



# TVET LEVEL II



# AGRICULTURE

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## Meat Processing

# TRAINEE MANUAL



Approved by:  Workforce  
Development  
Authority



**USAID**  
FROM THE AMERICAN PEOPLE



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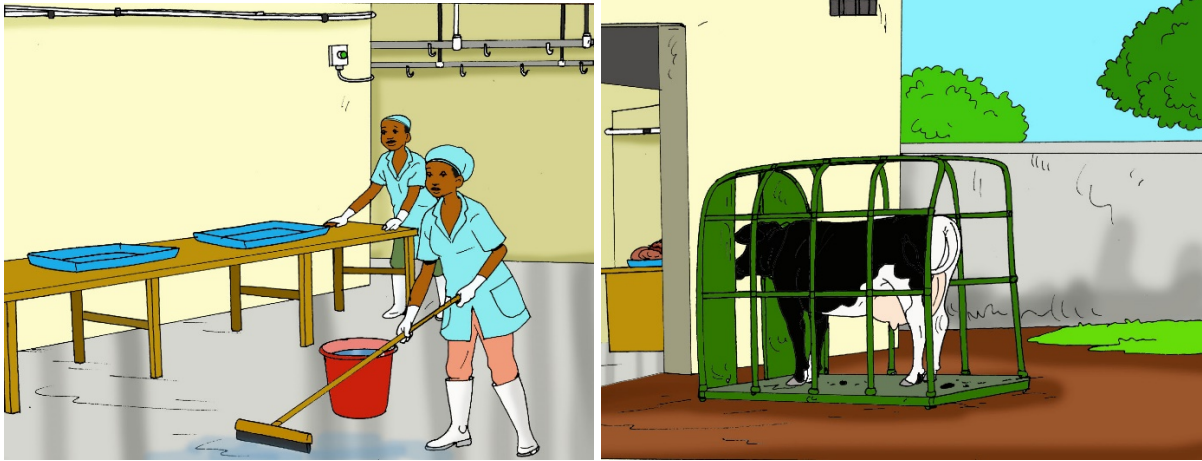
# **MEAT PROCESSING**

**Unit 1: Preparation of the workplace and animals for slaughter**

**Unit 2: Preparation of a carcass for butchering**

**Unit 3: Making meat products**

# Unit 1: Preparation of the workplace and animals for slaughter



## **Topics**

- 1.1** Application of hygiene and sanitation practices in accordance with work instructions
- 1.2** Restraining animals to ensure animal welfare
- 1.3** Stunning animals to ensure animal welfare

### **Unit Summary:**

This unit describes knowledge, skills, and attitudes required so trainees will be able to prepare a slaughtering workplace then prepare animals destined for slaughter using techniques to ensure the welfare of the animals.

## Self-Assessment Unit 1

1. Look at the unit illustration. What do you see? What do you think this unit will be about? What topics might be covered?
2. Fill in the self-assessment below: There are no right or wrong ways to answer this survey. It is for your own use during this course. Think about yourself: do you think you can do this? How well? Read the statements across the top. Put a check in column that best represents your situation. At the end of this unit, we'll take this survey again. Read the statements across the topics of this unit. Put a tick (✓) in the column that best represents your situation.

<b>My experience</b>	<b>I don't have any experience doing this.</b>	<b>I know a little about this.</b>	<b>I have some experience doing this.</b>	<b>I have a lot of experience with this.</b>	<b>I am confident in my ability to do this.</b>
<b>Knowledge, skills, and attitudes</b>					
Describe personal hygiene in slaughtering working area					
Describe environmental hygiene in slaughterhouse					
Explain cleaning procedures used in slaughterhouse					
Describe frequency of cleaning in slaughtering work area					
Describe different restraint devices used for slaughtering					
Explain different restraining methods used in slaughtering					
Apply different stunning methods for slaughtering operations					

<b>My experience</b>	<b>I don't have any experience doing this.</b>	<b>I know a little about this.</b>	<b>I have some experience doing this.</b>	<b>I have a lot of experience with this.</b>	<b>I am confident in my ability to do this.</b>
<b>Knowledge, skills, and attitudes</b>					
Use different shackling methods in slaughtering operations					
Apply different sticking techniques for slaughtering					

## **Topic 1.1: Application of hygiene and sanitation practices according to work site requirements**

### **Key Competencies:**

<b>Knowledge</b>	<b>Skills</b>	<b>Attitudes</b>
<b>1.</b> Explain main principles of environmental hygiene	<b>1</b> Apply environmental hygiene in a slaughter zone	<b>1.</b> Methodical
<b>2.</b> Explain main principles of personal hygiene	<b>2</b> Apply personal hygiene	<b>2.</b> Diligent
<b>3.</b> Describe cleaning and sanitation procedures	<b>3</b> Perform cleaning and sanitation	<b>3.</b> Problem Solver

## ↶ Getting Started: What do we know and where are we going?



### Topic 1.1 Task 1:

1. Find a partner. You have 5 minutes to complete the following task.
2. Observe the photograph below. Look at all the details provided and respond to the following questions with as much detail as possible. There are many correct answers so list as many as you can in each response.
  - a. How can you identify this photograph as a slaughterhouse?
  - b. What are the personnel doing in the photograph—and why?
  - c. What will the work team do next?
  - d. List out what the personnel are wearing—and explain the importance of each piece.



3. Share and discuss your answers with the rest of the class.
4. Review the Key Competencies table together

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<sup>1</sup> U.S. Department of Agriculture. (2014, May). 20120106-OC-AMW-0210 [Photograph]. Public Domain Files. [https://www.google.com/url?sa=i&url=http%3A%2F%2Fwww.publicdomainfiles.com%2Fshow\\_file.php%3Fid%3D13996097425040&psig=AOvVaw04KreOAK9kyCsjGsd4GzJ&ust=1596628060358000&source=images&cd=vfe&ved=0CA0QjhxqFwoTClkxZq9gesCFQAAAAAdAAAAABAD](https://www.google.com/url?sa=i&url=http%3A%2F%2Fwww.publicdomainfiles.com%2Fshow_file.php%3Fid%3D13996097425040&psig=AOvVaw04KreOAK9kyCsjGsd4GzJ&ust=1596628060358000&source=images&cd=vfe&ved=0CA0QjhxqFwoTClkxZq9gesCFQAAAAAdAAAAABAD)



## Problem Solving Activity



### Topic 1.1 Task 2:

1. Individually, close your eyes and envision two times you saw animals slaughtered—in two different environments. Try to remember all the details carefully. Focus on how the area was prepared prior to killing the animal, and how the area was kept clean and then cleaned up after the animal was slaughtered.
2. In a group of three, decide on two different animals in two different environments that one or several of the group members has remembered, then complete the following table with as much detail as you can remember:

<b>Type of animal:</b>	<b>Type of animal:</b>
Description of the place where this animal was slaughtered: 1. 2. 3.	Description of the place where this animal was slaughtered: 1. 2. 3.
Steps taken to clean the area and animal prior to the slaughter: 1. 2. 3.	Steps taken to clean the area and animal prior to the slaughter: 1. 2. 3.
Steps taken to keep the area clean during slaughter: 1. 2. 3.	Steps taken to keep the area clean during slaughter: 1. 2. 3.
Steps taken to clean up after the slaughter: 1. 2. 3.	Steps taken to clean up after the slaughter: 1. 2. 3.

Identify areas where contamination of the meat product could have happened: 1. 2. 3.	Identify areas where contamination of the meat product could have happened: 1. 2. 3.
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3. After completing your table, share with the class. Ask other groups questions to clarify.

4. Next, read **1.1 Key Facts** together as a class.

### 1.1 Key Facts

- **Points to consider while applying hygiene and sanitation practices:**
  - Where should hygiene happen? Areas, buildings, equipment, and liquid or waste disposal
  - Personal hygiene—how are you adding to the sanitation of the area?
  - Environmental hygiene—how are the surroundings to be kept clean?
  - Cleaning procedure—what are standard procedures and are they adequate?
  - Frequency of cleaning—how often does the cleaning need to happen?
- **Consider hygiene in the following places:**
  - Places for slaughtering and processing (butchering) operations
  - Personal protective clothing (boots, aprons, gloves, head covers, and clothes)
  - Equipment (including tools and all surfaces where the tools are used)
  - Sanitary facilities (both those inside the slaughtering zone and those nearby)
  - Liquid and solid waste disposal zones
- **Consider personal hygiene:**
  - **Purpose:** Workers may transmit bacteria, germs, and dirt to work surfaces and food products which can cause illness or spoilage. Personal hygiene prevents this.
- **Personal hygiene consists of:**
  - Proper hand washing
  - Clean working clothes
  - Hair covering
  - Hygienic gloves
  - Overall good health
- **Principles of environmental hygiene:**
  - Proper fencing: prevent access by the public or other animals by controlling access the work zone.

- Pest control: eliminate access or presence of rodents and insects, and birds.
- Liquid and solid waste disposal systems: avoid contamination of work zones and avoid polluting by avoiding chemical seepage and waste disposal into areas where they may impact groundwater or farm zones.
- **Cleaning procedures:**
  - The cleaning program will be set up according to local conditions of slaughterhouse.
- **Open slaughter zone:**
  - Suitable if climate is dry and sunny and if water supplies are restricted or not available.
- **Slaughterhouse:**
  - Buildings may or may not be roofed and are constructed to protect against climatic conditions and use varying supplies of water and energy.
- **Cleaning procedures:**
  - **If no water is available:**
    - Surfaces (floors, tables etc.) must be scraped and swept clean, eliminating and disposing of all waste and soil prior to slaughtering.
  - **If water supply is restricted, cleaning procedure may consist of:**
    - Remove solid waste from surfaces by scraping and sweeping
    - Scrub with brushes with water and detergent using the two-pail system
    - Rinse with clean water
    - Dry surfaces and disinfection with hypo-chloride
  - **If sufficient energy and water supplies are available, cleaning procedure may consist of:**
    - Remove solid waste from surfaces using brooms and shovels
    - Pre-rinsing with cold water using a low-pressure cleaner if available
    - Apply detergent (dosage according to suppliers' instructions)
    - Rinse with warm water using a low-pressure cleaner if available
    - Disinfect with chlorine using a garden sprayer
    - Post rinsing with potable water
- **Frequency of cleaning:**
  - A thorough cleaning program must be enacted at least once a day.
  - A reduced cleaning program must be repeated before any slaughtering process during the workday, that is, after killing the animal and before preparing the meat for production and sale.

- **The best hygiene standards are well planned and well implemented:**
  - Careful planning minimises contamination of animals, meat, surfaces, and people
  - Strict discipline ensures hygienic practice is implemented throughout processing<sup>2</sup>



## Guided Practice Activity



### Topic 1.1 Task 3:

1. You will visit an actual workplace (slaughterhouse) so this work is preparing for that visit. Trainees will observe and take notes regarding the cleaning and sanitation procedures seen during their visit. To prepare for the field trip—and to make the observational time more valuable—you will consider the types of contaminations that may occur, the products to eliminate contaminants, and good procedures to use.
2. Complete Brainstorm 1 a class, using the following questions:
  - a. What contaminants may be found in a slaughterhouse?
  - b. List out a set of steps that outline a good general process for cleaning a slaughterhouse, before, during, and after an animal is slaughtered.
3. After reflection, complete Brainstorm 2 about the things that are needed to prepare a slaughter area in a hygienic manner under the headings of:
  - a. Tools and materials needed
  - b. Cleaning products needed
4. Having completed the list of tools and supplies needed, now work on Brainstorm 3 about the cleaning process.
  - a. Outline generalized cleaning process or a checklist ensuring that the slaughter zone is hygienic.

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<sup>2</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Slaughterhouse cleaning and sanitation*. <https://www.fao.org/3/x6557e/X6557E02.htm>



## Application Activity



### Topic 1.1 Task 4:

1. You will visit a local butcher or a local slaughterhouse. While there, you will observe the processes that are used to ensure sanitation and safety. Use the following questions to guide your notetaking and write careful and complete notes. You will submit a short report to your trainer after this visit, so it is important to gather as much detailed information as possible into your report.
  - a. Describe the slaughtering zone—what do you see there that is sanitary? What can you identify as not clean? What needs to be done to upgrade the zone to make it hygienic?
  - b. What safety equipment or practices do you observe?
  - c. Describe the following:
    - personal hygiene practices used
    - environmental hygiene practices used
    - cleaning practices used
  - d. What protective and sanitary clothing are the personnel wearing?
  - e. Describe the cleaning methods used –list out the process you observe including the tasks done, the tools used, and the names of any cleaning products.
  - f. Write down any other observations that you think are relevant to sanitation and safety.
2. Submit your report to the trainer and consider the feedback provided by the trainer.



### Points to Remember

- Wear protective clothing, which can be sanitized between uses.
- Cleaning should take place before, during, and after slaughtering an animal.
- Plan ahead to minimise contamination of any meat products.



## Formative Assessment

Select the correct answer for each question.

1. Personal hygiene includes:
  - a. Pest control
  - b. Hand washing
  - c. Using electrical equipment safely
  
2. Environmental hygiene includes:
  - a. Use of gloves
  - b. Liquid and solid disposal
  - c. Equipment available
  
3. The following are steps of cleaning, except:
  - a. Disinfecting
  - b. Rinsing
  - c. Scrubbing
  - d. Mincing and chopping
  
4. List steps for a slaughterhouse cleaning procedure, include when (in the butchering process) should each step be done (or repeated), and tools and materials needed at each step.

## Topic 1.2: Restraining animals using techniques that ensure the welfare of the animal

### Key Competencies:

Knowledge	Skills	Attitudes
1. Describe restraint devices	1. Use restraining devices on animals	1. Patient
2. Explain restraining techniques	2. Decide which restraint is best for a given situation	2. Methodical



### Getting Started: What do we know and where are we going?



#### Topic 1.2 Task 1:

1. Discuss as a class: Have you ever noticed how animals are restrained prior to being slaughtered? Share your experiences. Why do you think it is important to restrain animals as they are prepared for slaughter?
2. Review the picture below and individually respond to the questions with lists of observations.
  - a. List at least 3 reasons a cow may be put into the restraint shown in the picture.
  - b. If this restraint was used prior to slaughter, what other devices might be added to further restrain the cow?
  - c. Give reasons that this is NOT a good restraint, if the intention is to slaughter this cow.



3. Share and compare your answers with a partner. Then, share out with the rest of the class.
4. Review the Key Competencies table together.



## Problem Solving Activity



### Topic 1.2 Task 2:

1. Consider the three general types of animal restraining techniques prior to slaughter:
  - a. Psychological
  - b. Physical
  - c. Chemical
2. Think about what the words mean and try to guess what each kind of animal restraint entails.
3. Write your ideas and then share them with the class to develop a common understanding.
4. Read **1.2 Key Facts** together. Ask questions to be sure you understand.
5. Focus on the Animal Welfare information. As butchers, you are expected to **KNOW** and **FOLLOW** the guidelines to minimise animal suffering and to ensure safe livestock practices

### 1.2 Key Facts

- **Generalized restraining techniques:** There are three major groups of restraining techniques.<sup>3</sup>
  - **Psychological** – this a non-restrictive type of restraint which entails using a soft, soothing voice while gently stroking the animal to help calm and sooth the animal and would always be used in combination with other types of restraint.
  - **Physical** – this is the primary method of restraint and involves using the handler’s hands or body along with muzzles, ropes, or other equipment.
  - **Chemical** – this method uses drugs such as sedatives, tranquilizers or anaesthesia to alter an animal’s mental state, so the animal is immobilized and/or without pain.

<sup>3</sup> Animal Behavior College. (n.d.). *Fundamentals of restraint*. <https://422eh83b5hvp2tnqmr27zgbf-wpengine.netdna-ssl.com/wp-content/uploads/2020/01/vap-sneak-peek-stage2.pdf>

- **Methods of restraining animal with specific devices:**

- **Restraining the head region**

- **Bull nose ring:** A metal ring fixed to the nasal septum of bulls. This can be used to restrain and control the head region of the bull when a **rope** or **bull holder** is attached to the ring.<sup>4</sup>



- **Bull holder:** A wooden pole fitted with metal hook structure which links to the nose ring.
- **Bull nose leader:** Used to connect bull ring with rope if examination of the animal is to be prolonged or if the animal is restive (moving a lot). The swivel allows the bull to turn and twist its head without hurting his nose and without twisting the operator's wrist.

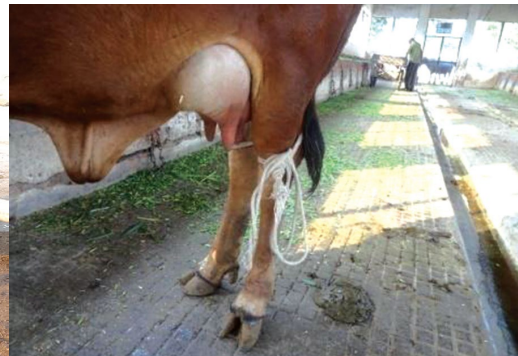


<sup>4</sup> National Council of Education Research and Training (NCERT). (2018, June 28). *Restraining farm animals*. <https://ncert.nic.in/textbook/pdf/ievw101.pdf>

<sup>5</sup> *Bull Nose Ring* [Photograph]. (2016, November 28). Pixabay. <https://pixabay.com/photos/bull-nose-ring-snout-animal-mammal-1863730/>

<sup>6</sup> Goodwin, C. (2008, March 26). *Lead nose ring and a bull holder* [Photograph]. Wikimedia. [https://commons.wikimedia.org/wiki/File:Nose\\_rings.jpg](https://commons.wikimedia.org/wiki/File:Nose_rings.jpg)

- **Muzzle cover:** Used to envelope mouth of animals to prevent the animal from biting (also used to prevent overeating) made of rope/leather straps and bamboo splits/wire netting.
- **Mouth gag:** Used for keeping the jaws of cattle open for examination of the mouth. One strip on the gag is extended out the right side of the mouth and the other from the left side.
- **Restraints involving ropes:<sup>7</sup>**
  - **Restraining a foreleg:** The foreleg of the cattle can be raised and held off the ground for examination or treatment. Raising the foreleg also helps in controlling the movement of the animal and hinders kicking with the hind leg. The method restrains the front leg with the help of a **rope**.
  - **Restraining a hind leg:** Following photos show two commonly used ways of restraining the hind leg. **Anti-kicker** (holding up one leg) and **Milker's knot** (tying the two legs together) are used to prevent an animal from kicking.



- **Restraining the whole animal (Casting an animal)**
  - Casting means using ropes to make the animal falls on the ground.
  - Animals are cast for various reasons, mainly surgical operations or hoof trimming.

<sup>7</sup> National Council of Education Research and Training (NCERT). (2018, June 28). *Restraining farm animals*. <https://ncert.nic.in/textbook/pdf/ievw101.pdf>



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- **Boxing or Crating an animal**
  - Animals are often led into a very small, confined box or cage in which they can barely move. Often the animal's head is outside the box or cage and the neck is held stable.
- **NOTE: Protective clothing must be worn while restraining an animal**
  - Important protective clothing includes hard-hats (to avoid head injury from kicking or falling) boots (an animal may stomp on people's feet), as well as thick gloves (if an animal could bite).



### Guided Practice Activity



#### Topic 1.2 Task 3:

1. Different animals require different kinds of restraining techniques and devices. The different devices depend on the size/strength of the animal as well as the materials that are locally available to construct or purchase such restraints. Cultural practice also plays a part in the way animals are restrained prior to butchering. For example, the Muslim faith has strict regulations on how the animals are to be treated prior to butchering.
2. During this task you will work with a small group of trainees to research as many details as possible regarding the ways that different animals are treated prior to being butchered, then what sort of restraints are used during the process of the slaughter.
3. Each group will prepare a short presentation to be given to the class after the research period. You should review the resource books available at your school, use information

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<sup>8</sup> National Council of Education Research and Training (NCERT). (2018, June 28). *Restraining farm animals*. <https://ncert.nic.in/textbook/pdf/ievw101.pdf>

available from the internet, and you should also rely on local knowledge so it is advised that you go out and interview a butcher in your community to gather knowledge there too. Be sure to include details on the materials/tools used for restraints, to improve safety, and to ensure sanitary conditions. Drawings and photos may be helpful in your explanations.

- a. Group 1 will research how **cows** are prepared and restrained for slaughter.
  - b. Group 2 will research how **sheep/goats** are prepared and restrained for slaughter.
  - c. Group 3 will research how **pigs** are prepared and restrained for slaughter.
4. Share your presentations with the class. Ask other trainees questions about their presentations.



### Application Activity



#### Topic 1.2 Task 4:

1. During this task you will do a field visit. Your trainer has prepared a time for you to visit a slaughterhouse so you can observe and participate in the restraining of animals as they are prepared for slaughter. You will take notes and prepare a brief report that demonstrates you have gathered important details during this visit.
2. Read the following questions to guide you:
  - a. Describe the slaughterhouse or zone you are visiting. Include details on the sanitation practices you note and list out all the different animals that you see there.
  - b. Make a list of all the tools being used and all the protective clothing that you see worn by personnel.
  - c. Explain whether the butchering personnel are using psychological, physical, or chemical restraints (or if they use a combination). Describe the process of restraining animals prior to slaughter carefully, including any tools or materials used, and explanations of all actions that are taken by the personnel involved in the restraint of the animal. Be sure to include the reason behind each of the actions that are taken.
  - d. You may be given the opportunity to participate in the restraint of an animal. Describe exactly what you did, and why each action was important.

- e. Write down any other relevant observations, including any recommendations you may have to improve the procedures observed.

3. After the visit, share your findings with the rest of the class and discuss.



### Points to Remember

- Proper restraint minimises the suffering of an animal being prepared for slaughter.
- Proper restraints protect personnel from animals who may kick, be moody, bite, etc.
- Check restraining devices and ensure all tools are in place before use.



### Formative Assessment

Answer the following open questions using complete sentences.

1. Give the three general types of restraints used on animals and explain each.
2. Is the bull nose ring the same as the bull holder? Explain your answer.
3. Give at least three restraining methods where a rope can be used.
4. Give two kinds of safety gear that personnel should wear.

## Topic 1.3: Stunning animals using techniques that ensure the welfare of the animal

### Key Competencies:

Knowledge	Skills	Attitudes
1. Explain different stunning methods and when to use each method	1. Perform stunning	1. Decisive
2. Explain benefits of shackling and best positions during slaughtering	2. Shackle live animals	2. Active
3. Explain difference between sticking techniques and when each is valuable	3. Conduct sticking activity	3. Precise

### Getting Started: What do we know and where are we going?



#### Topic 1.3 Task 1:

1. With the person next to you, observe the picture below. Describe what you believe to be happening in the picture and explain why that process is being done as part of the slaughtering techniques.



2. Share your answers with the rest of the class and come to an agreement.
3. Review the knowledge, skills, and attitudes for this topic.

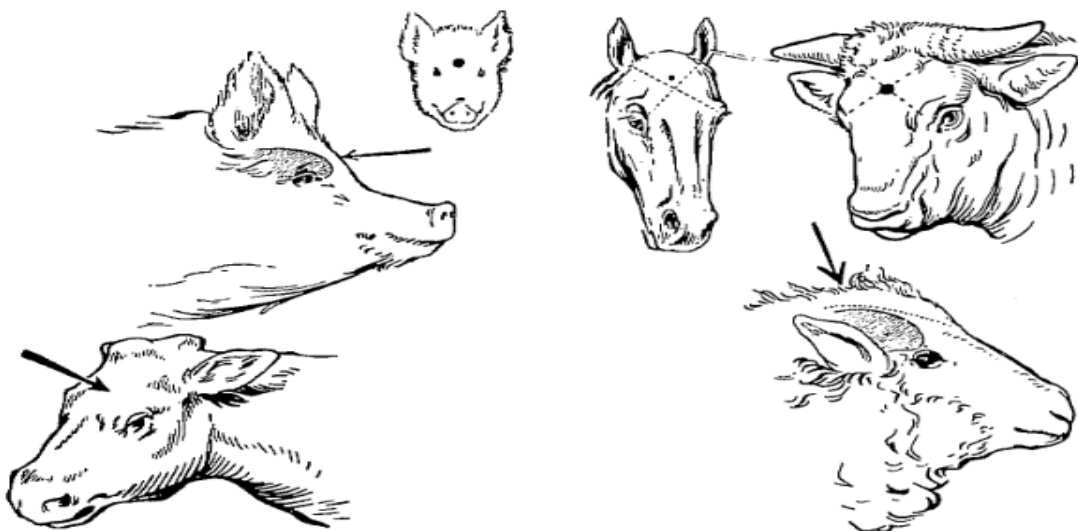


## Problem Solving Activity



### Topic 1.3 Task 2

1. Find a partner and review the picture below very carefully. You will notice that there is a specific point identified on each of the different animals' heads. This is the point where an animal is to be hit when they are to be stunned (using either a wooden hammer or using a captive bolt). Note that the area is different for different animals.



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2. Review the picture carefully then answer the questions below.
  - a. Describe, in words, the exact location for stunning for each of the animals shown in the pictures above.
  - b. Why is the place different for each animal?
  - c. Explain why it is important to know the exact area to stun each different kind of animal.

<sup>9</sup> Alpha International Corp. (1980). *The Schermer mechanical stunning apparatus* [Drawing]. Semantic Scholar. <https://pdfs.semanticscholar.org/2ede/b848d773a778e718d5263433ebbb9bd01834.pdf>

3. After discussing with your partner, volunteer to share your answers with the class and discuss. Verify your answers with the trainer and correct them as needed.
4. Review the picture again and commit to memory the place where each animal needs to be hit to stun that animal correctly and without suffering.



### Guided Practice



#### Topic 1.3 Task 3:

1. Read **1.3 Key Facts** aloud together. You are expected to commit the facts to memory before they participate in a field visit, particularly the area on the head where animals should be stunned.
2. In pairs, read **1.3 Key Facts** aloud to one another again and check that your partner has memorized and understanding of all the details.

### 1.3 Key Facts

- **Stunning:** Ensures that the animal is unconscious before it is slaughtered which eliminates pain, discomfort, and stress from the procedure. Methods for stunning include:
  - **Striking:** Hitting the animal's head with a wooden hammer or captive bolt. Care should be taken so blow is hard enough but does not damage the frontal bones which may cause brain haemorrhage. This is the most common method.
  - **Electrical stunning:** An electric current of 75-120 volts is passed through the back of the head of the animal for 15-70 seconds.
  - **Anesthetization:** Using a mixture of CO<sub>2</sub> and air in equal volume with 0.18% chloroform, the animal (mainly pigs) inhale for a period up to one minute.<sup>10</sup>
- **Sticking:** Cutting of an animal's neck, using a very sharp knife. This severs major blood vessels in the neck/chest that supply the brain resulting in rapid blood loss and death.<sup>11</sup>
  - **Transverse incision of the neck:** This is performed by cutting fully across the throat, severing all soft tissues of the neck including: muscles, blood vessels, windpipe (oesophagus), trachea, and nerves.

<sup>10</sup> E-Krishi Shiksha. (n.d.). *Lesson 21. Slaughtering techniques and post-mortem inspections*. E-Courses Online. <https://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5945>

<sup>11</sup> RSPCA - UK. (n.d.). *Animal slaughter factfile - Stunning, sticking, religious slaughter*. <https://www.rspca.org.uk/adviceandwelfare/farm/slaughter/factfile>

- **Lateral stab incision of the neck:** This is performed by sticking the sharp knife straight into the neck. The cut, or incision, is made on the neck in specific places that will kill the animal quickly.
- **Shackling:** positioning an animal after being slaughtered so blood drains from the carcass.
- **Horizontal position of animal:** Faster bleeding rates thus a greater recovery of blood.
  - Perform operation on very clean stainless-steel table.<sup>12</sup>

3. You will visit the slaughterhouse in the school compound (or one nearby in the community) to observe and to assist in the stunning, sticking, and shackling of an animal. Prior to this visit, you need to be prepared so the visit is valuable and helps your learning.
4. Brainstorm responses to the following question individually. After a few minutes, you will be asked to share your best ideas with the rest of the class.
  - a. What should you ask, observe, and note during the upcoming field visit focused on stunning, sticking, and slaughtering?
5. Review the responses with the class and copy down the final list of questions to be used during the field visit. Remember that you will complete a brief report after the field visit.



## Application Activity



### Topic 1.3 Task 4:

1. Make the most of your field visit by preparing questions and observational guide in advance!
2. You have begun this process during the class brainstorming session, but you should be sure that you take time to think of your individual additional questions that will help your own learning as you begin to bridge the gap between school and the world of work.
3. Write out the guiding questions prior to your visit. The questions should include:
  - a. Describe the slaughter zone. Give details related to:
    - Hygiene and sanitation practices being used.

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<sup>12</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Guidelines for slaughtering, meat cutting and further processing*. <https://www.fao.org/3/T0279E/T0279E04.htm>

- Safety and protective clothing being worn.
  - Restraining methods and equipment.
- b. Explain which techniques are used for each of the three steps (stun, stick, and shackle).
  - c. List the tools that are used in each step and explain what the butcher does with each tool.
  - d. Review the purpose of stunning—and explain if you see a minimum of suffering and stress or if the process should be done better. If it should be better, explain what went wrong and how to do it better.
  - e. Other observations? Other personal ideas that should be focused upon? Other questions?
4. During the field visit: take careful notes.
  5. After the field visit: re-read your notes. Use your notes to write a short report to describe your visit, what you saw, what you learned, etc. Submit your report to your trainer who will provide feedback.



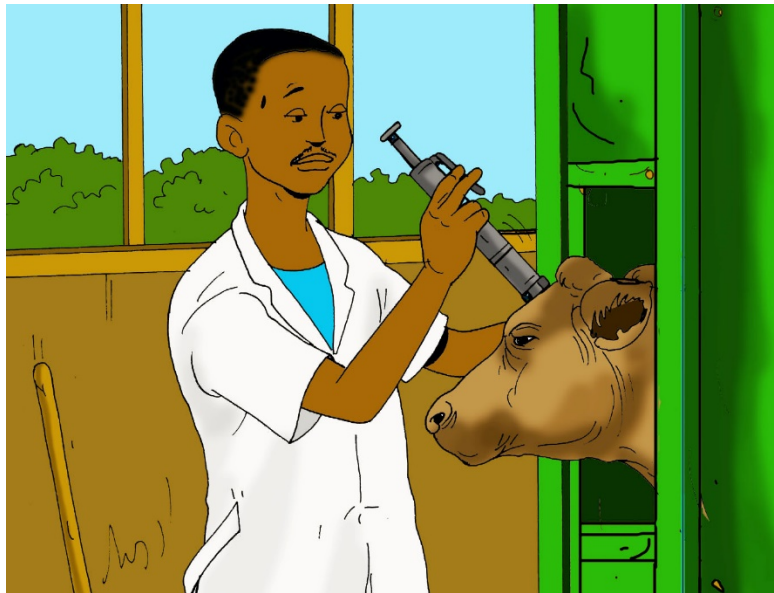
### **Points to Remember**

- Safety of personnel and minimal suffering of the animal are main goals during slaughter.
- Check stunning device, ensure sharp knives, and gather equipment needed for shackling PRIOR to the slaughter.
- Sanitation and hygienic practice are paramount.

## Formative Assessment

Answer the following questions using complete sentences.

1. Give at least three methods of stunning an animal during slaughtering.
2. Differentiate vertical from horizontal shackling position and list the benefits for each.
3. During sticking, differentiate transverse incision from lateral stab incision.
4. Explain why the following picture is not a correct method for stunning an animal:





## Self-Reflection

1. You have come to the end of the unit. You are going to do the survey you did at the beginning of the unit again to help you do self-assessment of your knowledge, skills, and attitudes.

Again, there are no right or wrong answers to this survey. It is for your own use to gauge your knowledge, skills and attitudes after the unit. Read the Knowledge, Skill or Attitude in the left column. Can do this? How well? Put a check in column that best represents your situation.

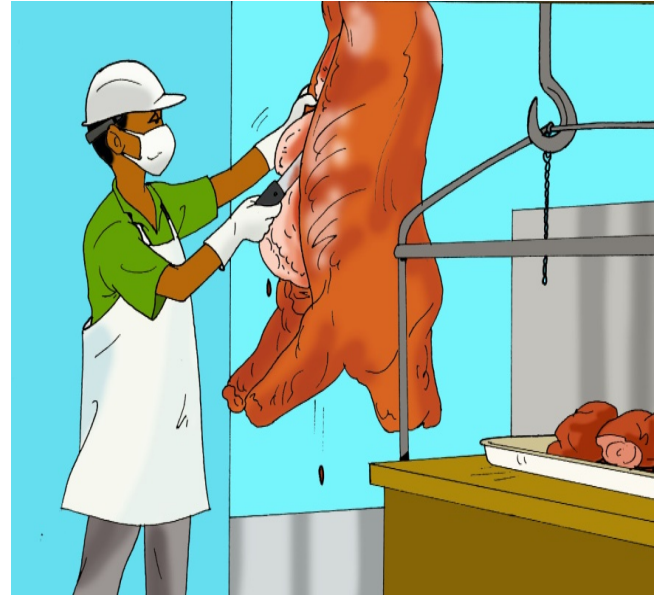
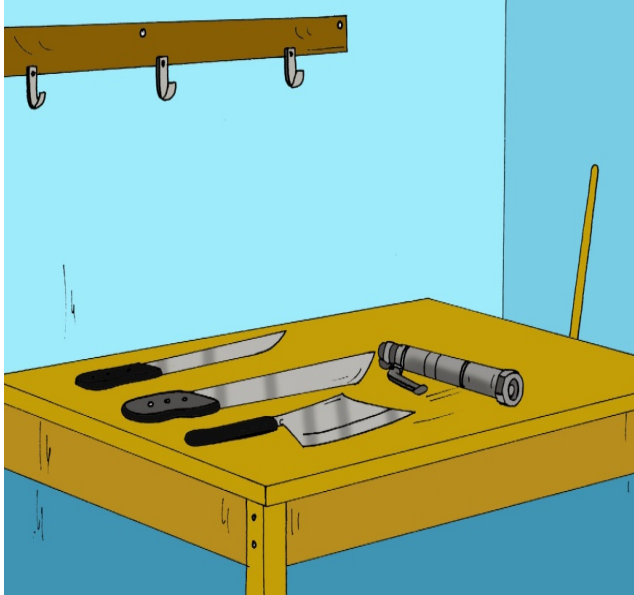
<b>My experience</b>	<b>I don't have any experience doing this.</b>	<b>I know a little about this.</b>	<b>I have some experience doing this.</b>	<b>I have a lot of experience with this.</b>	<b>I am confident in my ability to do this.</b>
<b>Knowledge, skills, and attitudes</b>					
Describe personal hygiene in slaughtering working area					
Describe environmental hygiene in slaughterhouse					
Explain cleaning procedures used in slaughterhouse					
Describe frequency of cleaning in slaughtering work area					
Describe different restraint devices used for slaughtering					
Explain different restraining methods used in slaughtering					
Apply different stunning methods for slaughtering operations					

<b>My experience</b>	<b>I don't have any experience doing this.</b>	<b>I know a little about this.</b>	<b>I have some experience doing this.</b>	<b>I have a lot of experience with this.</b>	<b>I am confident in my ability to do this.</b>
<b>Knowledge, skills, and attitudes</b>					
Use different shackling methods in slaughtering operations					
Apply different sticking techniques for slaughtering					

2. Complete the table below by identifying areas from the unit where you have improved and where you need improvement with the actions/strategies you will use to help you improve when receiving and interpreting information at the workplace.

<b>Areas of strength</b>	<b>Areas for improvement</b>	<b>Actions to be taken to improve</b>
1.	1.	1.
2.	2.	2.

# Unit 2: Preparation of a carcass for butchering



## Topics

- 2.1 Preparing, checking, and adjusting materials, tools, and equipment to cut meat
- 2.2 Skinning, eviscerating, washing, and cutting a carcass
- 2.3 Preparing meat cuts

### Unit Summary:

This unit describes knowledge, skills, and attitudes required to prepare raw meats for processing. By the end of this module, the trainees will be able to prepare, check, and adjust materials, tools, and equipment. Then skin, eviscerate, and wash a carcass and finally, to prepare meat cuts destined for processing.

## Self-Assessment: Unit 2

1. Look at the unit illustration. What do you see? What do you think this unit will be about? What topics might be covered?
2. Fill in the self-assessment below: There are no right or wrong ways to answer this survey. It is for your own use during this course. Think about yourself: do you think you can do this? How well? Read the statements across the top. Put a check in column that best represents your situation. At the end of this unit, we'll take this survey again. Read the statements across the topics of this unit. Put a tick (✓) in the column that best represents your situation.

<b>My experience</b>	<b>I don't have any experience doing this.</b>	<b>I know a little about this.</b>	<b>I have some experience doing this.</b>	<b>I have a lot of experience with this.</b>	<b>I am confident in my ability to do this.</b>
<b>Knowledge, skills, and attitudes</b>					
Describe the work area sanitation and hygiene practices					
Prepare equipment and tools					
Select tools materials and equipment					
Skin a carcass					
Evisceration a carcass					
Identify quarters of different carcasses					
Explain meat deboning and cutting techniques					
Describe storage of meat cuts					

## Topic 2.1: Preparing, checking, and adjusting materials, tools, and equipment prior to butchering

### Key Competencies:

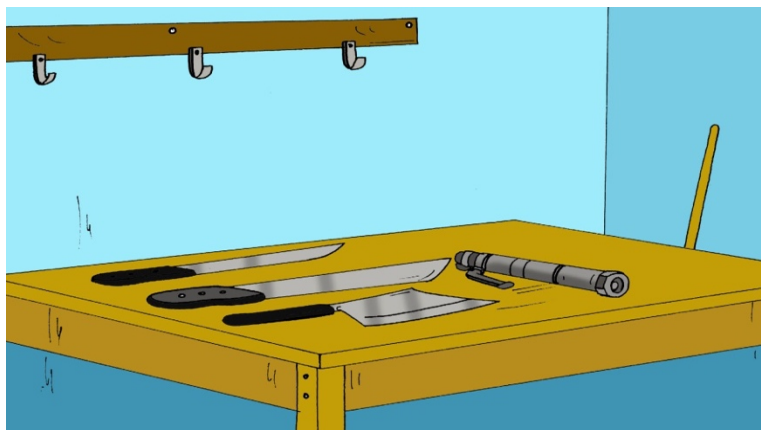
Knowledge	Skills	Attitudes
1. Explain main preparation of work area	1. Prepare the work area	1. Adaptable
2. Describe tools, materials, and equipment needed	2. Select tools, materials, and equipment	2. Motivated
3. Discuss adjustment of the equipment, tools, and materials for butchering	3. Adjust, install, and test the equipment and tools needed for butchering	3. Methodical

### ↻ Getting Started: What do we know and where are we going?



#### Topic 2.1 Task 1:

1. Your trainer will show you a selection of tools that are used for skinning, evisceration and meat cutting. They will look something like the tools shown in the illustration below. Observe the tools carefully and think about what you ALREADY know about these tools.



2. Then, answer the following questions:
  - a. What do you see? Give a correct name for the tool and a description of its use.
  - b. Which of these tools have you used? Which have you already seen used?

3. Volunteer to share your responses and clarify any misconceptions with the trainer.
4. Review the knowledge, skills, and attitudes you will gain by the end of this topic.



### Problem Solving Activity



#### Topic 2.1 Task 2:

1. With your group of 4 trainees, list out all the details you remember as important from each of the previous learning outcomes:
  - a. Apply hygiene and sanitation practices according to site requirements.
  - b. Restrain animals using techniques compatible with Animal Welfare Act.
  - c. Stun animals in compliance with Animal Welfare Act.
2. After you have cleaned and prepared the site, your next step will be to restrain and stun the animal, according to the information you have reviewed above. Once the animal is stunned the next step is to slaughter the animal quickly, cleanly, and correctly. Consider what tools and equipment you will need to do that job. List out the tools and for each tool explain what should be done to clean each tool—and to check that it is ready for use.
3. Share your group's answers with the rest of the class. Contribute to other groups' responses as well.



### Guided Practice Activity



#### Topic 2.1 Task 3:

1. Review **2.1 Key Facts** with a partner. Once everyone has read, discuss with the class. Ask questions to clarify any confusion.

## 2.1 Key Facts

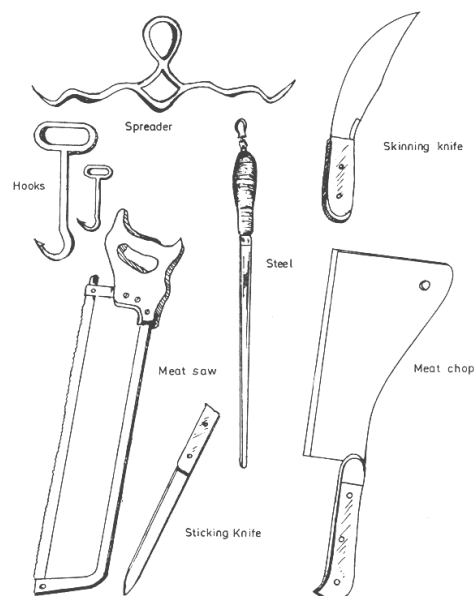
- **Types of cleaning products** (used for cleaning in addition to soap):
  - **Disinfectants:** Used for the elimination of micro-organisms, bacteria, and germs, either by using hot water (or better steam) or chemical disinfectants.
  - **Chemical disinfectants:** Often preferred in the meat industries because they are easy to use, readily available, have low risk of accidents, and rarely damage equipment.
  - **Examples:** Chlorine compounds (bleach) or quaternary ammonium compound (ammonia)
  
- **Manual cleaning techniques:**
  - Manual cleaning uses brushes, brooms, scrubbers, and similar equipment, recommended for smaller equipment and tools, which can be collected for cleaning by hand.
  - Recommended process is the **3-tank system:**
    - Remove soil from the equipment by scraping all surfaces.
    - Put equipment in **tank 1** (with water and detergent) to loosen the soil. Dirty equipment may require soaking for a longer period and scrubbing in tank 1.
    - Transfer equipment to **tank 2**, containing clean water and more detergent. The equipment is scrubbed clean while in this tank.
    - Rinse equipment in clean water (from pails, running water tap, or a hose).
    - Equipment is then moved to **tank 3** containing hot (boiling) water and chemical disinfectant.
    - Stack equipment to drain and dry.<sup>13</sup>
  
- **Selection of equipment, materials, and tools:**
  - For immobilization, slaughter (or dressing) and bleeding out, use the following tools:
    - **Stunning Pen:** Also referred to as the knocking pen.
    - **Hoist:** A device for lifting a stunned animal for bleeding; it may be operated manually, mechanically, or electrically.
    - **Skinning Cradle:** Where bled animal is placed for skinning and evisceration.<sup>14</sup>

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<sup>13</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Slaughterhouse cleaning and sanitation*. <https://www.fao.org/3/x6557e/X6557E06.htm>

<sup>14</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Manual for the slaughter of small ruminants in developing countries*. <https://www.fao.org/3/X6552E/X6552E03.htm>

- **Offal gear includes the following major equipment** (in addition to knives):<sup>15</sup>
  - **Collecting Troughs:** These are containers for receiving blood and collecting gut material.
  - **Offal Cleaning Tables:** Often built into the offal chamber wall, they may be of concrete, galvanized metal, or stainless steel.
- **Slaughtering tools include:**<sup>16</sup>
  - **Sticking Knife:** A knife with a six-inch (15.2 cm) blade and a v-shaped end, used in severing the blood vessels of the neck. Used to kill and bleed-out the animal.
  - **Skinning Knife:** this knife is curved backwards allowing ease of operation and is used for the removal of the animal's skin
  - **Meat Saw:** A replaceable-blade, handsaw used to saw through bone
  - **Meat Chop:** Also called a cleaver
  - **Spreader:** A metal device for holding apart legs or chest cavity during slaughter
  - **Grinding or Honing Stones:** coarse grained stones use for the initial sharpening of knives to thin edges
  - **Sharpening Steel:** A long, tapered, rounded, metal rod which knives are sharpened on to improve keenness
  - **Meat Tree/Hooks:** Metal devices with bent or curved ends for hanging parts of the slaughtered meat and offal for washing and inspection.
- See illustrations for the tools mentioned above:



<sup>15</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Manual for the slaughter of small ruminants in developing countries*. <https://www.fao.org/3/X6552E/X6552E03.htm>

<sup>16</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Manual for the slaughter of small ruminants in developing countries*. <https://www.fao.org/3/X6552E/X6552E03.htm>

<sup>17</sup> Food and Agriculture Organization of the United Nations. (n.d.). *FIG.2 SHEEP AND GOAT SLAUGHTERING TOOLS* [Drawing]. <http://www.fao.org/3/X6552E/X6552E03.htm>



## Application Activity



### Topic 2.1 Task 3:

1. Your trainer will organise a class visit to a local slaughterhouse during the actual slaughtering of an animal. While there, please pay close attention to details that you have discussed in class and write your notes into the following table:

<b>Cleaning processes I observed:</b>	<b>Preparing/Checking equipment I observed:</b>
<b>Equipment, tools, and protective clothing that were used during the observation time:</b>	<b>Equipment that was available but NOT used:</b>
<b>Animals I watched being slaughtered:</b>	<b>Other relevant observations:</b>

2. After the visit, discuss your observations with the class.



### Points to Remember

- Protective clothing should be worn at all times while butchering and cutting meat.
- Correct hygiene procedures protect the butcher and consumer of the meat produced.
- All equipment and tools should be in place and cleaned prior to the butchering process.



## Formative Assessment

1. Match the word to the sentence by writing the corresponding letter in answer in the space:

Word List:

A. Skinning knife    B. Meat saw                    C. Cleaning agents (acid or alkaline)  
D. Stunning pen    E. Sticking knife                    F. Meat chop                    G. Steel

Sentences:

- \_\_\_\_\_ 1. Suitable for removing organic dirt, protein residues, and fat or inorganic deposits, scaling like lime, etc.
- \_\_\_\_\_ 2. Also referred to as the knocking pen.
- \_\_\_\_\_ 3. A replaceable blade handsaw used to saw through bone.
- \_\_\_\_\_ 4. A long, tapering rounded and smooth metal rod on which knives are sharpened regularly to improve keenness.

2. Explain the steps in the 3-tanks system of manual cleaning in 5-7 sentences.

## Topic 2.2: Skinning, eviscerating, washing, and cutting a carcass

### Key Competencies:

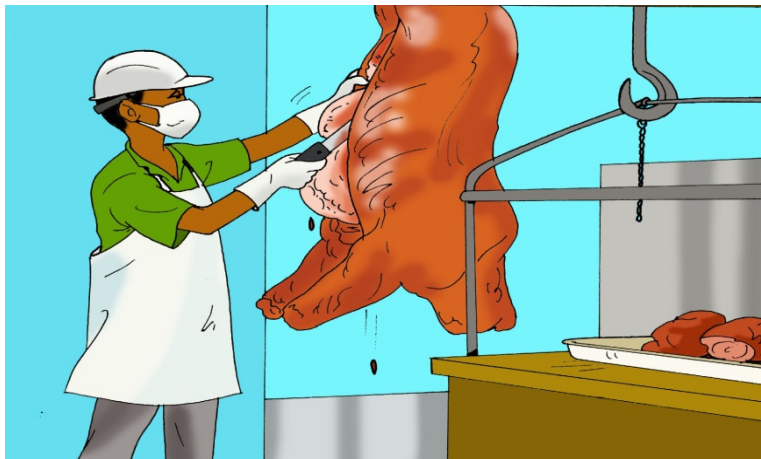
Knowledge	Skills	Attitudes
1. Explain skinning and evisceration of animal	1. Skin and eviscerate an animal	1. Accurate
2. Identify different quarters according to the animal	2. Quarter a carcass	2. Methodical
3. Describe different cutting techniques	3. Use cutting techniques to cut meats	3. Adaptable

### Getting Started: What do we know and where are we going?



#### Topic 2.2 Task 1:

1. Brainstorm all that you can see in the picture below:



2. Discuss your observations with the class.
3. Review the Key Competencies table together.



## Problem Solving Activity



### Topic 2.2 Task 2:

1. Now that the animals have been slaughtered and we have considered how to clean the site and prepare the equipment, let us think about WHY we prepare the equipment in advance.
2. First work individually, then work with a partner. Finally, share with the entire class to find as many good responses as possible to the following two questions:
  - a. Why do we clean the site before cutting the meat?
  - b. Why must we ensure sharp knives?
3. Listen to the trainer's expert view on the questions.



## Guided Practice Activity



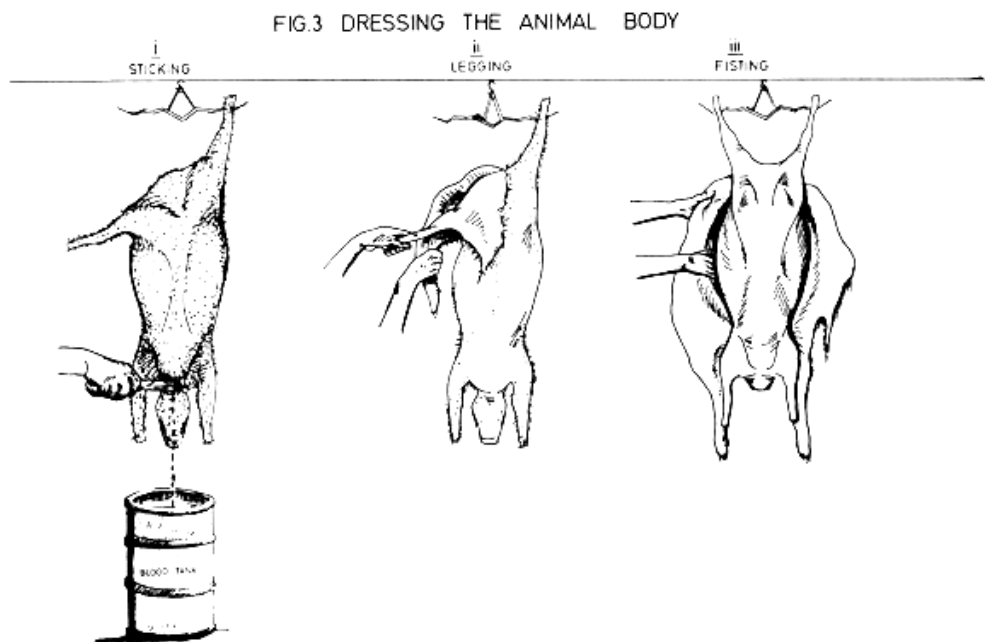
### Topic 2.2 Task 3:

1. Read and discuss **2.2 Key Facts** in pairs. Take notes and quiz each other to help learn the information.

### 2.2 Key Facts

- **Washing a carcass:**
  - After slaughter, prior to butchering, use clean water in a deep tub--or a spray wash on a conveyor-belt to thoroughly clean the carcass. No soap or disinfectant is used on a carcass.
- **Skinning:**
  - **Hoist-Position Skinning**
    - With the animal body suspended on a hoist, and the skinning knife in hand.
    - Skinning is begun at the back of the free (unsuspended) leg by removing the skin around the hock (hip end) and working toward the toes (or hooves).
    - The foot is cut off at the ankle. The joint and the tendon are loosened and hung on a hook to suspend the leg. The process is repeated for the other leg.
    - Cuts are continued on the inside of both legs towards the naval region.

- The body skin is next removed. Make an opening on the front leg. Cut toward the jaw and continuing over the belly toward the naval.
- Loosening the skin is accomplished by **fisting** or by use of the human fist, forced between the skin and the muscle of the carcass to remove the skin.
- To drop the skin off, a cut is made around the tail and below the jaw. After this the tongue is removed, washed and placed on a hook and the head severed at the neck joint.<sup>18</sup>



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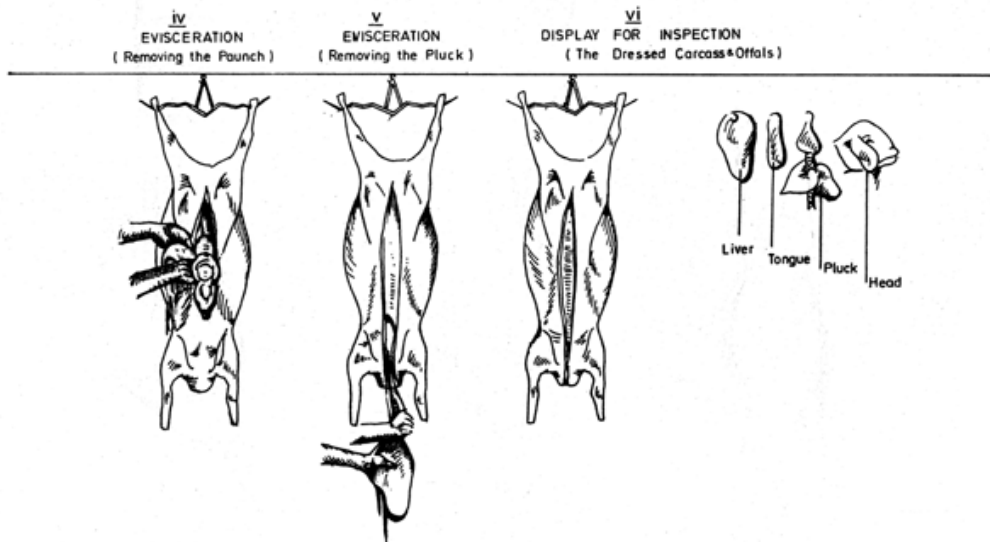
- **Horizontal Skinning:**
  - The animal is placed on its back on a flat surface, such as a sturdy plastic pallet or a concrete slab.
  - Cutting and fisting begin at the forelegs, working toward the belly and sides of the animal, then end at the hind legs.
  - The tendon between the hock and the toes is exposed and loosened and the feet, tail, and head are cut at the designated points.<sup>20</sup>
- **Evisceration techniques:**
  - With the external structures (skin, feet and head) removed next cut open the body cavity, to dislodge the offal and gut contents. You now have a prepared carcass.

<sup>18</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Manual for the slaughter of small ruminants in developing countries*. <https://www.fao.org/3/X6552E/X6552E03.htm>

<sup>19</sup> Food and Agriculture Organization of the United Nations. (n.d.). *FIG.3 DRESSING THE ANIMAL BODY* [Drawing]. <http://www.fao.org/3/x6552e/x6552e06.htm>

<sup>20</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Manual for the slaughter of small ruminants in developing countries*. <https://www.fao.org/3/X6552E/X6552E03.htm>

- Cut around the rectum and free it completely from all attachments then drop it in the pelvic cavity. Then cut the breastbone along the midline. Use skinning knife to cut down the middle from the breastbone to the udder. Push the stomach and intestinal mass (or paunch) out this midline opening.
- Remove contents of the chest cavity by cutting the diaphragm, separating the cavity from the belly. Then the heart, lungs, trachea and oesophagus can be pulled out as a single unit.<sup>21</sup>



22

- **Cutting a carcass into quarters or halves:**
  - Done immediately after dressing, that is, after skinning, cutting off head and feet, and removing internal organs out.
  - **Quartering:** Beef quarters are cut depending on use, the wishes of the consumers, and the quality of the carcass. Each quarter will contain one of the legs of the animal. Quartering is also known as ribbing because the carcass is divided between the twelfth and thirteenth ribs into fore-and hindquarters one on either side.
  - **Halving:** Halving is done immediately after the animal has been dressed and every effort should be made to saw the carcass into two equal sides through the centre of the backbone.<sup>23</sup>

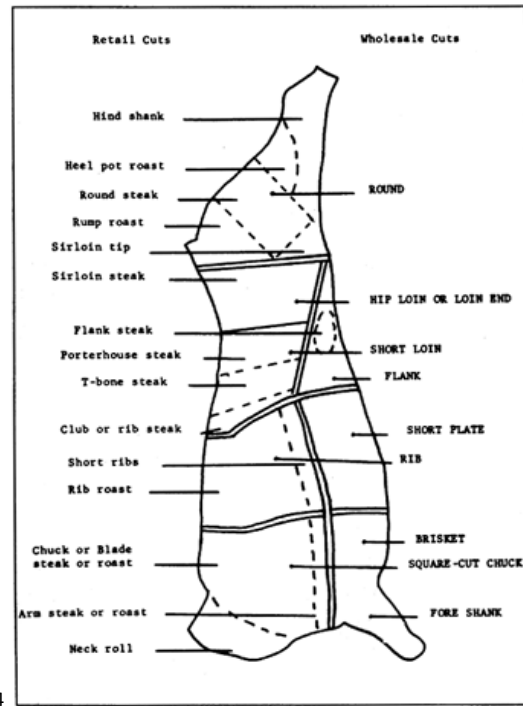
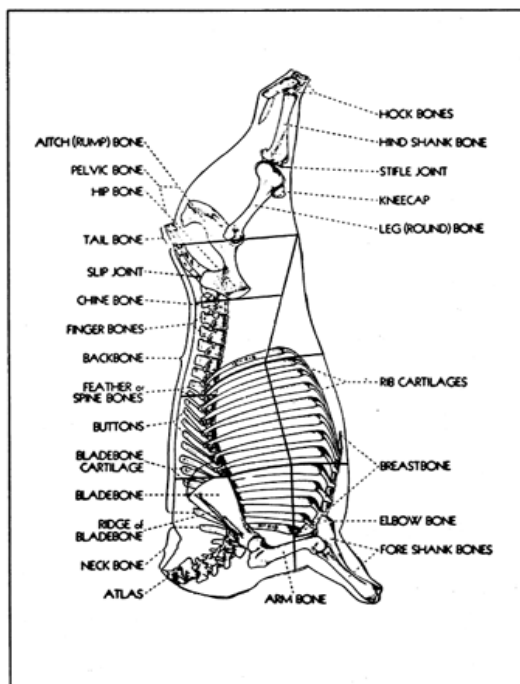
<sup>21</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Manual for the slaughter of small ruminants in developing countries*. <https://www.fao.org/3/X6552E/X6552E03.htm>

<sup>22</sup> Food and Agriculture Organization of the United Nations. (n.d.). *FIG.3 DRESSING THE ANIMAL BODY* [Drawing]. <http://www.fao.org/3/x6552e/x6552e06.htm>

<sup>23</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Guidelines for slaughtering, meat cutting and further processing*. <https://www.fao.org/3/t0279e/t0279e05.htm>

- **Cutting techniques:**
  - **Mincing/grinding**
    - Remove gristle, fat, bones, skin, and connective tissue from the meat with a sharp knife. Chop the meat into uniform cubes approximately 1-inch square.
    - Place the meat into the blender, replace the blender's lid and start the blender on its "Chop" setting. Stop after 20 to 30 seconds, remove the lid and check the consistency of the meat. If you want a very fine, smooth texture for baby food, this necessitates a lengthy blending time, while sausage meat requires a coarser texture thus a shorter blending time.
  - **Chopping**
    - Slice the meat into long thin strips. Freeze the meat for 20-30 minutes. Use two knives rapidly to chop the meat to desired texture.

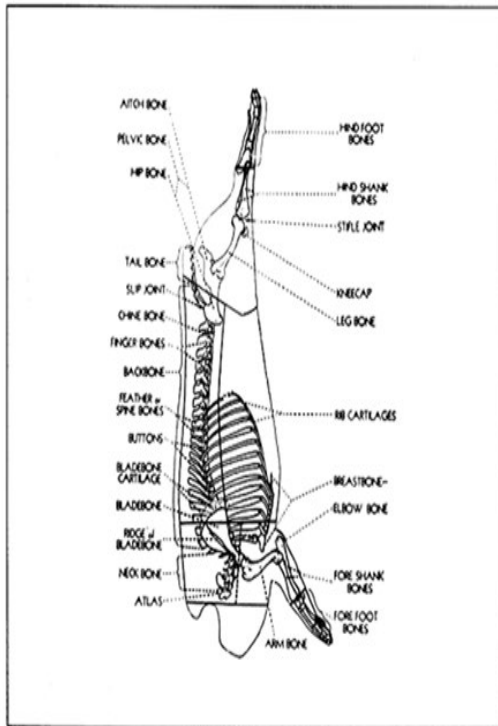
- **Prime cuts of beef:**



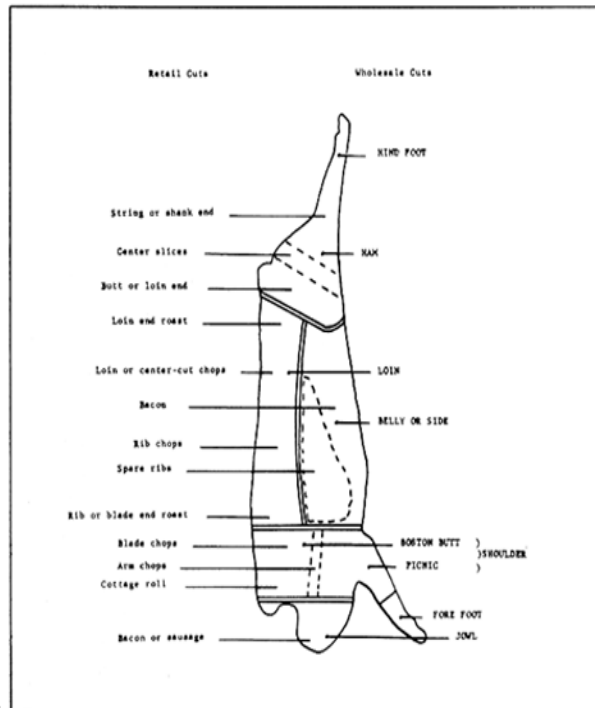
<sup>24</sup> Food and Agriculture Organization of the United Nations. (n.d.). 55. *The beef carcass and its bones* [Drawing]. <http://www.fao.org/3/t0279e/t0279e05.htm>

<sup>25</sup> Food and Agriculture Organization of the United Nations. (n.d.). 56. *The beef carcass and its cuts* [Drawing]. <http://www.fao.org/3/t0279e/t0279e05.htm>

• Prime cuts of pork:

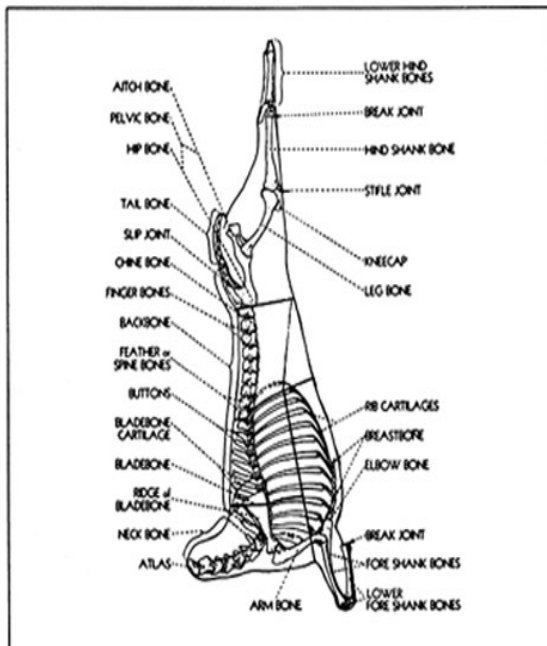


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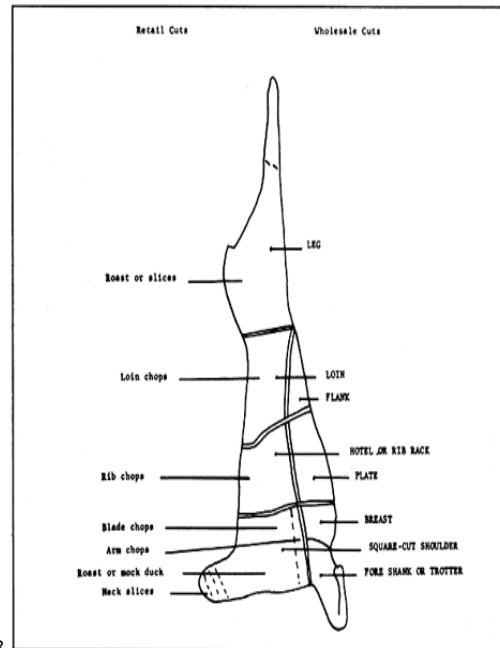


27

• Prime cuts of lamb:



28



29

<sup>26</sup> Food and Agriculture Organization of the United Nations. (n.d.). 93. *The pork carcass and its bones* [Drawing]. <http://www.fao.org/3/t0279e/t0279e05.htm>

<sup>27</sup> Food and Agriculture Organization of the United Nations. (n.d.). 94. *The pork carcass and its cuts* [Drawing]. <http://www.fao.org/3/t0279e/t0279e05.htm>

<sup>28</sup> Food and Agriculture Organization of the United Nations. (n.d.). 107. *The lamb carcass and its bones* [Drawing]. <http://www.fao.org/3/t0279e/t0279e05.htm>

<sup>29</sup> Food and Agriculture Organization of the United Nations. (n.d.). 108. *The lamb carcass and its cuts* [Drawing]. <http://www.fao.org/3/t0279e/t0279e05.htm>



## Application Activity



### Topic 2.2 Task 4:

1. You will be joining your trainer and your classmates on a field visit to a slaughterhouse. You will observe preparation of site and tools as well as skinning and evisceration and initial cutting of a carcass.
2. To guide your observations, write careful responses to the following questions. After the visit you will be required to write and submit a report on your findings to the trainer for review.
  - a. Describe cleaning tools, products, and processes were observed.
  - b. Explain how safety and hygiene conditions were maintained during your observation?
  - c. Describe tools and equipment used during skinning.
  - d. Describe tools and equipment used during evisceration.
  - e. Which skinning technique was used? Describe it.
  - f. Was halving and quartering done? Why did they do that?
  - g. What sort of meat chopping was done? Describe the process.
  - h. Give other observations or commentary.
3. Upon completion of your field visit, review your notes and re-write them into a brief report which will be submitted to your trainer for review and comments.



### Points to Remember

- Ensure correct sanitation and hygiene as well as protective clothing.
- Use sharp cutting tools when cutting a carcass to avoid spoiling meat cuts.



## **Formative Assessment**

Answer the following open questions in 3-5 complete sentences.

1. Skinning techniques of an animal include hoist skinning and horizontal skinning. Explain the difference between those techniques.
2. Briefly, explain how hoist skinning is performed.
3. Briefly, explain the evisceration techniques.
4. Differentiate halving from quartering during cutting operations.
5. Is meat mincing the same as meat chopping? Explain your answer.

## Topic 2.3: Preparing meat cuts

### Key Competencies:

Knowledge	Skills	Attitudes
1. Explain main principles of meat deboning	1. Conduct meat deboning	1. Honest
2. Explain meat trimming techniques	2. Conduct meat trimming	2. Accurate
3. Explain best practice for storage of meat cuts	3. Adjust storage condition for meat cuts	3. Committed



### Getting Started: What do we know and where are we going?



#### Topic 2.3 Task 1:

1. With a partner, review the illustration below.



2. Then, discuss the following questions with your partner:
  - a. What do you see happening in the illustration?
  - b. List all the tools that are being used in the illustration.
  - c. Describe the protective and hygienic clothing being worn and give reasons for each piece.

3. Volunteer to share your responses and discuss as a class.
4. Review the knowledge, skills, and attitudes for this topic together.



## Problem Solving



### Topic 2.3 Task 2:

1. Your class will be divided into 5 groups and each group will be responsible for researching one of the following topics. Then, your group will report back to the class all that they can find about your topic. Pay close attention to the beef, pork, and chicken meat techniques.
  - a. Meat deboning
  - b. Meat trimming
  - c. Meat mincing
  - d. Meat storage
  - e. Meat grading
2. After you have researched your topic, prepare a short presentation for the class to share what you have learned to the other trainees in the class. Everyone will gain knowledge by sharing research and questioning one another.
3. Listen closely to the trainer's expert view on each topic and review the details from the collective research.

### 2.3 Key Facts

- **Washing and sanitizing techniques for workplace and equipment (review):**
  - Remove solid waste from surfaces using brooms and shovels.
  - Pre-rinse with cold water using a low-pressure cleaner if available.
  - Apply detergent and scrub surfaces and equipment.
  - Rinse with warm water or use a low-pressure cleaner, if available.
  - Disinfect with chlorine bleach or hot water or steam using a sprayer, if available.
  - Post-rinse with potable water or use a low pressure cleaner.
- **Deboning techniques:**
  - Various animals require slightly different de-boning techniques, but most involve taking out one central bone. Note: some cuts have a bone remaining inside the prepared meat.

- Beef deboning tips:
  - Place the meat in the centre of cutting board.
  - Find the bone with the non-cutting hand and grip it securely.
  - Use the tip of the knife at a slight angle to make a preliminary cut along the length of the bone thus separating meat from bone.
  - Repeat slicing along the length of the bone until fully separated then remove the bone from meat.
  - Keep the knife as close as possible to the bone to avoid waste.
  - Tidy the meat by slicing away pieces of sinew or cartilage (connective tissue) and fat.
  
- Lamb deboning tips:
  - Locate both ends of the bone, feel how it runs through the meat.
  - Make a smooth incision into the flesh until the tip of the knife hits the bone.
  - Use small cuts to trim around the bone until bone top is exposed.
  - Grip the exposed bone and use tip of knife to trim to the opposite end joint
  - Remove bone.
  - Trim as close as possible to the bone to avoid meat wastage.
  
- Chicken deboning tips:
  - Ensure the chicken cavity is free of gizzards and organs.
  - Place chicken on cutting board breast side up.
  - Remove wings: locate joint connection to the body, slice through at that junction.
  - Pull legs away from the body to find joint where skin is taut. Bend the leg back until the joint pops then cut at the joint to get full leg and thigh pieces.
  - Make a smooth cut between the two breasts until knife hits keel bone then make small, even, sliding cuts in a horizontal direction to free the breasts.<sup>30</sup>
  
- **Meat trimming techniques**
  - **Trim fat off:**
    - Pinch a tag of fat and pull upward until taut, set knife between this fat and the meat then cut downward in a slicing motion.
    - Tilt knife slightly toward fat as you slice to avoid cutting into the meat.
    - Hold fat taut nearly parallel to the cutting board and pull fat away to help accurate cutting.
    - Work in strips, starting at the top of the meat cut each time.<sup>31</sup>
  
- **Grades of meat:**
  - Grades of meat are determined by how much fat (and connective tissue) remains on the cut.

- Higher grades of meat have more pure meat and lower grades have more fat and tissue.
- Beef is graded from Grade 1 (lean muscle meat) to Grade 3 (20% fat and connective tissue).
- Pork is graded from Grade 1 (lean muscle meat) to Grade 6 (including fat, tissue, fatty skin).<sup>32</sup>
- **Meat mincing techniques:**
  - Remove gristle, fat, bones, skin, connective tissue from meat with a sharp knife.
  - Chop the meat into uniform cubes approximately 1-inch square.
  - Place the meat into the blender, replace lid, and blend on "Chop" setting.
  - After 20 to 30 seconds, check the consistency of the meat.
  - Continue until consistency is correct.
  - For example, fine texture is for baby food (longer blending), sausage meat is a coarser texture (short blending time).<sup>33</sup>
- **Storage of meat cuts:**
  - Correct storage helps retain nutrients and keep food fresh longer
  - Freezers should be kept below 0°C; Refrigerators should be kept at 1-2°C
- **General guidelines for safe storage of basic meats:**

Type of meat	In refrigerator	In freezer
Uncooked poultry	1–2 days	9 months (pieces) to 1 year (whole)
Uncooked ground meat	1–2 days	3–4 months
Uncooked steaks or chops	3–4 days	4–12 months
Uncooked fish	1–2 days	6 months
Cooked poultry, meat, or fish	3–4 days	2–6 months

<sup>30</sup> Inagaki, T. (2018, June 27). *Comprehensive guide to deboning meat.*

Kamikoto. <https://kamikoto.com/blogs/fundamentals/comprehensive-guide-to-deboning-meat>

<sup>31</sup> Christensen, E. (n.d.). *Basic techniques: How to trim the fat off meat.*

kitchn. <https://www.thekitchn.com/basic-techniques-how-to-trim-t-73832>

<sup>32</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Selection and grading of raw materials for meat processing.* <https://www.fao.org/tempref/docrep/fao/010/ai407e/ai407e01.pdf>

<sup>33</sup> Guangzhou Long Prosper Industrial Co., Ltd. (n.d.). *How to grind meat in a blender.* <https://m.gzprosperltd.com/news/how-to-grind-meat-in-a-blender>



## Guided Practice Activity



### Topic 2.3 Task 3:

1. Read **2.3 Key Facts** individually, section by section. After each section, stop and review the information together as a class.
2. You will observe your trainer (or a local expert) while they cut a carcass into meat products. Your task is to take careful notes and to ask questions whenever something is not clear or if you need added explanations. Organise your notes into the following categories:

Sanitation and Hygiene details	Tool preparation and cleaning of area	Deboning and cutting carcass	Trimming and grading of meat cuts

3. After the demonstration, review your notes at home and return to class with any questions you have. Be prepared to describe (in detail) all the processes that you saw. Upon returning to class, see if you can answer each other's questions. If not, the trainer will clarify for you.



## Application Activity



### Topic 2.3 Task 4:

1. You and your class will be visiting a community butcher shop. You know what you will see because you observed the demonstration of the same techniques that your trainer or a local expert performed for you. Still, it is important to prepare for this visit so you gain as much as possible during your time there.
2. With a partner, review the list of guiding questions below and add at least three more questions of your own. Questions should target the bits that you found difficult during the demonstration. Remember that this list of questions will help you focus your visit so you maximize your learning.
3. You will write up the notes and responses to your questions after the visit and submit the report to your trainer for review.
  - a. How is the butchering/meat cutting area prepared prior to the arrival of the carcass?
    - Do those preparations result in a sanitary zone?
    - If NOT, give suggestions that should be done to better sanitize the zone prior to cutting.
  - b. What tools are used?
    - Did you see the knives being sharpened immediately prior to cutting and trimming?
  - c. What protective gear is worn by the butcher?
    - Is this adequate? Can you suggest better/more/other gear that would be helpful?
  - d. Describe the de-boning process in detail
    - Do you think that you could de-bone as efficiently as the butcher?
  - e. Describe the trimming technique used
    - What is done with the bits that are trimmed off the meat?
  - f. Explain how the butcher cuts the meat after trimming
    - Why does the butcher cut some pieces small and leave others big?
  - g. Assign a grade for the different cuts of meat you see being cut. Explain why you give each grade.

- h. How does the butcher store the meat after cutting?
    - Can you suggest improvements?
  - i. With your partner add three other questions here:
    - 
    - 
    -
4. After you have written your three additional questions, share your questions in case others would like to ask those same questions.
  5. Process to the field visit site.
  6. After the visit, rewrite and review your notes. Then, submit your reports to the trainer who will read and comment on each report.



### Points to Remember

- Wear clean and sanitary clothing as well as protective gear during meat cutting activities.
- Use sharp cutting tools and be careful during the cutting process.



### Formative Assessment

Select the correct answer for each question.

1. Which of the following is among general beef deboning tips?
  - a. Place the meat in the centre of cutting board
  - b. Find the first bone with the non-cutting hand & grip it securely
  - c. Remove the bone
  - d. None is correct
  - e. All above are correct
2. Deboning lamb leg requires the following actions:
  - a. Slicing into the bone until the bone has been separated into two pieces
  - b. Removing the bone
  - c. slicing away any pieces of fat
  - d. All are correct
  - e. None is correct

3. Meat trimming is done by setting the cut of meat on a cutting board then pinching off a small tag of the fat toward the top to slip the knife between the fat and the flesh.
  - a. True
  - b. False
  
4. Meat mincing refers to removing gristle, fat, bones, skin and connective tissue from the meat with a sharp knife.
  - a. True
  - b. False



### Self-Reflection

1. You have come to the end of the unit. You are going to do the survey you did at the beginning of the unit again to help you do self-assessment of your knowledge, skills, and attitudes.

Again, there are no right or wrong answers to this survey. It is for your own use to gauge your knowledge, skills and attitudes after the unit. Read the Knowledge, Skill or Attitude in the left column. Can do this? How well? Put a check in column that best represents your situation.

My experience	I don't have any experience doing this.	I know a little about this.	I have some experience doing this.	I have a lot of experience with this.	I am confident in my ability to do this.
Knowledge, skills, and attitudes					
Describe the work area sanitation and hygiene practices					
Prepare equipment and tools					
Select tools materials and equipment					
Skin a carcass					
Evisceration a carcass					

<b>My experience</b>	<b>I don't have any experience doing this.</b>	<b>I know a little about this.</b>	<b>I have some experience doing this.</b>	<b>I have a lot of experience with this.</b>	<b>I am confident in my ability to do this.</b>
<b>Knowledge, skills, and attitudes</b>					
Identify quarters of different carcasses					
Explain meat deboning and cutting techniques					
Describe storage of meat cuts					

2. Complete the table below by identifying areas from the unit that show where you have improved and those that show you still need improvement. Identify the actions/strategies to help you improve, with a focus on learning strategies that you may use in a workplace.

<b>Areas of strength</b>	<b>Areas for improvement</b>	<b>Actions to be taken to improve</b>
<b>1.</b>	<b>1.</b>	<b>1.</b>
<b>2.</b>	<b>2.</b>	<b>2.</b>

# Unit 3: Making meat products



## **Topics**

- 3.1** Preparation of ingredients for meat products
- 3.2** Grinding mixtures for meat products
- 3.3** Assisting with making meat products
- 3.4** Storage of meat products

### **Unit Summary:**

This unit describes knowledge, skills, and attitudes required to make meat products. At the end of this unit, the trainees will be able to prepare ingredients, grind mixtures, make sausage, and store meat products.

### Self-Assessment: Unit 3

1. Look at the unit illustration. What do you see? What do you think this unit will be about? What topics might be covered?
2. Fill in the self-assessment below: There are no right or wrong ways to answer this survey. It is for your own use during this course. Think about yourself: do you think you can do this? How well? Read the statements across the top. Put a check in column that best represents your situation. At the end of this unit, we'll take this survey again. Read the statements across the topics of this unit. Put a tick (✓) in the column that best represents your situation.

<b>My experience</b>	<b>I don't have any experience doing this.</b>	<b>I know a little about this.</b>	<b>I have some experience doing this.</b>	<b>I have a lot of experience with this.</b>	<b>I am confident in my ability to do this.</b>
<b>Knowledge, skills, and attitudes</b>					
Differentiate meat ingredients					
Weigh, mix, and dose ingredients					
Size different meat products					
Use mixing techniques for meat processing					
Prepare casing					
Differentiate types of sausage					
Check quality of sausages					
Use packaging techniques					
Label meat products					
Maintain and monitor storage conditions					

## Topic 3.1: Preparation of ingredients for meat products

### Key Competencies:

Knowledge	Skills	Attitudes
1. Describe different meat ingredients	1. Select all meat ingredients	1. Patience
2. Explain how to weigh, mix, and dose ingredients	2. Perform weighing, mixing, and dosage of ingredients	2. Accuracy



### Getting Started: What do we know and where are we going?



#### Topic 3.1 Task 1:

1. With a partner, review the ingredients that your trainer has provided in the class (or if that was not possible, review the illustration).



- List all the ingredients that you see then for every single ingredient, think of (and write) as many meat products which include that ingredient. To help organise you may use a table like the following:

Name of the ingredient	Meat products that use this ingredient

- Share your list with the rest of the class.
- Review the knowledge, skills, and attitudes for this topic together.



### Problem Solving Activity



#### Topic 3.1 Task 2:

- Form yourselves into groups of 4 trainees—then pair up within that grouping. The first pair will be responsible for reading the **Curing** section, the second pair will be responsible for reading the **Meat Additives** section. After reading and researching your section, come together to ‘teach’ this section to the other trainees in your small group.
- Each pair will read their section of **3.1 Key Facts** carefully and quiz each other to ensure clear understanding. Then the pair will take approximately 15-30 minutes to do additional internet research on their topic to complete their base of knowledge.
- After the research is complete, the pairs will join back into a single group of 4 trainees and each will report back their learning, thus teaching all members of the group the foundational knowledge that has been learned through **3.1 Key Facts**.
- Next, the trainer will ask questions to the whole class. Shout out the answers.

### 3.1 Key Facts

- **Curing**
  - The treatment of muscle meat with common salts to tenderize and add flavour. Curing is often used in preparation of sausages or larger pieces of preserved meat.
  - **Curing salts:** Sodium chloride (NaCl or table salt), Sodium nitrite (NaNO<sub>2</sub>), or Sodium Nitrate (NaNO<sub>3</sub>)
  - **Dry Curing:** Traditionally preferred for preserved meats. Preserves, enhances flavour, adds colour. Cuts are rubbed with dry curing salts and plant-based spices.
  - **Wet Curing:** A brine is made by boiling salt, sugar, and spices in water to create a solution. Once the brine has cooled, meat is submerged into the brine and left for up to 6 days in a refrigerator then meat is left to chill for another day before rinsing and cooking.
- **Meat Additives**
  - Most common meat additives are the following:
    - **Water** –compensates for moisture loss during cooking, increases juiciness, and reduces fat content in products while adding bulk.
    - **Table Salt** – (sodium chloride)—adds or enhances flavour, tenderizes meat, and serves as anti-microbial agent thus reduces risk of illnesses.
    - **Sodium Nitrite (NaNO<sub>2</sub>) and Sodium Nitrate (NaNO<sub>3</sub>)** -- Prevents contamination (clostridium botulinum spore germination), contributes to pink cured meat colour, limits fats deteriorating from contact with air (oxidization), and adds flavour.
- **Non-meat ingredients used in curing meat products** (depending on recipe chosen):
  - Salts (to break down proteins for tenderness, add flavour)
  - Sugars (to enhance flavour and improve acceptability per cultural tastes)
  - Protein extracts like soy or dairy (to bind moisture, improve juiciness of meats, improve the texture and slice-ability)
  - Starches (to bind moisture, enhance stability for freezing/thawing)
  - Grains (to add bulk and lower cost)
  - Dairy extracts (to bind moisture and extend shelf life)
  - Spices (to provide colour and flavour)
  - Examples of spices derived from plant materials include:
    - Seeds – nutmeg (*Myristica fragrans*), mustard (*Brassica nigra*)
    - Leaves – sage (*Salvia officinalis*), thyme (*Thymus vulgaris*)
    - Bulbs – garlic (*Allium sativum*), onion (*Allium capa*).
    - Fruits – pepper (*Piper nigrum*), paprika (*Capsicum annum*)
    - Berries – black pepper
    - Flowers – clove (*Eugenia caryophyllata*)

- Bark – cinnamon (*Cinnamomum zeylanicum*)
- Roots – ginger (*Zingiber officinale*)



### **Guided Practice Activity**



#### **Topic 3.1 Task 3:**

1. The trainer will show various meat products, the ingredients, and the recipes that were used to prepare the meat products. The trainer will explain each product and the recipe carefully.
2. Do the following:
  - a. Identify the various ingredients in each meat product.
  - b. Weigh or measure out the quantities identified in each recipe.
  - c. Determine how to mix the ingredients together and how the additives should be combined with the meat produced (chopped together, minced together, simply stirred, soaked in a broth, etc).
  - d. Explain how the final meat product is completed then cooked.
3. Apply washing and sanitization practices on the workplace and equipment in the classroom. Choose the appropriate cleaning product and equipment to be used during cleaning process, then clean the workstation in preparation for mixing meat products.
4. After cleaning and selecting the tools and equipment, gather ingredients to prepare the meat products that have been displayed with their raw ingredients in small groups.
5. With your group, weigh and mix ingredients according to recipes provided by the trainer. Then combine the additives with the meat in accordance with the recipe to complete your group's meat product. When meat product is completed, clean your station completely and correctly and return unused ingredients to the trainer.
6. After completing the activity, discuss the processes and share the lessons learned.



### **Application Activity**



#### **Topic 3.1 Task 4:**

1. In pairs, go to a local butcher shop in your community. Discuss with the butcher to understand which meat products the butcher prepares and observe the preparation of

those products, if possible. While at the butcher shop, write down (in fine detail) two recipes that are used by the local butcher.

2. Upon returning to class, share your recipe with a new partner. Give feedback on your partner's recipe, particularly if they used enough detail and where they should add more information.
3. Finally, submit your recipe for validation to your trainer.



### Points to Remember

- Quality of ingredients will impact the quality of the final meat product so use good additives.
- Measure additives carefully according to recipes to ensure correct flavour and quality.



### Formative Assessment

Complete the following short answer questions using 2-3 complete sentences.

1. Describe the process for wet-curing (or brining) meat.
2. Give two reasons why a person might want to cure meat.
3. List 5 different meat additives.

## Topic 3.2: Grinding meat mixtures for meat products

### Key Competencies:

Knowledge	Skills	Attitudes
1. Discuss size of different meat products	1. Change grinder fittings to adapt textures of meat products	1. Methodical
2. Discuss mixing techniques used in meat processing	2. Apply mixing techniques	2. Attention to detail

### Getting Started: What do we know and where are we going?



#### Topic 3.2 Task 1:

1. Observe and discuss hand-crank grinder.
  - a. Have you ever used such a grinder?
  - b. How is it used and why?
  - c. Discuss what can be ground in this machine.
2. Review the knowledge, skills, and attitudes you will gain by the end of this topic.



### Problem Solving Activity



#### Topic 3.2 Task 2:

1. Your group will be given a hand-crank manual meat grinder. Carefully examine the meat grinder. Think about how you can disassemble the meat grinder. Be careful to not break the grinder or hurt yourself with the sharp pieces. Unscrew the moving parts and lay out the pieces of the meat grinder in order on your table.
2. Once the grinder is completely disassembled and laid out on your table, ask trainer to confirm you have completed the first part of the task. Your meat grinder should look something like this:



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3. In your notebooks, sketch each grinder part that is on your table. Then use the given diagram to label each part. This will help you remember the pieces and the names.
4. After sketching, work together to re-assemble the meat grinder. Confirm your assembly with the trainer.
5. After properly assembling the grinder, brainstorm as a class: Why is it important to know how to take apart and re-assemble grinders?



### Guided Practice Activity



#### Topic 3.2 Task 3:

1. Brainstorm the following questions as a class:
  - a. When is it best to chop meat?
  - b. When is it best to grind roughly?
  - c. When is it best to grind finely?
2. Read through **3.2 Key Facts** as a class.

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<sup>34</sup> OpenClipart-Vectors. (n.d.). *Mincer Meat Grinder Grinder Free Photo* [Drawing]. Need Pix. <https://www.needpix.com/photo/89034/mincer-meat-grinder-grinder-mincing-machine-kitchen-household-cooking>

- Then, observe the trainer as he/she demonstrates how to take apart an electric grinder, showing the parts illustrated in **3.2 Key Facts**. Note how to change the settings to change texture of meat produced, to clean, and to sanitize the machine.

### 3.2 Key Facts

- The texture of ground meat depends on the size of grind plate holes (ranging from 1 to 13 mm) used in the meat grinder.
- **Grinding techniques:**
  - Cut the meat into cubes then chill in freezer for 30 minutes.
  - Also chill in freezer: grinding plate and other cutting parts.
  - Place meat and (other ingredients) in hopper then grind by spinning hand crank or turning on if electric.
- **Meat mixing techniques:**
  - The chopped meat mass should be well mixed with other ingredients. Air pockets are removed by kneading while mixing. Cover final product to minimise contact with air.<sup>35</sup>



### Application Activity



#### Topic 3.2 Task 4:

- You will visit at least 2 local butchers in your home community after class. Pay special attention to the chopping and grinding techniques done by the butcher and the machines used. Ask any questions that you have and complete the table below:

<b>Name and Location of Butcher #1:</b>	<b>Name and Location of Butcher #2:</b>
Describe grinding machine:	Describe grinding machine:
What size /texture does this butcher make? Explain why?	What size /texture does this butcher make? Explain why?
How does the butcher clean this machine?	How does the butcher clean this machine?

<sup>35</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Small-scale sausage production*. <https://www.fao.org/3/x6556e/X6556E05.htm>

What does the butcher sell most—Ground meat or chopped meat? Why?	What does the butcher sell most—Ground meat or chopped meat? Why?
Other observations:	Other observations:

2. Upon returning to class, share your observations and experiences.



### Points to Remember

- Always wear protective clothing when using the machines.
- Unplug and fully sanitize the machine after every grinding session.



### Formative Assessment

Answer the following questions with 3 or more complete sentences.

1. Explain reasons to either chop or grind meat.
2. Describe how to use the manual hand-crank grinder to chop meat.

## Topic 3.3: Assisting with meat products (sausage)

### Key Competencies:

Knowledge	Skills	Attitudes
1. Explain the principle of casing preparation	1. Prepare casing	1. Methodical
2. Describe different types of sausages	2. Make sausage	2. Honest
3. Explain main principles of quality check for sausages	3. Test the sausage	3. Attention to detail

### Getting Started: What do we know and where are we going?



#### Task 3.3 Task 1:

1. Observe the illustration carefully. Try to notice all the details. Describe what you see to a partner.



2. Write out responses to the following questions:
  - a. What are the two butchers making?
  - b. Are the two people doing the same things? If no, explain what each is doing.
  - c. What tools do you see in the illustration?

- d. Why is it important to wear hygienic clothing?
3. Volunteer to share your responses and discuss as a class.
4. Review the knowledge, skills, and attitudes you will gain by the end of this topic.



### Problem Solving Activity



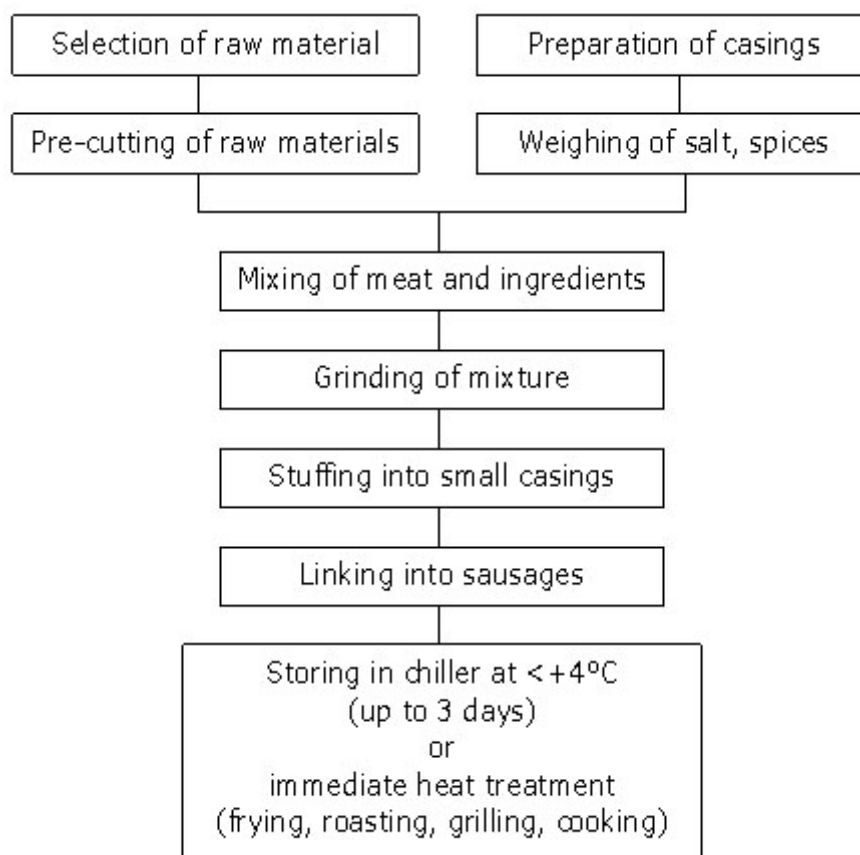
#### Task 3.3 Task 2:

1. Share with the class what you know about making sausages.
2. Read **3.3 Key Facts** individually and prepare to answer relevant questions from the trainer.

### 3.3 Key Facts

- **Sausage:** A cylindrical meat product usually made from ground meat stuffed into a tube.
  - Sausages can be made from different types of **meat mixtures**. Pork, beef, chicken, veal, etc. is mixed with salt, various spices, flavouring, breadcrumbs, or other fillers.
  - Sausage meat mixtures are then **stuffed into a skin**, called **casing** which are either natural (made from animal intestine which has been well cleaned) or artificial (tubes made from cellulose, collagen, plastic or other materials).
  - The stuffed sausage is then tied off (called **linking the sausage**) into consistent lengths called **links** using natural (edible) strings.
  - Stuffing sausages into their skin is the process called **bulking** or **extruding** which pushes the meat mixtures through a sausage filling machine (or by pushing the mixture through a funnel by hand to fill the sausage casing).

- The following flow-chart outlines the process for making sausages:



- **Types of sausage include:** Smoked sausage, cooked sausage, and dry sausage
- **Smoked sausage:**
  - Smoking: a process used to dry and cure meat using smoke from a fire of sawdust.
  - Smoking meat improves flavour and inhibits bacteria development so the product can be stored longer.
  - The amount of time needed to smoke a sausage depends on the length and the diameter of the sausage.
  - Smoked sausages can be eaten without further cooking if fully smoked.
- **Cooked sausage:**
  - Cooking sausages have raw meat so must be cooked.
  - They can be fried, grilled, or baked.
  - Cooking times vary according to the type and size of the sausage. All sausages should be cooked thoroughly to the point that the juice is clear and no pink meat can be seen.
- **Dried sausage:**

- Dried sausages are raw (not submitted to the smoking process) but have been air-dried.
- This variety of dry sausage is characterized by a highly attractive appearance with a yeasty-cheesy flavour.
- Sausage drying rooms are equipped with fans, dehumidifiers, and temperatures so sausages dry thoroughly and quickly.
- **Quality check for sausages:**
  - **Appearance:** whole sausage and cross section: colour and texture
  - **Flavour/Odour:** checked both before and after smoking
  - **Acidity:** pH should range from 5.8 to 6.3.
  - **Moisture content:** moisture should be approximately 70%
  - **Storage/Handling:** meat should be prepared in sanitary conditions and stored correctly<sup>36</sup>



## Guided Practice Activity



### Task 3.3 Task 3

1. The trainer will provide you with a recipe for making sausage.
2. Trainer Demo: Gather around the trainer who will demonstrate correct sausage making technique. The trainer will:
  - a. focus first on sanitation of the workstation.
  - b. weigh and mix meat and other ingredients then grind them all together.
  - c. carefully stuff prepared sausage meat into the casings using machine or funnel.
  - d. demonstrate linking the sausage so each link is a consistent size.
  - e. complete demonstration by discussing options for storage of raw sausages to be cooked later, process for smoking the sausages so they can be stored easily, and processes for drying the sausages to preserve them.
3. Take detailed notes on this demonstration.

<sup>36</sup> Food and Agriculture Organization of the United Nations. (n.d.). *Small-scale sausage production*. <https://www.fao.org/3/x6556e/X6556E05.htm>



## Application Activity



### Topic 3.3 Task 4:

1. Visit two local butcher shops that make sausages. At each of the shops, interview the butcher on the process and recipes used to make sausages.
2. For each of the two visits, your job is to write down:
  - a. The recipe ingredients, including quantities/weights of each thing added to the mix.
  - b. All the steps in the process of making the sausages.
3. When you return to class, you will compare the two recipes and processes that you have found with those that another trainee heard observed at different butcher shops.
  - a. How are both recipes/processes the same?
  - b. How do the recipes/processes differ? And which seems to be a better idea?



### Points to Remember

- Sanitation is vital when processing meats.
- Sausages combine many ingredients so prepare everything needed before beginning.



### Formative Assessment

Answer the following open questions using complete sentences.

1. Define the term sausage.
2. Differentiate natural casing from artificial casing.
3. Explain the purpose of smoking sausage.
4. Why must we sometimes cook sausages? Name 3 cooking techniques for sausages.
5. List the 5 areas that should be checked when evaluating the quality of a sausage.

## Topic 3.4: Storing meat products

### Key Competencies:

Knowledge	Skills	Attitudes
1. Explain principles for packaging	1. Perform packaging	1. Honest
2. Describe packaging material quality parameters	2. Select appropriate packaging materials	2. Self-motivated
3. Explain principle on labelling techniques	3. Perform labelling	3. Committed
4. Explain principle on storage conditions and monitoring	4. Maintain conditions for meat product storage	4. Accurate



### Getting Started: What do we know and where are we going?



#### Topic 3.4 Task 1:

1. Observe the set of meat packaging materials that your trainer has assembled in the classroom.
2. After careful observation and consideration, complete the following table with a partner:

Name of the packing material:	Description of the material:	Explain why this is good to store meat products:

3. After completing your table, share and discuss your responses with the rest of the class.
4. Review the knowledge, skills, and attitudes you will gain by the end of this topic.

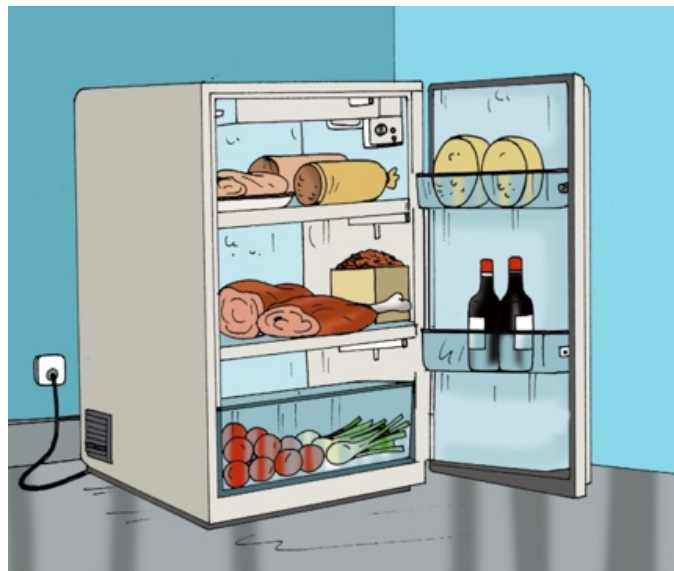


## Problem Solving Activity



### Topic 3.4 Task 2:

1. There are three ways that meat can be stored:
  - a. Patty Paper
  - b. Poly/Plastic bags
  - c. Refrigerator



2. With your partner, discuss the following questions. Use the internet to search images, if needed.
  - a. What is similar about all three of these storage methods?
  - b. How is each method different from the others?
  - c. Explain how each method has a purpose in protecting and/or preserving meat.
3. After discussing, share your answers with the rest of the class.
4. Read **3.4 Key Facts** aloud as a class.

### 3.4 Key Facts

- **Packaging and Storing:**
  - Meat is packaged and stored carefully to avoid contamination and to avoid spoilage.
- **Packaging Products:**
  - Products that can be used to package meats include the following:
    - Butcher Paper, Deli Paper (waxed), Freezer Paper (plastic), Bags, Trays, Tray Liners, Patty Paper, Shrink Film, Shrink Pouches, Vacuum Pouches
  - Quality varies among different products and manufacturers.
  - Choice of product depends on many things including cost, availability, use, and re-use.
- **Package Labelling:**
  - Packaged products must be carefully labelled, or they should not be trusted.
  - Label should include: Manufacturer name and address, product name, quantity (weight/ volume), production and expiration date, storage conditions, ingredients, and allergens
- **Storage conditions:**
  - Store meat products in the coldest part of the refrigerator or in the refrigerator's meat bin. Use fresh meat, stored in the refrigerator within two days of purchase.
  - Freeze meat and meat products in freezer-safe wrap at or below -17°C.
  - Eat or freeze cooked sausage and other meat products within three to four days only if it can be carefully refrigerated.<sup>37</sup>



#### Guided Practice Activity



#### Task 3.4 Task 3:

1. The trainer will demonstrate packaging and storing. Ask questions and take notes.
2. Observe as the trainer ensures that:
  - a. Sanitation practices and correct hygiene are demonstrated with each packaging material.

<sup>37</sup> G&L Davis Meat Co. (n.d.). *Sausage handling & storage – Gianelli sausage*. Gianelli Sausage. <https://www.gianellisausage.com/sausage-handling-storage/>

- b. All equipment needed (bag sealers, scales, knives, scissors) is in place at demo.
  - c. Each package is correctly and completely labelled.
  - d. With each packaging type, explain how that package should be stored too.
3. While the trainer is demonstrating packaging, labelling, and discussing storage for each different packaging product, ask questions to ensure understanding.
  4. Practice the wrapping and bagging techniques that have been demonstrated by the trainer.



### Application Activity



#### Topic 3.4 Task 4:

1. You have participated in a demonstration of packaging, labelling, and storing meat products today during class. Now it is time for you to identify these practices out in your community. After school today, you will visit local butchers, shops, grocers, supermarkets, or other places that may sell meat products and identify the kind of packaging used and the way that product is stored.
2. Complete the table below with as many different packaging techniques as you can.

Describe the packaging	Describe the label	Describe storage technique

**Note:** you will submit your table to the trainer at the beginning of the next class. The trainee with the most packaging techniques will win a prize.

3. After submitting your list, discuss the findings and experiences as a class.



### **Points to Remember**

- Careful packaging and storage of meat and meat products guards quality of the product.
- Sanitation procedures must be adhered to at all times, from cutting to storing meat.



### **Formative Assessment**

Answer the following questions using complete sentences.

1. Give at least two types of packaging materials for meat products.
2. List two reasons it is important to package meat products carefully.
3. List 4 items that should be included on a product label.
4. Which storage condition is most desirable for meat products?



## Self-Reflection

1. You have come to the end of the unit. You are going to do the survey you did at the beginning of the unit again to help you do self-assessment of your knowledge, skills, and attitudes.

Again, there are no right or wrong answers to this survey. It is for your own use to gauge your knowledge, skills and attitudes after the unit. Read the Knowledge, Skill or Attitude in the left column. Can do this? How well? Put a check in column that best represents your situation.

<b>My experience</b>	<b>I don't have any experience doing this.</b>	<b>I know a little about this.</b>	<b>I have some experience doing this.</b>	<b>I have a lot of experience with this.</b>	<b>I am confident in my ability to do this.</b>
<b>Knowledge, skills, and attitudes</b>					
Differentiate meat ingredients					
Weigh, mix, and dose ingredients					
Size different meat products					
Use mixing techniques for meat processing					
Prepare casing					
Differentiate types of sausage					
Check quality of sausages					
Use packaging techniques					
Label meat products					
Maintain and monitor storage conditions					

2. Complete the table below by identifying areas from the unit where you have improved and where you need improvement with the actions/strategies you will use to help you improve when receiving and interpreting information at the workplace.

<b>Areas of strength</b>	<b>Areas for improvement</b>	<b>Actions to be taken to improve</b>
1.	1.	1.
2.	2.	2.

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