FRUIT AND VEGETABLE PROCESSING -Level-II

Based on May 2019, Version 2 Occupational standards

Module Title: Working with Temperature Controlled Stock

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LG #25	LO #1- Store stock to meet temperature control requirements

Instruction sheet

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

- Identifying goods requiring temperature control
- Locating goods in correct storage areas
- Recording stores information

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

- Identifying goods requiring temperature control
- Locating goods in correct storage areas to meet storage temperature, stores handling and stock rotation requirements
- Recording stores information according to workplace requirements

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information Sheet 1- Identifying goods requiring temperature control

1.1. Introduction

This module covers the knowledge, skills and attitude required to store and retrieve temperature controlled stock from appropriate storage facilities. Keeping food at a proper temperature is one of the most important things a food handler can do to prevent bacteria that cause foodborne illness from growing rapidly. Leaving certain foods out for a long time in certain temperatures creates conditions for bacteria to grow, sometimes to dangerous levels. Limiting how long foods spend in growth-promoting temperatures minimizes the risk of someone getting sick.

1.2. Time and Temperature

Time and temperature are two of the most important factors to control in the prevention of a food borne illness. There are many steps during the process of preparing and serving food in which time and temperature must be controlled. Harmful microorganisms grow well in foods held between temperatures of 41^{o}F and 135^{o}F. This temperature range is also known as the Temperature Danger Zone (TDZ). The less time foods spend in the TDZ, the less time harmful microorganisms have to grow. Typically harmful microorganisms can grow to levels high enough to cause illness within four hours; therefore specific regulations in the *California Retail Food Code* related to the prevention of a food borne illness focus on reducing the amount of time foods remain in the TDZ.

1.3. Types of Potentially Hazardous Foods (PHF)

Many types of foods can become unsafe and cause people to become ill. Some foods, known as PHFs, are at higher risk for growing harmful microorganisms; it is these microorganisms that cause a food borne illness. Temperature control food can be whole food, or it can be food that has already been prepared. Temperature control food can be from animal or plant sources. Foods that are considered temperature control include:

- Milk and other dairy products
- Meat (beef, pork, lamb) or poultry (chicken, turkey)
- Fish and shellfish
- Eggs
- Baked potatoes
- Plant-based foods that have been heat-treated (cooked rice, beans, or vegetables)
- Soy foods (tofu, textured soy protein/meat alternatives)
- Sliced or cut fruits or vegetables (e.g. cantaloupe or melons, leafy greens, tomatoes, etc.)
- Bean sprouts and sprout seeds
- Untreated garlic-and-oil mixtures

Most produce is stored in the refrigerator at 2° to 4°C (36° to 39°F) to ensure freshness and to prevent rapid deterioration. There are, however, a number of exceptions, including potatoes and bananas, which should be stored at higher temperatures. Keep these factors in mind when storing produce:

- Soft fruits should not be stored too long. It is often best to buy soft fruit as you need it, keeping very little on hand.
- Unripe fruit can be ripened at storeroom temperatures of 10°C to 15°C (50°F to 59°F). It will ripen much more slowly under refrigerator conditions.
- Before storing and when rotating stock, it is important to remove rotting fruit from cases as one piece can affect others. The chain reaction can quickly destroy the quality of a whole case of fruit.
- Be aware of special storage problems. For example, bananas stored in the refrigerator turn black quickly. Bananas should be stored under conditions where the temperature range is 10°C to 15°C (50°F to 59°F).

- The length of time produce can be stored varies widely. For example, hardy vegetables such as carrots and cabbage will last for weeks, while delicate vegetables such as lettuce should be bought as fresh as possible as they do not keep for long.

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Write true if the statement is right and false if it is wrong

1. Most produce is stored in the refrigerator at 2° to 4°C to ensure freshness and to prevent rapid deterioration (4 point)

Test I: Short Answer Questions

1. List at this three temperature control food from plant sources (5 point)
2. What is food temperature control (5 point)

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

Note: **Satisfactory rating - 7 points** **Unsatisfactory - below 7 points**

Answer Sheet

Score = _____

Rating: _____

Information Sheet 2- Locating goods in correct storage areas

2.1. Food storage

It is essential to store food properly to ensure that it remains in prime condition for as long as possible

2.3. Types of Storage

2.3.1. Dry storage

Dry storage is meant for longer holding of non- and semi-perishable foods, the latter being stored for a shorter time. It is the space designed for the storage of foods usually at room temperatures ranging 20-25°C with the relative humidity maintained at 60-65%.

Figure 2.1. Foods that require dry storage

2.3.2. Low temperature storage

Low temperature storage is further divided into three types based on temperature requirement.

Refrigerated storage is a storage space maintained at temperature between 3 to 10°C. It is used to store perishable foods for short term say 3-5 days. Beyond this period, certain changes in foods take place due to enzymatic or microbial activity. Milk and eggs are generally stored under refrigerated storage.

Figure 2.2. Foods that require refrigerated

Cold storage is one in which temperature is maintained between 0 and 3°C. Such storage spaces are also called as chill rooms. These can hold perishables over a week and in the case of fruits and vegetables, even up to a month depending upon variety and stage of maturity. Fruits and vegetables are usually stored in this type of storage.

Freezer storage is apt for long term storage of perishable foods and the temperature ranges from -20°C to 0°C. Pre-treatments like blanching, quick cooling to freezing temperature and packing in air tight containers are necessary for successful freezing. Generally, frozen foods are kept under this type of storage.

Rotating stock is extremely important with frozen foods. FIFO (first in, first out) ensures proper rotation of foods in storage. When foods are received, put the oldest in the front and the newest in the back. Past-dated foods will lose their quality and sometimes become unsafe. Inventory cycle

Figure 2.3. Foods that need to be frozen

- **Essential features of food Storage Areas**

✓ It should be fit for purpose (dry store, chill, frozen etc.) i.e. it must provide proper

- ✓ temperatures and humidity for prolonging shelf life of foods
- ✓ The separate area could be designated for different types of food. For example raw and cooked should be stored separately.
- ✓ It should be able to provide protection from contamination/ infestation.
- ✓ It should be weatherproof.
- ✓ It should be able to keep out direct sunlight/ heat
- ✓ It should be easily cleanable.
- ✓ It should provide easy access to materials.
- ✓ It should be accessible for transport of food.

2.4. Factors that affect food storage

2.4.1. Temperature

The temperature at which food is stored is very critical to shelf life. For every 10.8 degrees rise you decrease the shelf life of stored food by half. The best range for food storage is a constant temperature between 40-60 degrees. Avoid freezing temperatures.

2.4.2. Moisture

It is recommended to remove moisture when storing foods. For long term storage foods should have a 10% or less moisture content.

2.4.3. Atmosphere the product is stored

Foods packed in air don't store as well as in oxygen free gasses. This is because air contains oxygen which oxidizes many of the compounds in food. A high oxygen environment causes

oxidation, which leads to discoloration, flavour loss, odours, rancidity and the breakdown of nutritional value in foods.

2.4.4. Container

Store foods in food grade plastic, metal or glass containers indicating that the container does not contain chemicals that could be transferred to food and harmful to your health. For best storage life, use containers with a hermetic (air tight) seal

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Choose your best answer from the given multiple choices

1. Which one of the following is not true regarding of proper storage? (4 point)

A. Protects food from flies and dust.

B. Prolongs its shelf life.

C. Ensures that the kitchen is clean and well organised.

D. The shelf life of a food is the length of time

E. Food remains safe and fit to be eaten.

F. None of the above

Test II: Short Answer Questions

1. List types of food storage (5 point)
2. List three types of low temperature storage (5 point)

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

Note: **Satisfactory rating - 7 points** **Unsatisfactory - below 7 points**

Answer Sheet

Score = _____

Rating: _____

Information Sheet 3- Recording stores information

3.1. Recoding work place information

Collection of information is timely and relevant to organizational needs .Each organization must have access to information and data if it is to function efficiently. This information needs to be collected (or created), stored and cared for and be easily accessed or retrieved. Records, then, are sources of information (documents or other items) which the organization wants or needs to retain

Correspondence, faxes, letters, memos, email, computer databases, customer records, library catalogue, computer files, copies of letters, other documents, sales records, monthly forecasts, targets achieved, forms, membership forms, insurance forms, invoices, accounts from suppliers; to debtors, personnel records, personal details, salary rates, minutes of meetings, staff meetings, board meetings. The overall objective of any records management system is to provide the right information, at the right time, to the right person(s) at an affordable cost. Information is stored so that specific information is available when it is needed and in such a way that security and confidentiality is maintained. Business

equipment/technology available in the work area is used to obtain information effectively. Types of technology or business equipment can assist in the effective collection of information Such as

- Photocopier
- Computer
- Printer
- Binder
- Filing systems – manual, computerized or electronic
- Answering machine
- Fax machine
- Telephone

All staff should know how to use this technology and equipment. If in doubt staff should ask for training or help to become familiar with the manufacturer's instructions. Someone in the organization should ensure that regular maintenance is carried out and that any faults or hazards are reported immediately; this will ensure the efficient collection of information continues.

3.2. Process work place information

Use business equipment/technology to process information in accordance with organizational requirements. Process information in accordance with defined timeframes, guidelines and procedures. Update, modify and file information in accordance with organizational requirements. Collate and dispatch information in accordance with specified timeframes and organizational requirements

Self-check 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Short Answer Questions

1. Write process of workplace information ?(5 points)
2. Write the need of workplace information (5 point)

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

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____
Rating: _____

LG #26	LO #2- Monitor and maintain temperature of stock within specifications

Instruction sheet

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

- Monitoring stock temperature
- Monitoring storage areas
- Monitoring residence time in temperature controlled stores
- Identifying out-of-specification storage temperatures
- Taking corrective action

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

- Monitor stock temperature to confirm temperature is within specified limits
- Monitoring storage areas to confirm temperature is within storage zone limits
- Monitoring residence time in temperature controlled stores to meet stock control requirements
- Identifying out-of-specification storage temperatures and take corrective action

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information Sheet 1- Monitoring stock temperature

1.1. Monitoring stock temperature

Monitor temperatures to avoid produce being destroyed by any exposure to low or high temperatures, which can happen in extreme cases. Thermometers should be placed inside and outside the storage facility. Stored produce will give off heat during storage making it necessary to regulate temperatures by use of the ventilation windows. If the outside temperature is 25^{o}c and the inside is 32^{o}c with the ventilation windows closed, the temperature will begin to rise and windows should be opened to lower the temperatures. Close the ventilation windows when outside temperatures are above the desired storage temperatures. Because certain crops are more sensitive to low temperature injury.

1.1.1. Temperature Monitoring using a Thermometer

Temperature of food can be checked using a probe thermometer. Ideally, hand-held digital thermometer should be used when probing foods and checking air temperatures. This may be supplemented by additional ‘in-place’ thermometers which may be located in refrigerators, chills, cold displays and freezers. Thermometers should be kept clean at all times. Probe thermometers should be sanitised/disinfected before/after each use. Under no circumstances should a mercury in glass thermometer be used as it would present contamination risk if it breaks. It is important that you regularly check that the probe thermometer you are using is working correctly.

Figure 1.1. Thermometers

1.1.2. Cold Temperature Monitoring

Always check the temperature of the warmest part of the chill. Avoid checking the temperature of refrigerators, chills, cold displays or freezers immediately after the door/lid has been open for any significant period of time or during a defrost cycle. Displays built into refrigerators, chills, cold displays and freezers indicate the air temperature within the appliance. These can be useful for day-to-day monitoring but should be checked regularly with a digital thermometer as a back-up check. Avoid puncturing the packaging of wrapped food when checking temperatures.

1.1.3. Hot Temperature Monitoring

The temperature of a food may vary throughout, especially during cooling and heating, therefore large pieces of fruit should be probed at the thickest part. Alternatively, in the case of stews, soups and other 'liquid' foods served hot, it is essential that food is stirred to ensure adequate distribution of heat before probing Temperatures of foods being 'Hot Held' in a bain-marie or displayed at a buffet are best measured by probing the foods

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Write true if the statement is right and false if it is wrong (5 point each)

1. Temperature of food can be checked using a probe thermometer
2. Avoid checking the temperature of refrigerators, chills, cold displays or freezers immediately after the door has been open is not important

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

Note: **Satisfactory rating – 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Information Sheet 2- Monitoring storage areas

2.1. Monitoring storage areas

Storage areas should be designed or adapted to ensure good storage conditions. In particular, they should be clean and dry and maintained within acceptable temperature limits. Where special storage conditions are required on the label (e.g. temperature, relative humidity), these should be provided, checked, monitored and recorded. Materials and products should be stored off the floor and suitably spaced to permit cleaning and inspection. Pallets should be kept in a good state of cleanliness and repair.

Figure 2.1. Storage condition of fruits and vegetables

Storage areas should be clean, and free from accumulated waste and vermin. A written sanitation programme should be available indicating the frequency of cleaning and the methods to be used to clean the premises and storage areas. There should also be a written programme for pest control. The pest-control agents used should be safe, and there should be no risk of contamination of the materials and products. There should be appropriate procedure's for the clean-up of any spillage to ensure complete removal of any risk of contamination.

The temperature of the storage rooms is controlled to maintain optimum storage conditions for fresh vegetables. The refrigeration facilities (storage rooms) are equipped with temperature measuring devices, preferably recording thermometers. If recording thermometers are not used, maximum/minimum thermometers are used. Stock rotation (of ingredients and, where appropriate, of packaging materials) is controlled to prevent deterioration and spoilage. First-in, first-out stock rotation is practiced.

Humidity sensitive ingredients and packaging materials are stored under appropriate conditions to prevent deterioration. The equipment used for monitoring should be checked at suitable predetermined intervals and the results of such checks should be recorded and retained. All monitoring records should be kept for at least the shelf-life of the stored material or product plus 1 year, or as required by national legislation.

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Write true if the statement is right and false if it is wrong

1. Temperature of the storage rooms is controlled to maintain optimum storage conditions for fresh vegetables (5 point)

Test I: Short Answer Questions

1. List at least three the ways of monitoring storage areas (5 point)

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

Note: **Satisfactory rating – 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

3.1. Time as a Food Safety Control

After four hours in the danger zone, most Time Control for Safety Food will contain enough bacteria to cause a risk for foodborne illness. Therefore, hot/cold ready-to-eat foods that are not temperature controlled should be consumed or reheated/chilled within 4 hours. After that, they should be discarded.

Time alone, at ambient temperatures, may be used to control the safety of products, but requires great care and attention. The duration should not be greater than the **"lag phase"** of the pathogen in the product. During this lag phase, the microorganisms assimilate nutrients and increase in size.

The lag phase of a microorganism depends on temperature; therefore, for a specific time control product, the shelf life or use period required for safety may vary depending on the temperature at which the product is stored. Generally, as storage temperature decreases, the lag phase extends and the rate of growth decreases.

Time control foods that begin cold and remain cool may be held at room temperature longer. Cold foods can usually be served for six hours as long as the food temperature stays below 70° F. However, if the temperature of cold food is not regularly checked, it should be discarded after four hours

- **2 Hour/4 Hour Rule**

The 2 Hour/ 4 Hour Rule tells you how long freshly potentially hazardous foods, can be safely held at temperatures in the danger zone; that is between 5° C and 60° C. It takes time for food poisoning bacteria to grow to unsafe levels. Apply the following time limits to ensure these risky type foods remain safe to eat. The total time includes all the time the food has been at room temperature, for example during delivery, preparation and transportation.

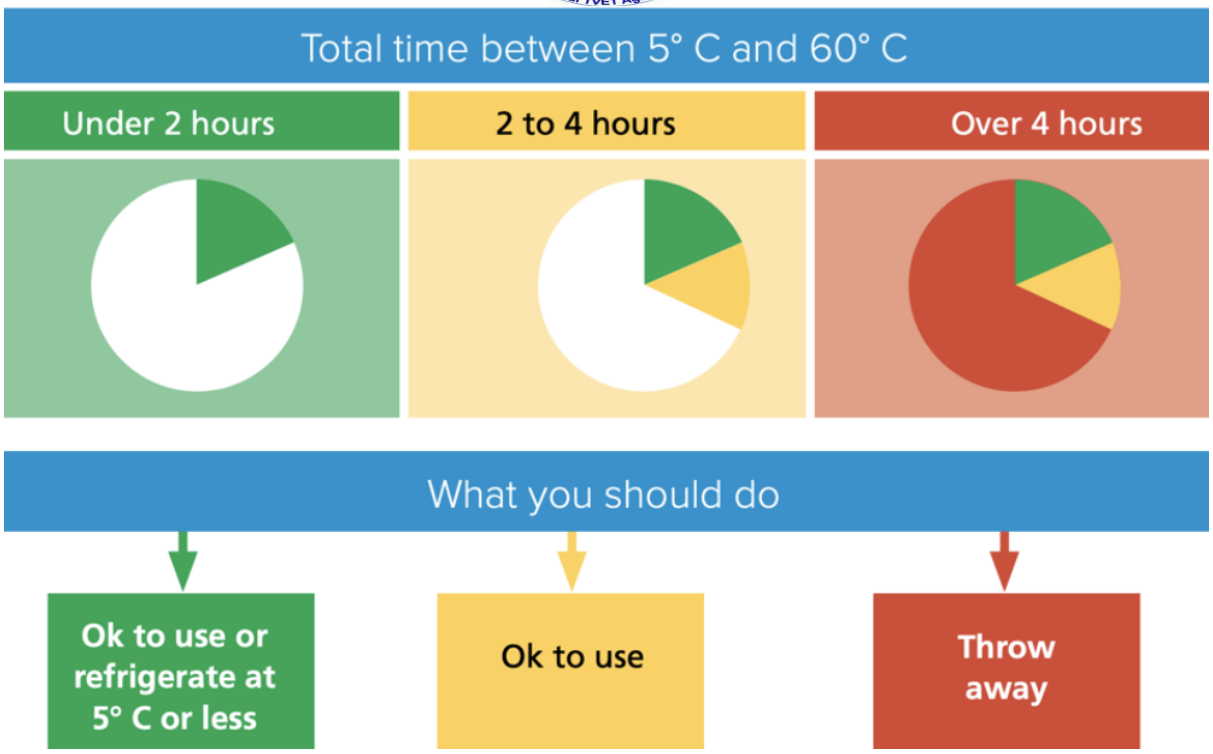

Figure 3.1. Rule of 2 Hour/4 Hour

- **Criteria for using time as a control**

✓ If time is used as the public health control, the following criteria must be met:

✓ The food must be marked or otherwise identified to indicate the time that is four hours past the time when the food is removed from temperature control

✓ The food must be cooked and served, served if ready to eat, or discarded within the four hours

✓ Food that is unmarked, or marked to exceed a four hour limit, must be discarded.

Self-check 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Short Answer Questions

1. What is 2hour/4hour rule means?(5 point)
2. What is minimum requirement to fulfil if using "**time only**" controls?(5 point)

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

Note: Satisfactory rating - 5 points Unsatisfactory - below 5 points

Answer Sheet

Score = _____

Rating: _____

Information Sheet 4- Identifying out-of-specification storage temperatures

4.1. Out of specification of storage temperatures

The term out of specifications, are defined as those results of in process or finished product testing, which falling out of specified limits. The out of specifications (OOS), may arise due to deviations in product manufacturing process, errors in testing procedure, or due to malfunctioning of analytical equipment. When an out of specifications (OOS) has arrived, a root cause analysis has to be performed to investigate the cause for OOS. The reasons for OOS can be classified as assignable and non-assignable. When the limits are not in specified limits called out of specifications. When OOS has occurred, the analyst should inform to quality control (QC) manager. Each out of specification will be identified with a unique identification number. For example:

- Bananas stored in the refrigerator turn black quickly. Bananas should be stored under conditions where the temperature range is 10°C to 15°C (50°F to 59°F).
- Soft fruits should not be stored too long. It is often best to buy soft fruit as you need it, keeping very little on hand
- The length of time produce can be stored varies widely. For example, hardy vegetables such as carrots and cabbage will last for weeks, while delicate vegetables such as lettuce should be bought as fresh as possible as they do not keep for long.
- Regulations allow limited periods outside temperature control during storage or transport, but it is an offence to keep food out of temperature control for so long that it could become unsafe.
- Temperature abuse occurs when a food is either left in the temperature danger zone (above 41°F and below 140°F) for an extended period of time, or does not reach its safe internal temperature.

The OOS investigation involves 2 phases.

Phase I: (laboratory investigation)

The purpose of the laboratory investigation is to identify the cause for OOS result. The reason for the OOS may be defect in measurement process or in manufacturing process. Irrespective of the rejection of batches, the OOS results must investigate for their trend. The investigation can be done to only those batches that are resulted in OOS, or also to other batches and even other products associated with OOS. The OOS investigation should be thorough, timely, unbiased, well documented and scientifically sound.

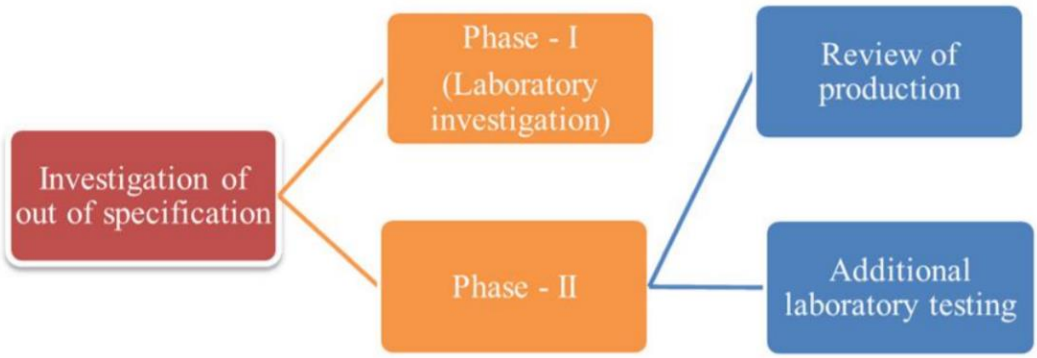

Figure 4.1. Investigation of out of specification result

Phase II investigation

When there is no possible outcome has obtained from the phase I investigation, the phase II investigation should be commenced in context to investigate the errors occurred in manufacturing processes, sampling procedures along with other additional laboratory testing.

Self-check 4	Written test

Name…… ID…… Date…….

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

Test I: Short Answer Questions

1. Define the term out of specification out comes? (5 points)
2. Explain two phases of out of specification out comes? (5 points)

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

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

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Information Sheet 5- Taking corrective action

5.1. Corrective Actions

If the temperature is outside of the acceptable range, then corrective action should be taken. It is important to insure the integrity of the materials and determine if product deterioration has occurred. The length of time, the degree of variance in temperature and the manufacturer's recommendations for material storage stability are used to determine what actions are necessary. The effected materials should be marked to indicate possible quality problems and moved, or in some way restored, to the correct temperature range. Corrective actions for those materials should at least include parallel testing as done when new materials are received in the laboratory. Rapidly cool ready-to-eat foods or foods that will be cooked at a later time. Immediately return ingredients to the refrigerator if the anticipated preparation completion time is expected to exceed 30 minutes. Discard food held in the temperature danger zone for more than 4 hours.

Self-check 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Write true if the statement is right and false if it is wrong

1. If the temperature is outside of the acceptable range, then corrective action should be taken(3 point)
2. Discard food held in the temperature danger zone for more than 4 hours (4 point)
3. Rapidly cool ready-to-eat foods or foods that will be cooked at a later time (3 point)

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

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

LG #27	LO #3- Transfer temperature controlled stock

Instruction sheet
This learning guide is developed to provide you the necessary information regarding the following content coverage and topics: • Handling and transferring goods • Recording stores transfer information • Conducting work This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to: • Handle and transfer goods to maintain temperature control and meet stock rotation requirements • Record stores transfer information according to workplace reporting requirements • Conducting work in accordance with workplace environmental guidelines
Learning Instructions:
1. Read the specific objectives of this Learning Guide. 2. Follow the instructions described below. 3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them. 4. Accomplish the “Self-checks” which are placed following all information sheets. 5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information Sheet 1- Handling and transferring goods

1.1. Moving and handling good

Once stock has been received, it must be transported to the appropriate storage or operational area as required. All items should be transported safely and without damage.

Why does stock need to be moved promptly? Stock should be safely moved from the delivery area in order to:

- Allow space for further incoming items to be unloaded.
- Remove potential hazards.
- Minimise the chance of theft.
- Reduce the damage of products.
- Eliminate confusion regarding stock checks and counts.
- Maintain the safety of food

Operational areas: The operational area to which stock and deliveries may need to be moved covers storage areas and departments and working areas

Storage areas: Storage areas to which stock may need to be transported can include:

- Dry goods store for food
- Refrigerated storage areas such as cool rooms and refrigerators
- Frozen food storage areas: walk-in freezers, domestic freezers.

Beverage storage areas: for alcoholic and non-alcoholic products which may include:

- Refrigerators
- Cool rooms
- Dry goods store

Working areas: Working areas to which stock may need to be transported can include:

- Kitchen

- Bar
- Housekeeping
- Retail outlets and shops

Load stock into storage units: Stock must be placed in to the designated storage areas and may need to be loaded into appropriate storage units.

Storage units may include:

- Shelves
- Bins
- Specially provided storage containers.

When loading stock into storage units:

- Rotate stock: place new stock at the bottom and move existing stock to the top
- Check container is clean: clean it where necessary
- Verify integrity of container: replace or repair if damaged
- Ensure lid makes a tight fit: storage containers are usually supplied with a lid intended to make a tight fit.

Guideline for food handler

- Maintain a high standard of personal hygiene.
- Wash hands before handling food and after handling rubbish, using a tissue, using the toilet or handling pets.
- Cover or tie back hair and wear a clean apron.
- Handle food as little as possible.
- Avoid touching face or hair while preparing food.
- Keep fingernails clean and short. Do not wear nail varnish.
- Do not cough or sneeze over food.
- Avoid wearing rings, earrings or watches when preparing food.
- Taste food with a clean spoon. Do not lick fingers.
- Cover any cuts or burns with a waterproof dressing.

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Short Answer Questions

1. What are the storage areas to which stock may need to be transported? (5 point)
2. What is guideline for food handler?(5)

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

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Information Sheet 2- Recording stores transfer information

2.1. Record Keeping

There are four sets of records that should be kept by the fruit and vegetable processer:

- Financial records
- Production records
- Quality assurance records
- Sales records.

The processor must understand why the information is collected and what it can be used for. Processors should also put in place a system of checks to ensure that one person does not have responsibility for a whole area of record keeping.

Table 2.1. Types of records for fruit and vegetable processing business

Type of record	Information to be recorded
Production records	Raw materials and ingredients received and suppliers Wastage % at different stages of the process Stock levels for each ingredient Production volumes and measurements Maintenance programs and schedules
Quality assurance records	Target amounts of ingredients and any changes made to recipe Measurements made at process control points Batch numbers and product code numbers Cleaning procedures and schedules
Sales records	Names of customers and amounts sold to each Weekly and monthly sales volumes
Financial records	Income from sales Costs of all process inputs Cash flow, Profit/loss, Tax records and Bank statements

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Short Answer Questions

1. What are the four sets of records that should be kept by the fruit and vegetable processer? (5 point)
2. What types information record in quality assurance in ?(5)

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

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Information Sheet 3- Conducting work

3.1. Conduct work in accordance with environmental policies and procedures.

The maintenance of cleanliness in a working area requires frequent or continuous cleaning as well as a clean-up at the end of each day. The purpose of this is to keep waste from accumulating during the operating day. It involves:

- careful organization
- training work scheduling and
- the best available equipment
- method and materials.

Hazard Analysis Critical Control Point (HACCP): HACCP allows processors/regulator to look at what happens during the process to ensure safety.

Major Concepts of HACCP

1. A preventive system of control particularly on biological hazards
2. A system approach for estimating the risk in producing a food product
3. Universally recognized system as the most effective way to prevent food borne illness
4. Science - based systematic, identified specific hazards and measures for their control to ensure food safety
5. Capable of accommodating change, such as advances in equipment design, processing procedures, or technological developments that can be applied throughout the food chain from the primary producer to the final consumer
6. Applicable to establishments that produce, process, treat, pack, trade, transport, serve, or involve in food production

Seven (7) HACCP Principles

1. Hazard analysis
2. Identify critical control points
3. Establish Control limits
4. Monitor critical limits

5. Establish corrective actions in case of deviation from established critical limits
6. Establish verification procedure to ensure that the system is consistent
7. Establish record keeping procedures

General Hazards Characteristics

- The product contains sensitive ingredients, which can be assumed as potential sources of contamination under normal circumstances.
- The manufacturing process does not contain controlled processing steps that effectively destroy harmful bacteria.
- There is substantial potential for microbiological abuse in distribution or in consumer handling that could render the product harmful when consumed.
- Product is subject to contamination after processing and before packaging.
- No terminal heat process after packaging.

HACCP Pre-Requisite Programs

1. Good Manufacturing Practices (GMP): This provides the sanitary infrastructure for Food Safety that the:
   - Plant grounds and building facilities emphasize pest control;
   - Equipment design provides ease in cleaning and maintenance;
   - Personal hygiene practices and facilities are set;
   - Process controls are followed;
   - Storage and warehousing are free from contamination.

2. Sanitation Standard Operating Procedures (SSOP): SSOP are components of GMP that emphasize sanitation procedure. They include:
   - Safety of water that gets in contact with food and food surfaces;
   - Condition and cleanliness of food contact surfaces;
   - Measures to prevent contamination;
   - Employee hygiene practices;
   - Control of employee health conditions that could result in contamination of food and food surfaces;

- Protection of food and food contact surfaces from adulteration with toxic and other harmful components;

Self-check 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Short Answer Questions

1. What is HACCP? (4 point)
2. What are the 7 principle of HACCP?(5)
3. What are Sanitation Standard Operating Procedures (SSOP) include?(5)

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

Note: **Satisfactory rating - 7 points** **Unsatisfactory - below 7 points**

Answer Sheet

Score = _____

Rating: _____

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