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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for TLE

Quarter 2
Lesson
7

Lesson Exemplar for Science Grade 8
Quarter 2: Lesson 7 (Week 7)
SY 2025-2026

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TLE/QUARTER 2/ GRADE 8

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners demonstrate an understanding of the concepts and skills in food processing
B. Performance Standards	The learners perform recipe quantification in food processing and develop label design for processed products.
C. Learning Competencies and Objectives	***Learning Competency*** • Discuss the importance of food processing. • Discuss opportunities for food processing as a career and as a business. • Discuss different raw materials used in food processing. • Explain the ingredients used for food processing. • Discuss different methods in food processing following industry standards. • Discuss different tools and equipment, uses, and maintenance in food processing.
D. Content	**Different Methods of Food Processing Following the Industry Standard.** **Tools and Equipment in Food Processing.**
E. Integration	**SDG 9:** Industry, Innovation, and Infrastructure **SDG 14:** Life Below Water

II. LEARNING RESOURCES

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III. TEACHING AND LEARNING PROCEDURE		**NOTES TO TEACHERS**
A. Activating Prior Knowledge	**DAY 1** **1. Short Review** **Multiple Choice** **Directions: Choose the letter of the correct answer.** 1. It is a substance added to food to enhance flavor, complement dishes, or add moisture. They often include sauces, spreads, or seasonings. a. herbs and spices b. condiments c. food additives 2.Plant-derived ingredients used to flavor food. a. herbs and spices b. condiments c. food additives 3.Substances added to food during processing to improve flavor, texture, appearance, or shelf life. Preservatives are a subset of food additives specifically added to prevent spoilage and extend shelf life. a. herbs and spices b. condiments c. food additives 4.The following preservatives are a subset of food additives specifically added to prevent spoilage and extend shelf life except _____. a. monosodium glutamate b. ascorbic acid c. cumin 5.The following examples are Herbs and spices except _____. a. mustard b. basil c. ginger **2. Feedback (Optional)**	Answers: 1. b. 2. a. 3. c. 4. c. 5. a.
B. Establishing Lesson Purpose	**1. Lesson Purpose** The teacher discusses the lesson on how to: 1. Preserve food following the industry standard.	Ask the learners if they have an

	2. Prepare, sanitize, and calibrate equipment, tools, and materials. **2. Unlocking Content Vocabulary** ● **Food Processing** - the process of transforming food items into a form that can be used. ● **Fermentation** is an enzyme-catalyzed, metabolic process whereby organisms convert starch or sugar to alcohol or an acid anaerobically releasing energy. ● **Pickling** is the process of preserving food by either anaerobic fermentation in brine or immersion in vinegar. ● **Curing** means preserving the raw materials using different ingredients, seasonings and extenders.	idea about the lesson.
C. Developing and Deepening Understanding	**SUB-TOPIC 1: DIFFERENT METHODS OF FOOD PROCESSING FOLLOWING THE INDUSTRY STANDARD** **1. Explicitation** **What is Food processing?** Food Processing is the process of transforming food items into a form that can be used. It can cover the processing of raw materials into food via different physical and chemical processes. The various activities covered in this process are mincing, cooking, canning, liquefaction, pickling, macerating, and emulsification. It takes clean, harvested crops or butchered and slaughtered animal products to produce attractive, marketable, and in several cases, life-long food products. However, food processing can also lower the nutritional value of the food and might include additives that adversely affect health. **Objectives of Food Processing** ● Food technology is a vast domain that deals with the production and processing of food. Food processing has certain objectives. ● It boosts the shelf life of food products. ● Prevent food contamination. ● Food storage and transportation. ● Turns raw food materials into attractive, marketable products. ● Employ a large population. **2. Worked Example**	

Food Processing Methods

There are certain criteria that must be compiled for the appropriate processing of food, right from the possibility of a pest or bacteria invading and multiplying on foods to the biological activity of foods. The following methods are applied for the proper processing of food:

1. sugar concentration.	5. curing
2. fermentation	6, smoking
3. pickling	7. drying
4. salting	8. dehydration

1. <u>Sugar Concentration</u>

Preparing Raw Materials

Sorting and Grading Fruits

The product should not have physical defects as these could be entrance doors for pathogens that cause rotting.

While the characteristics of good fruits vary for every type of produce, there are a number of attributes that indicate quality.

- *Integrity of shape* - The produce should not have physical defects as these could be entrance doors for pathogens that cause rotting.
- *Uniformity* - Each product in the batch should be uniform in size, form, and color.
- *Freshness* - The product should be harvested right on time to achieve maximum turgidity, color, flavor, and crispness. This can be ensured by asking for information from the supplier.
- *Ripeness or maturity* - Usually indicated by color and firmness, ripeness or maturity refers to the maximum edible quality of the fruit. Color and firmness are indicators of maturity.
- *Juiciness* - Juice content in fruits is directly related to the ripeness of the fruit.
- *Flavor* - This can be checked by measuring the total soluble solids with a refractometer.

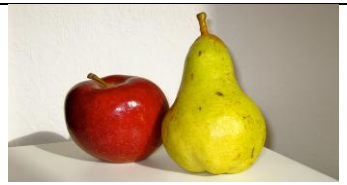
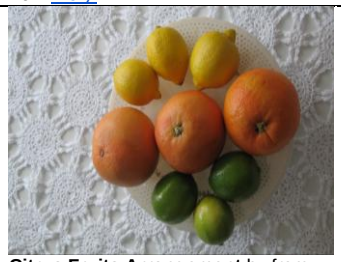
Quality Points

Good size and shape	Fresh
Good color	No bruising

Little to no soil

No pest damage

Types of Fruits and Examples

Pome/ Hard fruit	 Apple and Pear by Michael Stern, from Wikimedia Commons.	apple, pear	Berry	 **Berries Berry Collage Food Drink** from Picryl.	blueberry, cranberry, strawberry
Tropical	 **Fruit of Thailand** from Wikimedia Commons.	starfruit, dragonfruit, custard apple/sugar apple, longan, mango, rambutan	Citrus	 **Citrus Fruits Arrangement** by from Wikimedia Commons.	lemons, oranges, limes
Drupe/ Stone fruit	 peach  coconut  plum			Edible Food Fresh Fruits Leaves Peach from Pickpik; Coconut on White Background by Sattelit, from Wikimedia Commons; Plums African Rose - Whole, Halved, and Slice by Magnus Manske, from Wikimedia Commons.	

Preparing Fruit and Other Ingredients for Processing

a. *Washing and Cleaning Fruits* helps remove soil and chemical residues from produce.
b. *Knife peeling* is when fruits and vegetables are pressed against stationery or rotating blades to remove the skin. It is used for fruits with skin that can be easily removed with little damage.
c. *Slicing* refers to cutting food into broad or flat, thin pieces.
d. *Mincing* - is mainly done for size reduction and homogenization.
e. *Testing Pectin Content* - Pectin is a jelly stabilizer naturally found in fruits.

To test for pectin content:

1. Boil the fruit in water until a thick consistency is reached.
2. Take one teaspoon of the fruit juice and transfer it into a container. Leave to cool down.
3. Add three tablespoons of denatured alcohol and gently shake the container.
   Leave to stand for a minute.
4. Observe the jellied lumps. A large, firm lump means that the fruit has high pectin content; while small, soft lump means the fruit has low pectin content.

Sugar as a Preservative

Sugar, like salt, preserves food by drawing out water and replacing it with sugar molecules, dehydrating and killing microorganisms.

Adjusting Sugar and Acid in Jams and Jellies

Sugar activates pectin, breaking the pectin-water equilibrium and binding water, allowing pectin to form a gel. Acid strengthens the pectin gel network. Pectin is naturally present in fruit, and the balance of sugar and acid should match the fruit's pectin content. Excess acid makes the gel unstable, while too little acid results in soft lumps. Too much sugar weakens the gel, making it watery.

Based on the pectin test; sugar is added in the following proportions:

a. If juice is rich in pectin, add 1 cup of refined sugar per cup of juice.
b. If juice has moderate pectin content, add ¾ cup sugar per cup of juice.
c. If juice if poor in pectin, add ½ cup sugar per cup of juice
    - Large firm lumps = more sugar = less acid
    - Soft, small lumps = more acid = less sugar

Sugar Concentrated Products

- **Jellies**: Transparent, bright gels made from fruit juice, with the fruit's characteristic flavor and a mild acidic taste. They mold to the container's shape and slip out when poured, having a smooth, thick, and quivery texture. Juice is extracted by boiling fruit in water, which softens the tissue and converts pectose to pectin, and then draining through a cheesecloth.
- **Jams**: Made by cooking fruit with sugar syrup until thick. Jams contain the fruit's pulp and fiber and do not retain the fruit's shape. Good jams are soft, thick, and smooth. Blending the fruit before boiling enhances consistency. Jams can combine various fruits for diverse flavors and acidity; fully mature fruits provide the best texture and flavor.

- **Marmalades**: Similar to jellies but include suspended slices of fruit or peel, usually from citrus fruits. They have a blend of bitter, acidic, and sweet tastes, with a smooth, thick, and quivery texture.
- **Preserves**: Essentially jellies with whole fruits or large pieces. They retain the fruit's flavor and have a thick, non-watery syrup.

2.Fermentation

Fermentation is an enzyme-driven metabolic process where organisms convert starch or sugar into alcohol or acid anaerobically, releasing energy. The study of fermentation is called zymology.

Types of Fermentation

- *Homofermentation:* Produces one type of product.
- *Heterofermentation*: Produces multiple products.

End Product-Based Categories:

1. **Lactic Acid Fermentation**:
    - Produces lactic acid from pyruvate via lactate dehydrogenase, generating NAD+ from NADH.
    - Used by Lactobacillus bacteria to make curd and by muscles during intense exercise, causing fatigue.
2. **Alcohol Fermentation**:
    - Produces alcohol and CO2, used in wine, beer, and biofuel production.
    - Pyruvic acid converts to acetaldehyde and CO2, then to ethanol.
    - Catalyzed by pyruvic acid decarboxylase and alcohol dehydrogenase.
3. **Acetic Acid Fermentation**:
    - Produces vinegar in two steps: sugar to ethyl alcohol anaerobically by yeast, then ethyl alcohol to acetic acid aerobically by acetobacter bacteria.
4. **Butyric Acid Fermentation**:
    - Characteristic of Clostridium bacteria, used in jute retting, rancid butter, tobacco processing, and leather tanning.
    - Produces butyric acid from acetyl-CoA, yielding 3 ATP molecules.
    - Occurs in the human colon as a byproduct of dietary fiber fermentation, providing energy to the colorectal epithelium.

Fermentation is adaptable to various environments and is one of the oldest metabolic processes, present in both prokaryotes and eukaryotes. It is widely used across different industries.

Using suitable microorganisms and specified conditions, different kinds of fermentation products are formed, such as wine, beer, pickles, bread, biofuels, yoghurt, Sour foods containing lactic acid, certain

antibiotics, and vitamins. It can make food nutritious, digestible, and flavored. There are many benefits of consuming fermented food.

- It improves digestion and helps to maintain intestinal bacteria.
- It has an anti-cancer effect.
- Improves immune system.
- Reduces lactose intolerance.

Other than the food industry, there are many other areas where the fermentation process is used. Methane is produced by fermentation in sewage treatment plants and freshwater sediments.

3. Pickling

Pickling is one of the ancient methods of food preservation. It began 4000 years ago. The term pickle is derived from the Dutch word "peckle" meaning brine. It is called "achaar" in north India. The process of preservation of food in common salt or vinegar is called pickling. Pickles are good appetizers, and they aid in digestion by stimulating the flow of gastric juice.

Raw materials:

Raw materials used in pickling should process definite characteristics.

Salt

- For pickling, any variety of common salt is suitable, provided it is pure.
- Salts should be free from lime, as it reduces the acidity of the vinegar in which brined vegetables are pickled.
- Salts should also be free from iron, which is contact with the tannin of fruit, vegetable, and spice, produces blackening of the pickle.
- It should also not contain magnesium salts which impart a bitter taste to the pickle.

Vinegar

- Vinegar of good quality containing at least 4% acetic is suitable for pickling.
- Vinegar of low acid content is not suitable for pickling.

Spices

- Spices are added depending upon the kind of fruit or vegetable took and the kind of flavor desired.
- The spices commonly used in a pickle are leaves, cardamom, chilies, cinnamon, turmeric, clove, coriander, ginger, mace, mustard, black pepper, cumin, garlic, fennel, aniseed, etc.

Water

- Only potable water should be used for the preparation of brine.

- If hard water is to be used, a small quantity of vinegar should also be the brine to neutralize its alkalinity.

Coloring and Hardening Agents

- Colors are not generally added to pickles, although they are used to some extent in sauces. Some manufacturers use alum for firmness in pickles.

Common Fruits and Vegetables Used in Pickling.

Raw Mango	Lemon	Amla	Green Chilies	Garlic
Onio	Cauliflower	Tomato	Plums	Grapes
Apples	Papaya	Beetroot	Boiled beans	Cucumber
Cabbage	Radish	Ginger		

4. Salting Process:

Dry Salting

- Select, wash, drain, and weigh the vegetable.
- Use 3 kg of salt for every 100 kg of vegetables.
- Place vegetables 2.5 cm deep in a keg, sprinkle with salt.
- Repeat layering vegetables and salt until the keg is three-quarters full.
- Cover with two layers of cheesecloth, tuck sides, and place a wooden board on top.
- Weigh down with a 4.5 kg clean, non-reactive stone to form brine (usually within 24 hours).
- Place the keg in a warm, dry area for fermentation.
- Osmosis causes vegetable juice to form brine, covering the mass.
- Bubbles of CO_2 indicate the start of fermentation.
- Fermentation completes in 8-10 days under favorable conditions.
- Preserve by excluding air to prevent "pickle scum" (wild yeast) which can spoil the pickles.

Fermentation in Brine

- **Brining:** Steeping vegetables in a salt solution for a set time.
- **Use Case:** Ideal for cucumbers and vegetables lacking sufficient juice for dry salting.
- **Preparation:** Dissolve common salt in water, filter to remove impurities.
- **Brine Volume:** Typically, half the volume of the vegetables.

- **Duration:** Critical for proper texture and taste; usually takes 4-5 weeks.
- **Curing Indicators:** Vegetables become semi-translucent, color changes to dark olive green or yellowish green.
- **Effects:** Vegetables lose raw flavor, become firm and crisp.
- **Storage:** Properly cured vegetables can be stored indefinitely.

Pickling with Salt

- **Salt Method:** Pack vegetables with a large amount of salt to inhibit fermentation.
- **Salt Ratio:** Use 25 kg of salt per 100 kg of vegetables.
- **Post-Curing:** Drain and soak cured vegetables in cold or warm water to remove excess salt.
- **Storage:** Store vegetables in 10% strength vinegar for several weeks to prevent shriveling.

Packing Methods

- Pack pickled onions and mixed pickles loosely in bottles or jars to maintain shape.
- Add fresh vinegar to fill gaps between pieces.
- Store pickles for a few days to ensure vinegar absorption before marketing, depending on vegetable type, piece size, and curing conditions.

The Science Behind Salting Food Preservation

- **Mechanism:** Salt inhibits bacterial growth by creating a hostile environment, drawing out moisture, and dehydrating bacterial cells.
- **Flavor Enhancement***:* Salt amplifies food flavor, enhancing enjoyment.
- **Salt Types***:* Kosher, sea, and Himalayan pink salt are popular for their high mineral content and preservation properties.
- **Balance:** Proper salt-to-food ratio is crucial to avoid under or over-salting.

Benefits of Salting Food Preservation

- **Extended Shelf Life:** Salting delays spoilage, extending the usability of seasonal and perishable items.
- **Flavor Enhancement:** Salt intensifies natural flavors, especially in cured meats, making them more complex and enjoyable.
- **Culinary Transformation:** Salting not only preserves but also elevates food quality.

Types of Salt Used for Food Preservation

- **Kosher Salt:** Favored by chefs for its purity and versatility in preserving and seasoning.
- **Sea Salt:** Less processed, retaining natural minerals and flavors, suitable for various preservation techniques.

- **Himalayan Pink Salt:** Known for its unique flavor and high mineral content, adding richness to preserved foods.
- **Curing Salt:** Contains salt and sodium nitrite, specifically for preserving meats and maintaining color and flavor.

Choosing the right salt depends on personal preference, availability, and desired flavor profile. Experimenting with different salts can enhance culinary experiences.

The Process of Salting and Its Effects on Food

Salting involves preparing the food, applying salt, and allowing it to cure. This process not only preserves but also enhances the texture and flavor of the food.

- **Preparation**: For meats, trim excess fat and remove bones. Wash and cut vegetables, and scale and gut fish. Proper prep ensures even salt penetration.
- **Application**: Use 1-2% salt of the food's weight, adjusting for taste and preservation needs. Ensure even distribution over the food's surface.
- **Curing**: Let the food rest, allowing the salt to draw out moisture and inhibit bacterial growth. This process also tenderizes meat, enhancing flavor and texture.

Tips for Effective Salting

- **Right Amount**: Balance salt quantity; too little won't preserve, too much makes food inedible. Experiment to find the ideal ratio.
- **Even Distribution**: Ensure salt covers all food surfaces for uniform preservation and seasoning.
- **Size and Thickness**: Adjust curing time based on food's size; thicker cuts need more time, smaller pieces less.
- **Monitor**: Check curing progress to avoid under or over-salting. Taste periodically to achieve desired saltiness.
- **Curing Time**: Different foods require different times; delicate fish need less time than dense meats. Follow specific recipes or guidelines.

Common Mistakes to Avoid When Salting Food

Salting food seems simple, but common mistakes can affect the outcome. Here are some pitfalls to avoid:

- **Underestimating Curing Time**: Rushing the process can result in poorly salted and less flavorful food. Allow enough time for the salt to fully cure the food.

- **Over-Salting**: Excessive salt can make food too salty and unpleasant. Taste periodically to ensure the right balance.
- **Not Rinsing or Soaking**: Some techniques require rinsing or soaking after curing to remove excess salt. Follow specific instructions for the method used.
- **Using Iodized Table Salt**: Iodized salt contains additives that can affect taste and texture. Use natural salts without additives for better results.
- **Improper Storage**: Proper storage is crucial to maintaining the quality and safety of preserved food. Follow recommended guidelines for storage.

Salting is an ancient preservation method that enriches culinary traditions. Understanding its principles and techniques can help you master this valuable skill, extending the shelf life of food and enhancing flavors. By avoiding common mistakes, you can make the most of this timeless preservation method.

DAY 2

5. Curing

Curing preserving the raw materials Using different ingredients, Seasoning and extenders. Curing is a method in preserving selected raw materials into processed products like salted eggs, sausage, skinless longanisa, bacon, tocino, and many others.

Function of the Curing Agents

- Enhance the taste and color of meat.
- Increased the water binding capacity of the meat.

Curing ingredients

- Salt: Extracts moisture, prevents bacterial spoilage. Pink salt, or Prague powder, a mix of sodium chloride and nitrate/nitrite, controls botulinum toxin.
- Sugar: Reduces salt's harshness, prevents hardening.
- Nitrate/Nitrite: Preserves color, flavor, prevents spoilage and bacterial growth.
- Phosphate: Boosts yield, moisture.
- Ascorbic acid/Sodium erythorbate: Retains meat color.
- MSG: Enhances taste, aroma.
- Texture vegetable proteins: Added to meat.
- Spices: Adds flavor.

Curing Methods:

- Dry curing: Uses salt as a preservative.
- Pickle curing: Uses sugar, vinegar immersion.
- Injection curing: Injects brine solution into meat muscle.

Tips in Curing:

- Use appropriate container to prevent oxidation, contamination.
- Consider curing time.
- Maintain temperature at 36-40°F.
  - Regularly inspect for spoilage.
  - Ensure even distribution of the curing mixture.
  - Freeze cured product for storage.

6. Smoking

The smoking process involves exposing cured meats, poultry, game, and seafood to smoke generated from burning hardwood chips, herbs, fruit skins, or spices in a controlled environment. This imparts flavor, aroma, texture, appearance, and extends shelf life. Smoking can occur between 65°F to 250°F, with cold smoke infusing flavor and hot smoke cooking the food.

Reasons for Applying Smoke to Meat:

- Preservation: Antimicrobial compounds in smoke affect surface bacteria, but penetration is limited.
- Acids: Smoke coats meat, aiding surface coagulation and preventing mold and bacteria growth.
- Flavor & Aroma: Phenols, carbonyl compounds, and organic acids contribute to smoky taste, but excess can lead to bitterness.

SMOKING METHODS

COLD SMOKING	HOT SMOKING
Temperature of Smokehouse • 70°F and 100°F • 80°F) is average temperature	**Temperature of Smokehouse** • 160°F for all sausage (casings) • 85°F for all solid meats
Result of Cold Smoking • Product does not cook • Slight dehydration of overall texture	**Result of Hot Smoking** • Product cooks during the smoking process
USES • Sausage in the uncooked smoked category • Smoked salmon • Addition of smoke to an item that will be finished by some other cooking method	**Final internal temperature of cured hot smoked products** • All poultry 165°F internal • All meats 155°F internal • Final internal temperature of uncured hot smoked items • Beef (suitable cuts) 130 - 135°F for rare **USES** • To produce a fully cooked,smoked item • Sausage in the smoked cooked category

PREPARATION AND SMOKING PROCESS (HOT OR COLD)

COLD SMOKE	HOT SMOKING
Preparation before smoking • Trim item, truss, net or tie as necessary • Cure item by desired method • When cure is done, rinse item • Form pellicle	**Preparation before smoking** • Trim item, truss, net or tie as necessary • Cure item by desired method (optional) • If item is cured, rinse when done • Form pellicle
Smokehouse preparation • Place items on racks or hang from sticks	**Smokehouse preparation** • Place items on racks or hang from sticks
Smoke process • Smoke foods until desired color/flavor is achieved • Product can be air-dried further if drier product is desired • Refrigerate	**Smoke process** • Solid meat (185°F) smoke until proper internal temperature • Sausage (160°F) smoke until 140°F internal finish by • poaching in 170°F water until proper internal temperature

Note: It is recommended to cure all items that are to be cold-smoked because of possibility of botulism. Items that are hot-smoked can be left uncured if desired.

- Color Enhancement: Carbonyl compounds combine with meat proteins, creating reddish-brown hues characteristic of smoked products.
- Product Innovation: Smoky flavor extends shelf life and improves appearance.
- Oxidation Protection: Smoke guards against lipid oxidation and stale flavor
- Protective Coating: Acids in smoke help form a protective protein skin on meats and emulsion-type sausage.

7. Drying

Drying and dehydrating fruits and vegetables is an ancient preservation method, reducing water content to 75-90%, which lowers water activity, making them resistant to spoilage. Heat, typically from solar energy or hot air, removes moisture, but can result in texture loss, nutrient depletion, discoloration, and flavor loss.

Why Dry Foods?

- Water activity reduction controls chemical and microbiological changes.
- Decreased weight, size, and volume ease transportation.
- Simple, cheap packaging requirements.
- Facilitates further processing, like grain drying for flour production.

Drying Mechanism:

- Hot air evaporates water from food surfaces.
- Water vapor diffuses through air boundary and is carried away.
- A gradient from moist food interior to dry air drives water removal.

Effects of Drying:

- **Shrinkage:** Moisture loss reduces food size and density, causing internal stress and shriveling. Rapid drying improves texture.
- **Case Hardening:** Formation of hard outer layer due to rapid initial drying, common in solute-rich foods. Lower temperatures prevent it.
- **Browning**: Color change due to enzymatic oxidation (residual enzymes), Maillard reaction (protein-amino and sugar interaction), or caramelization (sugar conversion).

Types of Drying Methods:

- **Hot Air Drying:** Includes spray drying, tray drying, fluidized bed drying, etc. Spray drying involves atomizing pre-concentrated food into fine droplets and spraying them into heated air flow. Tray dryers use insulated cabinets with mesh trays and blow hot air through ducts for uniform drying.
- **Microwave Drying**: Utilizes microwaves for drying.
- **Freeze Drying (Lyophilization):** Used for heat-sensitive foods, freezing material and then reducing pressure to allow frozen water to sublimate into vapor.
- **Osmotic Drying:** Involves immersing high-moisture products in concentrated solutions (sugar or salt) to initiate counter-current mass transfer

8. Dehydration

Food Dehydration: A Timeless Preservation Method

- **Purpose**: Dehydration extends food shelf-life by removing water content, making it one of the oldest and most widespread preservation techniques.
- **Spoilage Prevention**: Moisture is a breeding ground for microorganisms like bacteria, yeast, and molds, leading to food spoilage. Dehydration prevents their growth by reducing moisture and slowing enzymatic reactions.
- **Dehydration Basics**: Successful dehydration requires heat (around 140°F), dry air to absorb moisture, and air movement to carry away moisture.

Benefits of Food Processing

- **Bacteria Reduction**: Processing methods like drying and pickling dehydrate food, altering pH levels and inhibiting harmful microorganism growth.
- **Extended Shelf-Life**: Food processing enhances shelf-life, reducing waste and promoting food sustainability.
- **Health Benefits**: Processing reduces health risks by eliminating harmful bacteria and addressing major health concerns.

Lesson Activity

Refer to Learning Activity Sheet No. 1 for students to accomplish.

DAY 3

SUB-TOPIC 2: TOOLS AND EQUIPMENT IN FOOD PROCESSING

1. Explicitation

A kitchen contains different tools and equipment used for food preservation. Having the right food preservation tools and equipment can make canning, freezing, drying, and pickling safe and easy.

Activity No. 1

Answers:

1. Curing
2. Dehydration
3. Osmotic
4. Nitrate
5. Smoking
6. Fermentation
7. Salting
8. Pickling
9. Drying
10. Shrinkage

Preservation is a method in which food is kept from spoilage. It is a way of prolonging the usefulness of food for future use. In preserving, specialized tools/utensils are used to make preservation successfully done.

2. Worked Example

Food Processing Tools and Equipment

Measuring Tools

- Weighing scale: Used to measure the weight of products like meat, vegetables, or fruit for portion uniformity.
- Measuring spoons: For measuring liquid or dry ingredients in specific amounts.
- Measuring cup: Measures liquid or bulk solid volumes, especially for amounts from 50 mL (2 fl oz) upwards.
- Food thermometer: Measures internal temperatures of meat and cooked foods, especially roasts and steaks.
- Refractometer: Measures dissolved solids content in fruits and vegetables, and sugar concentration in sap and syrup.
- Salinometer: Measures salinity or dissolved content.

Cutting Equipment

- **Knives:** Used for various cutting tasks such as meat, vegetables, herbs, and nuts.
- **Fillet knives:** Specifically for filleting and preparing fish.
- **Descaler or scaler:** Removes fish scales.

Smoking Equipment

- **Baklad:** Bamboo drying rack for fish before smoking.
- **Bakol:** Bamboo basket for transporting smoke.
- **Bistay:** Separates and collects sun-dried fish.
- **Dinarayan:** Wooden smoking tray.

Salting Equipment

- **Oil drum:** Container for salted fish during processing.
- **Earthen pots**: Used for storing salted products.
- **Wooden shovel:** Mixes salt and small fish for salting.
- **Wooden salting vat:** Container for salting process.

Other Equipment

- **Chopping board:** A wooden or plastic surface for cutting fish, meats, and vegetables.
- **Tong:** Grips and lifts objects instead of using hands directly.
- **Utility trays**: For mixing liquids or transferring products between containers.
- **Can sealer:** Seals can lid to the body airtight.
- **Smokehouse:** Cures meat or fish with smoke, storing finished products for extended periods.
- **Freezer and refrigerator:** Maintain raw material freshness and ideal temperatures for storing processed foods.

- **Panakip:** Covers to submerge fish in salt during boiling.
- **Panandok:** Metal ladle for removing cooked fish from boiling brine.

Checking, Sanitizing, and Calibrating Equipment

A. Procedure for Cleaning Equipment

1. Wash all the equipment with soap.
2. Rinse with clean water.
3. Disinfect by soaking in a sanitizer solution.
4. Remove from the solution.
5. Allow to air dry.

B. Procedure for Sanitizing Equipment

1. Prepare all the equipment that is needed to sanitize.
2. Measure a certain amount of chlorine and water.
3. Mix and dip the equipment in the mixture.
4. Remove from the solution.
5. Allow air to dry.
6. Pack and store in a clean and dry cabinet.

C. Calibrating Measuring Devices

1. For the Weighing Scale - make sure that the hand is pointed at zero to check the accuracy of an empty weighing scale.
2. Food Thermometer - Put the food thermometer in hot food and check if the temperature rises.
3. Refractometer-Put a drop of distilled water in the dark circular or rectangular area and close the cover. Dark areas can be seen on the scale inside the eyepiece. Rotate the calibration screw and wait until the dark area falls on the zero mark. Open the cover of the refractometer. Dry the cover and glass using cotton cloth or tissue paper.
4. Salinometer - Put a 20° brine solution in the salinometer and check if it records the reading properly.

DAY 4

Lesson Activity

Tools and Equipment Expert!

Directions: Identify the tools and equipment by putting the number on the box provided.

Identify the tools and equipment by putting the number on the box provided.

Tools & Equipment	No.	Picture	Tools & Equipment	No.	Picture

A. Food thermometer		 **1** Appliance Fridge Home Architecture Buildings from Picryl.	B. Can sealer		 **6** Conductivity Meter Wikimedia Commons.
C. Weighing scale		 **2** Glass Jar with Can Lid Closing Machine from Shutterstock.	D. Tongs		 **7** Kitchen Tools - Measuring Spoon by Joey Z, from Flickr.
E. Measuring cup		 **3** Thermometer Reading from Wikimedia Commons.	F. Salinometer		 **8** Portable Refractometer from Wikimedia Commons.
G. Measuring spoon		 **4** Plastic Measuring Cup by Don Hankins, from Wikimedia Commons	H. Knife		 **9** Tongs for Serving Food from Wikimedia Commons.
I. Refractometer		 **5** Weighing Scale by Tuxyso, from Wikimedia Commons.	J. Refrigerator		 **10** Handmade Chef Knife from Wikimedia Commons.

Answers:

A. 3
B. 2
C. 5
D. 9
E. 4
F. 6
G. 7
H. 10
I. 8
J. 1

D. Making Generalizations	**1. Learners' Takeaways** **Directions:** Answer the following according to your understanding of the topic. **What am I learning in this module?** / **Why am I learning this module?** / **How will I know that I've learned?** (	)

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION				**NOTES TO TEACHERS**
A. Evaluating Learning	**1. Formative Assessment** **Directions:** Arrange the procedure in cleaning equipment using number 1-5. Procedure in Cleaning Equipment _____ Remove from the solution. _____ Wash all the equipment with soap. _____ Allow to air dry. _____ Disinfect by soaking in a sanitizer solution. _____ Rinse with clean water. **2. Homework (Optional)** The teacher will assign the students to list all the measuring tools available in their homes and cite the ingredient/s they usually measure them with.			**ANSWER KEY** Procedure in Cleaning Equipment • 4 • 1 • 5 • 3 • 2
B. Teacher's Remarks	*Note observations on any of the following areas:*	**Effective Practices**	**Problems Encountered**	The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, the earner engagement and other related stuff. Teachers may also suggest ways to improve the different activities explored.
	strategies explored			
	materials used			
	learner engagement/ interaction			
	others			

C. Teacher's Reflection	*Reflection guide or prompt can be on:* ▪ *principles behind the teaching* *What principles and beliefs informed my lesson? Why did I teach the lesson the way I did?* ▪ *students* *What roles did my students play in my lesson? What did my students learn? How did they learn?* ▪ *ways forward* *What could I have done differently? What can I explore in the next lesson?*	Teacher's reflection in every lesson conducted/facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions.