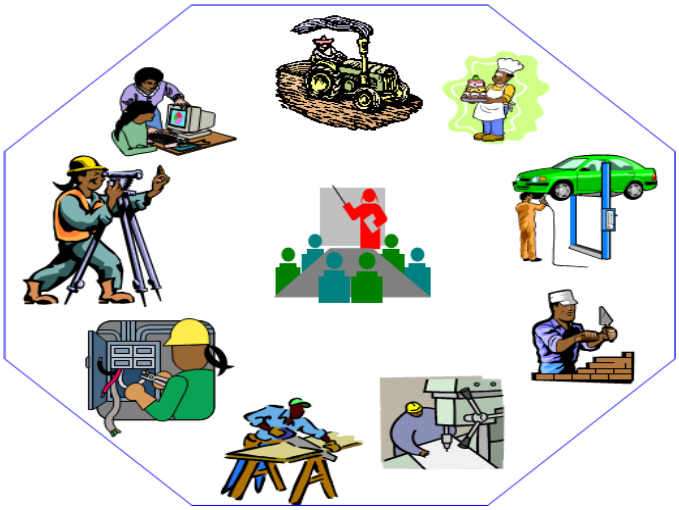
Animal Health Care Service

Level-III

Based on March, 2018, Version 3 Occupational standards (OS)

Unit competence: -Participate in Animal Diseases prevention and Control Activities



Module Title: -Participating in Animal Diseases prevention and Control Activities

LG Code: AGR AHC3M14 0121 LO (1-5) LG (54-58)

TTLM Code: AGR HC3TTLM 0621v1

June, 2021

Adama, Ethiopia

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East Africa Skills for Transformation and Regional Integration Project (EASTRIP)

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LG #54	LO #1- Implement Quarantine Procedures

Instruction sheet

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

- making assessment of hazards and risk
- Maintaining personal hygiene and cleanliness standards.
- Implementing safe work practice
- Preparing and maintaining quarantine area.
- Identifying & isolating animals requiring quarantine

Maintaining quarantine records

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

- make assessment of hazards and associated risk in the work place
- Maintain personal hygiene and cleanliness standards in quarantine area.
- Protect one from, and minimize the spread of, zoonotic diseases.
- Prepare and maintain quarantine areas with quarantine protocols.
- Identify and isolate animals requiring quarantine
- Maintain quarantine records.

Learning Instructions:

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

Information Sheet 1- Making Assessment Of hazards and associated risks in Quarantine

1.1. Risk management process

Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.

All hazards associated with the activities of quarantine should be the subject of a risk management process, namely:

- Hazard identification,
- Risk assessment,
- Risk control, through providing appropriate facilities, induction and training;

1.1.1 Hazard Identification

A **hazard** is a potential source of harm. Substances, events, or circumstances can constitute hazards when their nature would allow them, even just theoretically, to cause damage to health, life, property, or any other interest of value. The probability of that harm being realized in a specific incident, combined with the magnitude of potential harm, make up its risk, a term often used synonymously in colloquial speech.There are a number of potential hazards specific to working with animals, including:

- bites, scratches and kicks;
- the development of animal allergies;
- infections associated with zoonotic diseases; and
- the opportunity for the transmission of infection from animals to humans of pathogens with which the animals have been inoculated.
- manual handling tasks, hazardous substances, the use of sharps, use of genetically modified organisms, exposure to radiation, and so on.

Zoonosis

A zoonosis (zoonotic disease or zoonoses -plural) is an infectious disease that is transmitted between species from animals to humans (or from humans to animals).Over

200 diseases have been classified as zoonoses throughout the world. A variety of pathogens and reservoir animals (cattle, pigs, sheep, birds, dogs, cats and other domestic, native or exotic species) are involved. Persons having contact with animals must familiarize themselves with the potential zoonotic diseases that the species they are dealing with may harbour.

Some zoonotic diseases are fatal eg Hendra Virus, and Australian Bat Lyssavirus and some are life threatening, particularly in immuno-compromised individuals (e.g. people undergoing treatment with corticosteroids or chemotherapy, or who are HIV positive). Pregnant women can be particularly at risk due to certain infections such as toxoplasmosis that can affect the developing foetus.

The following tables summarise some of the potential zoonotic diseases. Note that research animals may be imported from other countries and may be quarantined within research animal facilities- and persons contacting such animals may be exposed to zoonoses not otherwise present in Australia.

Bacterial Diseases

Human Disease	Agent	Animal Hosts	Means of Spread
Anthrax	B. anthracis	Farm animals	Inhalation/ Ingestion of spores, contact with non-intact skin
Brucellosis	Brucella spp	Swine, dogs, cattle, sheep, goats	Contact
Colibacillosis	E. coli	most species	Ingestion

Leptospirosis	Leptospira spp.	Rodents, dogs, farm/ wild animals	Contact with urine
Mycobacteriosis	Mycobacterium spp.	Fish, reptiles, amphibians	Puncture wounds/scratches, inhalation
Pasteurellosis	P. multocida	mammals and birds	contact/ ingestion
Pseudotuberculosis	P. pseudotuberculosis	Rodents, birds	Contact/ ingestion
Psittacosis	Chlamydia psittaci	parrots, pigeons	Inhalation
Rat bite fever	S. moniliformis	Rodents Rodent	bites/ ingestion
Salmonellosis	Salmonella spp.	Farm animals, rodents, reptiles amphibian	Ingestion/ inhalation/ contact
Tetanus	Cl. Tetani	Horses, other equidae	Contaminated wounds
Tuberculosis	M. bovis/ avum/ tuberculosis	Primates, cattle, dogs, poultry, swine, sheep	contact, ingestion , inhalation, needle stick

Vibriosis (Campylobacter)	Vibrio spp.	Domestic ruminants, dogs, rodents, birds, fish, amphibians, reptiles	Uncertain, probable ingestion
Listeriosis	L. Monocytogenes	Ruminants, small marsupials, most animals and birds	Ingestion in food.
Wound infections	Aeromonas spp.	Fish, amphibians, reptiles	Contamination of existing wounds Rickettsial Diseases
Tick Typhus	R. australis	Mammals with ticks	Tick bites
Murine typhus	R. mosseri (R. typhi)	Rats/ mice	rat flea bites
Q fever	Coxiella burnetti	Cattle/ sheep	Inhalation
Scrub typhus	R. orientalis	Small forest mammals	Mite bites.

Viral Diseases

Human Disease	Agent	Animal Hosts	Means of Spread
Hendra Virus	Henipavirus	Horses (via bats)	Contact with body fluids
Australian Bat Lyssavirus	Lyssavirus	Bats	Bites and scratches contaminated with bat saliva
Menagle Virus	Paramyxoviris	Pigs (via bats)	Contact? Bites and scratches?
Equine Encephalomyelitis	EEE/ WEE/ VEE arbovirus	Birds/ horses	Mosquito bites
Haemorrhagic fevers	Asian arboviruses	Rodents/ hares/ monkeys	tick bites
Lymphocytic choriomeningitis virus	LCM Virus	rodents and other mammals	contact/ inhalation/ tissue culture
Herpes B Encephalitis	Herpes simiae	Rhesus/ other Macaca	contact/ bites
Hepatitis A	Hepatitis virus	Chimpanzees	Contact
Rabies	Rabies virus	dogs/ bats etc	bites, saliva contact

Murray Valley Encephalitis	Arbovirus	Birds, native and domestic animals	Mosquito bites
Epidemic polyarthritis (Ross River virus, Barmah Forest Virus)	Arbovirus	Mammals	Mosquito bites

Fungal and Protozoan Diseases

Human Disease	Agent	Animal Hosts	Means of Spread
Ringworm	Trichophyton spp./ microsporum spp.	Dog, cat, guinea pig, rodents, farm animals	Contact
Toxoplasmosis	Toxoplasma gondii	Primary Host cats, secondary hosts most mammals and birds	Ingestion (cat faeces and raw meat)
Cryptosporidiosis	Cryptosporidium spp	All animals	Ingestion (shed in faeces) Parasites

Trichostrigyliasis	Trichostrigyliasis spp	Sheep, cattle, goats pigs,horses, cats, pigeons	Ingestion vegetation contaminated by larvae from faeces
Toxocariasis	Toxocara canis	Dog	Ingestion of infectious ova from faeces
Hydatid disease	Echinococcus granulosus	Dog/ dingo	Ingestion of ova passed in faeces
Heartworm	Dirofilaria immitis	Dog	Mosquito bites

Allergies

Allergies, also known as allergic diseases, are a number of conditions caused by hypersensitivity of the immune system to typically harmless substances in the environment These diseases include hay fever, food allergies, atopic dermatitis, allergic asthma, and anaphylaxis. Symptoms may include red eyes, an itchy rash, sneezing, a runny nose, shortness of breath, or swelling. Food intolerances and food poisoning are separate conditions.

Common allergens include pollen and certain foods.[12] Metals and other substances may also cause problems.[12] Food, insect stings, and medications are common causes of severe reactions.[3] Their development is due to both genetic and environmental factors.[3] The underlying mechanism involves immunoglobulin E antibodies (IgE), part of the body's immune system, binding to an allergen and then to a receptor on mast cells or basophils where it triggers the release of inflammatory chemicals such as histamine.[13] Diagnosis is typically based on a person's medical history.[4] Further testing of the skin or blood may be useful in certain cases.[4] Positive

tests, however, may not mean there is a significant allergy to the substance in question.

Persons who come into contact with laboratory animal proteins (usually contained in saliva, urine or shed skin) may develop Laboratory Animal Allergy (LAA). Allergic reactions are more likely after substantial or repeated exposure to the allergen- either to the animal itself or to items contaminated with the excretions and secretions of animals including urine, saliva, dander, fur/hair and serum. LAA may lead to serious allergic reactions, including occupational asthma, if exposure to the allergens continues. Up to 30% of people exposed to laboratory animals may be affected by LAA to some degree if appropriate risk controls are not in place.

Bites, Scratches and Kicks

Handling live animals, both in the laboratory and in the field, obviously has an influence on their behaviour. Responses to stressful or threatening situations can lead to the handler being bitten, scratched, kicked, butted, trampled or stung.

Any animal bite or scratch that breaks the skin can quickly become infected if not cleansed immediately. The microbial flora of the mouth of animals contains a mixed population of potential pathogens.

1.1.2 Risk Assessment

A person may be exposed to pathogens carried by animals through:

- Inhalation of infected dust or droplets/aerosols (bedding, hair, body fluids, etc.);
- ingestion of infected material (e.g. contaminated food);
- by skin contact with infected material;
- Through skin penetration (bites & scratches).

The likelihood of a disease developing following this exposure depends on:

- the pathogen and its infective dose;
- the titre of the agent in the exposure;
- The immune status of the host.

The risk of developing a zoonotic disease therefore depends upon:

- ➢ the animal and its origin and microbiological status

- the potential pathogen
- the exposure routes that the work presents
- the immune status of the persons potentially exposed
- the type of animal handling required and the competence of the handler

Important risk factor:-

- The most important risk factor is level of exposure to the allergen.
- Persons with preexisting allergies may be more at risk of developing LAA or of exacerbation of their preexisting allergies.
- Smokers may be more at risk of developing LAA.

It is recommended that nitrile gloves are worn in preference to latex to minimize the risk of developing an allergy to latex.

Bites, Scratches and Kicks

- Risk of injury from animal bites, scratches and kicks relates to the manner of handling of the animal, the temperament of the animal and the ability of the animal to inflict damage.
- Domesticated animals are less likely to cause injury
- Persons trained in correct animal handling are less likely to be injured
- The type of risk is associated with species e.g. rats and mice are more likely to cause bite injuries, cattle are more likely to cause trampling injuries
- Painful procedures are more likely to result in an attack by an animal
- The correct handling equipment will reduce risk
- Familiarity of the animal to the handler should reduce risk of injury.

1.1.3 Risk Control

Personal Hygiene

Transmission of infectious agents from animals to persons in contact with them can largely be prevented by:

- Thorough hand washing after handling animals or cleaning their enclosures
- Not eating, drinking or applying cosmetics within the animal housing facility

- Microbiology Practices

It is recognised that there may be situations, eg. field work with wild bats, where this may not be possible. In such cases appropriate measures must be put in place, such as:

- The use of personal protective equipment (eye/face protection, gloves, overalls, etc.)
- Immunisation, where this is available
- Provision of first aid equipment and procedures (such as eye wash units, soap & water, etc.)
- Awareness of the risks involved
- Appropriate access to medical review and treatment

Health Status

Health status can significantly affect risks associated with handling of animals and animal products.

- Persons in contact with animals should always notify their health practitioner of the species of animals they are in contact with.
- Any staff working with animals that are immuno-compromised should inform their supervisor
- Pregnant women should notify their supervisor as early in their pregnancy as possible, as the risk to the foetus with some hazards (eg toxoplasmosis or x rays) is greatest in the first few weeks. If this is not possible they should consult a medical practitioner regarding the advisability of animal work as soon as possible after the pregnancy is confirmed.
- New staff in positions requiring contact with animals and/or animal products must be assessed prior to their appointment. In some cases medical advice may be against making an appointment. If an appointment proceeds, adequate measures should be taken to protect the health of the individual, and the individual must be made aware of the risks involved. The staff member shall be reviewed annually.

Training

It is essential that all persons who work with or come in contact with animals are

properly trained and supervised according to their level of competence.

All persons handling animals or animal products are required to attend the training session on animal handling conducted by the Veterinarian and Animal Welfare Officer, and follow this with specific training with their supervisor. A record of this training must be kept with the person.

Persons working with animals or animal products shall receive individual training by their supervisor/manager on the operation of any safety equipment and materials that they may be required to use. They shall also receive training of correct procedures to be used to protect themselves and other animal workers and this must be documented.

Personal Protective Equipment (PPE)

All employees handling animals or animal products must wear the correct personal protective equipment based on the risk of the procedure/practices. Possible PPE includes:

- Rubber or cotton-lined gloves (preferably Nitrile)
- Lab coat/gown or overalls.
- Face masks,
- Safety boots
- Cover shoes
- Surgical caps

The minimum requirements for PPE in a laboratory shall be laboratory coat/gown, protective eyewear and closed shoes unless lesser requirements can be justified by a risk assessment. All protective clothing must be removed after exposure to animal activities and laundered or disposed of in a manner appropriate to the type of contamination and clothing.

Vaccinations

For certain pathogens, immunization is an appropriate way of controlling the risks of acquiring a zoonotic disease.

- Tetanus Vaccination is recommended for persons working with any animal.
- Hepatitis B and tuberculosis vaccination may be required prior to working with some animals (eg primates)
- Q- Fever vaccination shall be given to persons working with goats, cattle and sheep and some native animals.
- Rabies vaccination (to protect against bat lyssavirus) is required for persons working with bats

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I: multiple choices

1. Of the following which one is risk management process in quarantine?
   a) Hazard identification-risk control-risk assessment
   b) risk control-risk assessment- Hazard identification
   c) risk assessment- Hazard identification- risk control
   d) Hazard identification -risk assessment- risk control
2. Which is risk control activity in animal quarantine procedures?
   a) Workers handling animals Personal Hygiene
   b) Notifying Health Status practitioners
   c) Animal and practitioner Vaccinations
   d) Wearing Personal Protective Equipment (PPE)
   e) All
3. Of the following one is bacterial zoonotic disease.
   a) Anthrax
   b) Rabies
   c) Toxoplasmosis
   d) Hepatitis B

Part II: short answer

1) _____ is disease transmitted from animal to human and vice versa. (1pt)

2) _____ is literally isolation (separation) of newly introduced or disease expected (infected) animal from healthy animals. (1pt)

3) List down at least 5 potential hazards which are specific to working with animals.(5pt)

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

Name: _____ Date: _____

Information Sheet 2- Personal hygiene and cleanliness standards are maintained in accordance with OHS and organisational policies and procedures.

Occupational Health and safety (OHS)

Occupational health and safety is one of the most important aspects of human concern. It aims an adaptation of working environment to workers for the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations. It includes:-

- Safe animal handling systems and procedures including zoonoses control,
- Identify hazards, assess and report risks.
- Safe manual handling systems and procedures.
- Safe systems and procedures for outdoor work including protection from solar radiation.
- Appropriate use of PPE clothing and equipment.

Sanitation (hygiene)

Sanitation addresses the cleaning—and disinfection when necessary—of people, equipment, animals and material entering a farm. Routine farm operations such as feeding, milking, animal handling, medical treatments, contact with vehicles and equipment, interactions with service providers and outside visitors, are all possible contact points for the transfer of diseases and pests. Entry and exit routes from buildings and a property have the potential to bring and take away disease-causing organisms.

Some form of cleaning and disinfection should be done before people and their clothing, equipment, supplies, and larger items such as vehicles and heavy equipment cross from dirty or low risk (the farm perimeter) to clean or higher risk areas (animal housing, animal transport vehicles, feed, water and other items that come into close contact with livestock).

Self-Check – 2	Written test

Name…… ID…… Date…….

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

1. Define and explain occupational health and safety(3pts)
2. Sanitation addresses the _____and _____ when necessary—of people, equipment, animals and material entering a farm.(3pts)

Note: **Satisfactorprating 3 points** **Unsatisfactory - below 3points**

Score = _____

Rating: _____

Information Sheet 3- Protecting and Minimizing Of the Spread of Zoonotic Disease

2.1. Proper Personal Hygiene

- Wash hands before and after animal handling.
- Do not eat or drink in the animal housing areas.
- Wear coveralls, farm specific clothing or laboratory coats when handling animals.
- Avoid handling sick animals or animals with lesions unless gloved.
- Wear a mask if you are allergic to animal hair or dander or if feed or bedding dust is present
- If you are sick, DO NOT enters the agricultural animal facilities. You are more susceptible to other infective agents and you may transfer pathogens to the animals!
- Routinely wear gloves when cleaning animal area.
- Note progression of any illness. Report illnesses to your supervisor.
- Inform physician of your animal related activities.

2.2. Environmental Maintenance

- Keep animal housing areas well organized and clean.
- Avoid urine and fecal build-up. Dry feces result in fecal dust which may be inhaled.
- Clean rooms have a lower likelihood of horizontal or zoonotic transfer.
- Proper ventilation protects the animal and workers.
- Clean feed and bedding from floors. Litter attracts vermin which may introduce a zoonotic disease into the facility.

2.3. Herd/Flock Maintenance

- Observe animals for health status on a daily basis.
- Report sick or dead animals.
- Note health problems such as diarrhoea, difficulty breathing, depressed, immobile.

- Take extra caution in cleaning the areas around ill animals. Don’t spread possible pathogens.
- Isolate affected animals as appropriate.
- Record history or progression of animal disease.

Self-Check –3	Written test

Name…… ID…… Date…….

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

3. Describe the three major ways that Protect and Minimize the Spread of Zoonotic Disease
4. Explain personal hygiene protect and minimize the spread of zoonotic disease

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

Score = _____

Rating: _____

Information Sheet 4- Preparing And maintaining Quarantine Areas

4.1 Quarantine protocol

During this period, certain prophylactic measures should be instituted. Individual fecal samples or representative samples from large numbers of individuals housed in a limited area (e.g., birds of the same species in an aviary or frogs in a terrarium) should be collected at least twice and examined for gastrointestinal parasites. Treatment should be prescribed by the attending veterinarian. Ideally, release from quarantine should be dependent on obtaining two negative fecal results spaced a minimum of two weeks apart either initially or after parasiticide treatment. In addition, all animals should be evaluated for ectoparasites and treated accordingly.

Vaccinations should be updated as appropriate for each species. If the animal arrives without a vaccination history, it should be treated as an immunologically naive animal and given an appropriate series of vaccinations. Whenever possible, blood should be collected and sera banked. Either a -70ºC freezer or a -20ºC freezer that is not frost-free should be available to save sera. Such sera could provide an important resource for retrospective disease evaluation.

Quarantine for all species should be under the supervision of a veterinarian and consist of a minimum of 30 days (unless otherwise directed by the staff veterinarian). Mammals: If during the 30-day quarantine period, additional mammals of the same order are introduced into a designated quarantine area, the 30-day period must begin over again. However, the addition of mammals of a different order to those already in quarantine will not have an adverse impact on the originally quarantined mammals. Birds, Reptiles, Amphibians, or Fish: The 30-day quarantine period must be closed for each of the above Classes. Therefore, the addition of any new birds into a bird quarantine area requires that the 30-day quarantine period begin again on the date of the addition of the new birds. The same applies for reptiles, amphibians, or fish.

Complete medical records should be maintained and available for all animals during the quarantine period. Animals that die during quarantine should have a necropsy performed under the supervision of a veterinarian and representative tissues submitted for histopathologic examination.

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I: multiple choices

_____1. Which statement is not true?

a) If during the 30-day quarantine period, additional mammals of different order are introduced into a designated quarantine area, the 30-day period must begin over again.

b) If during the 30-day quarantine period, additional mammals of the same order are introduced into a designated quarantine area, the 30-day period is not begun again.

c) The addition of mammals of a different order to those already in quarantine will have an adverse impact on the originally quarantined mammals.

d) The addition of any new birds into a bird quarantine area requires that the 30-day quarantine period begin again on the date of the addition of the new birds.

e) If during the 30-day quarantine period, additional mammals of the same order are introduced into a designated quarantine area, the 30-day period must begin over again.

Part II: short answer

1. List out at least 4 quarantine protocols

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Name: _____ Date: _____

Information Sheet 5- Identifying and Isolating Animals Requiring Quarantine

4.1. Introduction

Animal quarantine is designed for the purpose of preventing infectious diseases of domestic animals entering the countries. Animal quarantine is conducted for imported articles subject to quarantine (hereinafter referred to as designated quarantine goods to include cattle, pigs, goats, sheep, horses, chickens, ducks, turkeys, ostriches, quails, rabbits, honeybees and animal products, and including meat products such as ham and sausages). Furthermore, in order to import designated quarantine goods, an importer must attach an inspection certificate of the exporting country and ensure that the goods pass animal quarantine.

4.2. Reason of quarantine

The purpose of quarantine is to prevent infectious diseases of domestic animals entering the countries. Animal quarantine is conducted for imported or exported articles subject to quarantine.

4.3. Implementation of animal quarantine

Animal quarantine is implemented to animals and animal products imported or exported for the purpose of preventing the entry of infectious diseases of domestic animals through imported animals and animal products, and preventing the transmission of these infectious diseases to foreign countries, thereby contributing to enhancement of the international animal quarantine.

Processed meat products such as ham and sausages also have to be inspected under this system since their processing methods may not have completely sterilized all causative agents of animal infectious diseases or they might have been re-infected and may carry infectious livestock diseases by handling after processing. The products imported from permitted countries need to pass the export inspections performed by the appropriate government agency of the exporting country, be accompanied by inspection certificates issued by those government agencies which explicitly ensures that there is no threat to spread causative agents of designated animal infectious diseases or that there is a belief thereof, and pass inspections carried out by the animal quarantine officer in a country.

4.4. Animals needs be quarantined

- Newly introduced animals-imported animal and bought from local market.
- Animals expected that they have been infected (exposed)but no apparent clinical sign.
- Infected animal with apparent clinical sign

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the provided space for answer.

1. _____ is designed for the purpose of preventing infectious diseases of domestic animals entering the countries.(1pt)
2. Write reasons why animal to be quarantined.(1pt)
3. Explain animals needs to be quarantined.(3pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Name: _____ Date: _____

Information Sheet 6- maintaining Quarantine records.

Record keeping is an essential part of good livestock and farm business management. Recording can be done most easily if animals have some form of identification. Thus, animal recording and identification are inseparable.

6.1 Quarantine service efficiency records includes:

Animal history

- Owner's data
- Patient data
- Present history
- Past history
- Environmental and management history

Animal diseases diagnosis

- Clinical diagnosis
- Tentative diagnosis
- Differential Diagnosis
- Confirmatory diagnosis

Treatment data

- Generic name of drug
- Route of administration of drug
- Dose of administration of drug
- Duration of drug
- Post treatment advice

Disease outbreak

- morbidity of animals in a specified area(numbers of affected animals)
- Mortality rate (sum of the total number of death)
- response rate of the animals due to immunity
- Number of recovered animals from sickness after proper diagnosis and treatment.

Self-Check -6	Written Test

Directions: Answer all the questions listed below. Use the provided space for answer.

1. what are the quarantine service record

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Name: _____ Date: _____

LG #55	**Lo #2- Apply Biosecurity To People, Animals And Equipment**

Instruction sheet

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

- Identifying possible sources of pathogen contamination
- Identifying potential bio security threats.
- Maintaining personal sanitation and hygiene
- Cleaning and disinfecting all equipment is before being brought onto the site.
- Checking animals introduced to the site/quarantine area for health status, isolated from all others and placed in disinfected sheds.
- Keeping farm compound footpaths and areas around sheds clear of debris.
- mentioning Control ways of transmission ways of zoonotic diseases and other contagious diseases

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

- Identify possible sources of pathogen contamination
- Identify potential bio security threats.
- Maintain personal sanitation and hygiene
- Clean and disinfect all equipment is before being brought onto the site.
- Check nimals introduced to the site/quarantine area are for health status, isolated from all others and placed in disinfected sheds.
- Keep farm compound footpaths and areas around sheds clear of debris debris according to workplace policy.
- Mention Control ways of transmission ways of zoonotic diseases and other contagious diseases.

Learning Instructions:

7. Read the specific objectives of this Learning Guide.
8. Follow the instructions described below.
9. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
10. Accomplish the “Self-checks” which are placed following all information sheets.
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12. If you earned a satisfactory evaluation proceed to “the next learning guide

Information Sheet 1- Identifying possible sources of pathogen contamination

1.1 Biosecurity Measures

Animal biosecurity is the implementation of measures to prevent disease introduction into a healthy population of animals or limit the spread of disease once introduced. Biosecurity refers to measures aimed at preventing the introduction and/or spread of harmful organisms (e.g. viruses, bacteria, etc.) to animals and plants in order to minimize the risk of transmission of infectious disease. In agriculture, these measures are aimed at protecting food crops and livestock from pests, invasive species, and other organisms not conducive to the welfare of the human population. The term includes biological threats to people, including those from pandemic diseases and bioterrorism. The definition has sometimes been broadened to embrace other concepts, and it is used for different purposes in different contexts.

Biosecurity practices are simple steps you can take to keep diseases out of your farm, and out of our food supply. Your farm should be a safe zone. Here's what you need to know to provide an extra measure of protection for your animals:

Who is at risk?

- Swine
- Cattle
- Sheep
- Your Farm
- Poultry
- Horses
- Goats
- Our Economy

Steps of Prevention:

- Limit non-essential traffic on the farm.
- Allow only clean, disinfected vehicles on your property.
- Keep a record of all farm visitors.
- Have only one entrance/exit.
- Provide disposable footwear.
- Keep other animals and strangers off the property.
-

Animal Safety:

- Only buy livestock from a reputable dealer.
- New animals to the farm should be quarantined for 2 weeks, minimize co-mingling.
- Keep show animals segregated for two weeks after the fair.
- Use separate equipment for health and sick animals.
- Look for signs of infectious diseases.
- Report sick animals.
- Minimize Contamination:
- Don't bring unwanted germs into your farm.
- Keep a separate pair of boots for use on the farm, around your animals.
- Require disposable footwear for any visitors.
- Keep a footbath with a disinfectant solution on hand (4 oz bleach, 1 gallon water).
- Spray disinfectant on all vehicle and trailer tires before returning to the farm.
- Discourage visitors who have been to foreign countries in the last 7 days.
- Don't borrow tools or equipment from other farms.

Report Signs of Disease Immediately:

State veterinarians will work with you at no charge to take samples for diagnostic tests. Early reporting is critical to the health and safety of your herd/flock and the future of our industry.

1.2 source of pathogen contamination

Animals can be exposed to diseases from a variety of sources. Most occur between animals, but transfer can also occur from the environment, such as soil, water, or feed. Some diseases can also be transferred between animals and people. Diseases of animals transferred to people are referred to as zoonotic diseases, while diseases of humans transferred to animals are referred to as reverse zoonoses. Zoonotic diseases of concern for responders during animal health emergencies are addressed further in

the Health and Safety: Zoonoses Risks and Prevention Just-In-Time training presentation.

Zoonotic disease transmission

Sources

- Animal to animal
- Environment -soil, water, feed
- vectors
- Animal to human - Zoonotic – Human to animal

Routes of Transmission

- Direct contact
- Inhalation (Aerosol)
- Oral/Ingestion
- Fomites – Inanimate objects – Equipment, boots, vehicles
- Vectors – Mosquitoes, ticks, biting midges – Rodents or birds

Direct Transmission

Susceptible animal comes in contact with infected animal

- Body fluids – Urine, feces – Saliva – Blood, milk
- Tissues – Lesions – Carcass
- Breeding
- Mother-to-offspring

Aerosol Transmission

- Disease agents contained in droplets – Pass through air
- Most agents not stable in droplets
- Close proximity required – Enclosed barns, – Coughing, sneezing, – Contaminated soil,
    - ✓ Birthing tissues
    - ✓ Feces, urine

Oral Transmission

- Ingestion of contaminated feed or water – Feces, urine – Saliva – Milk

- Licking/chewing contaminated environment
- Shared feed or water sources

Fomite Transmission

- Contaminated inanimate object
- Carries pathogens to other animals – Needles, balling guns – Buckets – Bedding, shovels – Vehicles, trailers – Humans, clothing

Vector Transmission

- Living organism transfers disease between animals – Mosquitoes – Ticks – Biting midges – Flies
- Acquires pathogen from one animal

Transmits to another animal

Self-Check – 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Short Answer Questions

1. Define animal biosecurity.(2pt)
2. write the aim of biosecurity.(2pt)
3. list out potential sources of pathogen contamination.(3pt)
4. Write animals need to be quarantined.(3pt)

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

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

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet 2- Identifying Potential bio-security threats

Biosecurity (BS) can be briefly defined as comprehensive infection management practices. There is no doubt that farmers/producers are encountered a great number of external and internal barriers when they implement BS measures. The response of farmers to the BS is also affected by these challenges.

Major difficulties regarding BS can be summarized in following seven categories:

- ✓ Education level
- ✓ Sociocultural characteristics and perceptions
- ✓ Costs and financial resources.
- ✓ Farm size
- ✓ Geographical and climatic situations
- ✓ Epidemiological situation
- ✓ Regulations

BS is the most effective way to avoid further potential losses in the future. Increasing training and specialization, increasing communication with professional organizations and institutions, and holistic approach to the BS concept will provide significant contribution to solve current problems. In a more specific way, to make the best combination of BS measures, producers should consider characteristics of their own enterprises and they must calculate cost benefit ratio for each BS measure separately

Self-Check – 2	Written test

Name…… ID…… Date…….

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

Test I: Short Answer Questions

1. List down the potential threats/challenges of biosecurity.(6pts)
2. Write the possible solutions for biosecurity threats.(4pts)

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

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

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet 3- Maintaining Personal Sanitation and Hygiene on Entry to Quarantined Area

Sanitation

Sanitation addresses the cleaning—and disinfection when necessary—of people, equipment, animals and material entering a farm. Routine farm operations such as feeding, milking, animal handling, medical treatments, contact with vehicles and equipment, interactions with service providers and outside visitors, are all possible contact points for the transfer of diseases and pests. Entry and exit routes from buildings and a property have the potential to bring and take away disease-causing organisms.

Some form of cleaning and disinfection should be done before people and their clothing, equipment, supplies, and larger items such as vehicles and heavy equipment cross from dirty or low risk (the farm perimeter) to clean or higher risk areas (animal housing, animal transport vehicles, feed, water and other items that come into close contact with livestock).

- Wash hands before and after animal handling.
- Do not eat or drink in the animal housing areas.
- Wear coveralls, farm specific clothing or laboratory coats when handling animals.
- Avoid handling sick animals or animals with lesions unless gloved.
- Wear a mask if you are allergic to animal hair or dander or if feed or bedding dust is present
- If you are sick, DO NOT enters the agricultural animal facilities. You are more susceptible to other infective agents and you may transfer pathogens to the animals!
- Routinely wear gloves when cleaning animal area.
- Note progression of any illness. Report illnesses to your supervisor.
- Inform physician of your animal related activities.

Self-Check – 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Short Answer Questions

1. Mention maintaining of personal sanitation and hygiene on entry to quarantined area(5pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

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

Score = _____

Rating: _____

Name: _____ Date**:** _____

Information Sheet 4- cleaning and disinfecting all equipment before being brought onto the site

4.1. Basic Cleaning and Disinfection Considerations

Sanitation practices of cleaning and disinfection are intended to stop the transmission of infectious agents. It involves inactivating or destroying disease-causing microorganisms on the farm premises, equipment, vehicles and personnel.

Cleaning - removes germs, dirt and impurities from surfaces or objects. Cleaning works by using soap (or detergent) and water to physically remove germs from surfaces. This process does not necessarily kill germs, but by removing them, it lowers their numbers and the risk of spreading infection. Areas that are determined to be a low risk for disease transmission may only require cleaning

Sanitizing - lowers the number of germs on surfaces or objects to a safe level, depending on the requirements. This process works by either cleaning or disinfecting surfaces or objects to lower the risk of spreading infection.

Disinfecting - kills germs on surfaces or objects. Disinfecting works by using physical or chemical agents to kill germs on surfaces or objects. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface after cleaning, it can further lower the risk of spreading infection.

Sterilization - kills all forms of microbial life. Steam under pressure, dry heat and liquid chemicals are used in this process.

The life span of infectious agents/disease-causing microorganisms varies. Many viruses and bacteria have short life spans outside of a host, from hours to days. However, others can live a long time with the right environmental conditions for them (anthrax, foot and mouth disease). Removing organic material such as dirt, feed and manure is the first step in the sanitation process, no matter if you are cleaning boots, floors, buckets, water troughs, equipment or vehicles.

The general order for the sanitation process is:

- Dry clean (remove solids)
- Wet wash

- Rinse
- Dry
- Disinfect

Dry Cleaning - remove contamination such as soil, manure, bedding and feed.

- ✓ Moisten the area to control dust.
- ✓ Air blowers should not be used because of the risk of infectious agent spread.

Washing - the most overlooked step.

- ✓ Use of detergents - a detergent disperses and removes organic materials from surfaces.
- ✓ Washing reduces infectious agents and removes oil, grease, and body fluids such as blood.
- ✓ Shut off, remove or cover electrical equipment before washing.
- ✓ High pressure water is very effective but avoid using it if you know that a highly infectious or zoonotic disease is present.
- ✓ Warm to hot water should be used.
- ✓ Scrubbing may be necessary.
- ✓ Steam is effective for cracks, crevices and pipework.

Rinsing - rinse with cold water at low pressure.

- ✓ Surfaces should be inspected to make sure there is no beading water.

Drying - surfaces should be allowed to dry completely, overnight if possible

- ✓ Fans can be helpful in drying.

Self-Check – 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Use the space provided.

Test I: Short Answer Questions

1. Define the following. (4pts)

a.clieaning

b.sanitizing

c.stralization

d.disinfecting

2. Write general order for the sanitation process (5pts)

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

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

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet 5- checking health status of animals introduced to the site/quarantine area

5.1 Diagnosis of Animal Diseases

Signs of disease

Farmers and pastoralists know that animals are sick when they notice changes in behavior such as refusal to eat, keeping to shady areas, or physical signs such as different breathing, coughing, body swellings and weakness etc.

Animals cannot speak and tell us where they hurt. But we can observe the vital functions of their body and their behaviour. Feeding and ruminating are the best indicators of good health. For the good observer slight changes in feeding and ruminating can indicate beginning of a disease and early action can be taken (e.g. measuring the temperature). The earlier you are aware that an animal is sick the earlier you can start treatment and the more successful your treatment is going to be. - Treating animals that have been sick for long (chronic cases) is very difficult, costly and often a complete waste of time.

Disease Signs include:

- Loss of appetite or not feeding at all
- Fever
- Abnormal consistent of the faeces
- Abnormal colour (or consistence) of the urine
- Abnormal colour or consistence of the milk
- Swollen and hot areas of the body such as lymph glands or the udder
- Breathing rate
- Unusual smells
- Abnormal behavior

Body temperature and fever

Normal body temperature varies by about 0.5deg Celsius during the day and can be a bit lower (early morning) or a little bit higher (evening) than the normal body temperatures listed in the following table.

Body temperature in animals

Type of Animal	Normal Body temperature in degC	Upper limit in deg C (any higher temperature is fever*)
Cattle	38.5	39.5
Calves	39.0	40.0
Horses, mules, donkeys	38.0	39.0
Foals	38.5	39.5
Sheep	39.0	40.0
Goats	39.5	40.5
Pigs	39.0	40.0
Piglets	39.5	40.5
Rabbits	39.0	
Dogs	38.5	
Cats	38-39	39.5
Birds	40.5	

Normal breathing rates for animals

You can count the breathing rate of a sick animal by standing next to it and counting the breathing movements for one or two minutes (inhaling + exhaling together count as one breath). There are different sounds generated inside the body of animals (like heartbeat, breathing, stomach sounds), which are not easy to hear. Veterinarians (and human doctors) use a stethoscope that magnifies these sounds. Placing your ear on the skin of the chest wall of the animal above the lungs can help hearing abnormal lung noises in case of pneumonia

Healthy adult	Breaths per minute
Cattle	12
Sheep,goats	12
Horses	12
Mules,donkeys	12
Camels	10
Pigs	15
Cats	20-30
Dogs	20

5.2 Observing and Describing Disease Signs

The following list of symptoms intends to help you in recognizing disease and to also describe the disease signs to others (e.g. to the vet over the phone):

Fever: measured by thermometer in degrees Celsius (shivering is often a sign of fever)

Breathing: dilated nostrils, facing the wind, groaning, grunting, coughing

Face Expression: off feed, nervous, excitable, aggressive, dull, lethargic

Nose/Nostrils: dry nose, running nose: watery fluid, pus, bloody fluid

Body condition: weak, thin, emaciated

Skin: matted color, dry, rough, peeling, scruffy, crusted, lumpy, bald, lesions and swellings on the skin surface, bearing lice/ticks/fleas

Mucous membranes: (these are white skin areas inside the eyelids below the eyeball, and the inside of the mouth, nose and vagina): They can be pink, dark-red, bluish, yellow, whitish-pale; with vesicles, with pustules/ulcers/blood/, cheesy deposits, sloughing off, stinking

Eyes: Can be cloudy/milky, inflamed, discharging water or pus, bulging out, sunken, bloodshot, blind (not reacting to movement of the hand), avoiding light

Lymph glands (also called Lymph nodes): easy to locate under the skin: can be enlarged

Behaviour:

- Feeding: Off-feed, failing to chew the cud, vomiting
- Drinking: more//less water than normal, not drinking water
- Grinding the teeth, salivating, drooling
- Looking at the flank, rolling, convulsions
- Staring - not reacting
- Staggering, turning in circles, star-gazing, high-stepping
- Arching the back,
- Stiffness of the legs, unable to rise, paralysis, coma

Urine: abnormal color (red-brown), clear or cloudy, forming foam, pressing when passing urine,

Discharge from vagina: continuous or intermittent, clear, watery, cloudy or purulent, watery, yellow, pink, blood-streaked, foul-smelling, parts of placenta visible

Faeces: normally formed, soft, liquid, stinking, hard, slimy, frothy, clay-colored, black, greenish, containing blood clots, shreds of mucous membranes, worms

Milk: thick, watery, yellow, pale-white, pink, with pus or clots, blood clots, abnormal color, abnormal smell

Skin: swelling, hot or cold, hard or soft, painful or painless, containing liquid or gas, pitting or crackling on pressure, tense or flabby, sharply or ill-defined, discharging pus, how distributed and of what size

5.3 Sending samples to a vet or to a lab

A diagnosis on the cause of disease (or death) can only be made from fresh samples. That's why it is important to submit samples for examination as quick as possible. Using a cooling box helps to keep samples fresh for a bit longer. Sending

samples to a vet or laboratory that have stayed for some time and are already decomposed and smelly is a complete waste of time.

When submitting samples from a sick animal (e.g. faecal sample, milk sample) for analysis, always use clean containers (e.g. a screw cap jar flushed with boiling water before use) or a strong plastic bags for transport (use at least two bags, storing one sealed bag with the sample inside the other bag). Check that the transport container does not leak! Leaking containers can spread disease to whoever is transporting and handling your sample. Always send a written note with the sample. The note should provide information about:

- Your address and contact (mobile number)
- The type and age of animal that is sick (e.g. adult cow)
- The number of animals that are sick
- A full history of the disease signs seen (e.g. diarrhoea, swollen udder, not feeding, can't stand up, any abnormal behaviour)
- Information since when the animal(s) is/are sick.

If a sick animal died a good description of the symptoms seen before its' death can help the contacted veterinarian to reach a diagnosis. Abnormal fluids and faeces (if the animal was slaughtered in emergency, also organs) of the dead animal, can all help in finding out the cause of death. Touching organs and fluids of an animal that died of disease can cause disease and even death in people! Do not carry out post-mortems on your farm as this endangers health and lives of your family, of yourself, your livestock and your neighbours! Protect yourself when handling fluids or faeces from a dead animal. - Small animals (chicken, lambs, kids, young calves) that died of disease can be taken to a vet or laboratory for post-mortem examination, but must be packed in a non-leaking sealed bag. Make sure the vet uses non leaking gloves when handling post mortem samples to avoid spreading of diseases to humans.

Self-Check – 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Use the space provided.

Test I: Short Answer Questions

1. Mention the disease signs that can be observed during the checking/ diagnosing animals introduced the site/quarantine

2. Write down the information should be sent with sample to veterinary laboratory.

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

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

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet 6- Keeping Farm Compound Footbaths And Areas Around Sheds Are Clear Of Debris

Production Area Footbath

Footbath is a shallow receptacle containing chemically treated water for disinfecting the feet, as in a shower room or at the entrance to a a farm house. Dirty boots can pose a very real risk to your property. People can unintentionally carry pest or disease-causing organisms on unwashed footwear, bringing them on to your farm without even realizing it.

Soil-borne pests (like phylloxera, anthrax, Panama disease) and weed seeds are carried in dirt and mud. Pieces of infected plant material, manure and soil itself can carry diseases directly from one farm to the next.

A very simple way to manage this biosecurity risk is to ensure that visitors and staff who need to access your production areas thoroughly wash and disinfect their footwear.

In particular, high risk visitors who have been on other farms in the area recently should be asked to clean their shoes or change their footwear before moving onto your property.

People who are simply dropping in at the house and not coming into contact with your crops or livestock are a low risk and do not need to do this.

There are three simple rules when allowing visitors and workers to wear their own footwear in production areas:

1. Check all visitors and workers boots and ask where they were worn previously
2. Clean footwear with a brush to remove debris, and then wash with water to remove all visible plant material and soil
3. Disinfect footwear using a footbath containing a strong sanitizing product. You could also use a spray bottle to treat shoes with a disinfecting solution. Be sure to follow the use instructions on the product label.

The top panel shows the soles of shoes with two different tread patterns after three steps: dirty, washed with water and disinfected. The bottom panel shows the organisms that grow from samples taken at each of the steps.

Cleaning step

Before washing, use a strong bristled brush to remove all visible debris. Boots should be free of dirt, mud, and manure and plant material before using the footbath. These kinds of organic matter quickly contaminate the water and prevent the disinfectant from killing germs, so the boots need to be generally clean before you wash and disinfect.

Washing step

The footbath should be a container which allows easy access. Ensure the container can fit a large boot so that the liquid saturates all parts of the footwear. Adding some soap or detergent to the water can clean better than using water alone. If shoes were very dirty to begin with, use the scrubbing brush while standing in the soap solution to thoroughly clean the soles of the shoe.

Sometimes it's more practical to have a supply of shoes available for visitors or workers to wear on farm.

Disinfection step

For maximum cleaning disinfection step should follow the washing step.

A second footbath should contain disinfecting products. These must be refreshed regularly as build-up of dirt and rain water in these solutions will lessen their effectiveness.

You can use bleach diluted to 1% active sodium hypochlorite (the active ingredient in bleach). For example, dilute a bleach solution which is 4% active sodium hypochlorite using three parts water to one part bleach.

Any other farm detergents and disinfectants can also be used as per label instructions.

As leather or fabric shoes can be damaged by prolonged exposure to disinfectants, a final rinse with fresh water is advised.

Dedicated footwear

An alternative to washing boots every time someone enters or exits a production area is to provide visitors or workers with a change of shoes (e.g. gumboots) or disposable shoe covers that are only worn in the production areas. This will minimise the chance of transferring diseases, pests or weeds both on and off your property.

The boots will still need to be washed to keep them generally clean, but because they are only being worn in the production area they will not be a source of new diseases, pests or weeds.

Footwear hygiene

Footbaths are a useful and inexpensive method of cleaning footwear before entering and exiting production areas of a property. To set up a footbath station you will need:

heavy-duty scrubbing brushes and scraping tools such as a horse pick or a screwdriver

at least two heavy-duty plastic containers

water for the footbath and rinse tub

registered decontaminant (check the APVMA database; see below for further details)

drying material: something clean, porous and non-slip, such as hessian bags, rubber mats or towels and

a tarpaulin (if footbaths are to be placed on a dirt surface).

Preparing the footbath

Set up each footbath station on a flat surface.

Fill the first plastic container with clean water for washing off any soil and plant material prior to the decontamination process.

Fill the second footbath with a registered decontaminant to prevent the spread of soil-borne diseases. Follow the label instructions.

Lay drying material after each of the clean water and decontamination footbaths.

Scrubbing brushes and scraping tools should be provided to guests to assist with cleaning.

After the footbaths have been used, dispose of the water and decontaminant away from production areas and water sources. Take note of label instructions for disposal of the decontaminant.

Self-Check – 6	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Use the space provided.

Test I: Short Answer Questions

1. Write the three simple rules when allowing visitors and workers to wear their own footwear in production areas.(3pt)

Note: **Satisfactory rating – 1.5 points** **Unsatisfactory - below 1.5 points**

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

Score = _____

Rating: _____

Information Sheet 7- Mentioning control ways of zoonotic disease in quarantine

The fundamental concept in prevention, control and eradication of zoonotic diseases is focused upon 'breaking the chain of transmission at its epidemiologically **weakest link'** in the infection cycle viz., controlling the reservoirs (animals), breaking the routes of transmission and immunization of susceptible hosts (human beings).

Prevention means all measures to exclude disease from an unaffected population of animals there are three types of prevention

- Primary prevention
- Secondary prevention
- Tertiary prevention

Primary prevention • Includes those activities directed towards preventing exposure to causal factors. • Example: Quarantine and Vaccination.

Secondary prevention includes those activities designed to detect disease process as early as possible before clinical disease occurs.

Example:-

- ✓ screening test to detect Tuberculosis, Brucellosis
- ✓ Test slaughter and Depopulation, Milk ring test

Tertiary prevention -prevention by treatment.

CONTROL • Strategy which employs all tactics useful for reducing the frequency of illness which are already present in a population It aims to reduce the mortality and morbidity caused by the disease. Effective control of a disease requires knowledge about its multifactorial causation, removal of the weakest link may be sufficient to control a disease. Host specific agents are easy to control example: Streptococcosis. The infectious agents with wider host range or vector hosts may prove more difficult to control.

Eradication- is defined as the purposeful reduction in prevalence of a specific disease to the point of continued absence of transmission within a specified area by means of a

time limited campaign.

Eradication: term is used in four senses:

- To mean the extinction of an infectious agent. (Human Small pox)
- Reduction of infectious diseases prevalence in an area to a level at which transmission does not occur.
- Reduction of infectious diseases prevalence to a level at which disease ceases to be a major health problem, although some transmission may still take place. - Refers to the regional extinction of an infectious agent (Eradication of FMD in UK)
- Means elimination of disease-producing agent from a defined population or geographical area
  - ✓ Total Eradication: complete removal of the agent. Example: small pox from the world.
  - ✓ Practical Eradication: elimination of infectious agents from the reservoirs of importance to humans or their domestic animals in defined geographical area and making 'Disease free zone', rather than total eradication from the region. Example: (Eradication of canine rabies, where eradication of rabies from wildlife reservoirs may not be possible.)

Basic principles of disease control Source of reservoir Mode of transmission Susceptible host Focus on breaking the chain of transmission:-

1. Reservoir neutralization
2. Transmission from reservoir to susceptible host
3. Transmission between the susceptible host

Reservoir neutralization • Early diagnosis • Cull infected animals • Manipulation of environment Culling of birds during avian influenza outbreak

Transmission from reservoir Reducing contact potential • Isolation and treatment of infected animals • Quarantine of susceptible animal • Population control

Susceptible host • Increasing host resistance • Immunization • Chemo prophylaxi

Approaches employed for prevention &control of zoonoses:-

- Quarantine
- Test and slaughter
- Environmental hygiene
- Mass immunization
- Vector control
- Reservoir control
- Early diagnosis
- Treatment
- Genetic improvement
- Health education
- Epidemiological diagnosis
- Niche filling

Self-Check – 7	Written test

Name…… ID…… Date…….

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

Test I: Short Answer Questions

1. What are the types of prevention?(3pts)
2. Write the basic principle of animal disease prevention(3pts)
3. List out some approaches of animal disease prevention and control(4pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

LG #36	LO #3- Observe and assess livestock Health

Instruction sheet

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

- carrying out maintenance work
- Identifying Healthy animals and recording information.
- Carrying disease prevention strategies appropriate to the unit of production/work area

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

- carrying out maintenance work
- Identify Healthy animals and recording information.
- Carry disease prevention strategies appropriate to the unit of production/work area

Learning Instructions:

13. Read the specific objectives of this Learning Guide.
14. Follow the instructions described below.
15. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
16. Accomplish the “Self-checks” which are placed following all information sheets.
17. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
18. If you earned a satisfactory evaluation proceed to “the next learning guide ”.

Information Sheet 1- carrying out maintenance work

1.1 Risk management process

Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.

All hazards associated with the activities of quarantine should be the subject of a risk management process, namely:

- Hazard identification,
- Risk assessment,
- Risk control, through providing appropriate facilities, induction and training;

Hazard Identification

A **hazard** is a potential source of harm. Substances, events, or circumstances can constitute hazards when their nature would allow them, even just theoretically, to cause damage to health, life, property, or any other interest of value. The probability of that harm being realized in a specific incident, combined with the magnitude of potential harm, make up its risk, a term often used synonymously in colloquial speech.There are a number of potential hazards specific to working with animals, including:

Risk Assessment

A person may be exposed to pathogens carried by animals through:

- Inhalation of infected dust or droplets/aerosols (bedding, hair, body fluids, etc.);
- ingestion of infected material (e.g. contaminated food);
- by skin contact with infected material;
- Through skin penetration (bites & scratches).

The likelihood of a disease developing following this exposure depends on:

- the pathogen and its infective dose;
- the titre of the agent in the exposure;
- The immune status of the host.

The risk of developing a zoonotic disease therefore depends upon:

- the animal and its origin and microbiological status
- the potential pathogen
- the exposure routes that the work presents
- the immune status of the persons potentially exposed
- the type of animal handling required and the competence of the handler

Important risk factor:-

- The most important risk factor is level of exposure to the allergen.
- Persons with preexisting allergies may be more at risk of developing LAA or of exacerbation of their preexisting allergies.
- Smokers may be more at risk of developing LAA.

It is recommended that nitrile gloves are worn in preference to latex to minimize the risk of developing an allergy to latex.

Risk Control

Personal Hygiene

Transmission of infectious agents from animals to persons in contact with them can largely be prevented by:

- Thorough hand washing after handling animals or cleaning their enclosures
- Not eating, drinking or applying cosmetics within the animal housing facility
- Microbiology Practices

It is recognised that there may be situations, eg. field work with wild bats, where this may not be possible. In such cases appropriate measures must be put in place, such as:

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I: multiple choices

1. Of the following which one is risk management process in quarantine?
   e) Hazard identification-risk control-risk assessment
   f) risk control-risk assessment- Hazard identification
   g) risk assessment- Hazard identification- risk control
   h) Hazard identification -risk assessment- risk control
2. Which is risk control activity in animal quarantine procedures?
   f) Workers handling animals Personal Hygiene
   g) Notifying Health Status practitioners
   h) Animal and practitioner Vaccinations
   i) Wearing Personal Protective Equipment (PPE)
   j) All

Part II: short answer

1) _____ is literally isolation (separation) of newly introduced or disease expected (infected) animal from healthy animals. (1pt)

2) List down at least 5 potential hazards which are specific to working with animals.(5pt)

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

Name: _____ Date: _____

Information Sheet 2- Identifying healthy animals and recording information

1.1 Introduction

The presence of disease is revealed by certain changes in the structure and function of the living organism. Such changes, which may be qualitative, quantitative or both, are described as signs of disease or symptoms, and the process of deducing from the nature of the disease that is present is described as making a diagnosis.

1.2 Diagnosis

The purposes of making a diagnosis include being able to recommend specific treatment, to provide an accurate prognosis, and to make recommendations for costeffective control and prevention of new cases when groups of animals are at risk. The examination of the affected animal represents only a part of the complete clinical examination which has three aspects:

- The animal
- The history
- The environment

Prognosis is a prediction or the expectation about the future clinical course of a disease with or without treatment. The owner of an animal expects to receive an accurate prediction of the outcome of the disease “probability that an animal will recover or not, with or without treatment, the duration of signs”, and cost of treatment. An understanding of the natural history is necessary to make a prognosis. The information required for a reasonably accurate prognosis includes:

- Presence of the disease
- Stage of that disease
- Expected morbidity and case fatality rates for that disease
- Whether or not a specific treatment or surgical procedure is either available or possible
- Cost of the treatment

The prognosis may be: (Types of prognosis)

a. ***Excellent prognosis***: When the animal needs no treatment, but the owner needs advice for management. 4
b. ***Good prognosis***: When the animal will recover and return to normal within hours, and may be without treatment.
c. ***Favorable prognosis***: When the animal has good response after treatment.
d. ***Unfavorable prognosis***: When the animal has little response to treatment, and may need longer duration of treatment.
e. ***Bad prognosis***: When the animal has no response after treatment, and may die after some days.
f. ***Hopeless prognosis***: When the animal may die now, and should be slaughtered now.

Taking History

A complete history from the owner must be taken before the examination of the animal. Poor communication between owner and history taker leading to misdiagnoses. There are some considerations when you take the history, such as: •

- The owner or attendant must be handled with diplomacy and tact. •
- Use the non-technical terms to make the owner understand what you mean.

General history questions includes: -

- What is the primary complaint regarding this animal or a herd?
- How long have these signs been present?
- Have any animals died? If so, how many and how long ago
- Is more than one animal showing the same signs
- "Prior treatment" Have you treated it with anything? Has your therapy shown any success
- Preventive and control procedures, including vaccination, disinfection methods, dipping, etc.
- Transportation and mixing of animals.
- Recent travel to other geographical regions in which certain infectious diseases are endemic.

- Management history, including: nutrition “quality, quantity, changes, water supply”, hygiene, housing, population density, and other general managements.

Types of Diagnosis

1- **Differential diagnosis**: It is a list of diseases that may be responsible for the clinical and laboratory findings in a particular circumstance. In most cases the list consists of 3 to diagnoses and the probability of the presence or absence of a certain disease will change as new information becomes available.

2- Tentative diagnosis: It is the suspected diagnosis based on history or initial clinical examination. An example is a tentative clinical diagnosis of shipping fever, pneumonia in beef calves affected with fever, anorexia and toxemia, dyspnea and abnormal lung sounds several days after weaning.

3- Presumptive diagnosis: It is usually made after considering several differential diagnoses and the collection of further clinical and laboratory information.

4- Definitive and etiological diagnosis: It is the identification of the specific cause of a disease based on interpretation of clinical laboratory findings. Often an etiological diagnosis cannot be made because of lack of confirmatory laboratory assistance. Thus, clinical signs or necropsy lesions are used as the definitive diagnosis.

5- Open diagnosis: In open diagnosis, the clinical abnormalities are detected, but their cause cannot be determined. 6- Undetermined diagnosis: In many cases a diagnosis cannot be made even with extensive epidemiological, clinical and laboratory investigations. Symptomatic therapy of the clinical abnormalities may need to be initiated. If the response to treatment is unsatisfactory, cessation of all therapy and close monitoring of the patient over time may allow some vital clues to be recognized whereby appropriate diagnostic testing may provide a diagnosis.

Appearance of the animal

- The healthy animal is alert and aware of its surroundings. It is active and holds its head up watching what is happening around it.

- It should stand on all of its feet.
- The separation of an animal from the others in its group is often a sign of a health problem. An animal which is not interested in its surroundings and does not want to move has health problems.

Movement (GAIT)

- The healthy animal will walk easily and steadily with all of its feet taking its weight.
- Steps should be regular. Irregular movement results from pain in the feet or limbs.Horses normally stand during the day.
- If you go near an animal that is lying down it should stand up quickly otherwise it has health problems.

Eyes

The eyes should be bright and alert with no discharge at the corners.

Ears

Most animals have erect ears which move in the direction of any sound.

Ear movements will also be quick to get rid of flies; the body temperature of the pig can be checked by touching the ear when an unusually high temperature will be noticed.

Nose and muzzle

- The nose should be clean with no discharge.
- In cattle and buffalo the muzzle should be moist not dry.
- In sheep and goats, the nose should be cool and dry.
- Healthy animals frequently lick their noses with their tongues.

Mouth

- There should be no saliva dripping from the mouth.
- If chewing is slow or incomplete there must be a problem with the teeth.

The coat

- In short-haired animals, e.g. goat and cattle, the hair or coat of the healthy animal will be smooth and shiny.
- Healthy cattle, buffalo and their calves lick their coat and the lick marks will show.
- Horses should not sweat when resting.

- In poultry, the feathers should be smooth and glossy and not ruffled.
- In pigs a curly tail is a sign of good health while a scaly skin points to health problems.

Behaviour

- If a horse, cow or buffalo keeps looking at its flanks or kicks at its belly it has a pain in the stomach.

Breathing

Breathing should be smooth and regular at rest. Remember that movement and hot weather will increase the rate of breathing.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Short answer

1. List out types of diagnosis
2. What are the aspects of clinical examination?
3. Mention types of prognosis
4. Define prognosis
5. What is diagnosis

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

Name: _____ Date: _____

Information Sheet 3- Carrying out disease prevention strategies

3.1. General Disease Prevention and Control Measures

Disease prevention is a procedure through which individuals, particularly those with risk factors for a disease, are treated in order to prevent a disease from occurring. Treatment normally begins either before signs and symptoms of the disease occur, or shortly thereafter.

- Prevention of Environmental contamination
- Control of Intermediate host, vectors and reservoirs
- Control of internal parasite
- Control of arthropod pests
- Control and reducing the infection as soon as an outbreak occurs
- Isolation of sick animals
- Quarantine for newly purchased animals
- Vaccination of farm animals
- Deworming of animals
- Elimination of carriers
- Tuberculin test
- Disposal of carcass
- Burial of carcass
- Burning of carcass
- Disinfection of animal houses
- Disinfection of pastures

Prevention of Environmental contamination

The premises (sheds, stables, and kennels) and pastures should be prevented from contamination.

- Elimination of parasites from the host at the most appropriate time by use of antiparasiticides thereby preventing pasture contamination.Destruction of adult parasites in hosts prevents expulsion of eggs or the larvae and the associated contamination of the environment. Ovicidal drugs should preferably be used to destroy the eggs, thereby preventing environmental contamination.
- Anthelmentic treatments prior to rainy seasons using larvicidal drugs will prevent contamination of pastures at a time when conditions are becoming favourable for egg and larval development.

- Pens and pastures should not be overstocked.Reducing the stocking rate can significantly reduce the parasite burden in animals and the associated problem of contamination in sheds and pastures.

Control of Intermediate host, vectors and reservoirs

Limiting the contact between intermediate and final hosts by improvements in management. Direct action may be taken to reduce or eliminate intermediate host populations. Reduction in the number of snail intermediate host by chemical (molluscides) or biological control (ducks, Maris species of snails). Reduction in the number of snail intermediate hosts by drainage, fencing and other management practices. Reduction in the number of insect and tick vectors by chemical (insecticides/acaricides), biological control (hymenopterous insects, entomopathogenic fungi and Bacillus thuringiensis) and genetic control (sterile male technique, chromosomal translocation).

Destruction of reservoir hosts is important in controlling certain parasites, e.g., rodents for Leishmania and antelopes for African trypanosomes.

Control of internal parasites

Ridding the animal of internal parasites by periodical deworming, Preventing infestation of animals by keeping premises free from infective forms of parasite – disinfestations, and Elimination of intermediate hosts.

Control of arthropod pests

- Manure, filth, damp and dark corners, stagnant water etc. are all favorite breeding places of insects and these places should be concentrated for removal and cleaning periodically.
- Eggs of ticks and mites deposited in cracks and crevices in the walls, floors and wood work of the animal houses should be removed periodically.
- Periodical dipping or spraying of animals with suitable insecticides to prevent lice, flies, fleas, mites and ticks on skin of animals.
- Areas around animal sheds should also be kept dry and clean.
- Interior of animal sheds (roofs, walls and corners) should be cleared regularly of cobwebs and spider webs and sprayed with insecticides at least once in a month.

- Dusting of animals with DDT, lorexane, gammexane or with some patent preparations available in the market can be tried to control cattle warble flies, etc.

Control and reducing the infection as soon as an outbreak occurs

- Segregate sick animals
- Stop all animals, animal products, vehicles and persons coming into and out of the farm.
- Call a veterinarian for advice, adopt containment vaccination.
- Avoid grazing in a common place.
- Ban all visitors to the farm.
- Provide foot dips containing disinfectants at the entry of the farm and gear up sanitation and hygiene.

Isolation of sick animals

Isolation means segregation of animals, which are known to be or suspected to be affected with a contagious disease from the apparently healthy ones. Segregated animals should be housed in a separate isolation ward situated far away from the normal animal houses. If a separate accommodation is not available the animals concerned should be placed at one end of normal animals' buildings, as far away from healthy stock as practicable.

Attendants working on sick animals and equipment such as buckets, shovels etc. used for them should not be used for healthy stock. If this is not practicable, the sick animals should be attended to daily, after the healthy stock. After this, the equipment should be thoroughly disinfected before they are used on healthy stock next day; the attendant too should wash his hands and feet in antiseptic and discard the clothes in which he worked. The isolated animals should be brought back into the herd only when the outbreak ends and they are fully recovered.

Quarantine for newly purchased animals

Quarantine is the segregation of apparently healthy animals (especially animals being brought into the herd for the first time), which have been exposed to the risk of infection from those animals, which are healthy and unexposed to the risk of infection.

The idea is to give sufficient time for any contagious disease that the quarantine animals may be having, to become active and obvious. Hence, the quarantined period depends on the incubation period of a disease. But in practice a quarantine period of 30 days covers almost all diseases.

Vaccination of farm animals

Vaccination is a practice of artificially building up in the animal body immunity against specific infectious diseases by injecting biological agents called vaccines. The term vaccine is used to denote an antigen (substance form organisms) consisting of a live, attenuated or dead bacterium, virus or fungus and used for the production of active immunity in animals. The term also includes substances like toxins, toxoids or any other metabolites etc. produced by microbes and used for vaccination. The farm animals and young ones should be vaccinated at regular intervals at appropriate times. Vaccination should be done with consultation of veterinarians.

Deworming of animals

The most suitable time of deworming is the early stages of infection when the worm load is less.

- In adult animals deworming is done on examination of dung.
- It is good to deworm adult females after parturition.
- All the animals should preferably be fasted for 24 hours before giving the anthelmentic.
- Young animals should preferably be dewormed every month using a suitable anthelmentic.
- Older stock can be dewormed at 4-6 months' intervals.
- In places where heavy endo-parasite infestations are found (hot-humid regions) it is advisable to deworm heifers twice a year up to two years of age

Elimination of carriers

An animal recovers from a disease, although apparently in good health the causative organism harbors in its tissues. Such germ carrying animals are known as 'carriers'. The carrier state may remain for years and the animal becomes a potential danger to

susceptible animals. Common diseases for which carriers have been observed in farm animals are Tuberculosis, Leptospirosis and Brucellosis.

Carriers of diseases in the herd should be diagnosed and eliminated so that the herd may be completely free from diseases. Certain diagnostic screening tests can be used for spotting out carriers animals in the herd. These tests should be periodically conducted on all animals in the herd so that carriers can be diagnosed and culled.

Disposal of carcass

Proper disposal of carcasses of animals died of infectious disease is of utmost importance in preventing the spread of diseases to other animals and humans. Carcasses should never be disposed off by depositing them in or near a stream of flowing water, because this will carry infections to points downstream. An animal died of a infectious disease should not be allowed to remain longer in sheds as biting insects, rodents, etc. can reach it. Unless approved by a veterinarian (even then, only in a disinfected place) it is not safe to open carcasses of animals that have died of a disease. All carcasses should be disposed of properly either by burying or by burning.

Burial of carcass

The most common method of carcass disposal is burial.

This is a reasonably safe method if done deeply enough and in soil from which there is no drainage to neighboring places. Deep burial is necessary to prevent worms carrying bacterial spores to the surface as well as to prevent carnivorous animals from digging up the carcass. The carcass should be carried to the burial place in a trolley and never by dragging it over the ground. The burial pit should be got ready before the carcass is taken there. The pit should be so dug that the highest part of the carcass must be at least 1.5 m below the level of the land surface. Bedding used for the dead animals, its excreta, feed left over by it and the top 5 cm soil form where the dead animals was lying (if the floor is not cemented) should also be buried along with the carcass. Drainage of water out of the burial place can be checked by seeing to it that the burial place is an area where the general water level is at least 2.5 m below the ground. The carcass is

then covered with a thick layer of freshly burnt quicklime and then filled with dirt and topped with some rocks, to further circumvent marauders.

Burning of carcass

The most sanitary method of destroying carcasses is to burn them, preferably close to the site of their death, without dragging them any more than is absolutely necessary; even then only in trolley. Site for burning having been decided upon, the trench should be dug.

The trench should be at least 0.5m deep, shallower towards the ends, and comparing in width and length to the carcass's size. General direction of the trench should be that of the prevailing wing direction.

The trench is first filled with wood, some iron bars placed across it and the carcass placed thereon. By firing the wood, the carcass will be completely consumed and, with it, all infectious material

In towns and cities the so-called carcass utilization or carcass frying or rendering plants are usually available for industrial utilization of animal's carcasses. In these the skins are removed with due regard for the dangers of disease dissemination. After removal, the skins are usually disinfected by immersion in a disinfecting solution and the remainder of the carcass 'fried out' for its fat, the latter being used in manufacture of soap. Farmers can inform these plants whenever there is a carcass so that these utilization plants can collect the same.

Disinfection of animal houses

Under ordinary conditions, daily scrubbing and washing of houses and the action of sunlight falling in the houses are sufficient enough to keep them moderately germ-free. But when a disease outbreak has occurred disinfection is a must and should be carried out scrupulously. All floors, walls up to height of 1.5 m, interiors of mangers, water troughs and other fittings and equipments coming in contact with animals are all to be disinfected. The first step in disinfection of animal houses is removal of all filth, as the power of disinfectants is greatly reduced in the presence of organic matter. Floors, walls up to height of 1.5 m interior of water troughs and mangers should be well scrubbed and all dung, litter etc. should be removed and stacked separately, where animals cannot

reach. In case of an outbreak of anthrax, the dung, litter etc. should first be disinfected in situ thorough sprinkling of suitable disinfectant. If the floor is of earth, which is generally the case in Indian villages, the top 10cm earth should be removed and disposed off along with litter. After removal of filth, the place should be scrubbed and washed with 4 per cent hot washing soda solution (i.e., 4 kg washing soda in 100 litres of boiling water). The approved disinfectant solution should then be coated liberally over the place by sprinkling or preferably by spraying and left so to act for 24 hours. After this period, the animal house should again be washed with clean water and left to dry by wind and sunlight.

The interior of water troughs and mangers should be whitewashed. (This can be done even routinely at fortnightly intervals.)

Disinfection of pastures

Removal of any obvious infective material, like carcass, aborted foetus, dung etc. from over the pasture and prevention of animals from grazing on the pasture under question for at least three to four months. The pasture can be ploughed up and left fallow for about six months during which period the pathogens would be destroyed by sun.

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Short answer

1. List out some general disease prevention measure
2. What is the isolation?
3. Define quarantine

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

Name: _____ Date: _____

LG #57	LO #4- Treat Animals

Instruction sheet

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

- recognizing and reporting Signs of illness or injury
- recognizing abnormal animal behavior and conditions
- collecting samples
- Administering authorized animal treatments and recording information
- Implementing preventative medicine programs
- identifying, maintaining and using Materials, equipment and tools
- Identifying and using appropriate handling of drugs, biological and chemicals.

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

- recognize and report Signs of illness or injury
- recognize abnormal animal behavior and conditions
- collect samples
- Administer authorized animal treatments and record information
- Implement preventative medicine programs
- identify, maintain and use materials, equipment and tools
- Identify and use appropriate handling of drugs, biological and chemicals

Learning Instructions:

19. Read the specific objectives of this Learning Guide.
20. Follow the instructions described below.
21. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
22. Accomplish the “Self-checks” which are placed following all information sheets.
23. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
24. If you earned a satisfactory evaluation proceed to “Operation sheets
25. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
26. If your performance is satisfactory proceed to the next learning guide,
27. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1 - Recognizing and Reporting Signs Of Illness Or Injury

1.1. Recognizing Ill Health in Animals

There are degrees of ill health ranging from the animal that is merely "off-colour" to one that is desperately ill. An animal that looks "not quite right" should be observed closely until it appears fully recovered. If it is incubating a serious disease, an early diagnosis could save the animal. By checking the vital signs of the animal, the owner can receive early warning that something is amiss. Seriously ill animals must receive immediate and urgent veterinary attention.

The first sign that an animal is becoming sick is that it picks at or refuses food. It may drink more or less water than normal, depending on the illness. The eyes will be dull, and on closer inspection, the mucous membranes may have changed colour. Deep red membranes indicate fever; pale membranes show anaemia; yellow membranes indicate a liver disorder, while blue-red membranes show heart and circulatory problems, or pneumonia.

The coat may look dull and dry. The animal might be sweating (except for dogs). A cold sweat indicates pain while a hot sweat indicates fever. If the animal is in pain it will probably be restless (getting up and down and pacing about) and it might even be groaning.

The animal will either scour (i.e. pass very loose droppings), or will become constipated and pass no droppings at all. The passing of urine might also cease. A very sick animal will lie down for long periods and will not get up when approached.

The vital signs of a sick animal will change. The temperature may go up or down. A rise in temperature of one or two degrees usually indicates pain, while a rise of more usually indicates infection.

The rate of respiration, and the way the animal breathes could also show changes. With pain or infection, breathing becomes more rapid. In a very sick animal, breathing can be laboured and shallow.

A slightly increased pulse rate suggests pain, while a rapid pulse suggests fever. An irregular pulse can indicate heart trouble. In a very sick animal, the pulse is weak and feeble.

- General condition – weight and body condition
- Sluggishness
- Movement or Gait – check for lameness
- Appetite
- Excessive Thirst
- Weight Loss
- Mucus membranes
- Swellings
- Excitability
- Slobbering
- Discharge
- Urination
- Diarrhoea
- Breathing
- Vomiting

1.2 Identifying Sick animal

Proper and timely identification of sick or injured cattle helps minimize unnecessary treatment expense and preventable production losses. Accurately pulling cattle needing examination or treatment is difficult but essential in order to treat sick or injured cattle without unnecessarily spending money on or adding stress to healthy cattle. Sick calves can be identified in several ways. The most popular is rectal temperature and visual indications.

Body Temperature

When properly used, body temperature can be a good indicator of illness. A greater incidence of illness can be identified using body temperatures rather than visual observation alone. One common rule of thumb in farm operations is to designate cattle with rectal temperatures of 104°Fahrenheit or greater as sick.

Body temperature rises in animal infected with a disease-causing organism as the immune system begins to fight the infection. Some untreated cattle overcome infection and recover, while others suffer elevated body temperatures and show other signs of illness. In cattle that begin to succumb to disease, clinical signs worsen and body temperature eventually falls well below normal, creating a dangerous health situation. Early detection of elevated body temperatures and rapid recognition of clinical signs of illness are important for effective treatment of sick cattle.

To use body temperature properly as a measure of illness, it is necessary to know what is “normal.” Unfortunately, normal temperatures for animal rise during the day. Animal producers must consider this when deciding when to use body temperature as an indicator for pulling sick animal.

Unlike humans, animals expel body heat primarily through respiration rather than sweating. In fact, body temperature in animal follows a daily pattern where there is a period of increasing heat load and rising body temperature followed by a period of heat dissipation and falling body temperature.

Animal body temperatures rise during the day rather than the animals spending energy to get rid of the heat. Minimum body temperature usually occurs early in the morning, and then steadily increases during the day. The heat load built up during the day is dissipated at night such that body temperature falls gradually during the night, reaching a daily low early in the morning. This process occurs even on cold days. Animal body temperatures tend to increase during daylight hours. Heat load is then dissipated at night. This is the case in both warm and cold weather conditions. It also occurs in controlled environments with a standard temperature, so factors other than the outside temperature have a significant influence on cattle body temperature. Feeding, activity level, solar radiation, and humidity also influence cattle body temperatures. Acute elevations in body temperature occur directly after feeding or exercise. Fevers are identified more accurately when body temperatures are at their daily lows.

For proper identification of sick cattle, make sure that body temperatures are not taken too late in the day when false positives for illness might occur.

While working animal in the late evening may seem like a good idea, cattle generally need several hours past sundown to dissipate heat and cool down from an extremely hot day. It is critical to take temperatures before mid-morning. Producers measuring cattle temperature in the afternoon, even on a cold day, and letting cattle stand around for three or four hours before processing may identify cattle for treatment that are actually healthy.

Be careful to minimize exercise and stress just before measuring temperatures. Cattle should never stand for more than 20 minutes in alleyways or chute of handling facilities before temperatures are taken. Once in the chute, measure body temperatures immediately. It may be necessary to divide cattle into small groups that can be worked in a reasonable amount of time instead of trying to work the entire group at once.

1.2 Visual Signs of animals Illness

When using visual appraisal, one of the most important signals of illness is appetite suppression. Feed consumption of animal exposed to respiratory disease begins to decrease about 48 hours before increased body temperature is observed.

The most effective time to observe the feeding behavior of cattle is when they are fed each day. Unfortunately, it is difficult to monitor daily feeding patterns of grazing animal on self-feeders. In this case, observe signs of gut fill. Animal that has not been eating and drinking properly appears gaunt, and their abdomens often bounce when they walk. Rapid weight or body condition loss also indicates illness.

Other later occurring signs of illness include labored breathing, deep coughing, eye and nasal discharge, bloody diarrhea, or depression. Depression is noted as drooping head and ears, excessively slow movement, lagging behind the rest of the herd, and

reluctance to get up when approached. These symptoms occur after sick animal have gone off feed and their rectal temperature has risen. Therefore, it is extremely important to thoroughly observe animal daily to catch illness early and begin an effective treatment protocol.

Vaccination can produce signs of illness in some situations. Discuss expected effects of specific vaccines on cattle before administration to distinguish between an animal that is ill or one that is suffering a temporary side effect of vaccination.

Examining cattle manure can also help identify sick animals. Loose manure with large feed particles, mucus, or blood can indicate illness or injury. While it may be difficult to identify a specific animal in grazing situations, producers can at least be alerted to watch the herd closer. Animals often defecate during handling, so plan to observe manure during this time.

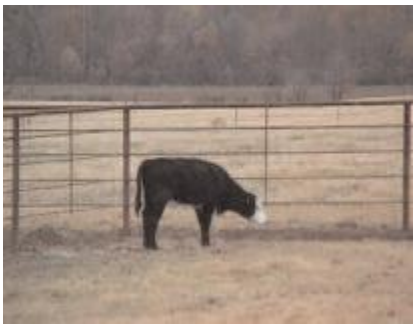


Figure: Calf displaying classic signs of illness, including drooping head and ears

1.3 Identifying Injured animal

Injuries in animals may be minor or severe. Some injuries are relatively easy to detect upon observation, such as injuries that result in lameness or inability to stand up or walk (a non-ambulatory or "downer" animal). These types of injuries can prevent marketing an animal or result in market discounts. Other injuries are more subtle, including bruising and internal organ injuries such as hardware disease. Suspect these types of injuries when cattle display behavioral changes such as appetite changes or reluctance to move.

Examine the animal's environment for potential hazards or conditions that may have caused an

injury. Horns contribute to bruising in animals housed together. Injuries to breeding animals often occur during the breeding season as a result of mounting behavior. Inadequate feed through space increases competition for feed and chance of injury. Sharp objects such as wire and nails in pastures or handling areas also contribute to cattle injuries.

Inspect animals' cattle closely during feeding and animal handling to identify injuries that are not easily seen in pasture settings. Foot injuries, eye injuries, mouth injuries, minor lacerations (cuts), hematomas (blood vessel rupture and blood pooling under the hide), penis injuries, and biting insect damage are examples of injuries that sometimes require close inspection to identify. By identifying injuries during animal handling, animals can be treated while restrained.

Self-Check -1	Written Test

Directions: Answer all the questions listed below.

Part I: short answer

1. Write down signs of ill health (5pt)
2. List out visual signs of animal illness(5pt)

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

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet 2- Recognizing abnormal animal behavior and conditions

Abnormal behaviour in animals can be defined in several ways. Statistically, abnormal is when the occurrence, frequency or intensity of a behaviour varies statistically significantly, either more or less, from the normal value. This means that theoretically, almost any behaviour could become abnormal in an individual. Less formally, 'abnormal' includes any activity judged to be outside the normal behaviour pattern for animals of that particular class or age. For example, infanticide may be a normal behaviour and regularly observed in one species, however, in another species it might be normal but becomes 'abnormal' if it reaches a high frequency, or in another species it is rarely observed and any incidence is considered 'abnormal'. This list does not include one-time behaviours performed by individual animals that might be considered abnormal for that individual, unless these are performed repeatedly by other individuals in the species and are recognised as part of the ethogram of that species.

Most abnormal behaviours can be categorised collectively (e.g., eliminative, ingestive, stereotypies), however, many abnormal behaviours fall debatedly into several of these categories and categorisation is therefore not attempted in this list. Some abnormal behaviours may be related to environmental conditions (e.g. captive housing) whereas others may be due to medical conditions. The list does not include behaviours in animals that are genetically modified to express abnormal behaviour (e.g. reeling mice)

- Abnormal sexual behavior.
- Activity anorexia;.
- Adjunctive behaviour;
- A dog chasing its tail
- Barbering, or fur and whisker trimming;
- Broodiness;
- Cannibalism;
- Coprophagia;.
- Cribbing or crib-biting;
- Depression;
- Excessive vocalisation;
- Excessive aggression;
- Excessive/submissive urination (Polyuria);.
- Excessive licking;
- Fainting;
- Feather pecking;
- Forced moulting;

- Geophagia;
- Infanticide;
- Lignophagia; eating wood.
- Obsessive-compulsive disorder;
- Osteophagy
- Polydipsia; excessive drinking.
- Vent pecking;

Animal sexual behavior

The mating system specifies which males mate with which females, and under what circumstances. There are four basic systems:

The four basic mating systems		
	Single female	**Multiple females**
Single male	Monogamy	Polygyny
Multiple males	Polyandry	Polygynandry

Monogamy- occurs when one male mates with one female exclusively. A monogamous mating system is one in which individuals form long-lasting pairs and cooperate in raising offspring. These pairs may last for a lifetime, such as in pigeons,[6] or it may occasionally change from one mating season to another, such as in emperor penguins.

Polygamy

The term polygamy is an umbrella term used to refer generally to non-monogamous matings. As such, polygamous relationships can be polygynous, polyandrous or polygynandrous. In a small number of species, individuals can display either polygamous or monogamous behaviour depending on environmental conditions.

Polygyny- occurs when one male gets exclusive mating rights with multiple females. In some species, notably those with harem-like structures, only one of a few males in a group of females will mate. Technically, polygyny is defined as a system in which a male has a relationship with more than one female, but the females are predominantly bonded to a single male.

Polyandry- occurs when one female gets exclusive mating rights with multiple males. The males in some deep sea anglerfishes are much smaller than the females.

Polygynandry -occurs when multiple males mate indiscriminately with multiple females. The numbers of males and females need not be equal, and in vertebrate species studied so far, there are usually fewer males.

Types of sexual behavior

Copulation- is the union of the male and female sex organs, the sexual activity specifically organized to transmit male sperm into the body of the female

Hermaphroditism -occurs when a given individual in a species possesses both male and female reproductive organs, or can alternate between possessing first one, and then the other.

Sexual cannibalism- is a behaviour in which a female animal kills and consumes the male before, during, or after copulation. Sexual cannibalism confers fitness advantages to both the male and female.

Mating behaviour

Mammals mate by vaginal copulation. To achieve this, the male usually mounts the female from behind.[130] The female may exhibit lordosis in which she arches her back ventrally to facilitate entry of the penis.

Broodiness

Broodiness is the action or behavioral tendency to sit on a clutch of eggs to incubate them, often requiring the non-expression of many other behaviors including feeding and drinking. Being broody has been defined as "Being in a state of readiness to brood eggs that is characterized by cessation of laying and by marked changes in behavior and physiology". Broody birds often pluck feathers from their chest and abdomen, using them to cover the eggs. As a consequence of this, they develop one or several patches of bare skin on the ventral surface. These reddish, well-vascularized areas of skin are usually called brood patches, and improve heat transfer to the eggs. Broodiness is

usually associated with female birds, although males of some bird species become broody and some non-avian animals also show broodiness.

In wild birds, egg incubation is a normal and essential phase in the process of reproduction, and in many families of birds, e.g. pigeons, the eggs are incubated by both male and female parents.

In domestic poultry, broody hens can be recognized by their behaviour. They sit firmly over the eggs, and when people approach or try to remove the eggs, threaten the person by erecting their feathers, emitting a characteristic sound like clo-clo-clo and will peck aggressively. When broody, hens often temporarily cease eating or reduce their feed consumption.

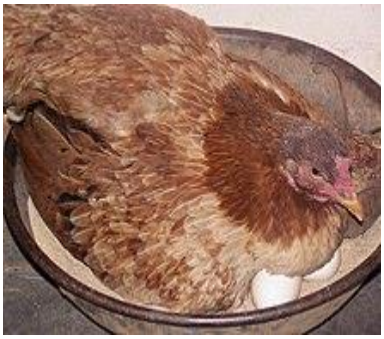


Figure: brooding hen

Letting eggs accumulate in a relatively dark place near the floor often stimulates hens to become broody. Placing artificial eggs into nests also stimulates broodiness. Keeping hens in dark places with warm temperatures and in view of vocalising orphan chicks can induce broodiness, even in breeds that normally do not go broody.

Some environmental conditions stimulate broodiness. In heavy breeds of chickens, warm weather tends to bring about broodiness. Removing eggs each day, out of the sight of the hens, helps avoid broodiness not only in domestic poultry but also in some wild species in captivity. This continued egg laying means more eggs are laid than would occur under natural conditions. Poultry farming in battery cages also helps to avoid broodiness.

Because hens stop laying when they become broody, commercial poultry breeders perceive broodiness not as a normal physiological process, but as an impediment to egg and poultry meat production. With domestication, it has become more profitable to incubate eggs artificially, while keeping hens in full egg production. To help achieve this, there has been intense artificial selection for non-broodiness in commercial egg laying chickens and parent stock of poultry. As a result of this artificial selection, broodiness has been reduced to very low levels in present-day breeds of commercial fowl, both among egg-laying and meat-producing breeds.

Cannibalism

Cannibalism is the act of consuming another individual of the same species as food. The rate of cannibalism increases in nutritionally poor environments as individuals turn to conspecifics as an additional food source. Cannibalism regulates population numbers, whereby resources such as food, shelter and territory become more readily available with the decrease of potential competition. Other negative effects may include the increased risk of pathogen transmission as the encounter rate of hosts increases.

The act of cannibalism may also facilitate trophic disease transmission within a population, though cannibalistically spread pathogens and parasites generally employ alternative modes of infection. Cannibalism is an ineffective method of disease spread as cannibalism in the animal kingdom is normally a one-on-one interaction, and the spread of disease requires group cannibalism; thereby it is rare for a disease to have evolved to rely solely on cannibalism to spread. Usually there are different means of transmission, such as with direct contact, maternal transmission, coprophagy, and necrophagy with different species. Infected individuals are more likely to be consumed than non-infected individuals, thus some research has suggested that the spread of disease may be a limiting factor to the prevalence of cannibalism in the population.

Forms of cannibalism

Foraging dynamics- Cannibalism may become apparent when direct competition for limited resources forces individuals to use other conspecific individuals as an additional resource to maintain their metabolic rates.

Sexual cannibalism- refers to the killing and consumption of conspecific sexual partners during courtship, and during or after copulation. Normally, it is the female which consumes the conspecific male organism.

Size-structured cannibalism- is cannibalism in which older, larger, more mature individuals consume smaller, younger conspecifics.

a. ***Filial cannibalism***- is a specific type of size-structured cannibalism in which adults eat their own offspring. Although most often thought of as parents eating live young, filial cannibalism includes parental consumption of stillborn infants and miscarried fetuses as well as infertile and still-incubating eggs.
b. ***Infanticide*** is the killing of a non-adult (young offspring) animal by an adult of the same species. Infanticide is often, but not always, accompanied by cannibalism. It is often displayed in lions; a male lion encroaching on the territory of a rival pride will often kill any existing cubs fathered by other males; this brings the lionesses into heat more quickly, enabling the invading lion to sire his own young.

Intrauterine cannibalism- is a behaviour in some carnivorous species, in which multiple embryos are created at impregnation, but only one or two are born. The larger or stronger ones consume their less-developed siblings as a source of nutrients. In adelphophagy or embryophagy, the fetus eats sibling embryos, while in oophagy it feeds on eggs.

Coprophagia

Coprophagia or coprophagy is the consumption of feces. The word is derived from the Greek κόπρος copros, "feces" and φαγεῖν phagein, "to eat". Coprophagy refers to many kinds of feces-eating, including eating feces:-

- of other species (heterospecifics),
- of other individuals (allocoprophagy), or
- one's own (autocoprophagy)

Osteophagy

Osteophagy is the practice in which animals, usually herbivores, consume bones. Most vegetation around the world lacks sufficient amounts of phosphate. Phosphorus is an essential mineral for all animals, as it plays a major role in the formation of the skeletal

system, and is necessary for many biological processes including: energy metabolism, protein synthesis, cell signaling, and lactation. Phosphate deficiencies can cause physiological side effects, especially pertaining to the reproductive system,[1] as well as side effects of delayed growth and failure to regenerate new bone. The importance of having sufficient amounts of phosphorus further resides in the physiological importance of maintaining proper phosphorus to calcium ratio. Having a Ca:P ratio of 2:1 is important for the absorption of these minerals, as deviations from this optimal ratio can inhibit their absorption. Dietary calcium and phosphorus ratio, along with vitamin D, regulates bone mineralization and turnover by affecting calcium and phosphorus transport and absorption in the intestine.

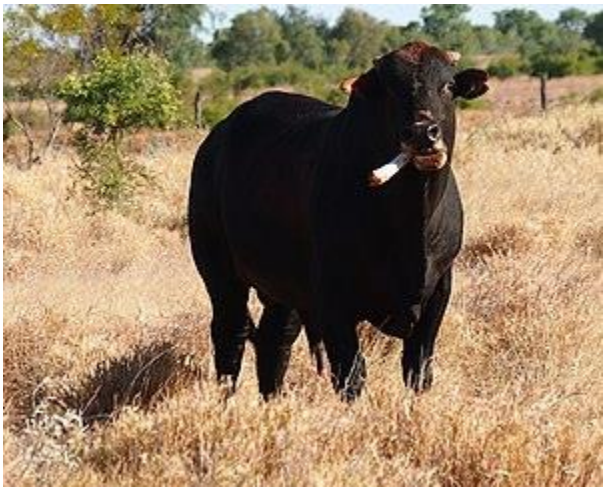


Figure: bull eating bone

It has been suggested that osteophagy is an innate behavior that allows animals to supplement their phosphorus and calcium uptake in order to avoid the costly effects of deficiencies in these minerals.

Forced molting

Forced molting, sometimes known as induced molting, is the practice by some poultry industries of artificially provoking a flock to molt simultaneously, typically by withdrawing food for 7–14 days and sometimes also withdrawing water for an extended period. Forced molting is usually implemented when egg-production is naturally decreasing toward the end of the first egg-laying phase.

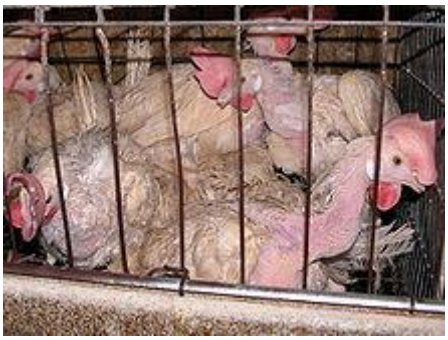


Figure:poultries forced to molt

During the forced molt, the birds cease producing eggs for at least two weeks, which allows the bird's reproductive tracts to regress and rejuvenate. After the molt, the hen's egg production rate usually peaks slightly lower than the previous peak, but egg quality is improved. The purpose of forced molting is therefore to increase egg production, egg quality, and profitability of flocks in their second or subsequent laying phases, by not allowing the hen's body the necessary time to rejuvenate during the natural cycle of feather replenishment.

Geophagia

Geophagia also known as geophagy is the intentional practice of eating earth or soil-like substances such as clay, chalk, or termite mounds. It occurs in many non-human animals and has been documented in more than 100 primate species. Geophagy also occurs in humans and is most commonly reported among children and pregnant women. Human geophagia is a form of pica – the craving and purposive consumption of non-food items – and is classified as an eating disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM) if not socially or culturally appropriate. Although its etiology remains unknown, geophagy has many potential adaptive health benefits as well as negative sequelae.

Pica (disorder)

Pica is a psychological disorder characterized by an appetite for substances that are largely non-nutritive. The substance may be biological such as hair (trichophagia) or feces (coprophagia), natural such as ice (pagophagia) or dirt (geophagia), and otherwise chemical or manmade (as listed below). The term originates from the Latin word pica ("magpie"), from the concept that magpies will eat almost anything.

Pica is most commonly seen in pregnant women,[6] small children, and people who may have developmental disabilities such as autism and more. Children eating painted plaster containing lead may suffer brain damage from lead poisoning. A similar risk exists from eating soil near roads that existed before the phase-out of tetraethyllead or that were sprayed with oil (to settle dust) contaminated by toxic PCBs or dioxin. In addition to poisoning, a much greater risk exists of gastrointestinal obstruction or tearing in the stomach. Another risk of eating soil is the ingestion of animal feces and accompanying parasites. Pica can also be found in animals such as dogs[8] and cats.

Chronic egg laying is a maladaptive, behavioral disorder commonly seen in pet birds which repeatedly lay clutches of infertile eggs in the absence of a mate. Birds exhibiting chronic egg laying behavior will frequently lay eggs one after the other without stopping to brood them once the typical clutch size for their particular species has been reached. Excessive egg laying places a strain on the hen's body, depleting resources such as calcium, protein and vitamins from her body and may lead to conditions such as egg binding, osteoporosis, seizures, prolapse of the oviduct or peritonitis - which may lead to her death.

Polyuria is excessive or an abnormally large production or passage of urine (greater than 2.5 L or 3 L over 24 hours in adults). Increased production and passage of urine may also be termed diuresis.

Polyuria often appears in conjunction with polydipsia (increased thirst), though it is possible to have one without the other, and the latter may be a cause or an effect. Primary polydipsia may lead to polyuria. Polyuria is usually viewed as a symptom or sign of another disorder (not a disease by itself), but it can be classed as a disorder, at least when its underlying causes are not clear.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer the blank space for the answer.

Part I: short answer

1. Most abnormal behaviours animal can be categorised collectively. (3pt)
2. The four basic mating systems includes (4pt)
3. _____ is the act of consuming another individual of the same species as food.(1pt)
4. _____ is the killing of a non-adult (young offspring) animal by an adult of the same species. (1pt)
5. _____ is the consumption of feces.(1pt)
6. _____ is the intentional practice of eating earth or soil-like substances such as clay, chalk, or termite mounds.(1pt)

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

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet- 3	Collecting and recording samples correctly

3.1 Introduction

The starting point for the laboratory investigation of an animal disease is the taking of samples. Samples may be taken from animals or the environment for a variety of purposes, such as disease diagnosis, disease surveillance, health certification or monitoring the response to treatment or vaccination. The samples collected should be appropriate for the intended purpose, and adequate in number and amount to provide statistically valid results. Diagnostic laboratories require the submission of appropriate samples that arrive at the laboratory in good condition. For disease diagnosis, the tissues sampled should be representative of the condition being investigated and the lesions observed. Samples should be taken with care, to avoid undue stress or injury to the animal or danger to the operator. Where appropriate, samples should be collected aseptically, and care should be taken to avoid cross contamination between samples.

The samples should be carefully packaged, labelled, and transmitted to the laboratory by the fastest practicable method, with the appropriate temperature control. There are specific requirements for the packaging and shipping of infectious substances, including diagnostic specimens that must be followed. If material is sent to a laboratory in another country, this laboratory should be consulted in advance to ensure that it is willing to receive the material and to obtain the appropriate import licence. All samples should be accompanied by a letter or submission form, which includes the name and address of the submitter, the origin of the material, the relevant history, animal identification and corresponding specimens, and the tests requested.

3.2 Collection of samples

Before taking samples, careful consideration should be given to the purpose for which they are required. This will determine the type and number of samples needed to provide valid results. When samples are taken from live animals, care should be taken to avoid injury or distress to the animal or danger to the operator and attendants. It may

be necessary to use mechanical restraint, tranquillisation or anaesthesia. Whenever handling biological material, from either live or dead animals, the risk of zoonotic disease should be kept in mind and precautions taken to avoid human infection. The samples collected should be representative of the condition being investigated and the lesions observed. Also the stage of the disease and lesion development should be considered, as well as the type of test(s) that will be performed. Frequently, a combination of blood samples for serology and tissues from dead or culled animals for microbiological culture and pathological examination will be required.

Sample collection from live animals

a) Blood

Blood samples may be taken for haematology or for culture and/or direct examination for bacteria, viruses, or protozoa, in which case it is usual to use anticoagulants, such as ethylene diamine tetra-acetic acid (EDTA) or heparin. They may also be taken for serology, which requires a clotted sample. Blood plasma is also used for some procedures. A blood sample is taken, as cleanly as possible, by venipuncture. In most large mammals, the jugular vein or a caudal vein is selected, but brachial veins and mammary veins are alsoused. Vena cava veins are also used in pigs. In birds, a wing vein (brachial vein) is usually selected. For techniques for sampling small laboratory animals, see refs 1 and 6. Blood may be taken by syringe and needle or by needle and vacuum tube (not easy in delicate veins but convenient in strong veins). Small quantities of blood are conveniently obtained by pricking with a triangular, solid-pointed needle. Ideally the skin at the site of venipuncture should first be shaved (plucked) and swabbed with 70% alcohol and allowed to dry.

For samples that are collected with anticoagulant, thorough mixing, using gentle agitation only, is necessary as soon as the sample has been taken. It may also be necessary to make a smear of fresh blood on a microscope slide; both thick and thin smears may be prepared. For polymerase chain reactions, EDTA is the preferred anticoagulant. For serum samples, the blood should be left to stand at ambient

temperature (butprotected from excessive heat or cold) for 1–2 hours until the clot begins to contract. The clot can then be ringed round with a sterile rod and the bottles placed in a refrigerator at 4°C. After several hours, or overnight, the sample can be centrifuged at about 1000 ***g*** for 10–15 minutes and the serum can be decanted or removed with a pipette. In order to establish the significance of antibody titres, paired serum samples will often need to be collected 7–14 days apart. An alternative method for collecting and transporting blood that is to be used for serology is to place a drop of blood on to filter paper, the blood is dried at room temperature and the sample can then be shipped unrefrigerated. Contact the laboratory to enquire if this method of collection is validated for the required tests.

Faeces

At least 10 g of freshly voided faeces should be selected. Faeces for parasitology should fill the container and be sent to arrive at the laboratory within 24 hours. If transport times are likely to be longer than 24 hours, the sample should be sent on ice or refrigerated to prevent the hatching of parasite eggs. Screw top containers or sterile plastic bags should be used for shipment; avoid tubes with rubber stoppers as gas generated can result in blowing the stopper off the tube, ruining the integrity of the sample and contaminating other samples in the package. An alternative and sometimes preferable method is to take swabs from the rectum (or cloaca), taking care to swab the mucosal surface. The swabs should be visibly coated with faecal material; however, samples collected with a swab are inadequate for parasitology. Care should be taken when collecting swabs from small, delicate animals or birds to avoid injury to the animal; small swabs are commercially available that should be used. Swabs should be transported in appropriatetransport medium. Faeces are best stored and transported at 4°C.

Skin

In diseases producing vesicular lesions, collect, if possible, 2 g of affected epithelial tissue as aseptically as possible and place it in 5 ml phosphate buffered glycerine or Tris-buffered tryptose broth virus transport medium at pH 7.6. Additionally, the vesicular fluid should be sampled where unruptured vesicles are present; if possible, vesicular

fluid should be aspirated with a syringe and placed in a separate sterile tube. Plucked hair or wool samples are useful for surface-feeding mites, lice and fungal infections. Deep skin scrapings, using the edge of a scalpel blade, are useful for burrowing mites and, in birds, feather tips can be taken for detection of viral antigen where Marek's disease is suspected.

Genital tract and semen

Samples may be taken by vaginal or preputial washing, or by the use of suitable swabs. The cervix or urethra may be sampled by swabbing. Samples of semen are best obtained using an artificial vagina or by extrusion of the penis and artificial stimulation. The sperm-rich fraction should be present in the sample and contamination by antiseptic washing solutions should be avoided. Specific transport media and conditions are often required.

Eye

A sample from the conjunctiva can be taken by holding the palpebra apart and gently swabbing the surface. The swab is then put into transport medium. Scrapings may also be taken on to a microscope slide. The handles of metal-handled swabs are useful for this, to ensure that sufficient cells are removed for microscopic examination. Mucopurulent nasal and lacrimal discharges are rarely useful.

Nasal discharge (saliva, tears)

Samples may be taken with dacron, cotton or gauze swabs, preferably on wire handles as wood is inflexible and may snap. It may be helpful if the swab is first moistened with transport medium. The swab should be allowed to remain in contact with the secretions for up to 1 minute, then placed in transport medium and sent to the laboratory without delay at 4°C. Long protected nasopharyngeal swabs should be used to collect samples for some suspected viral infections.

Milk

Milk samples should be taken after cleansing and drying the tip of the teat, the use of antiseptics should be avoided. The initial stream of milk should be discarded and a tube filled with the next stream(s), a sample of bulk tank milk can be used for some tests. Milk for serological tests should not have been frozen, heated or subjected to violent shaking. If there is going to be a delay in submitting them to the laboratory, preservatives can be added to milk samples that are being collected for serological testing. If necessary, milk for bacterial examination can be frozen.

3.3 Information To Be Sent With Samples (Labeling)

It is essential that individual samples be clearly identified using appropriate methods. Marking instruments should be able to withstand the condition of use, i.e. being wet or frozen (use indelible marking pen). Pencil has a tendency to rub off containers and labels attached to plastic will fall off when stored at –70°C. Information and case history should always accompany the samples to the laboratory, and should be placed in a plastic envelope on the outside of the shipping container. As outlined in the following section on transport of samples, this information must also be inside the shipping container. The following are suggested items that should be addressed. It would be advisable to contact the receiving laboratory to determine if it has a submission form that it would like to have submitted with the samples or if it needs other information.

i) Name and address of owner/occupier and geolocation (latitude and longitude, if available) where disease occurred, with telephone and fax numbers.

ii) Name, postal and e-mail address, telephone and fax numbers of the sender.

iii) Diseases suspected and tests requested.

iv) The species, breed, sex, age and identity of the animals sampled.

v) Date samples were collected and submitted.

vi) List of samples submitted with transport media used.

vii) A complete history would be beneficial for the laboratory and should be included if possible. Some of the components of the history are:

a) A list and description of the animals examined and the findings of the post-mortem examination.

b) The length of time sick animals have been on the farm; if they are recent arrivals, from where did they originate.

c) The date of the first cases and of subsequent cases or losses, with any appropriate previous submission reference numbers.

d) A description of the spread of infection in the herd or flock.

e) The number of animals on the farm, the number of animals dead, the number showing clinical signs, and their age, sex and breed.

f) The clinical signs and their duration including the temperature of sick animals, condition of mouth, eyes and feet, and milk or egg production data.

g) The type and standard of husbandry, including the type of feed available, possible contact with poison or poisonous plants.

h) History of foreign travel by owner or of introduction of animals from other countries or regions.

i) Any medication given to the animals, and when given.

j) Any vaccines given, and when given.

k) Other observations about the disease, husbandry practices and other disease conditions present.

3.4 Transportation of specimens

The specimens should be forwarded to the laboratory by the fastest method available. If they can reach the laboratory within 48 hours, samples should be sent refrigerated. If dry ice is used, the additional packaging requirements must be met. Infectious substances, which can include diagnostic specimens, are not permitted to be shipped as checked luggage or as carryon luggage and must be shipped as cargo.

3.5 Packaging

The shipper should ensure that the specimens are packaged so they arrive at the laboratory in good condition and there is no leakage during shipment. The Dangerous Goods Regulations (DGR) have explicit requirements for packaging and shipment of diagnostic specimens, by all commercial means of air transport. In some countries,

there are similar requirements for ground shipments and the postal service, but these requirements should be reviewed before shipping. These requirements for air transport are covered in detail in the IATA publication, which are updated every year. The shipper is expected to know and follow the procedures outlined in the current DGR. The following is a summary of the regulations at the time that this revision of the Terrestrial Manual was published and it should only be used as a guide for shipping. Shippers must also always check the latest version of the DGR prior to shipping diagnostic specimens. In addition, three of the national guidelines provide explicit directions for packaging and shipping diagnostic specimens and are based on IATA requirements.

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer the blank space for the answer.

Part I: short answer

1. The samples should be carefully _____, _____, and _____ to the laboratory by the fastest practicable method, with the appropriate temperature control.
2. Write the Sample collected from live animals
3. Information to Be Sent With Samples (Labeling

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

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet- 4	Administering authorized animal treatments and recording information

4.1 Drugs administration in Animals

A wide range of dosage formulations and delivery systems has been developed to provide for the care and welfare of animals. Using the correct dosage is very important in terms of effectiveness and safety. Drug treatment and delivery strategies can be complicated because of the variety of species and breeds treated, the wide range in body sizes, different animal rearing practices, seasonal variations, and the level of convenience, among other factors.

Drugs Given by Mouth

Oral dosage forms (given by mouth) include liquids (solutions, suspensions, and emulsions), semi-solids (pastes), and solids (tablets, capsules, powders, granules, premixes, and medicated blocks).

A solution is a mixture of 2 or more components that mix well and form a single phase that is consistent down to the molecular level (such as sugar water). Solutions are absorbed quickly and generally cause little irritation of the lining of the stomach and intestine. However, the taste of some drugs is more unpleasant when in solution. Oral solutions provide a convenient means of drug administration to newborn and young animals.

A suspension is a coarse dispersion of insoluble drug particles in a liquid (for example, flour mixed in water). Suspensions are useful for administering insoluble or poorly soluble drugs or in situations when the presence of a finely divided form of the material in the stomach and intestinal tract is required. The taste of most drugs is less noticeable in suspension than in solution because the drug is less soluble in suspension. Suspensions must typically be shaken vigorously just prior to administering.

An emulsion consists of 2 non-mixable liquids, one of which is dispersed throughout the other in the form of fine droplets (such as oil and vinegar salad dressing). Emulsions for oral administration are usually oil (the active ingredient) in water. They facilitate the administration of oily substances such as castor oil or liquid paraffin in a more palatable form.

A paste is a 2-component semi-solid in which a drug is dispersed as a powder in a liquid or fatty base. It is critical that pastes have a pleasant taste or are tasteless. Pastes are a popular dosage form for treating cats and horses, and can be easily and safely administered by owners.

A tablet consists of one or more active ingredients mixed with fillers. It may be a conventional tablet that is swallowed whole or a chewable tablet. Conventional and chewable tablets are the most common forms used to administer drugs to dogs and cats. Tablets can be more physically and chemically stable than liquid forms. The main disadvantages of tablets are the low absorption rate of poorly water-soluble drugs or simply poorly absorbed drugs, and the local irritation of the stomach or digestive tract lining that some drugs may cause.

A capsule is usually made from gelatin and filled with an active ingredient and fillers. Two common capsule types are available: hard gelatin capsules for solid-fill formulas, and soft gelatin capsules for liquid-fill or semi-solid-fill formulas. Capsules have no taste and are therefore good for drugs that are otherwise hard to give because of their bad flavor.

A powder is a formulation in which a drug powder is mixed with other powdered fillers to produce a final product. Most powders are added to food. Powders have better chemical stability than liquids and dissolve faster than tablets or capsules. Unpleasant tastes can be a factor with powders and are a particular concern when used in food

because the animal may not eat all of it. In addition, sick animals often eat less and may not eat enough of the powdered drug for it to be effective.

A granule consists of powder particles that have been formed into larger pieces. Granulation is used when combining more than one form of medication. Granulation is especially effective for combining particles that are of different sizes because it helps prevent the separation or settling of the different particle sizes during storage or dose administration. Imagine granola clusters—if you just have granola mix, the smaller pieces fall to the bottom and are not eaten as often, but if you form it into clusters (large granules), you get every type of ingredient in each bite.

Drugs Given as Injections or Implants

A drug that is given parenterally—that is, by injection or as an implant—does not go through the gastrointestinal system. These drugs may be formulated in several different ways for use in animals, including solutions, suspensions, emulsions (see How Drugs are Given in Animals), and as a dry powder that is mixed with a liquid to become a solution or a suspension immediately prior to injection. Dry powders are used for those drugs that are unstable in liquid form.

The majority of implants used in veterinary medicine is compressed tablets or dispersed matrix systems in which the drug is uniformly dispersed within a non-degradable polymer.

Drugs Applied to the Skin or Mucous Membranes

The dosage forms applied to the skin or mucous membranes that are available for treating animals include solids (dusting powders), semi-solids (creams, ointments, and pastes), and liquids (solutions, suspension concentrates, and emulsifiable concentrates). These are known as topical drugs. Of special interest are transdermal delivery systems that work by carrying medications across the skin barrier to the bloodstream. Examples of these are transdermal gels and patches that are used in

pets. There are also dosage forms that are unique to veterinary medicine, such as spot-on or pour-on formulations developed for the control of parasites.

A dusting powder is a fine-textured insoluble powder containing ingredients such as talc, zinc oxide, or starch in addition to the drug. Some feel gritty, and some have a smooth texture. Some dusting powders absorb moisture, which discourages bacterial growth. Others are used for their lubricant properties. The use of dusting powders is good for skin folds and not good for use on wet surfaces, as caking and clumping is likely to result.

A cream is a semi-solid emulsion formulated for application to the skin or mucous membranes. Cream emulsions are most commonly oil-in-water but may be water-in-oil. The oil-in-water creams easily rub into the skin (commonly called vanishing creams), and are easily removed by licking and washing. Water-in-oil emulsions are skin-softening and cleansing. Water-in-oil creams are also less greasy and spread more readily than ointments.

Anointment is a greasy, semi-solid preparation that contains dissolved or dispersed drugs. A range of ointment bases is used. Ointments are often effective at soothing because they block the skin from irritation. Ointments are useful for chronic, dry skin conditions and are not good for oozing or weeping areas of the skin.

A paste for skin use is a stiff preparation containing a high proportion of finely powdered solids such as starch, zinc oxide, calcium carbonate, and talc in addition to the drug(s). Pastes are less greasy than ointments. Pastes do not seal wounds.

Solutions are liquid formulations (see Drugs Given by Mouth). Topical solutions include eye drops, ear drops, and lotions.

A transdermal delivery gel consists of a gel that delivers the active drug through the skin to the bloodstream. Not all drugs are suitable for this type of transdermal application, however. Transdermal gels have been used to treat several diseases in dogs and cats, including undesirable behavior, cardiac disease, and hyperthyroidism. The dose is applied to the inner surface of the ear, making it easy to administer, especially in cats.

A transdermal delivery patch typically consists of a drug incorporated into a patch that is applied to the skin. The drug is absorbed across the skin over a long period of time. One type of pain reliever, which produces reactions like the body's own natural pain relievers, is delivered by transdermal patch in dogs, cats, and horses.

Aspot-on formulation is a solution of active ingredient(s), which also typically contains a co-solvent and a spreading agent to ensure that the product is distributed to the entire body.

Insecticidal collars are plasticized polymer resins that contain an active ingredient. Collars for the control of ticks and fleas on dogs and cats release the active ingredient as a vapor, a dust, or a liquid, depending on the chemical. The animal's activity is an important factor in how well the insecticide moves from the collar to the animal.

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer the blank space for the answer.

Part I: short answer

3. The samples should be carefully _____, _____, and _____ to the laboratory by the fastest practicable method, with the appropriate temperature control.
4. Write the Sample collected from live animals

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

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet- 5 Implementing Preventative medicine programs for infectious, non-infectious and parasitic diseases

Preventative medicine Programs includes:-

- Strategic deworming,
- insect control,
- vaccination,
- adaptation and acclimatization of animals to specific environment and ecology and
- Quarantine and isolation of animals.

Deworming Strategies for Livestock

Deworming strategies have evolved over the years to accomplish three main goals:

- Reduce the chance of developing resistant parasites.
- Reduce operational expenses for livestock producers
- Reduce the use of drugs in food animals.

In most herds, 20% of the animals shed 80% of the parasite load. Therefore, in small herds it is more economical to treat only the most infected animals, this practice is used in equine and small ruminant operations. In larger production herds such as cattle, animals should be treated as management categories and each category be treated according to their risk. In large small ruminant production systems, a percentage of animals should be tested to determine if the herd needs to be treated.

Equine

Equine deworming has moved away from the use of a rotational deworming strategy every 4-8 weeks to a much more targeted, individual treatment protocol. The use of targeted deworming significantly reduces the chance of developing drug resistant parasites and reduces the chance of confusion on which dewormer to use and when.

Florida peak season for equine parasite infections are spring, fall, and winter, treatments should be focused during these time frames. Operations should be utilizing fecal egg counts to determine which horses have a high enough parasite load to justify treating and which horses will not need a treatment. Fecal egg counts are often a small cost through your veterinarian and often do not require a farm visit. Horses with a fecal egg count higher than 500 should be treated based on the species of eggs present, a veterinarian should give the recommendation on which dewormer to use to provide the most effective treatment.

It is important to note that fecal egg counts can not identify tape worms, therefore horses should be treated with praziquantel biannually or annually.

Equine deworming should focus on prevention and control through the use of management techniques:

- Clean and dispose of manure in the pasture at least twice weekly.
- Mow and harrow pastures regularly to break up manure and expose parasite eggs to the sun.
- If possible, rotate pastures by allowing other livestock to graze them.
- Group horses in a pasture by age to reduce exposure to certain parasites, and maximize the deworming program geared to that group.
- Prevent overgrazing and reduce fecal contamination by keeping the number of horses per acre to a minimum.
- Feed horses in a feeder for hay and grain rather than on the ground.
- Remove bot eggs from the hair routinely to prevent ingestion.

Small Ruminants (Sheep/Goat)

Sheep & Goat deworming treatments should be made using FAMACHA or fecal egg count (FEC) scoring. FAMACHA scoring is a practice that determines a small ruminants anemia level, and therefore its level of parasite infection. FEC scoring, like in other livestock species, is the practice of counting parasite eggs in a fecal

sample. FEC scoring can give a more specific recommendation since species of parasite can be determined; this leads to a more targeted deworming protocol.

Livestock producers can benefit from the use of mixed species grazing. Grazing small ruminants after horses or cattle can help break parasite life cycles since the same parasites do not inflict small ruminants and other livestock. Utilizing this grazing strategy can increase forage utilization while still allowing longer periods between when a particular livestock species is re-introduced to a pasture, reducing the parasite load over time.

Cattle

Deworming strategies for cattle are unlike other livestock species since they are treated by management category and not by individual animal. Cattle parasite control methods focus on stomach and intestinal worms, lung worms are often controlled with a proper intestinal worm control program and liver flukes are not a problem on every Florida cattle operation.

Parasitism in cattle is a herd wide issue. Focusing treatments methods on the most susceptible animals and separating treatments by management category can reduce production costs while accomplishing three goals:

- Saving clinically affected animals
- Improving overall production of the herd
- Reduce pasture contamination levels and thus reinfection rates/need for re-treatments.

Nursing calves, stockers, and replacement heifers (any cattle pre-weaning to a year after weaning) are the groups of cattle most affected by parasites. These management categories are most susceptible to clinical affects of parasites such as poor performance or death, they also are the heaviest shedders of eggs and the reason for most re-infection. Mature cattle have a strong enough immunity to resist ill effects of parasites but poor body condition associated with heavy loads of parasites can affect reproductive efficiency. Control of parasites in younger cattle will reduce needs of treatment of mature cattle.

Although long pasture rotation times (in excess of 6 months) can break parasite life cycles and reduce the need for dewormers, this is not generally a feasible production style for Florida ranchers, therefore strategic deworming is necessary. Strategic programs should be developed with these four core production aspects in mind:

- Time of year grazing begins. Since cattle are infected with parasite eggs through grazing, grazing seasons will determine potential parasite loads and timing of treatment.
- Age/Category of animals. Management categories of animals will determine whether it is economically feasible to work animals in order to deworm and can allow for appropriate timing of deworming protocols.
- Type of operations grazing system. Grazing systems, such as rotational strategies, use of cool season forages, etc. can influence deworming protocol timing.
- Grazing history of pastures. Pastures that have not had cattle grazing in the last 6 months or more likely have reduce parasite contamination when compared to pastures that have had recent (<6 months) cattle grazing.

All approved cattle dewormers are effective against all species of adult parasites, selection of specific dewormers is important when trying to control larvae or liver flukes. There are products that can effectively dose dewormers without having to work cattle, such as blocks, salt/mineral mix, top dress, cubes, and others. These products can be beneficial if working cattle at the time dewormer is needed is not ideal or does not fit into other production practices (calving season, working calves, etc.)

Insect control

- Manure, filth, damp and dark corners, stagnant water etc. are all favorite breeding places of insects and these places should be concentrated for removal and cleaning periodically.
- Eggs of ticks and mites deposited in cracks and crevices in the walls, floors and wood work of the animal houses should be removed periodically.

- Periodical (once in April-June and once in July-September) dipping or spraying of animals with suitable insecticides to prevent lice, flies, fleas, mites and ticks on skin of animals.
- Inside of animal sheds should be scrubbed and cleaned daily to remove all filth.
- Areas around animal sheds should also be kept dry and clean.
- Interior of animal sheds (roofs, walls and corners) should be cleared regularly of cobwebs and spider webs and sprayed with insecticides at least once in a month.
- Dusting of animals with DDT, lorexane, gammexane or with some patent preparations available in the market can be tried to control cattle warble flies, etc.
- For larger herds a gunny bag (or any other bag having sufficiently large pores through which dusting powder can escape out) filled with dusting powder can be hung at a convenient place and at a convenient place and at a convenient height. As the animals pass under the bag they rub their backs against the bag, getting a dusting in the process. Such convenient places for hanging the bags are the entrances to stanchion barn, hay or straw feeding bunk, gates leading out on to the pasture etc.
- Organophosphate insecticides like Malathion, Parathion, and Neguvon etc. are available which are very destructive to insects but are quite toxic to animals as well.
- Newer generation synthetic pyrethroids like Deltamethrin (ButoxTM), Cypermethrin (Cyprol, Tikkil) etc. are available in the market.
- Ref-https://agritech.tnau.ac.in/expert_system/cattlebuffalo/general%20disease%20prevention.html

Vaccination

Vaccines have a long and successful history of preventing and controlling disease. It works by stimulating an immune response in an animal without

causing the disease itself. When healthy animals are vaccinated, their own immune system responds to the vaccine and can remember the infectious agent to which the animal is vaccinated. This means, if appropriately vaccinated animals are then exposed to the pathogen against which they have been vaccinated, they can expect a level of protection from disease.

The main types of vaccines available can be categorised as:-

- modified-live (attenuated)
- inactivated(killed)
- Recombinant and
- Toxoid

Modified-live (attenuated): a vaccine that contains an intact but weakened pathogen which stimulates an immune response but does not cause clinical disease.

Inactivated (killed): a vaccine that contains a completely inactivated pathogen, which is no longer infectious. These vaccines often contain an adjuvant, which is a compound added to help improve the protective immune response.

Recombinant: a vaccine that is produced using genetic engineering technology and using specific genetic material from a pathogen to produce proteins which will stimulate an immune response when the animal is vaccinated.

Toxoid: a vaccine that is based on inactivated toxins produced by pathogens. These vaccines stimulate immunity and protect the animal against these toxins.

Irrespective of the type of vaccine used, an animal should be in good health at the time of vaccination – as a properly functioning immune system is needed to stimulate a good immune response and develop an effective level of protection. Initially a primary vaccination course should be completed and depending on the vaccine type and the species of animal, it may be necessary to follow up with booster vaccinations at intervals based on veterinary advice and the characteristics of the vaccine, to maintain protective immunity throughout the animals' lifetime.

Another important concept in vaccination is that of 'herd immunity'. Herd immunity is the protection offered to a wider community of animals, pets or farm

animals, when a sufficiently high proportion of individual animals are vaccinated, reducing the prevalence of disease and numbers of susceptible

Vaccination strategies

Different vaccination strategies may be applied alone or in combination, taking into account the epidemiological and geographical characteristics of occurrence of the disease. The following strategies may be applied:

1) Barrier vaccination: means vaccination in an area along the border of an infected country or zone to prevent the spread of infection into or from a neighboring country or zone.

2) Blanket vaccination: means vaccination of all susceptible animals in an area or an entire country or zone**.**

3) Ring vaccination: means vaccination of all susceptible animals in a delineated area surrounding the location where an outbreak has occurred.

4) Targeted vaccination: means vaccination of a subpopulation of susceptible

Some vaccines in ethiopia

Name of Vaccine	Route	Dose	Immunity	Booster	Side effect	Precaution	storage	Withdrawal period	Type	Age at vaccination
anthrax	S/Cut	1ml/cattle and equines, and 0.5/sheep and goats	Develops in 10 days and lasts for one year	Annually(every year)	Swelling at injection site,disappeared	Not given for pregnants, dispose empty bottles	4^{o}c in refrigerator to-20 ^{o}c	6 weeks from meat after vaccination	Live(freeze-dried)	3 months and above
Bov.pasterellosis	S/Cut	2ml / cattle	Develops in 10 days and lasts for 6 to 8 months	After 6 months	Swellingand anaphylacti reaction at injection site,disappeared	Shake vigorously before use Avoid light and heat	At room temprature	-	killed	6 months and above
Blackleg	S/Cut	2ml / cattle	Develops in 10 days and lasts for	Annually(every year)	-	Shake vigorously before use	At room temprature	-	killed	6 months and above

			one year			Avoid light and heat				
CBPP	S/C ut	1ml / cattle	Develops 3 weeks post vaccination and lasts for one year	Annually(every year)	Mild Swelling at injection site and disappeared	Avoid light and heat	-20 °c to 4 °c in refrigerator	-	Live (freeze-dried)	6 months and above
CCPP	S/C ut	1ml / Goat	Develops 2 weeks vaccination and lasts for one year	Annually(every year)	Slight edematous swelling by adjuvants and disappear	Shake vigorously before use Avoid light and heat	At room temperature or at 4°c	-	Killed	3 months and above
Ovine pasteurellosis	S/C ut	1ml /sheep	Develops in 10 days and lasts for 6 to 8 months	After 6 months	-	Shakevigorously before use Avoid light and heat	At room temperature or at 4°c	-	killed	3 months and above
L.S.D	S/C ut	1ml / cattle	8 days after vaccination and lasts for one year	Annually(every year)	-	Avoid light and heat	Stored at -20 °c	-	live(freeze-dried)	6 months and above
F.M.D	S/C ut	4ml / cattle	2-3 weeks after vaccination and lasts for one year	Annually(every year)	Mild Swelling at injection site and disappeared	Shakevigorously before use Avoid light and heat,,not given with other vaccines	at 4°c	-	Killed(trivalent) A,O and sat 2	6 months and above

P.P.R	S/Cut	1ml / sheep and Goat	8 days after vaccination and lasts for 3 years(lifelong)	3 years	Mild Swelling at injection site and disappeared	Avoid light and heat,,	Stored at -20 °c	-	Live (freeze-dried)	6 months and above
Rinderpest	S/Cut	1ml / cattle	8 days after vaccination and lasts for 1 year	Annually (every year	Mild Swelling at injection site and disappeared	Avoid light and heat	Stored at -20 °c	-	live(freeze-dried)	6 months and above
Sheep and goat pox	S/Cut	1ml / sheep and Goat	8 days after vaccination and lasts for 1 year	Annually (every year	Mild Swelling at injection site and disappeared	Avoid light and heat	Stored at -20 °c	-	live(freeze-dried)	6 months and above
A.H.S	S/Cut	1ml /equines	Appear 2 weeks after vaccination and lasts for 1 year	Annually (every year	Mild Swelling at injection site and disappeared	Avoid light and heat Rest for 15 days	at 4°c,not freezed	-	live(freeze-dried)	6 months and above

Self-Check 5	Written Test

Directions: Answer all the questions listed below. Use the Answer the blank space for the answer.

Part I: short answer

1. Write the main types of vaccine.
2. List vaccine strategies
3. Mention the preventive medicine programs
4. What are the deworming strategies goals?

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

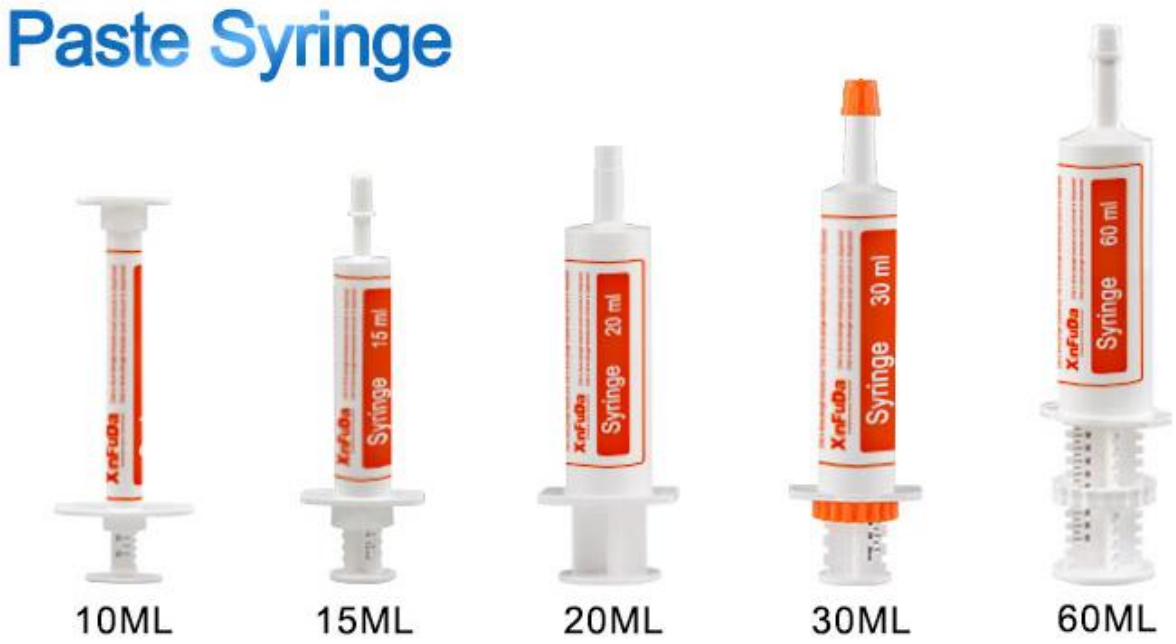
Score = _____

Rating: _____

Name: _____ Date: _____

Information sheet-6	identifying, maintaining and using Materials, equipment and tools

Vaccination and treatment syringes, needles; diagnosis kits, obstetrical and surgical kits, PPE cloths and equipment, animal handling, transportation and restraining facilities Paste syringe is consisting of four components: barrel, cap, plunger and dosing ring. Veterinary syringe is made of PE material and there are four size including 15ml, 20ml, 30ml, 60ml. All can be with printing on plunger or barrel.



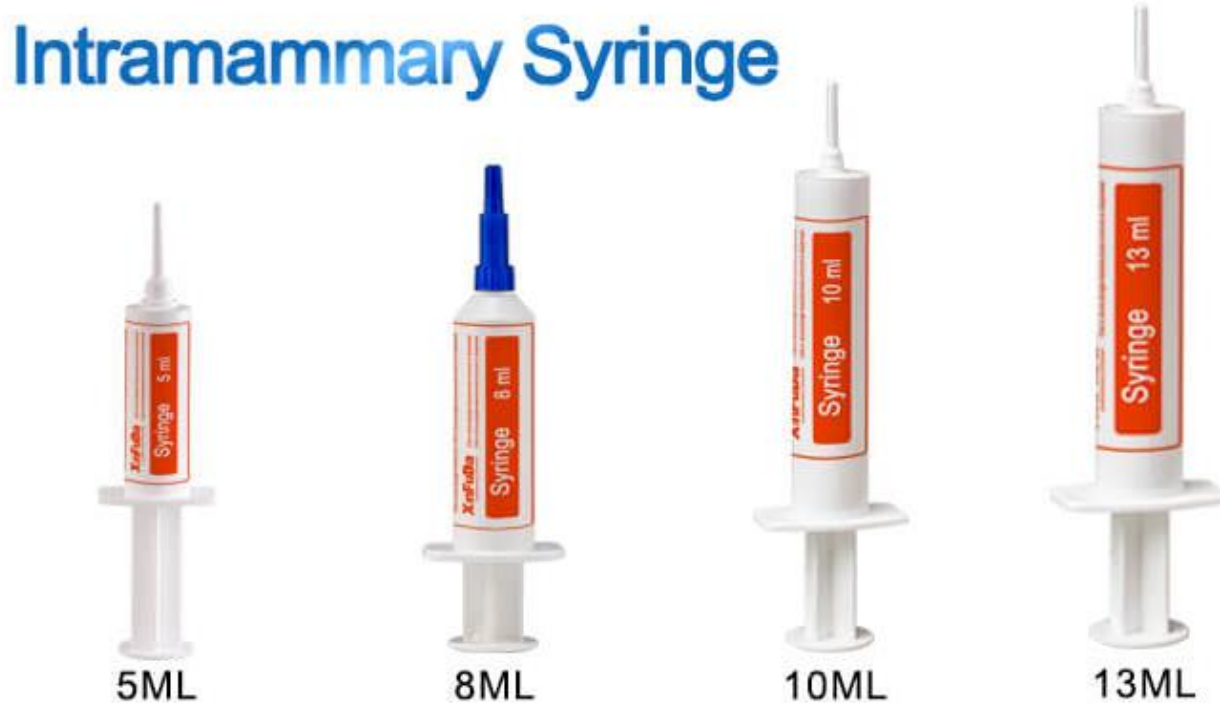
Reference	Capacity	Material	Parts
G015	10ml	PE&PP	barrel, plunger, cap, ring
G014	15ml	PE	barrel, plunger, cap, ring

G006	20ml	PE	barrel, plunger, cap
G003	30ml	PE	barrel, plunger, cap, ring
G004	60ml	PE	barrel, plunger, cap, ring

Intramammary syringes

Intramammary syringes for mastitis treatment in cows. They have a soft needle, making them exceptionally well-suited for the cow mastitis. With this veterinary syringe a pharmaceutical product can easily be injected into the udder of the cow.

Reference	Capacity	Material	Parts
G010	5ml	PE	barrel, plunger, cap
G001	8ml	PE	barrel, plunger, cap
G005	10ml	PE	barrel, plunger, cap
G002	13ml	PE	barrel, plunger, cap



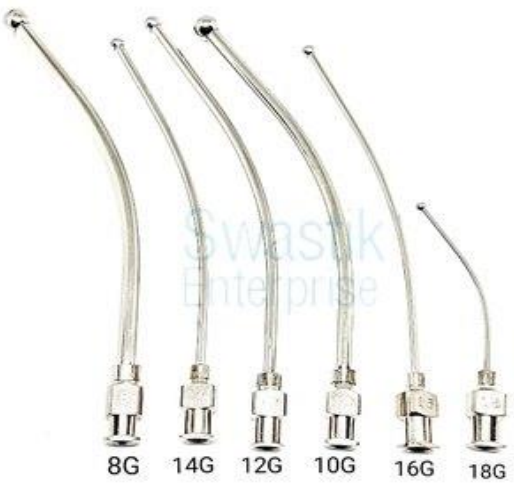


Figure: Oral feeding needles-curved

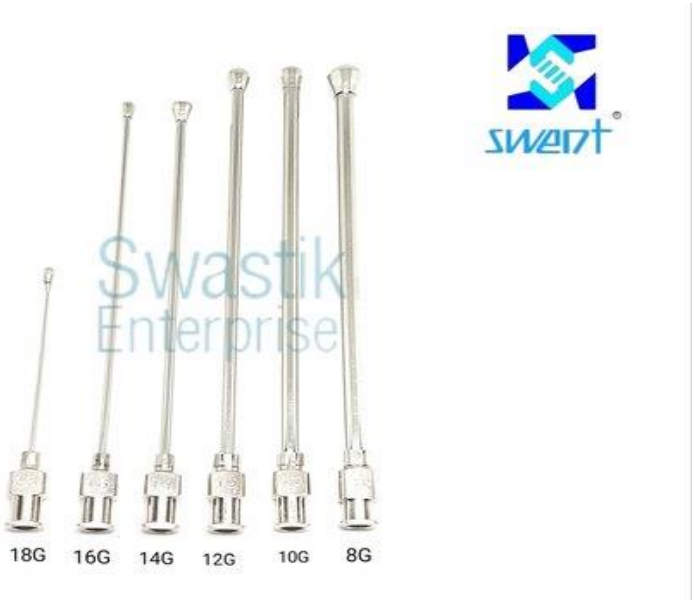


Figure: Oral feeding needle- straight

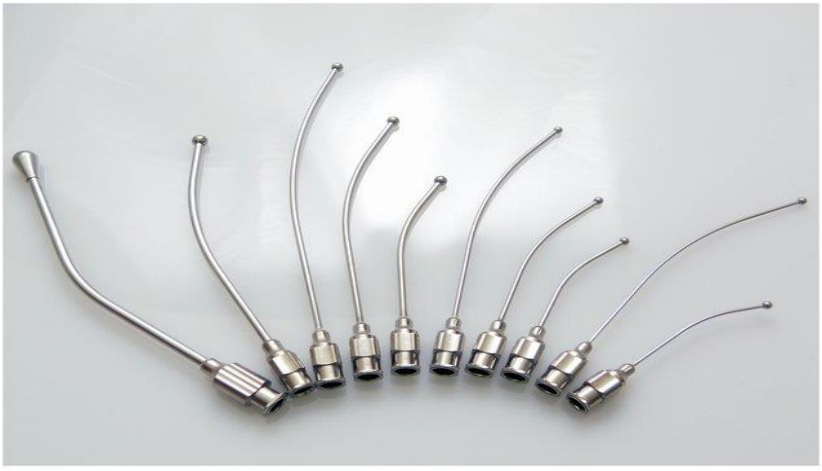


Figure: Reusable small animal feeding needle-curved

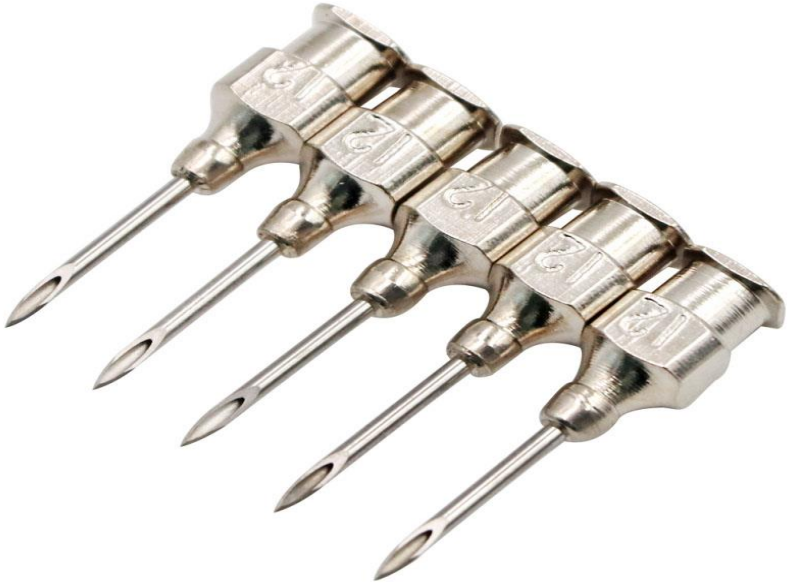


Figure :Vet vaccine syringes needle for farm animals

Self-Check 6	**Written Test**

Directions: Answer all the questions listed below. Use the Answer the blank space for the answer.

Part I: short answer

1. List tools and equipment required in animal disease prevention and contro

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

Score = _____

Rating: _____

Information Sheet 7- identifying and using appropriate handling of drugs, biological and chemicals

Handling of drugs, biological and chemicals

The use of cold chains, refrigerators and freezers, ice boxes, appropriate waste disposal techniques after expiry or use, appropriate transportation and storage techniques of drugs, biological and chemicals

Operation Sheet -measuring body temperature of animal

Sequence of operations for body temperature of animal measuring

The following sequence is provided as a step-by-step example of a measuring body temperature of animal

- Control (restrain) the **animal**
- Disinfect the thermometer
- Shake gently the thermometer
- Lubricate thermometer
- Move the tail to the side.
- Put the thermometer gently into the anus, as far as possible.
- Hold the thermometer at an angle so that it touches the wall of the rectum. ...
- Hold the thermometer in place for half a minute. ...
- Remove the thermometer and wipe it if necessary and read it.

LAP TEST	Performance Test

Name…… ID……Date……

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task- measure body temperature of cow

LG #58	LO #5- Participate in local disease prevention program

Instruction sheet

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

- Identify prevention and treatment strategies to resolve health issues,
- Carrying out prevention of mixing heard of different owners at watering, grazing points and isolation of those newly brought/returned from market.
- Taking quick isolation of sick animal and appropriate measure.

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

- Identify Prevention and treatment strategies to resolve health issues, including rotational grazing, exclusion from infected areas, involving in the national development of immunity, genetic selection and treatment with drugs.
- Carry out Prevention of mixing heard of different owners at watering, grazing points and isolation of those newly brought/returned from market.
- Take quick isolation of sick animal and appropriate measure.

Learning Instructions:

28. Read the specific objectives of this Learning Guide.

29. Follow the instructions described below.

30. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.

31. Accomplish the “Self-checks” which are placed following all information sheets.

32. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

33. If you earned a satisfactory evaluation proceed to “next module,

,

Information Sheet 1-Identifying Prevention and treatment strategies to resolve health issues

Some diseases threaten so many animals and people that governments have programmes to control them or to get rid of them. Work together with others to help these programmes. When animals in your area are not sick it is tempting not to help. But unless all the people in your area work together, the disease will not be controlled and your animals can get disease another time. These are some ways that programmes try to control disease:

- They advise people to take precautions, such as isolating sick animals, destroying bodies of dead animals or boiling milk from sick animals before people drink it.
- They try to control the movement of animals to stop infected animals spreading disease and to stop healthy animals moving to a place where there is already disease.
- They vaccinate animals to protect them against the disease. So they do not become sick and spread it to other animals.
- They kill infected animals. Good governments, who ask animal keepers to kill animals as part of control programmes like this, give the animal keepers money to compensate them. Programmes that ask animal keepers to kill animals with no compensation do not often work.
- They do tests to find out if animals have been vaccinated properly or if they carry infection. They need to take samples - often blood samples - to do these tests. These tests are important to make sure that control programmes work.
- rotational grazing, exclusion from infected areas, involving in the national development of immunity, genetic selection and treatment with drugs.
- Prevention of mixing heard of different owners at watering, grazing points and isolation of those newly brought/returned from market is carried out.

Self-Check 1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer the blank space for the answer.

Part I: short answer

4. Write some ways that programmes try to control disease:

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

Score = _____

Rating: _____

Information Sheet 2- Taking Quick isolation of sick animal and appropriate measure

Isolation of sick animals

Isolation means segregation of animals, which are known to be or suspected to be affected with a contagious disease from the apparently healthy ones. Segregated animals should be housed in a separate isolation ward situated far away from the normal animal houses. If a separate accommodation is not available the animals concerned should be placed at one end of normal animals' buildings, as far away from healthy stock as practicable.

Attendants working on sick animals and equipment such as buckets, shovels etc. used for them should not be used for healthy stock. If this is not practicable, the sick animals should be attended to daily, after the healthy stock. After this, the equipment should be thoroughly disinfected before they are used on healthy stock next day; the attendant too should wash his hands and feet in antiseptic and discard the clothes in which he worked. The isolated animals should be brought back into the herd only when the outbreak ends and they are fully recovered.

The most likely way for disease to arrive on your farm is through the arrival of new animals, or the return of your own animals from elsewhere. You can help to protect animals already on your farm against disease by separating them from the arriving animals until your vet is sure they are free of disease.

This is referred to as **quarantine** and is a key part of reducing disease impact.

Disease may also develop within your stock at any time, so you will look to separate sick animals to protect your healthy animals. This is referred to as **isolation** and it allows sick animals to rest and recover and prevents disease spreading around the pen, group or wider farm.

The key adviser is your vet who will ensure the design of your own quarantine and isolation programmes form part of your Health and Biosecurity Plan.

Take steps to prepare your farm so you can effectively quarantine or isolate animals

- Designate specific areas of your farm to be used for quarantine or isolation. You could require several areas at one time, for example:

- ✓ A quarantine area for newly arriving/returning animals
- ✓ An isolation area for animals in quarantine which develop disease
- ✓ An isolation area for resident animals which become sick

- These areas should:
  - ✓ Be as far as possible from all other animals
  - ✓ Be completely separate buildings with separate airspace, and double-fenced grazings
  - ✓ Use separate equipment, if possible
  - ✓ Have separate feed, water, drainage supplies and bedding
  - ✓ Be adequately lit to allow effective inspection of animals
- Disinfectant footbaths placed at the isolation area entrance act as a barriers to disease:
  - ✓ Keep these clean and topped up regularly with approved disinfectant at appropriate dilution
  - ✓ Aim to protect them from dilution or contamination by rainwater

Self-Check 2	**Written Test**

Directions: Answer all the questions listed below. Use the Answer the blank space for the answer.

Part I: short answer

1. Define quarantine
2. What is isolation
3. Explain the the difference between isolation and quarantine

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

Score = _____

Rating: _____

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10. Biosecurity basics: Make your own footbath - Farm Biosecurity: https://www.farmbiosecurity.com.au/biosecurity-basics-make-your-own-footbath/

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15. Terrestrial Code Online Access - OIE - World Organisation for Animal Health: https://www.oie.int/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/

AKNOWLEDGEMENT

We wish to extend thanks and appreciation to the many representatives of TVET instructors and respective industry experts who donated their time and expertise to the development of this Teaching, Training and Learning Materials (TTLM).

We would like also to express our appreciation to the TVET instructors and respective industry experts of Oromia Regional State TVET Bureau, Holeta polytechnic College and the World Bank who made the development of this Teaching, Training and Learning Materials (TTLM) with required standards and quality possible.

This Teaching, Training and Learning Materials (TTLM) was developed on June 2021 at Adama, Pan Africa Hotel.

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