted into the field?

Danica: Do we also consider the distance, depth, and rate of planting seeds when growing seeds in the field?

Mr. Sahorda: Certainly! Distance, depth and rate of planting should be considered when planting seeds and seedlings.

Below is the table on how to plant seeds and seedlings considering distance, depth and rate of planting.

Seeding Rate, Depth and Distance of Planting Farm Crops

| Crops | Rate of Seeding (gm per hectare) | Depth of Sowing (cm) | Distance of Planting between hills (cm) |
|-------------|----------------------------------|----------------------|---|
| Cabbage | 150 | ½ | 30-50 |
| Sweet Corn | 8,500 | ½ | 60-90 |
| Eggplant | 75 | 1 | 40-50 |
| Green Onion | 85 | ½ | 8-20 |
| Lettuce | 90 | ¼ | 25-30 |
| Mongo | 26,250 | 1 ½ | 25-30 |
| Mustard | 750 | ½ | 12-20 |
| Okra | 2,870 | 2.5 | 30-50 |
| Squash | 200 | 2.5-3 | 60-120 |
| Pechay | 700 | ¼ | 12-20 |
| Pepper | 200 | 1 | 20-30 |
| Radish | 3,250 | ¼ | 15-25 |
| Pole Sitao | 8,000 | 2.5-3 | 30-50 |
| Onion Bulb | 2,000 | ¼ | 8-15 |
| Bush Sitao | 40,000 | 2.5 | 15-25 |

Below are the advantages of observing rate, depth and distance in planting.

1. Rate of planting - refers to the thickness of sown seeds in a row or the number of seeds planted per hill. This depends on whether or not the plants are to be thinned. If there are more seeds germinated in a hill, some can be transferred to another hill when germination has failed. In commercial farm crop production, this is not advisable because of added labor and wastage of seeds.
2. Depth of planting - Three factors determine the appropriate depth of planting seeds, as follows:
 - a. Size and structure of seeds - Seedlings of vegetable crops with large seeds have greater power to push their way to the surface of the soil compared to the small seeds. Bigger seeds are usually planted deeper than small seeds.
 - b. Soil - the condition of the soil influences the depth of planting seeds. Plant the seeds deeper on sandy than in clay soil. This is so because of soil moisture.
 - c. Season of planting - the seeds may be planted at different depths in different seasons of the year. If the soil is almost too wet for the germination of seeds, shallow planting is advisable. On the other hand, during the dry season when evaporation is rapid and the heat of the sun is intense, the conditions of both moisture and temperature are likely to be more favorable for germination at a

considerable depth below the surface. Under these conditions, the seeds should be planted as deeply as the power of the seedlings will permit.

3. Distance of Planting -The distance at which seeds should be planted is determined by two factors:
 - a. Amount of space needed by the plant for normal development during the time it is expected to occupy the given location and the amount of space needed to properly care for the plants.
 - b. Size of the plants at maturity if they are not to be transplanted or the size at the time of the first shift if they are to be transplanted.

Did you learn something from this lesson. Well, let us see. Work on the activity below.

Activity 4

Alberto is a plant grower who is planning to plant 4 types of vegetables on his 4 hectares farm. Help him find the right vegetables to plant considering the rate and depth of planting.

- | | |
|--|--|
| <p>A. Type of vegetables: _____ Rate of planting: _____ Depth of planting: _____</p> | <p>C. Type of vegetables: _____ Rate of planting: _____ Depth of planting: _____</p> |
| <p>B. Type of vegetables: _____ Rate of planting: _____ Depth of planting: _____</p> | <p>D. Type of vegetables: _____ Rate of planting: _____ Depth of planting: _____</p> |

 Self-check:

Complete the chart below. Provide the proper distance, depth and rate of planting seeds and seedlings.

| Crops | Rate of Seedling | Sowing Depth | Planting Between Hills |
|-------------|------------------|---------------|------------------------|
| Sweet corn | 8, 500 | $\frac{1}{2}$ | _____ |
| Eggplant | 75 | 1 | _____ |
| Lettuce | 90 | _____ | 25-30 |
| Green onion | 85 | _____ | _____ |
| Okra | 2, 870 | 2.5 | _____ |

Lesson 5

Vegetable Plant Adapted to the Locality

Now that you have learned the advantages of rate, depth and distance of planting, it will be easy for you to apply these when planting vegetables.

Have you checked the seeds you sowed in the seedbox in your previous activity? It is time for you to transplant these to a permanent growing area.

What kind of vegetable seed did you sow? The most common leafy vegetables grown in our country are pechay, mustard, green onion, spinach and celery. Fruit vegetables popularly grown are eggplant, pepper and tomatoes.

Have you experienced planting any of the vegetables mentioned? If you had, good! Find out if you followed the steps correctly in your previous lesson.

Steps in Transplanting Seedlings

1. Water the seedbox or seedbed before transplanting.
2. Hold the seedling carefully or use a dibble or stick to lift the small plant out from the germinating area. Do not shake the soil off the roots to prevent exposure to air which will dry them out.
3. Plant the seedlings one at a time, depending upon the required distance.
4. Press the soil around the roots gently.
5. Water the seedlings on the soil surface with a gentle stream of water to settle the soil around the roots.
6. Water the plants four times a day to prevent drying up during the first three days. Reduce watering if the young plants can withstand their new environment or the roots have grown and absorbed water from the soil.

Transplanting is done late in the afternoon or early in the morning but watering technique as suggested above must be followed if plants are exposed directly to sunlight, particularly in large-scale production. In small-scale production, a shade per plant can be provided.

Did you follow the same steps? Very good! Happy planting!

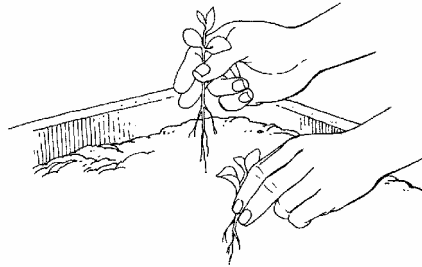
Activity 5

Analyze each picture and write the task being performed.

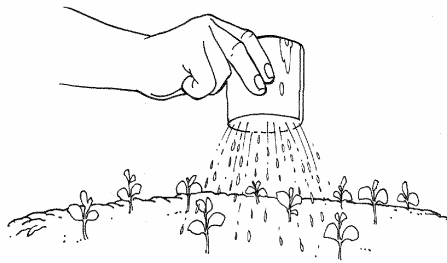
1.



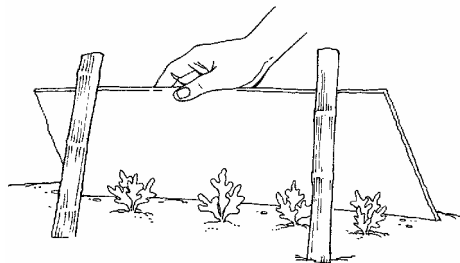
2.



3.



4.



Self-check:

Fill in the chart below with the steps in transplanting vegetables.

| |
|----|
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |
| 6. |

You have now reached the end of this module. Congratulations! Did you enjoy studying this module? Very Good!



LET'S SUMMARIZE

- ❖ In direct planting, seeds are planted directly in the field.
- ❖ Indirect planting is sowing the seeds first in seedbeds or seedboxes before transplanting to the field.
- ❖ Seeds directly planted in the field are usually big such as upo, patola, amaplaya, and squash. Small seeds are planted indirectly like the mustard, pechay, onion and spinach.
- ❖ Raising seedlings is usually done by preparing a seedbed or seedbox. Soil medium is composed of sand, compost and soil is prepared. When sterilized, seeds are sown. Mist watering is advisable particularly on small seeds.
- ❖ It is best to observe proper distance, depth and rate of planting seeds and seedlings, for plants to grow well and attain maximum growth.
- ❖ Pechay and mustard are the most common leafy vegetables growing in the country, while tomatoes and eggplants are the most popular fruit vegetables. These plants are first sown on seedbeds or in seedboxes before transplanted to their designated place.



POSTTEST

Choose the correct answer to each item below. Write the letter of the item of your choice on the blank before the number.

- _____ 1. Growing plants in a permanent place is
 - a. direct planting
 - b. indirect planting
 - c. pricking
 - d. thinning

- _____ 2. Indirect planting is planting seeds in
 - a. a seedbox or seedbed
 - b. its permanent cite
 - c. the nursery farm
 - d. the forest

- _____ 3. The following groups of seeds are indirectly planted, except one
 - a. cabbage and pechay
 - b. onion and cauliflower
 - c. cucumber and corn
 - d. pepper and celery

- _____ 4. Which of the following seeds is directly planted?
 - a. tomatoes
 - b. okra

- c. pepper
- d. eggplant

- _____ 5. Pricking is the process of transplanting seedlings from
- a. one seedbox to another
 - b. seedbox to its permanent place
 - c. nursery to open field
 - d. open field to nursery
- _____ 6. Microorganisms are best destroyed through
- a. fumigation
 - b. fertilization
 - c. sterilization
 - d. cultivation
- _____ 7. Refers to the thickness of the sown seeds in a row.
- a. depth of planting
 - b. rate of planting
 - c. season of planting
 - d. distance of planting
- _____ 8. A distance of 30-50 cm between plants is best for
- a. okra
 - b. squash
 - c. eggplant
 - d. pechay
- _____ 9. A dibble is a tool used in
- a. sowing seeds
 - b. transplanting seedlings
 - c. detecting dormancy
 - d. germinating seeds
- _____ 10. Which of the following is indirectly planted?
- a. celery
 - b. cucumber
 - c. katuray
 - d. melon



ANSWER KEY

Pretest

1. a
2. b
3. a
4. c
5. b
6. d
7. c
8. b
9. a
10. b

Lesson 1: Self-check

In direct planting, seeds are planted directly in a designated place where they grow until harvested. Corn and beans are planted directly on the field. Plants with large seeds are grown by direct planting.

In direct planting, seeds are first sown in a seedbox or seedbed. As soon as the seedlings have grown three or more true leaves, they are ready for transplanting. This is usually done to plants with tiny seeds like pechay and mustard.

Lesson 2: Self-check

- | | | | |
|-------------------------------------|------------|-------------------------------------|-----------------|
| <input type="checkbox"/> | 1. pechay | <input type="checkbox"/> | 6. sweet pepper |
| <input checked="" type="checkbox"/> | 2. corn | <input type="checkbox"/> | 7. tomato |
| <input checked="" type="checkbox"/> | 3. squash | <input checked="" type="checkbox"/> | 8. carrot |
| <input type="checkbox"/> | 4. onion | <input checked="" type="checkbox"/> | 9. okra |
| <input type="checkbox"/> | 5. cabbage | <input checked="" type="checkbox"/> | 10. upo |

Lesson 3: Self-check

1. 7
2. 6
3. 3
4. 1
5. 2
6. 4
7. 5

Lesson 4: Self-check

| Crops | Rate of Seedling | Depth of Seedling | Distance of Planting between Hills |
|-------------|------------------|-------------------|------------------------------------|
| Sweet corn | 8,500 | $\frac{1}{2}$ | 60-90 |
| Eggplant | 75 | 1 | 40-50 |
| Lettuce | 90 | $\frac{1}{4}$ | 25-30 |
| Green onion | 85 | $\frac{1}{2}$ | 8-20 |
| Okra | 2, 870 | 2.5 | 30-50 |

Lesson 5: Self-check

1. Water the seedbox.
2. Hold the seedling to lift the small plant out from the germinating area.
3. Plant the seedlings one at a time.
4. Press the soil around the roots gently.
5. Water the seedlings on the soil surface.
6. Water the plants four times a day to prevent drying up during the first three days.

Posttest

1. a
2. a
3. c
4. b
5. a
6. c
7. b
8. a
9. b
10. a