



NQF Level: 2 US No: 116128

Assessment Guide

Primary Agriculture

Apply plant manipulation methods



Assessor:

Workplace / Company:

Commodity: Date:

Before we start...

This assessment guide contains all necessary activities and instructions that will enable the assessor and learner to gather evidence of the learner's competence as required by the unit standard. This guide was designed to be used by a trained and accredited assessor whom is registered to assess this specific unit standard as per the requirements of the AgriSETA ETQA.

Prior to the delivery of the program the facilitator and assessor must familiarise themselves with content of this guide, as well as the content of the relevant Learner Guide.

The assessor, facilitator and learner must plan the assessment process together, in order to offer the learner the maximum support, and the opportunity to reflect competence.

The policies and procedures that are required during the application of this assessment are available on the website of the AgriSETA and should be strictly adhered to. The assessor must familiarise him/herself with this document before proceeding.

This guide provides step-by-step instructions for the assessment process of:

Title: Apply plant manipulation methods
US No: 116128 NQF Level: 2 Credits: 4

This unit standard is one of the building blocks in the qualification listed below. Please mark the qualification you are currently assessing, because that will be determined by the context of application:

Title	ID Number	NQF Level	Credits	Mark
National Certificate in Animal Production	48976	2	120	<input type="checkbox"/>
National Certificate in Mixed Farming Systems	48977	2	120	<input type="checkbox"/>
National Certificate in Plant Production	48975	2	120	<input type="checkbox"/>

Please mark the learning program you are enrolled in:

Are you enrolled in a:	Y	N
Learnership?	<input type="checkbox"/>	<input type="checkbox"/>
Skills Program?	<input type="checkbox"/>	<input type="checkbox"/>
Short Course?	<input type="checkbox"/>	<input type="checkbox"/>

Note to Assessor:

If you are assessing this module as part of a full qualification or learnership, please ensure that you have familiarized yourself with the content of the qualification.

1.1**SO 1 AC 1****Practical exercise and discussion****Learner Guide: Page 15****Facilitator Guide: Page 11**

1. Go to the garden shed and collect all the tools and materials which can be used in crop manipulation.

Discuss the function and correct use of each tool and other material with the facilitator. Make notes on the use of these tools and materials.

Model Answer(s):

Student will have hands on experience of the tools and material which can be used in crop manipulation (See Learner Guide for detail). They will be able to identify the different tools and material and also know how and when to use it and how to care for the tools and materials.

1.2**SO 1 AC 1****Practical exercise and discussion****Learner Guide: Page 16****Facilitator Guide: Page 11**

The facilitator will now illustrate some basic plant manipulation techniques. Take notes on how and why it is being done. Now make use of the supplied plant material and perform these techniques. Clean the tools and material used and return it to the shed.

Model Answer(s):

Students will have hand on experience as how to perform some basic plant manipulation techniques (See Learner Guide for detail). They will know when to perform these manipulations and what can go wrong. They will also know the importance of proper hygiene and the success on crop manipulation. Proper care of tools and material will again be emphasized.

1.3

SO 1 AC 1

Group discussion

Learner Guide: Page 17

Facilitator Guide: Page 11

Explain the reason why you would manipulate your crop and the how and when you are going to apply the manipulation(s)

Model Answer(s):

Tomatoes as example. Indeterminate tomato plants tend to grow very lush and tall. This causes the plant to fall over which in turn have the following problems:

- difficult to move between rows
- difficult to pick tomatoes without trampling on plants and fruits
- difficult to see fruits – yield losses due to this
- difficult to apply insect, disease and weed control
- fruits laying on soil surface might get damaged by soil borne diseases and insects.

By trellising the plant the plant is held upright preventing the above mentioned problems and also encourages better light penetration into the canopy and also better air movement around the leaves for improved photosynthesis.

Trellising can be done by planting poles in the rows with set distances in between and then stringing wire between the poles at different levels (tiers). Plants are then led up from one tier wire to the next as it grows taller.

My Notes ...

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SO 2 AC 1-3

Field trip

Learner Guide: Page 23

Facilitator Guide: Page 13

Learners will be going to an operating farm that has at least two types of crops growing on a trellis system. The facilitator will take learners through the trellis system and will be required to fill out the following observation form.

Principles of trellising	Crop 1	Crop 2
Describe the structure.	<i>Exp tomatoes – simple pole and wire system leading stem from one horizontal wire to the next</i>	<i>Fruit crop such as peaches – One main leader shoot and side shoots on the tiers</i>
Height of supports above the ground.	<i>As measured in the field</i>	<i>As measured in the field</i>
Height of top of support.	<i>As measured in the field</i>	<i>As measured in the field</i>
Describe the style of trellising e.g. two wire system	<i>As observed in field</i>	<i>As observed in field</i>
Number of tiers of trellised plant.	<i>As observed in field</i>	<i>As observed in field</i>
Direction that the trellis faces.	<i>As observed in field</i>	<i>As observed in field</i>
Width between rows.	<i>As observed in field</i>	<i>As observed in field</i>
Number of years to get the crop to produce fruit.	<i>Every season</i>	<i>Within two to three years</i>
Occasion of pruning crop.	<i>None</i>	<i>At plant to get single leader Then again when plant reaches a tier to ensure only the required number of side shoots</i>
Was growth uniform on the trellis.	<i>As observed in field</i>	<i>As observed in field</i>
Describe the area in between the rows. Did it have vegetative cover?	<i>As observed in field</i>	<i>As observed in field</i>

3.1**SO 1 AC 1-3****Field trip****Learner Guide: Page 28****Facilitator Guide: Page 15**

Learners go to an operating farm that uses at least two types of crops growing on trellis systems. The facilitator will discuss the trellis system and will illustrate the purpose of flower and fruit manipulation – make notes.

Model Answer(s):*Will differ from crop.***My Notes ...**

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3.2

SO 1 AC 1-3

Field trip

Learner Guide: Page 29

Facilitator Guide: Page 15

1. In this activity you will be required to discuss with the facilitator what is the purpose and benefit of being able to manipulate flower and fruit development. Write down your findings in the table provided below.

Model Answer(s):

Purpose of flower and fruit manipulation in regards to the following:

- *Improve fruit set*
In apple trees there are different types of shoots that tend to produce different parts of the plant - the lateral shoots tend to produce leaves and tend to want to grow and not produce fruit. If these are left unchecked the plant becomes very leafy and bears very little fruit. If these laterals are pruned they tend to produce sprigs that generally produce fruit.
- *Market requirements*
Through the use of chemicals the energy of the plant can be directed to the purpose of producing a quality fruit of the required size at the required time.
- *Size of fruit*
Thinning is a manipulation process by which a part of a too heavy crop is removed. This leads to improved fruit size and promotes regular cropping by alleviation of alternate bearing. If fruit trees are allowed to produce a too heavy crop, the tree would start producing a crop only every two years (alternate bearing).
- *Timing / planning*
Through the use of chemicals you can avoid the period of bud dormancy and stimulate the plant into early production, thus gaining the lucrative early market for a crop.
- *Disease control*
Excess plant material is removed, reducing disease risk and making spraying against disease more easy and effective.

Summative Test and Attitude & Attribute Evaluation

Before the knowledge test is undertaken, the learner must be reminded of what is expected from him / her in terms of summative and reflexive competence. Read and explain to the learner, the **Preparation for Your Final Assessment** section in the learner Guide. Learners and assessor should sign off this section to acknowledge that this step was completed.

Please set up a knowledge test from the questions given as a guideline to learners and supply each learner with a test sheet.

Supply each report with the following heading:

Unit Standard:	116128	NQF Level:	2
Learner Name:			

1. Define crop training. Give reasons why plants are being manipulated in this way. Which crops can be trained?

Model Answer(s):

Supporting a crop like tomatoes by leading it up a wooden pole with pieces of string to for example improve movement of air, infiltration of sunlight and preventing the fruits from laying on the soil surface where it can be damaged etc..

Tomato stems are supported by turning them around ropes (baling twine) hanging from the framework of the tunnel. The same support system is used for cucumbers, peppers and other vine crops.

2. Briefly explain how you will train an apple tree.

Model Answer(s):

Remember pruning woody plants often refer to removing unwanted growth while at the same time stimulating dormant buds to grow out in predetermined direction depending on the position of the cut. Pruning is mostly done during the dormant period of the plants (winter) although summer pruning can also be done.

During the initial stages of plant development the farmer is mainly concerned with the training of the tree.

The aim is to develop a frame work for the future that can carry heavy

crops of good quality fruit.

Phase 1- at the planting stage the stem is pruned down to a height of 80 cm above ground and the side growth is removed leaving only four selected branches that form the first evenly spaced tier. This normally happens in winter.

These remaining branches are then staked down to the desired angle being 30-40 degrees above the horizontal. Summer pruning will have to be done to remove misplaced branches.

Phase 2- By the second year the first tier has grown new shoots and the tree developed another tier that will be staked down to the first tier. This second tier should be about 50 cm above the first tier. At this point it is advisable to shorten the leader if it is too vigorous. If the branches that make up this tier are not evenly spaced then a useful method of lightly coiled wire can be used. This technique can also be used to adjust the angle of the growth of the side branches. For this training use 1.5m of fencing wire (no. 8 gauge). Twine half the wire around the branch on one side of the central leader and extend it to twine around a branch on the

other side. Leave the wire in place for only about six weeks so that it does not damage the wood and buds.

Phase 3 The third winter the tree is starting to show a pyramid shape and has developed a third tier. The second tier will have produced laterals, again keep pruning to an absolute minimum. Again the leader is shortened to stimulate growth into the framework.

Phase 4 By the fourth winter the tree has developed four tiers and the leader needs to be shortened again. By this stage the tree has produced fruit and it might be necessary to thin fruit from the branch terminals until they are stronger and more able to withstand the weight of the fruit.

Phase 5 After the fourth year you will need to conduct light pruning. This will promote early and heavy bearings. Do not shorten back laterals in the young tree only if they are out of place or diseased.

3. Briefly explain how you will train and support a tomato plant.

Model Answer(s):

Tunnel tomatoes have, what is called, indeterminate growth, meaning that they can grow and produce fruit continuously for a long period. The tomato has a sympodial growth model, meaning that after the juvenile phase (sexually immature – before flowering) during which about 7 leaves are produced, the apical meristem terminates in an inflorescence. To continue growth, the axillary bud of the most terminal leaf grows out and produces two to three leaves before it also terminates in an inflorescence. Another axillary continues grow in the same manner as has

just been described. This process of the sprouting bud, formation of two to three leaves and an inflorescence, can keep on "indefinitely" as long as the plant remains healthy and well fed. To prevent plants to become too dense, all lateral shoots are pruned (removed), using either pruning shares or pruning knives that must be sterilised at regular intervals. In this way the single, remaining stem become very long and need to be supported.

Very few tools are used here.

During pruning all lateral shoots in the leaf axils are removed at a young stage. Small and malformed fruit are removed from the trusses to assure uniform size. Old leaves at the bottom of the plant are removed to expose the trusses to more light for coloring of fruit.

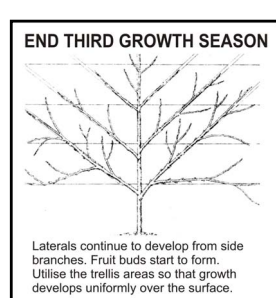
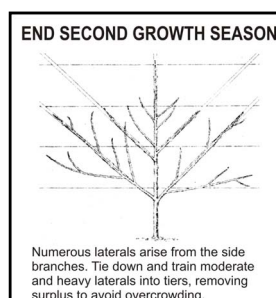
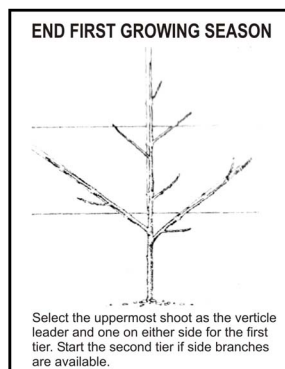
4. Define pruning. Give reasons why plants are pruned. Which crops are usually pruned.

Model Answer(s):

Cutting away from certain plant material to improve for example the growth of the remaining fruits on a tomato plant when some of the flowers are removed.

5. Briefly explain how you will prune an apple tree.

Model Answer(s):



6. Were you able to identify all the tools and equipment necessary for training and pruning a crop. If not, what problems did you experience?

Model Answer(s):

Basic recognition skills and know what is meant by training and pruning of a crop.

7. Can a crop be pruned at any stage throughout its life cycle? Defend your answer with applicable examples.

Model Answer(s):

Basic recognition of different growth stages in the life cycle of a plant.

The effect of pruning at the wrong time on the further growth, development and yield of the crop.

8. Explain the importance of good hygiene principles in successful pruning.

Model Answer(s):

Basic knowledge on the spreading of diseases – examples by means of contaminated tools.

Personal hygiene and smoking (tobacco mosaic virus) and the risk of contamination.

9. Would you recommend flower and fruit manipulation in a crop. Defend your answer.

Model Answer(s):

Basic knowledge on the aims of flower and fruit manipulation.

10. Flower and fruit manipulation can be done by means of chemicals of physical manipulation. Explain the difference and give applicable examples.

Model Answer(s):

Several chemicals are used to control flower and fruit development in fruiting plants. Through the use of chemicals the energy of the plant can be directed to the purpose of producing a quality fruit of the required size at the required time.

Through the use of chemicals you can avoid the period of bud dormancy and stimulate the plant into early production, thus gaining the lucrative early market for a crop.

With the use of chemicals like 'Paclobutrasol' the height of the plant can be controlled, terminal buds can be 'pinched', cold requirements substituted and excessive long shoots can be chemically disbudded.

Ethylene is a chemical that is naturally produced in fruits, seeds, flowers, stems, leaves and roots and controls a multitude of processes.

Ethylene is used commercially to promote flower development and colour formation and speeds up fruit ripening. Ethylene is also used in the

production of pineapples to stimulate even flowering.

In deciduous fruit production the flowers often drop off the tree prematurely before pollination has taken place resulting in a loss of potential crop. If the plant is sprayed with a chemical **silver thiosulate** it tends to prolong the life of the flower and reduces floret abscission.

In apple trees there are different types of shoots that tend to produce different parts of the plant - the lateral shoots tend to produce leaves and tend to want to grow and not produce fruit. If these are left unchecked the plant becomes very leafy and bears very little fruit. If these laterals are pruned they tend to produce sprigs that generally produce fruit. If you want to prune all the laterals so that the plant will produce fruit it is time consuming. Where as you can use chemicals that will kill the terminal buds and produce side shoots that tend to become sprigs that will produce fruit.

Physical manipulation of fruit and flowers in crop production.

This method of manipulation is as old as civilisation it's self. Basically it is the manual activities that encourage the healthy development so that a tree produces regular sizeable crops when the farmer wants it to.

Again it is the directing of the plant's energy into the process of producing a quality fruit within a time period that is expected by the farmer.

Thinning is a manipulation process by which a part of a too heavy crop is removed. This leads to improved fruit size and promotes regular cropping by alleviation of alternate bearing.

Thinning should be carried out early in the season, after the first natural fruit shedding and as soon as it becomes obvious that the crop is too heavy. After ideal thinning mature fruit should not touch each other.

If fruit trees are allowed to produce a too heavy crop, the tree would start producing a crop only every two years (alternate bearing). Thinning will ensure that the tree produces a crop every year.

Thinning can also be done during pruning by thinning out bearer shoots. In tomatoes and cucumbers grown under protection, thinning implies the removal of all lateral branches, leaving one bearing stem only.

- 11.** What problems did you experience whilst manipulating and pruning your crop? What is your advice to solve these problems?

Model Answer(s):

Basic knowledge and insight into manipulation and pruning as set out in above questions.

12. Were all your manipulation and pruning attempts successful? If not, what went wrong and what is your advice to solve these problems?

Model Answer(s):

Basic knowledge and insight into manipulation and pruning as set out in above questions.

Also keep in mind the correct/save/hygienic handling of material / tools / equipment.

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Assessment Feedback Form

Comments / Remarks	
<p>Feedback to learner on assessment and / or overall recommendations and action plan for competence:</p>	
<p>Feedback from learner to assessor:</p>	
<p>Assessment Judgement You have been found:</p> <p><input type="radio"/> Competent</p> <p><input type="radio"/> Not yet competent in this unit standard</p>	<p>Actions to follow:</p> <p><input type="radio"/> Assessor report to ETQA</p> <p><input type="radio"/> Learner results and attendance certification issued</p>
<p>Learner's Signature:</p>	<p>Date:</p>
<p>Assessor's Signature:</p>	<p>Date:</p>
<p>Moderator's Signature:</p>	<p>Date:</p>