Animal production Level-III

Based on March 2018, Version 3 OCCUPATIONAL STANDARD

MODULE TITLE: Assisting Poultry Production Activities

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

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LG #61	LO #1- IDENTIFY POULTRY PRODUCTION SYSTEMS AND THEIR REQUIREMENT

Instruction sheet

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

- Identifying and characterizing the systems
- Identifying requirements in the systems
- Recommending suitable and feasible production system.
- Co-ordinating and Monitoring poultry production systems

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 and characteriz the systems
- Identify requirements in the systems
- Recommend suitable and feasible production system.
- Co-ordinate and Monitor poultry production systems

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.
2. 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.
3. Accomplish the “Self-checks” which are placed following all information sheets.
4. 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).
5. If you earned a satisfactory evaluation proceed to “Operation sheets
6. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
7. If your performance is satisfactory proceed to the next learning guide,
8. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

1.1 Definition of Terminology

Poultry: Poultry is a term for domesticated fowl, particularly focusing on the species valued for their meat and egg use, such as chickens and turkeys

1.2 Importance of chicken production and Consumption

Chicken production and consumption provide different functions for the producer as compared to the other livestock production. Among the different functions, the following are the main ones:

- Immediate source of cash income
- Provides meat and egg for household consumption
- Contributes for food security and creates employment
- Source of organic fertilizer
- Requires low initial capital investment
- Requires small land and low labor input
- Efficient feed converters and have a wide range of adaptability for different agro-ecologies
- Their product is acceptable by most of the community and the meat and eggs contain special proteins that allow children to grow strong and their brain to develop

Disadvantages of Raising Poultry

There are some problems involved in raising poultry, including:

- serious problems with diseases and parasites
- Need for large amounts of capital for large operations
- Limitations of zoning on the location of flocks
- High death losses due to predators and stampeding
- Need for careful control of product quality
- need for careful marketing
- need for high volume for an economical enterprise
- problems with waste disposal and odor
- Need for a high level of management ability, especially for large commercial flocks

1.3. Characterizing poultry production systems

I) Free-range chicken production system

A. Advantages of free-range chicken production system include:

- The chickens are healthy since they exercise in the open air freely
- There is minimal infection with parasites if enough space available
- There is little or no labor input

B. Disadvantages of free-range chicken production system include:

- IT is difficult to control and manage the chicken especially the young chicks are easily exposed for predators and unfavorable weather conditions
- The chickens eat sown seed when looking for feed
- A large percentage of the eggs can be lost as the laying hens are not accustomed to laying nests
- High diseases transmission and occurrence of high death
- Chickens are less productive.

ii) Semi- intensive chicken production system

- Is better than free ranging production system since
- it uses inputs like supplemental feed, vaccine, etc
- It has a small house which accommodate laying nest and feeders which serves as chicken house for night
- They are more productive than the chicken in free scavenging system.
- It contains flock size of 50-200 birds/chicken per household which are improved breed

A. **Advantages of semi-intensive chicken production system**

The advantage of this system include,

- complete control over operation
- operational throughout the year
- economic use of land (free range)
- there is better protection during winter

B. Disadvantages of semi-intensive chicken production system

- high cost in fencing and danger of over stocking
- exposure for different disease if the campus is not clean and dry.

1.5.Intensive chicken production system

1.5.1 Deep litter system

- It involves rearing of chickens on a floor littered by 5-10 cm thickness litter . To keep healthy chicken in this type of system, the following points should be noted:
  - ✓ The existing litter should be removed totally when the existing stock culled
  - ✓ Before introduction of new stock, the house should be cleaned carefully and left free at least for **two weeks**
  - ✓ Make sure that the litter should be dry at any time
  - ✓ At any time the thickness of the litter should not be less than 5cm

A. Advantage deep litter system . The advantages of the system included

- prompt culling of unproductive birds
- proper control of diseases and predators and good record keeping and high egg production.
- It has also advantageous in that land requirement is minimum, easy and economic management, scientific feeding and management, high degree of supervision, minimum labour.

B. Disadvantage of deep litter system . The disadvantages of this intensive system of chicken production include

- high capital investment
- Problem of cannibalism and diseases outbreak.
- The deep-litter system is inappropriate for very humid areas (80 - 90% humidity) damp litter spreads diseases.
- The litter must be turned often, particularly in damp weather, and this requires more labor than other systems.

1.5.2 Cage system a single cage (120 cm long x 50 cm wide x 45 cm high) and divided into three compartments holding 12 hens (total). It can be constructed from bamboo with a thatched or other type of roof and is on poles or a stand about 1 m above the ground. Each compartment holds 4 layers.

Advantages of cage system

The advantages of the system include:-

- cages can be placed under existing roofs
- Less labour per bird is needed than other systems.
- Poor layers can be identified immediately and culled

A. Disadvantage of cage system The disadvantages of the system include,

- high cost of installation
- cage layer fatigue
- There is more broken eggs than with deep litter

Self-Check -1	**Written Test**

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

1. The extensive system of poultry production is commonly named as (2pts)

a) Intensive b) semi-intensive c) Free-rang

2. ____is a production system that chickens are fully confined either in houses or in cages throughout their lives. (1pts)

a) Extensive b) Semi-intensive c) Intensive

3. The disadvantages of the cage system include(1pts)

a) low cost of installation

b) breeding is not possible if artificial insemination is practiced

c) C) cages are hard to construct properly

d) All

4. Poultry production requirement includes (1pts)

a) Feed c) housing

b) health management d) all

Note: Satisfactory rating 5 points Unsatisfactory below 5 points

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet -2 Identifying requirements in the systems

Nutrition is a critical part of a bird's environment, and a good ration is the foundation of chicken and turkey growth. No matter what a bird is feed, it will only grow as well as you feed it**,** and n it can not grow beyond its maximal potential.

There are four important principles in developing an appropriate nutrition program for show broilers and turkeys.

Principle 1: To grow, birds must eat and drink**.** Inadequate feed stunts development and prevents birds from growing to their potential.

Several factors can cause birds to eat less than they should. These factors are:

- ✓ feed availability
- ✓ water availability
- ✓ feed competition
- ✓ water competition
- ✓ environmental temperature
- ✓ personal attention

Principle 2: To grow well, birds must eat the right things**.**

Bird feed should contain all nutrients needed to grow:-muscle, bone, internal organs, fat and feathers.

Principle 3: To win, birds must eat and grow in a balanced way.

- A ration is the amount of food that a bird will eat in a day.
- Birds will eat this much and no more, so everything they need must be in this amount of feed.

Several balances of ingredients must be maintained:-

- ✓ energy and protein
- ✓ amino acids (complete protein)
- ✓ minerals
- ✓ essential fats (and fat-soluble vitamins)

Principle 4: To unbalance a balanced ration with supplements is destructive. If you havea good ration that fulfills all of the dietary needs of the broiler or turkey, do not alter it. Sometimes a little more of a good thing upsets a balanced ration.

Self-Check -2	Written Test

Directions: Answer all the questions listed below 10 point each. Use the Answer sheet provided below.

1. List and describe all directional planes of the animal body

Note: **Satisfactory rating 10 points** **Unsatisfactory 10 below 6 points**

Score = _____
Rating: _____

Answer Sheet

Name: _____

Date: _____

Answer

Information Sheet-3 Recommending suitable and feasible production system

3.1. Feasibility and suitability production system Suitable and feasible production system that is helpful to achieve pre-determined farm objective and in line with environmental legislations is recommended. Which management system is more appropriate to local and improved or both breed as to run the production successfully and make it profitable? Based on this question you should plan the most applicable production system during running the operations. The suitability and feasibility of the three production systems are discussed below.

3.1.1 Extensive chicken production system

This system is most suitable if you have a lot of space, preferably covered with grass. At night, the chickens can be kept in any kind of shelter which should be as roomy, airy and clean as possible. Disease concerns increase when birds have access to the outdoors and interact with wild birds. The poultry can encounter more predators (including theft by neighbors). In this system local breed works best.

3.1.2 Semi- intensive chicken production system

This type of chicken production system is better is partially supplemented with inputs like supplemental feed, vaccine, etc. In this production systems Local, modern breeds or a mixture of the two work best. The house must be accommodating laying nest and feeders which serves as chicken house for night time. The house should have one or two side open door for easy movement of the chicken to the fenced area during the day time. The fence can be made from mesh wire or other materials and will not allow the chicken to escape above on it. The fenced area should be always clean and dry. The feed the chickens obtain from the scavenging is very low, they should be supplemented with energy and protein feeds.

3.1.3 Intensive chicken production system

This system requires high management systems (feeding, housing and health care services) with more inputs (feeds and feeding, breed, health, housing and other inputs) than the above two chicken production systems. It is market oriented andshould provide the expected product within that time. In this production systems improved breeds (layer or broiler) works best. They should provide the expected product within that time

Self-Check -3	Written Test

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

1. Discuss about the feasibility of three production systems? (10pts)

Note: **Satisfactory rating 10 points** **Unsatisfactory below 10 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
_____
_____

Information Sheet- 4.Co-ordinating and Monitoring poultry production systems

4.1 Co-ordinate poultry production systems

1. **Biosecurity:**

- Well-defined biosecurity practices throughout broiler production (pre-, during and post placement) are crucial to successful poultry production.
- Effective biosecurity can aid hygiene, vermin and insect control on-farm and help to limit disease transmission within and between barns.

2. **Pre-placement preparation**

- Pre-placement preparation is needed before the new flock arrives to help prevent losses during brooding and the rest of grow out. Checkpoints to keep in mind:

✓ Heaters
✓ floor temperature
✓ temperature
✓ relative humidity probes
✓ ventilation
✓ drinkers and feeders, etc.

3. **Brooding management**

- With today's improved genetic capabilities and the fast growth of birds, more time is being spent during the critical brooding phase. As a result, ensuring a good start in poultry production can have a significant impact on the future health and performance of the birds.

4. **Litter management**

- The litter in a poultry house acts as bedding for the birds.
- In addition to standing and resting on the bedding, birds will naturally peck at the litter.
- Litter condition and quality have an impact on broiler intestinal health and profitability, starting from when the chicks are placed all the way through production.

5. **Water management**

- Drinking water accounts for 70–80 percent of the bird's daily drinking needs.
- Poultry will generally consume more water than feed. As a result, water is the most critical nutrient for poultry.
- An abundance of clean water will reduce challenges and maximize performance.

6. **Feed management**

- Birds must have easy access to feed.
- Proper feeder line height corresponding to the height of the birds helps to reduce feed wastage and mixing feed with litter, and it ensures that all birds have access to feed.
- Adequate feed access is also achieved by following the feed line manufacturer's recommendations for the number of birds per feed pan or line of trough feeder.

- Birds will naturally peck at litter but avoiding “out-of-feed” events helps to reduce the potential for birds to peck excessively at the litter.
- Good feed quality that avoids contaminants like mycotoxins is important to ensure performance.

7. Stocking density

- A higher stocking density of poultry in addition to crowded housing conditions has been shown to have a negative impact on performance, causing **stress to the birds**
- Lowering stocking density throughout the overall production of the birds may help to reduce challenges.

8. Environmental management :General environmental management of the barn includes many components, such as :

✓ Temperature
✓ relative humidity
✓ ventilation and lighting.

9. Keeping an eye on equipment .Walking the barns routinely will also help to ensure equipment remains in working order

10. Mortality checks: Cull diseased birds as early as possible.

4.2. Monitor poultry production systems

- Monitoring during times of transition Increasing the frequency at which barns are walked and examining the activity of the flock can help with early disease detection.

Daily monitoring of :

✓ Temperature ✓ humidity
✓ ventilation inside the barn as well as outside temperature is recommended

- Monitoring transition times can help with understanding what is happening in the barn (e.g., from day to night, when birds are placed, during half-house brooding, feed changes.
- Monitoring feed and water consumption helps to monitor the flocks’ progress

4.2.1 Communication and provide feedback to staff and management .Based on the monitoring results, the workers should have to communicate and discuss as to:-

- Ensuring strong communication and coordination between all those involved in helping your farm run smoothly will ensure a stronger and more successful gut health management program for your birds.
- Feedback is provided
- to staff and management on request
- Feedback is given to each worker either orally or in written form.

Self-Check -4	Written Test

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

1. Discuss the activities that should be coordinated and monitored in chicken production systems (5pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____

Operation Sheet 1 Preparing for Bird Arrival or Pre-placement preparation

Preparing for chicken arrival or pre-placement preparation

Step 1- Remove all old litter.

Step 2- Clean the house

Step 3- Disinfect house and equipment using an approved disinfectant.

Step 3- Fumigate if possible

Step 4- Let house lie empty and air out for two weeks

Step 5- Place about four inches of clean, dry litter such as pine shavings or sawdust

Step 6- Use chick guards to keep birds close to heat, feed and water.

Step 7- Bring house up to brooding temperature one day before delivery.

Step 8-Fill waterer 4 hours before arrival.

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 4 hour.

Task 1.Remove old litter from poultry house and preparing for chicken arrival

LG #62	LO #2- IDENTIFY AND SELECT POULTRY BREED AND BREEDING

Instruction sheet

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

- Identifying and characterizing common poultry breeds
- Deciding criteria for selection.
- Selecting appropriate breeds

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 and characterize common poultry breeds
- Decide criteria for selection.
- Select appropriate breeds

Learning Instructions:

Read the specific objectives of this Learning Guide.

Follow the instructions described below.

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.

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Commercial or Exotic Breeds

i. Bovans Brown
ii. Issa Brown
iii. White Leghorn
iv. Rod Island
v. Red

A. Cock hock

- This chicken breed honestly doesn't have amazing annual production
- Average egg production of this chicken ranges between 160-180 eggs per year.
- They are large breed; they can make decent birds for meat
- They have a mixture of black and red or white and black color
- They consume more feed and Slow growth rate
- They are not good egg layer

B) **Bovine chickens**

- They are a superior chicken breed.
- The Bovines Brown and white are a highly versatile
- Combined traits include high peak production, great laying persistency
- The Bovines Brown and white have excellent feed intake capacity
- The Bovines Brown and white are an ideal bird for the commercial egg producer looking for overall solid performance.
- They can laid 300-330 eggs per year per hen.

C) ISA brown

- Is Improve breed
- Country origin france
- Isa brown is prolific egg layers.
- Mostly used in commercial layer farming purpose to produce large size brown color eggs.
- They lay more than 300 eggs in a year by a single hen.
- The weight of the single egg is 60 g.

- Meat production: It is light in weight the meat production is quite less

E) Sussex Chickens

- The most famous Sussex chooks are the Light Sussex.
- These are very distinctive types of chickens having a white body with a black tail and black wing tips, neck being white striped over with black

- The Sussex chicken was created over a century ago in the county of Sussex, England.
- Cocks should weigh approximately 9lbs (4.0 kg), and the hens (females) 7lbs (3.2 kg)
- The Sussex chicken is an alert, docile breed that can adapt to any surrounding, comfortable in both free range and confined spaces
- Sussex is dual purpose
- Types of chickens that are good foragers, and understandably

2. Indigenous (local) Breed

The general characteristics of the indigenous chicken breeds summarized as:

- Non-descriptive breeds closely related to the Jungle fowl.
- They vary in color, comb type, body conformation
- Vary in weight and may or may not possess shank feathers.
- Broodiness (maternal instinct) is pronounced.
- Slow growth rate
- Late maturity
- Relatively resistant to disease than exotic breeds
- Low egg production,
- Small sized eggs
- Low survivability of chicks
- Low feed utilization efficiency

Some of the Ethiopian indigenous chicken ecotypes are:-

A) Farta indigenous chicken breed

- Found in the Amhara regional state in northern Ethiopia.
- They are maintained under scavenging regimens with occasional supplementation and sheltered in the family house.
- The chickens have predominantly white body plumage that occurs at similar frequency in both sexes.

B. Horro indigenous chicken breed

- Found in HorroGuduruWollega Zone,
- Improved local chicken breed
- Horro is good for meat and eggs
- capable of hatching 180 eggs per year
- High-production under low-input systems
- Medium sized chicken

C. Sheka indigenous chicken breed

- Egg production potential of local chicken is 30 to 60 eggs/year/hen
- They are not good layer, but good for meat production
- They are medium sized chicken
- The chickens are disease resistant and
- productive under low-input systems

D. Mandura indigenous chicken breed :

- Found in the BenshangulGumuz regional state in northwest Ethiopia
- They are reared by mixed communities of Amhara, Gumuz and Agaw
- Complete red is typical of males' plumage but absent in females
- Brown is the most predominant plumage in the population followed by red, white and white orgrayish strips on brown or reddish background

E. Konso indigenous chicken breed

- Found in the Southern NNRS in south Ethiopia.
- Few hens have naked necks
- Most of the cocks have different color: red body plumage, brown, zigrima and black are the prominent plumage colors in hens.

Self Check -1	Written Test

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

1._____ is the indigenous chicken breed of Ethiopia (3pts)

a) Horro

b) Bovine brown

c) RIR

d) all

2. Which of the following poultry breed is improved?(3pts)

a) Mandura chicken breed

b) Farta chicken breed

c) Sussex Chickens

Note: **Satisfactory rating -6 points** **Unsatisfactory - below 6 points**

Answer Sheet

Score = _____

Rating: _____

2.1. Breeding goals

All breeding plans for commercial breeding companies have one major objective in Common: to increase the genetic potential of the stock to produce saleable, high quality products at minimum cost in a given production system.

Breeders of egg-type chickens concentrate on four major objectives. They are:

- ✓ Maximum number of saleable eggs per hen housed
- ✓ Low feed cost per egg or per kg egg mass
- ✓ optimal internal and external egg quality
- ✓ Low mortality and high adaptability to different environments

2..2. Criteria to Measure

1. Egg production
2. Conformation
3. Health
4. Adult size

1. Egg Production

- Select hens that don't go broody
- Hens don't lay eggs when broody
- Do this only if you have an incubator to incubate eggs, or will be using
- other hens to hatch the eggs for you

2. Conformation: Layers need sufficient capacity to maintain high egg production:Look for birds which are

- Long, Deep ,Thick , Good abdominal capacity and Measure between the keel and pubic bone

3. Health

- Select only birds that are in good health
- Cull birds that get sick
- Make sure they have bright clean eye

Self-Check -2	Written Test

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

1) List the desarale crateria of breed selction for egg production (5pts)

Note: **Satisfactory rating 5 points** **Unsatisfactory 5 below 7 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

2._____

3.1. Identify egg laying hens: There are some common criteria that are used to identify and select good layer or hens. These are:

1.Lookingwattle

3. vent shape

4. Shank color

5. Measure how many fingers fit between the pubic bones. If you can't fit 3 fingers or more then she is not good laying

Good layer

Poor layer

Generally the main characteristic for distinguishing a layer from a non-layer is given below.

Good Layer	**Bad Layer**
1. Head small, lean and well proportionate	1. Head large and thick
2. Beak strong, shining and well curved	2. Beak long, thin and dull coloured
3. Comb and wattles warm; brightly red and full	3. Comb cold, shrunken and dull coloured
4. Eyes bright, well opened and alert	4. Eyes dull and sleepy
5. Neck short and strong	5. Neck long and thin
6. Body long, deep and proportionate	6. Body short, weak and thin
7. Back broad and straight	7. Back long and curved
8. Skin thin, smooth and oily	8. Skin coarse and thick
9. Abdomen large and soft	9. Abdomen small and hard
10. Ventral oval, soft and moist	10. Ventral small, dry and narrow
11. Feathers moult late	11. Feathers moult early
12. Shank thin and soft on back	12. Shank hard on back
13. Good appetite	13. Poor appetite

Self-Check -3	Written Test

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

1) List at least four characteristics of good layer? (7pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

2. _____

2._____

Identify laying hens

Step 1- Wear appropriate workplace PPE

Step 2- Use footbath

Step 3- Enter the chicken house

Step 4-Catch the hen

Step 5- check the wattle, vent shape, shank color, under foot color and measure pubic bones by your finger

Step 6-judge and identify whether the hen is good or bad lay

LAP Test	Practical Demonstration

Name: _____

_____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within --- hour.

Task 1.Identify the poor and good layer following its procedures

LG #63	LO #3- PLAN POULTRY HOUSE CONSTRUCTION AND FACILITIES

Instruction sheet

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

- Identifying requirements for construction.
- Selecting appropriate site
- Determining space requirements
- Planning farm lay out and chickens' houses
- Selecting farm design.
- Identifying feederer, waterer, lighting and other facilities

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 requirements for construction.

- Select appropriate site
- Determine space requirements
- Plan farm lay out and chickens' houses
- Select farm design.
- Identify feederer, waterer, lighting and other facilities

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Introduction of poultry house construction for each production system

- Poultry house is the structure/building that protects birds from external harsh environments and provides them with suitable situation for their health and productivity
- Poultry production systems should provide fresh air, clean feed and water, protection against predators, shelter from cold, rain, wind, sun and excessive heat; as well as a source of heat when birds are young.
- Basically, the birds need a good house to be able to grow, sleep, and lay eggs in comfort, free from stress and disease.

A properly constructed poultry house, regardless of its size and the materials used, has certain essential features. The basic requirements for poultry housing are:

- ✓ atertight roof
- ✓ Proper ventilation
- ✓ Inner surfaces which are easy to clean
- ✓ Protect rat and wild bird
- ✓ A clean environment
- ✓ proof floor, walls and roof

The following point should be considered during poultry house construction.

1. **Location against wind direction**: The house should be placed at the back faces the direction from which wind and storms usually come
2. **Orientation of poultry house**: is an important consideration in order

- to protect poultry from wind and rain storms
- to prevent direct sunlight from entering the house and stressing the birds
- to have good drainage around the house to protect it from flooding
- to avail of the prevailing wind to cool the house in a warm climate

3. **Adequate space according to the number of poultry:**

- The size of poultry house depends on the number of fowls
- The measurement varies according to the production purpose, growth stage of the poultry.
- The main aim should be to provide a type of house that has plenty of space.

4. **Need for specifying foundation, well- drained area and good drainage system:**
5. **Adequate aeration:**
6. Ventilation in the poultry house is necessary to provide the birds with fresh air and to carry off moisture.
7. **Adequate light:**

- Day light in the house is desirable for the comfort of birds. Sunlight in the house is desirable not only because of the destruction of disease and for supplying vitamin-D but also makes poultry happy.

Self-Check -1	Written Test

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

1. What are the basic requirements for poultry housing?(10pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

3. _____

2**.1 Introduction**.Today, poultry farmers must be aware of concerns related to

1) Environmental issues like

- water quality
- odors and flies
- litter applications on fields and
- high soil phosphorous levels;

2) Nearby neighbors and public areas like churches, parks and businesses; and

3) Laws and regulations that affect farming operations.

2.2 Site selection

Site selection criteria

- In planning a poultry farm the most important points to considered are:
- Well-drained land, this is especially important where litter systems are used.
- Within sight of owner / supervising personnel.
- Away from other chicken houses to reduce the spread of diseases.
- Noisy areas should be avoided.(garage ,railway and road)
- The housing of the house should take advantage of natural air movement
- No direct sunshine entering the house, placing the house in an east-west direction is best.
- Accessible to transport and communication

HOUSING

The purpose is to protect the birds from dogs, cats, snakes, rats and other pests and thieves and to keep out mice, rats and birds from eating valuable poultry feed and transmitting disease.

Basic requirements for the building are**:**

- it is rain proof
- it protects poultry from direct sunlight
- it is not subject to flooding
- it is wild bird proof (difficult to do)
- it has enough space
- it is easy to clean out
- it has a solid door with a lo

Self-Check -2	**Written Test**

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

1. What are the important parameters used for site selection for establishing chicken house (at least five)? (10pts)

Note: **Satisfactory rating 10points** **Unsatisfactory 10below 10points**

Answer Sheet

Name: _____ Date:

Score = _____

Rating: _____

Short Answer Question

1. _____

_____

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_____

3.1 Space requirement . Stocking densities (maximum)

- Chickens 0-6 weeks old: 10-12 birds/m2 Floor size 5m x 2m /100 birds
- Pullets to 16 weeks old: 5-7 birds/m2 Floor size 2m x 2m / 25 birds
- Laying hens: 5 birds/m2 Floor size 5m x 2m / 25 hens
- Hens in layer cages, floor space may be 12-15 birds/ m2
- Cage size for 3 hens: 40 cm long x 30 cm wide x 45 cm high, for 5 hens: 50 cm long x 30 cm wide x 45 cm high

Feeding space, watering space, housing space and laying nest requirements for chickens at different ages

Feeding and watering space requirement in cm/bird					
Feeder/ Drinker type	Chicks 0-8 weeks	Layer growers 8-18 weeks	Broilers	Layers	Breeders
Long feeder	7	9	5	12	18
Round feeder	3	4	2	5	7
Long drinker	1.5	2	1	2.5	3.5
Round drinker	1.5	2	1	2.5	3.5

Housing space requirement (number of birds in $1m^2$)			
Housing type			
Full slats	15	7	-
2/3 slats, 1/3 litter	-	6	4
1/2 slats, ½ litter	-	5	-
Full litter	10	4	3

Laying nests requirement		
Types of nests		
Individual nest (hens/nest)	7	5
Communal nests (hens/m^2)	50-75	30-50

. Water allocation should meet these requirements 30 layers

100 chicks	0-3 weeks	10 litres/day
100 chicks 3	3-7 weeks	25 litres/day
30layers	Adult	15 litres/day

Self-Check -3	Written Test

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

1. Write the floor space requirement of layer, meat and dual purpose chickens?(10pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
_____
_____
_____
_____

In selecting the site for the chicken house, one should be guided by the following factors

- The site should preferably be on a level ground.
- The soil must be well-drained so that during rain there is no water clogging
- The area must have plenty of natural air movement in order to aid ventilation.
- The house should be oriented on an east-west axis to reduce the effect of direct sunlight on the sidewalls during the hottest part of the day.
- The ground must be big enough to accommodate the number of birds one wants to keep. This is guided by the stocking density of adult birds which should be **10 -12** birds per m^2..
- The broiler house should be at least **1.5 km** away from other types of poultry production

Poultry Housing Specifcations

- The width of the house should not exceed 12 m in open sided houses.
- Height should be at least 2.4 – 2.6 m on the higher side of a flat roofed house
- Brick wall on length side should be 40 - 50 cm and a 25-mm chick mesh wire to cover the gap between the wall and the roof.
- Roofing material should have a reflec tive surface on the outside to help reduce the conduction of solar heat and should be well insulated.
- Heating systems should have ample heating capacity in accordance with the climate.
- Ventilation systems should be designed to provide ample oxygen and to maintain optimum temperature and relative humidity conditions for the birds.
- Lighting should be oriented to provide an even distribution of light at the floor level.
- It is important provide winches in order to facilitate the curtain management.
- The material of outside curtain can be sacs, but must be well sealed.
- All holes and tears in sidewall and/or inlet curtains must be repaired.
- Curtains need to be sealed at the bas

Self-Check -4	Written Test

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

2. Write the proper lay out of chicken house)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

2. _____
_____
_____
_____
_____

There are three types of poultry House

1. Open-side Poultry house
2. Front and Back sides
3. Controlled Environment house

1. Open-Sided Poultry House

- **Width of house***.* It should be about 30 ft.(9.8 m) and no more than 40 ft. (12.2 m) wide
- **Height of house**. Most open-sided houses have a stud that is 8 ft. (2.4 m) long.
- **Length of house***.* Poultry houses may be almost any convenient length.
- **Shape of roof***.* Practically all poultry houses built today have a gable roof, the pitch varying from one-quarter to one-third.
- **Roof exhausts***.* Houses should be equipped with a covered exhaust area at the peak of the roof to allow excess heat to escape.
- **Insulation***.* Even with the conventional poultry house, it is well to provide some type of insulation.
- **Building materials and construction***.* Open-sided and environmentally controlled houses use a variety of building materials.
- **Foundation***.* A solid and adequate foundation should support the building. Concrete, concrete blocks, bricks, or other permanent and termite-proof material should be used. Evenness of the foundation is important, for it will determine the Evenness of the completed structure.
- **Floor.** With certain disease-control programs, a concrete or similar floor is mandatory. **Doors.** Doors at the end of the house Should be large enough for a truck, tractor, or manure-handling equipment to pass through. Such equipment will be used when the house is cleaned.
- **Orientation.** Houses must be oriented in a direction to take advantage of prevailing airflow patterns. Orientation must also be considered relative to solar heat transfer into the building from exposed roofs or sidewalls. Pullet-rearing areas should always be located upwind from adult birds.

2. Open Front and Back Sides

With this type of house most of the side areas are open. The height of the opening Will be determined by climatic conditions, and by the type of bird being housed, as Follows:

- ✓ **Broilers and young chicks**. From one-half to two-thirds of each side is left open, the Exact amount being determined by summer and winter temperatures. When both Heat and cold are to be dealt with; the size of the opening should be medium.

  Where heat is continuous, the opening should be larger; sometimes almost all of the Side is left open.

- ✓ ***Growing birds and layers***. The opening size is greater for older birds. They should be provided with more air because bird density is greater and more ventilation is ece ssary.

- **Curtains during cold weather.** Young chicks and older birds should be given some Protection during periods of cold weather and extreme winds. Curtains made of some Durable and plastic like material usually provide this protection.

  They are installed down the length of the building and hung so that the entire curtain may be rolled up or down by cables and a winch located at one end of the building or by thermostatically controlled automatic winches. This construction makes it easy to regulate the size of the opening according to weather conditions—an almost indispensable provision.

3. Controlled environment house

A controlled-environment house is one in which inside conditions are maintained as Near as possible to the bird's optimum requirements.

so usually necessitates a Completely enclosed insulated house with no windows.

Air is removed from the House by exhaust fans and fresh air is brought in through intake openings. Artificial Light, rather than natural daylight, is used to illuminate the interior. Where high Outside temperatures are involved, some method of controlling the temperature Inside of the house is provided. The houses are not heated except for brooders.

Self-Check -5	**Written Test**

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

1. List types of poultry house?(10pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1) _____

2)_____

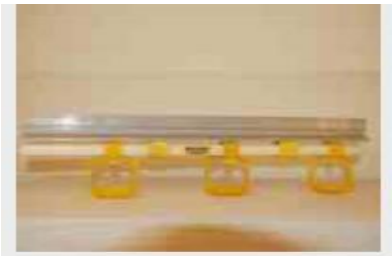
3)_____

Pan and jar type:

This type of waterer is circular in nature, having two compartments i.e. jar for filling water and pan for delivering water. **Water basin madeof plastic / wood/GI with grill.**Basins of different diameters are available (10", 12", 14" and 16" diameter). A separate grill is available to prevent the entry of birds inside the water

Nipple drinker;

It can be used both in deep-litter and in cage system.When used in deep-litter system, it is attached with cup under the nipple to prevent wetting of litter material.These drinkers look like a nipple and water drops comes out when they are pressed.They can be used for all types and classes of birds, but most commonly used in laying cages.One nipple drinkers in each cage housing 3 layers is sufficient.



Bell type automatic waterer:

These are made of high-impact plastic in a bell shape usually suspended from separate pipeline for the purpose.

This type of waterers has control over the water flow and maintains the required water level always.

There will be a continuous flow of water so as to ensure water available for the birds throughout the day.Height at which the water is available can be easily adjusted by simple clamp mechanism and rate of flow water is adjustable by a valve (spring-mounted). Plastic drinkers will be brightly colored (red, blue) and hence are expected to attract layers, especially chicks to water

- **Manual drinker**: In case of chicks during first week of brooding, manual drinkers are popularly used.They also referred as "fountain drinkers" because water comes out of the holes like that in case of a fountain.

The main advantage of manual drinkers is the ease of giving vitamins and other probiotics/medicines/vaccines through water.

Manual drinkers with stand made of high-impact plastic in bright colors (red or blue) are available. Arrangement of drinkers at an equal distance of 0.6m between any two feeders and feeder and a drinker.

Feeding equipment's

Feeders are equipment's used in feeding poultry birds. The food is deposited in the feeder and the birds feed from it. The amount of feeders provided for a poultry farm should be according to amount of birds available. It is important that you always keep the feeders clean to ensure the health safety of the birds.

A .Linear feeder: is chicken feeding equipment having a rectangular shape which usually made of Galvanized Iron. Also locally available material like wood and bamboo et

B. Circular feeder: These are semi-automatic feeders and can hold 5 to 7 kg feed in its cone at a time. These are made of high plastic and usually suspended from roof/ roof-truss or from separate pipeline for the purpose.These are also called as 'hanging feeders'.These feeders are available in different capacity and when completely full, the feed will suffice 4 to 7 days, depending upon the age and number feeding on them

B. Automatic feeder:

These are operated with electricity and the height of the feeder can be adjusted depending upon the age of the birds.

C. Heaters or Brooders:

The heater or brooder is equipment used in regulating and increasing the temperature of the poultry farm. These helps to keep the birds warm when the weather is cold

Self-Check -6	Written Test

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

1. Discuss the type of feederer and waterer required for chicken.

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
_____
_____

LG #64	LO #4: MANAGE AND FORMULATE RATION FOR DIFFERENT CLASSES OF POULTRY

Instruction sheet

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

- Identifying, recognizing and carrying out routine management activities.
- Referring nutrient requirement of the chickens
- Identifying available feed stuffs and determining their nutrient content
- Formulating ration
- Preparing and providing feed and water
- Carry out chicks rearing activities
- Clean equipment, chickens' house & its environment

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Identifying, recognizing and carrying out routine management activities.
- Referring nutrient requirement of the chickens
- Identifying available feed stuffs and determining their nutrient content
- Formulating ration
- Prepare and provide feed and water
- Carry out chicks rearing activities
- Clean equipment, chickens' house & its environment

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 "Operation sheets
7. Perform "the Learning activity performance test" which is placed following "Operation sheets" ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to "Operation sheets".

Feeder for poultry

Introduction

On day of arrival the day old chicks are fed on feeder plates, egg trays or on paper. This allows easy access to the feed. Gradually this type of feeder is replaced by the normal feeders. After 7 to 14 days only the normal feeders should be used.

The requirements for a good feeder are:

- to avoid wastage of feed
- to prevent contamination of feed
- to clean easy
- durable, strong
- easy to fill
- stable, should not tip over
- cheap

Because feed costs is about 70% of the total costs of poultry production the point of feed wastage needs extra attention, although it must be realised that the feeder is not the only thing that influences feed wastage.Wastage of feed is influenced by:

1. **Type of bird** It seems that nervous birds have less good eating habits than more quiet birds, and thus waste more feed
2. **Debeaking** Hens with a shorter beak need more time to consume sufficient feed and thus eat less greedily
3. **Eating space:** Less eating space at the trough will give more fighting for feed and thus more wastage of feed.
4. **Construction of feeder**: Feeders with a U-shape trough can contain more feed than feeders with a V shape, so normally the feed level in U-shape troughs can be lower, this gives less feed wastage

Drinkers

Water is the nutrient essential to life. A bird can stand a longer time without food than it can without water. Water in the body

Regulates body temperature

- is a solvent for the products of digestion
- is a solvent for the waste products of metabolism
- is a means of transportation in the body
- is a medium for physiological and chemical processes.

Types of nests

Four types of nest boxes could be used:

1. **Individual nest boxes** are constructed so that only one hen will be able to fit in one compartment at a time.

- Dimensions of individual laying nests are : width 25 to 35 cm, length 25 to 35 cm and a height of 30 to 40 cm.

2. **communal nest boxes** a individual nest is recommended above a communal nest because in communal nests the risk of egg breaking and dirty eggs is higher than with individual boxes.
3. **roll away nestboxes** are constructed with a slope bottom so that the egg after being laid rolls away from the hen in a egg drawer.
4. **trapnests** are mainly used on research stations or on breeding farms. After entering the nest the hen is trapped and can not leave the nest anymore.

Recommended Age For Debeaking

The age for beak trimming is 14 weeks or younger, after week 14 it starts to interfere with the maturing process. It is also more difficult to prevent bleeding at an older age. In emergencies, slight trimming can be carried out at any age, even during lay.. The best age at which to debeak is approx. **8 weeks**. Trimming before **6 weeks** of age is less effective because the beak grows again and further beak trimming is often required. Pecking, however, may start so early that a first trim between **7 and 10 days is necessary**. A second trimming is then commonly practised at 10 weeks for most birds. In extreme cases, a top notch is applied on the first day.

Debeaking Procedure

Field results illustrate the need for skilled and accurate labour, combined with good and clean instruments for trimming. The sharp top of the beak can be melted away by heat in d.o.c.'s.

Debeaking on day one is rarely practised, its main purpose being to prevent the pecking at the first week and feather pecking in the first 6 to 8 weeks.

There are also farmers that trim beaks again at 7 to 10 days. At 7 to 10 days it is a precision job to ensure proper use of the hole in the lower blades when normal trimming instruments are used. Upper and lower parts of the beak are trimmed simultaneously. The blades are hot, resulting in a dark red colour of the cutting area on the blades. Immediately after trimming, the cut is cauterised by pressing it against the knife for 2½ seconds. After every 10.000 chicks, the blades should be cleaned using sandpaper. Blades must be renewed regularly, depending on their quality. When trimming, the distance between nostrils and the end of the beak should be about 2mm, as shown in picture 1b. No more than 700 chicks should be debeaked per man per hour.

Because the lower part of the beak grows faster than the upper one, and to prevent it from becoming the longer part, trimming at an angle of 90 degrees or slightly less is recommended.

In dark houses, debeaking can be delayed until between 8 and 10 weeks when it is often combined with a vaccination. In open houses, birds trimmed at 7 to 10 days should have another trimming at 10 weeks. The procedure can be more stressful then and use of the holes is impossible, though the beak is bigger and it is easier to see where to trim.

Red to white hot blades are needed for cauterisation. Eating afterwards prevents loss of blood. During and after trimming vitamin K should be added to drinking water to stimulate faster clotting of the blood. Giving 24 hours of light reduces the bodyweight loss due to lower feed intake after trimming. The level of feed in the feeders is generally doubled to avoid contact between the freshly trimmed beak and the bottom of the feeding trough. Some growers get good results by rounding the corners of the trimmed beak off using the heat of the knife. Blades must be cleaned after 10.000 birds and should renewed after 20.000 to 30.000. At the age of 8 to 10 weeks, upper and lower beak are debeaked simultaneously. The lower beak is pulled back a little by the forefinger to prevent cutting the tongue. This results in a slightly longer lower beak, necessary for proper nipple drinking.

Self-Check -1	Written Test

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

1. Mention the age at which debeaking is done
2. Discuss the *Factors affecting the nutrient requirements of poultry?*
3. Why debeaking ? and mention time of debeaking?

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

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_____

Information sheet -2 Referr nutrient requirement of the chickens

4.1. Nutrient Requirements: Poultry diets must be formulated to provide all of the bird's nutrient requirements if optimum growth and production is to be achieved.

Nutrient Requirement of birds at different class

Class of Poultry	Protein %	Energy kj/g	Ca %	P %	Lys %	Met %	Vit %
Chick starters (0-8weeks)	20	11	1	0.5			
Growers (9-20weeks)	18	10.5	1	0.43			
Broiler starter (0-8weeks)	23	12.5	1	0.43			
Broiler finisher (8-12 weeks)	20	13	0.8	0.40			
Pullet (8-22wks)	12	10.5	0.8	0.40			
Layer (>22wks)	16	11.5	3.5	0.50			

There are six classes of nutrients: **protein,CHO,Fats,Minerals,vitamins**

1. Proteins – required for the synthesis of body tissue (particularly muscle), physiological molecules (such as enzymes and hormones), feathers and for egg production. Proteins also provide a small amount of energy **Eg**. soybean meal, meat products, amino acids (methionine, lysine

2.Carbohydrates – the major source of energy for poultry. Most of the carbohydrate in poultry diets is provided by cereal grains.eg. corn, sorghum, other grains

3. Fats – provide energy and essential fatty acids that are required for some body processes **Eg** corn oil, blended fat products

4. Vitamins – organic chemicals (chemicals containing carbon) which help control body processes and are required in small amounts for normal health and growth. Eg vitamin mix, other ingredients

5. Minerals - inorganic chemicals (chemicals not containing carbon) which help control body processes and are required for normal health and growth. Eg salt, limestone, calcium carbonate, calcium phosphate, trace mineral mix

Factors affecting the nutrient requirements of poultry

The nutrient requirements of poultry are affected by a large number of factors, including:

- Genetics
- Age .
- Sex .
- Reproductive state
- Ambient temperature -
- Housing system -.
- Health status –
- Production aims

Feed consumption

There are a number of factors that influence voluntary feed intake. These are discussed in the section on Feed intake. Table 1 provides data on typical feed consumption for modern brown-egg laying hens in relation to target body weight. From Week **18,** hens start to enter their laying period, reaching peak of lay around **32** weeks of age, and typically maintaining egg production until **65-68** weeks of age. Feed intake will increase to a steady level of **100-105g** per day and hen body weight will reach a mature level of **1700-1800g**.

Table 1. Body weights and associated feed consumption for a **brown-egg laying** breed during the growing period

Age (wk	Body weight (g)	Feed consumption (g/bird/day)	Age (wk)	Body weight (g)	Feed consumption (g/bird/da
1	70	13	11	960-1080	61
2	115	20	12	1050-1117	66
3	190	25	13	1130-1250	70
4	280	29	14	1210-1310	73
5	380-390	33	15	1290-1370	75
6	480-500	37	16	1360-1430	77
7	580-620	41	17	1500-1540	80
8	680-750	46	-	-	-
9	770-860	51	-	-	-
10	870-970	56	-	-	

6. **Water**

- Water is normally provided Adlibitum for birds.
- Potable (safe) water should also be provided for birds

Functions of water

- Regulates body temperature
- Waste excretion
- Nutrient absorption
- Medium for physiological & chemical process

Sources of water -

- Water from the feed
- Metabolic water
- Drinking water

Factors affecting water intake

I. Fee d intake

Chickens consume twice (2x) as much water as fed /body weight (WI = 2FI)

It also depends on salt content of feed: ↑salt =>↑Water intake

Feed in take decrease if birds are restricted not to drink water for some hours; if water intake of birds is restricted for long period; production declines and birds do not recover with in short periods.

II. **Environmental temperature*:* -** Birds consume more water at high ambient temp than at lower ambient temperature

III. **Age**:-Adult birds like Layers/breeders need more water than very young chicks.

Self-Check -2	Written Test

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

1. Discuss the *Factors affecting the nutrient requirements of poultry?*
2. Why debeaking ? and mention time of debeaking?

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

2. _____
_____
_____

Information sheet -3 Identify available feed stuffs and determining their nutrient content

Feed ingredients for poultry diets are selected for the nutrients they can provide to poultry, the absence of antinutritional or toxic factors, their palatability or effect on voluntary feed intake and their cost.

- The main cereal grains used in poultry diets are wheat, sorghum and barley.
- The quality of cereal grains will also depend on the seasonal and storage conditions. Poor growing or storage conditions can lead to grains with lower than expected energy content or contamination with toxin-producing organisms such as fungi and ergots.

Nutrient Composition of Cereal Grains

Ingredient	Crude protein	Metabolisable energy (kcal/kg)	Calcium (%)	Available phosphorous (%)	Lysine (%)
Wheat	13.0	3153	0.05	0.20	
Sorghum	9.0	3263	0.02	0.15	
Barley	11.5	2795	0.10	0.20	
Rye	12.5	2734	0.05	0.18	
Triticale	15.4	3110	0.05	0.19	
Oats	12.0	2756	0.10	0.20	

Animal protein sources

The main animal protein sources used in poultry diets are meat meal, meat and bone meal, fish meal, poultry by-product meal, blood meal and feather meal. Further information on animal protein sources in poultry diets is available in the section on animal protein meals.

Nutrient Composition of Animal Protein Sources

Ingredient	Crude protein(%)	Metabolisable energy (kcal/kg)	Calcium (%)	Available phosphorous (%)	Lysine (%)
Meat meal	**50.0**	2500	8.00	4.00	3.6
Fish meal	**60.0**	2720	6.50	3.50	5.3
Poultry by-product mea	**60.0**	2950	3.50	2.10	3.4
Blood meal	**80.0**	2690	0.28	0.28	6.9
Feather meal	**85.**0	3016	0.20	0.75	1.7

Self-Check -3	**Written Test**

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

1. Mention at least 5 animal protein source and plant protein source.

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

2. _____
_____
_____

4.1. Rations for Growing Chickens

A. Starter - Rations:

Young chicks require a diet rich in protein and certain vitamins, with a carefully balanced mineral content. Two pounds of chick starter dry mash will feed one chick up to about six weeks of age. After that, in the case of the birds to be reared to maturity, a cheaper ration with increasing amounts of whole grain may be used. Birds to be killed as broilers, however, should be kept on a more concentrated diet to promote the rapid growth essential to profit in broiler raising.

While one may mix chick starter at home, the simplest plan is to purchase 200 pounds of commercial chick starter mash for each 100 chicks. Choose a brand that is flaky or mealy, avoiding the less palatable finely ground mixtures that tend to paste inside the chick's mouth. The dry mash should be stored in a cool dry place and fed fresh daily

B. Rations for Laying Hens

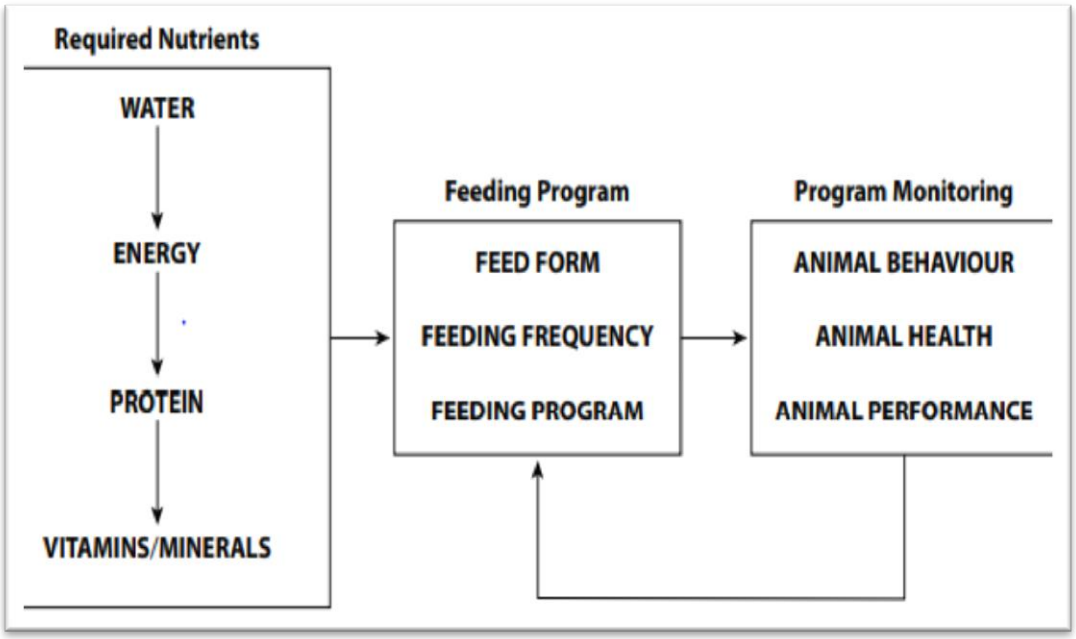
Egg production, to be profitable, must continue at a reasonably high level through most of the year. Hens turned loose to forage in the spring and only grain fed, soon lay themselves thin, cease laying, and molt and spend the summer and fall growing new feathers; moreover any eggs they lay are likely to be of "barnyard" quality and low grade.

Laying hens require some form of protein supplement in addition to grain and chop. Similarly they need more vitamin and mineral materials than grains contain. A farm supplied with wheat and coarse grains, well-cured alfalfa or clover hay, and plenty of skim milk, provides practically everything required in the laying diet.

Some form of Vitamin D supplement is needed for indoor conditions. Hens aren't likely to drink enough milk in cold weather to supply their protein requirement; this may be met by the use of laying concentrates or balancers, meat meal, fish meal, cooked meat or fish, etc. In any case the flock should have an ample daily feeding of alfalfa or clover leaves, or else limited pasture. Laying hens require a constant supply of oyster shells or limestone grit; also bone meal in a separate hopper when milk is used as the main protein supplement. Provide fresh clean drinking water at all times, or as soon as the daily amount of milk is consumed.

4.2. Feed formulation principle :-For all animals, diets are formulated using the following general sequence:

1. Water: Water is the most important essential nutrient but is often neglected. Suboptimal animal performance will occur if clean, fresh, cool water is not provided.
2. Energy: Energy is the primary limiting nutrient for all metabolic processes. Providing feedstuffs that meet the energy needs of the animal also supplies a large portion of the amino acids, vitamins, minerals and lipids. Any deficits in these can then be remedied.
3. Protein: Protein, or more correctly, amino acids, are considered next because the supply of essential amino acids can limit the utilisation of energy for maintenance and production.



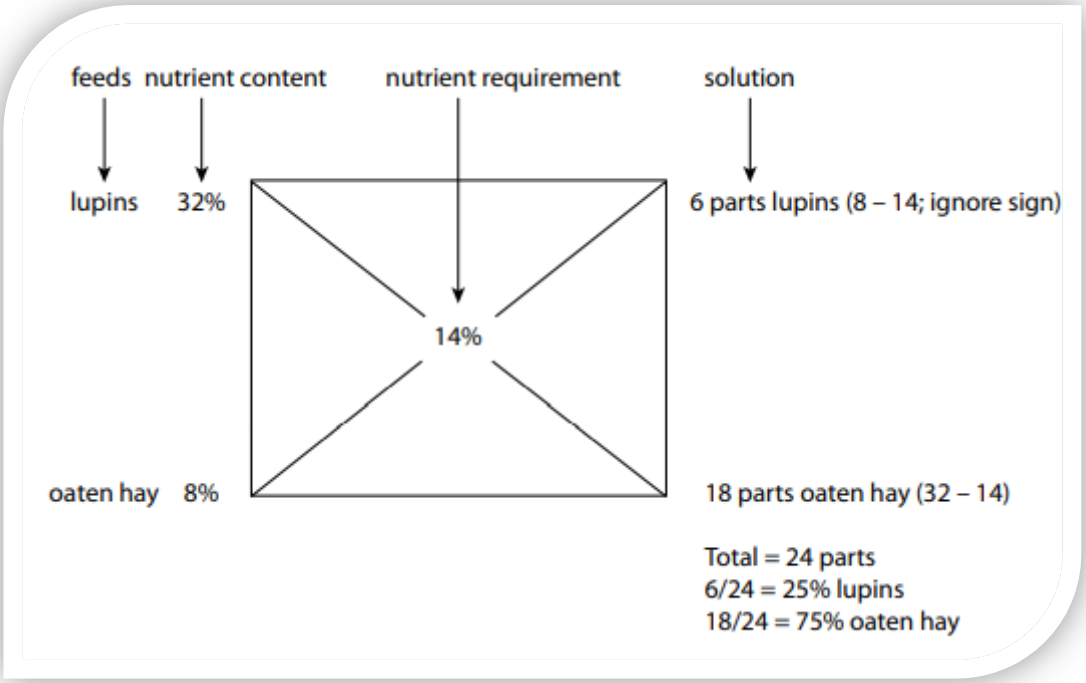
.Iterative steps involved in developing a feeding program for animals: establish the nutrient requirements, develop a feeding program, monitor the performance of the animals and revise the program.

4. Vitamins and minerals: Once the energy and protein requirements have been met, the next consideration is the supply of vitamins and minerals to meet the animal's requirement. Both dietary and microbial vitamin supplies must be considered.
5. Feeding program: The physical nature of the diet and the program of feeding must now be considered to ensure the diet is palatable, conducive to gut health and function (particularly microbial) and enriches the animal's daily life.
6. Evaluation of the feeding program: Frequent iterative assessment of the program and diet should be carried out using a combination of bodyweight measurement, body condition scoring, health assessments and production parameters to allow fine-tuning of the program.

The person square's :The simple way of makink simple ration.

A simple means of formulating diets made up of only two ingredients, or simple mixes of feeds, is to use a Pearson's Square. The method involves the following steps:

1. Place the nutrient requirement in the box (this approach can be used for all nutrients – protein, energy, minerals, vitamins).
2. Place the two feeds available and their respective nutrient content on the lefthand side (Note: the requirement must lie between the two values for the feeds).
3. Subtract the values along the diagonals (Note: ignore sign).
4. Sum the two values and divide the two values by the sum to determine the proportion of each feed to be fed



Pearson's Square for formulating simple diets from two ingredients or two mixes of feeds. In this case, the animal's crude protein requirement is 14% and the two feeds available contain 32% CP (lupins) and 8% CP (oaten hay).

Ration formulation for starter, grower and layer

Ingredient	Starter (%)	Grower (%)	Layer (%)
Maize	45.9	52.9	50.4
Wheat bran	7.5	7.5	7.5
Dried and grounded trifolium	2	2	2
Grounded bone and meat	4	4	4
Noug seed cake	37	30	30
Limestone	1	1	4.5
Grounded bone	2	2	1
Salt	0.35	0.35	0.35
Vitamin & mineral mix	0.25	0.25	0.25

Chicken ration formulated by feed win software using different ingredients			
Noug seed cake	10	10	10
Maize	45	60	55
Wheat bran	10	10	10
brewery dried grain	3	5	5
Soya bean meal	12	3	8
Salt	0.5	0.5	0.5
Alfalfa	3	0.5	1
Limestone	1.5	2	3.5
Sesame cake	15	9	7

Self-Check -4	**Written Test**

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

1. Which of the following is Nutrient requirement of poultry? (5pts)

A) The quantity of protein /essential amino acid

B) Additive & salt

C) Mineral supplement D) all

2. Which of the following factors is considered during formulation of balance ration (5pts) A) Type of production B) Feed cost C) Body Size D) all

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

Answer Sheet

Score = _____

Rating: _____

1. Discuss the metod of ration formulation?
2. Mention the principle of ration formulation

Note: **Satisfactory rating - 10 points** **Unsatisfactory 10below 6 points**

Information sheet -5 Prepare and provide feed and water

5.1. Feeding

- Complete feeds from the local feed store are a good option for small flock owners.
- Farms that have good mixing facilities for other livestock can use local grains mixed with the proper commercial concentrate.
- Follow the directions provided by your local feed supplier.
- A starter mash is generally fed for the first 6 to 8 weeks.
- Place the feed on chick box lids or trays for the first few days.
- Make sure the chicks have water as soon as they arrive.
- Provide 1 linear inch of feeder space per chick at the hoppers at first.
- You can increase the space to 2 inches once the chicks are 2 weeks old.
- After 8 weeks of age, pullets are then given a grower or developer mash.
- You can then increase the feeder space to 3 to 4 inches per growing pullet.
- Once the pullets start laying (about 20 weeks of age) you can start the birds on a laying mash.
- A hanging tube-type feeder 15 inches in diameter will feed about 30 birds.
- The birds will waste less feed if you fill the hoppers half full and adjust the feeder height or size to meet the birds' size.
- You should have at least three sizes of hoppers to use for growing birds.
- A yard or range can supplement pullet diets with green feed.
- Make sure chicks or pullets have chick- or pullet- sized grit available at the appropriate age.
- Try to keep your growing pullets within body-weight guidelines provided by the breeder.

5.2. Water

- Provide a one-gallon water fountain per 50 chicks during the first 2 weeks.
- Increase the number or size of waterers from 2 to 10 weeks to provide 40 inches of watering space per 100 birds or 1 gallon capacity per 10 birds if using fountains.
- Use a platform under waterers to avoid wet litter.
- Automatic waterers can save you labor, even with small flocks.
- Make sure chicks and pullets always have access to fresh, clean water.

Keeping the birds healthy

a.Isolate your birds

• Separate your birds from other flocks, pets and wildlife.

• Limit visitors from entering your poultry house and yard.

• Keep your flock's area free of rodents.

• Use screens to keep wild birds out of the poultry house.

b.Control parasites

• Rotate yard and range areas so that birds aren't on the same ground each year.

• Routinely clean your flock's housing area.

• Use a low-level coccidiostat drug in the feed during the brooding and growing period.

• Occasionally check birds for lice and mites.

c.Have a vaccination program

- Obtain chicks or pullets that are from Pullorum-typhoid clean stock.
- Use a vaccination program for Newcastle disease and bronchitis, especially if there are other poultry flocks in the area.
- Have chicks vaccinated at the hatchery for Marek's disease.

d. Routinely clean the house

- Clean waterers daily and periodically wash them with a sanitizing solution.
- Keep litter in good condition and remove caked and wet spots.
- Add fresh litter as needed.
- Provide good ventilation to keep out moisture and prevent ammonia build-up in the house.

e. Preventing cannibalism

Cannibalism often occurs in growing and laying flocks and is hard to control once it starts. The following factors can play a role in cannibalism.

- Crowding
- Nutrient deficiencies
- Poor ventilation
- Too little drinking or eating space
- Too much light
- Idleness
- The appearance of blood on injured birds

Proper care can often control most of these factors. You can use a pick-paste remedy in small flocks if the problem hasn't gotten out of hand. Beak trimming provides a permanent solution. Many hatcheries will beak-trim chicks at one day-of-age, if you request. Birds can be beak- trimmed at any age if done properly, but it should be avoided at times of stress or when pullets are coming into production.

Self-Check -5	Written Test

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

1. Discuss the *Factors affecting the couse of cannibalism in poultry.*

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

_____

_____

_____

Information sheet -6 Carry out chicks rearing activities

6.1. Brooding . The first two weeks of life,Chick survival is dependent on how quickly they adjust to the farm and this is the most important time for the flock, growers need to spend more time with their birds .

Mistakes made during brooding may be irreversible and negatively impact performance for the life of the flock

6.1.1. Basics of Brooding

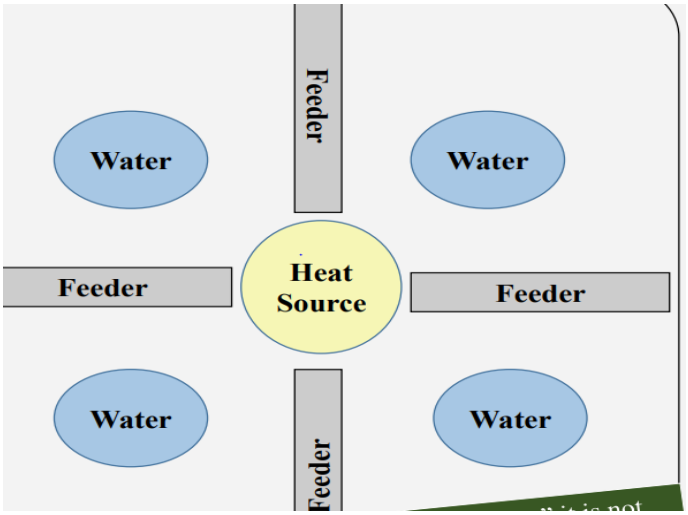
1. Pre-Placement
2. Temperature Management (Heat)
3. Feed Management
4. Water Management
5. Light Management
6. Air Quality/Ventilation

1. Pre-Placement means having every thing ready for the birds when they arrive.

✓ Barn is clean and warm

- ✓ Heater are running
- ✓ Feed and water are ready and placed in the barn

Example of how to place feed and water (the important part is to have lots of feed and water)



6.2. Heat. A quality heat source is necessary in order to keep the chicks warm

- Under a canopy or hover - keeps the heat down close to the chicks Use what you have available
- Electric, oil, carbon, and gas brooders are the most common types
- Radiation from an infrared lamp warms only the objects to which it is directed; it does not warm the air

CHICKE AGE	TEMPERATURE
1st day	32 -34°C
WEEK 1	30°C
WEEK 2	26°C
WEEK 3	22°C
WEEK 4	20°C
WEEK 5	18°C
WEEK 6	16°C

6.3. Feed and Water

When placing chicks in the barn put them on the feed (making it easy for them to find it

- Place paper on the floor, cover with feed, then place birds on that
- Remove paper after a couple of days
- For the first week, fill the feeders full
- Second week ¾ full and no more than half full thereafter
- Keeps birds from wasting feed
- Ideally, multiple feeders in each pen is best
- You don't want them to have to look for feed
- Watch birds eat and make sure all of them have access to feed

Self-Check -6	Written Test

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

- Why heat is important for chick?
- Mention over all activity required for chick.

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

3. _____
_____
_____

7.1 Cleaning and Disinfecting Poultry House:

In order to reduce SE and other health risks, a complete dry cleaning, washing and disinfection of the poultry house after each flock or at minimum once each year is recommended. Successful cleaning is hard work and requires systematic completion of several sequential steps. Every step isimportant.

Dry Cleaning Sweep or blow dust and other loose dirt off ceilings, light fixtures, walls, cages or nest boxes, fans, air inlets etc. onto the floor. Remove all feed from feeders. Scrape manure and accumulated dust and dirt from perches and roosts. Remove all litter from the floor.

Wet Cleaning: *Turn the power off to the building prior to using any water for cleaning*. Wet cleaning is done in three steps: soaking, washing and rinsing. Warm or hot water will do a better job getting through organic matter than cold water. You can use a cheap neutral detergent, like dish soap.

Drying; Thoroughly air-dry the building if disinfection cannot immediately follow rinsing. Open all windows and ventilation openings. Use a blower or fan if available. Cleaning on a dry, sunny day helps in the drying process.

Repairs:Make any repairs to the structure prior to the final disinfection step. Seal any rodent entry holes at the outside and inside of the building. Apply a small amount of spray foam insulation into the hole, then pack in fine steel wool and top with more spray foam.

Disinfecting This is a crucial step which the small flock owner might normally overlook. Disinfectants should be applied only after the building and equipment have been thoroughly cleaned, ideally right after rinsing. Disinfectants can be applied by sprays, aerosols or fumigation. Don't be intimidated by the thought of "fumigating" your hen house: for most small flock facilities, using a garden type sprayer is the easiest method, and chances are you already have a suitable disinfectant around the house. The types of disinfectants generally used are phenolic compounds (e.g., Pine-sol, One Stroke, Osyl), iodine or iodophors, (e.g., Betadine and Weladol), chlorine compounds (e.g., Clorox, generic bleach), quaternary ammonium compound (e.g., Roccal D Plus) and oxidizing compounds (e.g., Virkon S, Oxy-Sept 333).

Follow the manufacturer's directions for mixing and dilution of these disinfectants

Self-Check -7	Written Test

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

1. Discuss the *Cleaning and Disinfecting procedure in Poultry House:*

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

_____

_____

_____

Operation Sheet-1 Procedure for monitoring temperature and RH

Equipment

1. Hand held temperature / humidity meter.
2. Manual hygrometers.
3. Electronic temperature and RH sensors, these are linked to the automatic control computer.
4. Mercury minimum and maximum thermometers.

Step 1. Take 1 thermometer and 1 hygrometer and place at the center of the house beside the electronic sensors. Two additional thermometers should be placed half way between the center and the end walls of the house. They should be located where the birds cannot touch them and are not in the direct line of any heat sources. Calibrate the electronic sensors before the birds are placed.

Step 2. 1 manual thermometer and 1 hygrometer must be outside of the house in a shaded area away from direct sunlight to establish climatic conditions.

Step 3. All sensors should be checked at the same time every day as part of the daily routine.

Minimum and maximum readings should be recorded. The manual thermometers should be reset. Hand held temperature and humidity meters can be used to provide instant temperature and humidity measurements. They are a quick and reliable method of providing additional checks inside and outside the house.

.

LAP Test	**Practical Demonstration**

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 1 hour.

Task 1. Check temperature and RH of poultry house.

LG #65	LO #5. PERFORM HATCHERY OPERATIONS

Instruction sheet

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

- Identify types and parts of incubators
- Select, Clean and set eggs in the incubator
- Perform routine incubator management activities.
- Candle of eggs periodically

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

- Identifying types and parts of incubators
- Selecting, Cleaning and setting eggs in the incubator
- Performing routine incubator management activities.
- Candling of eggs periodically

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 “Operation sheets

Information sheet -1 Identify types and parts of incubators

5.1. INTRODUCTION An apparatus in which environmental conditions, such as temperature and humidity, can be controlled, often used for setting and hatching eggs artificially

A.TYPES OF INCUBATORS (PRINCIPLE)

1. Forced air incubator

- These have internal fans to circulate the air.
- Eggs are placed in stacks of trays. The capacity of these incubators is large.
- Most units have automatic equipment for turning the eggs and spray mist nozzles for holding proper humidity levels.

2. Still air incubator

- These are usually small but may hold 100 eggs or more, they do not have fans.
- Air exchange is made by escaping warm, air at the top and entering cool, fresh air near the bottom.
- Air circulation is limited, so only one layer of eggs can be incubated. Incubating temperatures in these machines must be about 2 to 3°F. Above the temperatures in forced-air incubators.

3. Basic incubators

- Still air
- Electronic thermostat controlling 25 watt heating element
- Setter and Hatcher(same)
- Window for observation of hatching process
- 60-80 eggs capacity

3. Advanced Incubators

- Forced Air/Still Air
- Digital automatic temperature and humidity with hourly egg turning
- Fan assisted air circulation
- Large observation window
- 300-500 eggs capacity

5. CABINET INCUBATORS

- This type of incubators have 3-5 turning trays
- Digital dial thermometer and hygrometer
- Large capacity 500-800 eggs(200 hatching capacity)(1000)
- High and low temperature alarms

- Programmable automatic egg turning from 30 to 180 minute intervals
- Clear,glazed observation door-Sturdy Metal frame, energy efficient, insulated cabinet
- covered hatching trays to prevent hatchlings from escaping

6. MULTI SETTING INCUBATORS

- When it comes to multi-stage systems, none of the incubators give as much result as multi setting incubators.
- More hatched livability
- More energy efficiency
- More convenience
- More innovative features

5.2. Essential Components Incubator

There are some basic things that every incubator needs. Here is a list of them along with information about each one.

1. Container

Depending on how many eggs you want to hatch at a time, you may want something small that will hold just 20-30 eggs or a larger, cabinet style unit that will hold several hundred. Determine how many eggs you want to incubate and then decide on the container. The more insulation it has, the less energy it will require to keep it at the correct temperature. You don't want something that will be drafty, but you do need some way for fresh air to come into the container. The developing embryos need oxygen just like you and I do. The shell is poreous and allows carbon dioxide to leave and oxygen to enter. A viewing window is handy for observing the eggs, especially while they hatch.

2. Heater

The size of the container, the amount of insulation it has, and the room temperature will all have an impact on how much energy, measured in Watts, you need for your incubator. Some of the popular table-top incubators (such as Little Giant and Hova-Bator) use a low wattage heating element. The Little Giant uses a 40 watt heater and the Hova-Bator uses a 25 watt heater. The larger Sportsman 1502 cabinet incubator uses a 225 watt heater.

3. Thermostat

Keeping a good temperature is so important for a good hatch. Developing embryos are quite particular about the temperature they need. A good thermostat will help you keep the temperature in the appropriate temperature range. The generally accepted ideal temperature is 99.5 degrees F (37.5 degrees C) for almost all birds. However, there are some exceptions. Emu eggs, for example, require a temperature between 96.5 - 97.5 degrees F.

4. Humidity control

Managing humidity in your incubator is a matter of keeping the appropriate amount of water surface area. As a general rule, the more water surface area, the higher the humidity will be in your incubator. You can use a container to hold water and refill it as needed. Many people find that putting a sponge in the water with part of the sponge above the water level will increase the humidity level. This is particularly helpful during the lock-down period the last 2-3 days of your hatch.

5. Thermometer and hygrometer

A thermometer will measure the temperature and allow you to adjust the thermostat accordingly. A hygrometer will measure the relative humidity. There are analog devices and digital types as well. All measurement devices will have some variability, so testing and calibrating your device is always a good idea.

6. Egg Turner

The egg turner will rotate the eggs gently back and forth to keep the yolk sack from sticking to the shell and providing needed exercise for the developing embryo. This can also be done by hand if you prefer not to spend money on an automatic egg turner.

7. Candler

An egg candler is a modified light that allows you to make the egg glow enough to see if the egg is developing. With a good candler, you can see the baby bird moving and how the air sack is developing. If the egg is not developing, you can remove it to make room for good eggs.

Self Check -1 Answer

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

1. What are the main component and parts of incubator?

Answer Sheet

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information sheet -2 Selecting, Cleaning and setting eggs in the incubator

Selecting, Cleaning and setting eggs in the incubator

A few tips to follow when selecting hatching eggs are:

- Select eggs from breeders that are
  - ✓ Well developed, mature and healthy
  - ✓ compatible with their mates and produce a high percentage of fertile eggs
  - ✓ are not disturbed much during the mating season
  - ✓ fed a complete breeder diet
  - ✓ not directly related [brother, sister, mother, father, etc.].
- Avoid excessively large or small eggs. Large eggs hatch poorly and small eggs produce small chicks.
- Avoid eggs with cracked or thin shells. These eggs have difficulty retaining moisture needed for proper chick development. Penetration of disease organisms increase in cracked eggs.
- Keep only clean eggs for hatching. Do not wash dirty eggs or wipe eggs clean with a damp cloth.

Egg Care and Storage

. Listed below are tips to help maintain hatching egg quality.

1. Collect eggs at least three times daily.
2. Slightly soiled eggs can be used for hatching purposes without causing hatching problems, but dirty eggs should not be saved.
3. Store eggs in a cool-humid storage area. Ideal storage conditions include a 55 degree F. temperature and 75% relative humidity.
4. Alter egg position periodically if not incubating within 4-6 days. Turn the eggs to new position once daily until placing in the incubator.
5. Hatchability holds reasonably well up to seven days, but declines rapidly afterward. Therefore, do not store eggs more than 7 days before incubating.
6. Allow cool eggs to warm slowly to room temperature before placing in the incubator. Abrupt warming from 55 degrees to 100 degrees causes moisture condensation on the egg shell that leads to disease and reduced hatches.

setting eggs

To avoid temperature shock to the embryo and consequent condensation on the shell, eggs should be removed from the egg room and pre-warmed before setting. Ideally, eggs should

be pre-warmed in a purpose-built room at around 75-80 °F (24-27 °C) so that all can achieve the desired temperature.

Effective air circulation and correct room temperature are essential to achieve the necessary even pre-warming of eggs. Uneven pre-warming increases variation in hatch time – precisely the opposite of the desired effect of pre-warming.

Even with good air circulation, it will take 8 hours for eggs on a buggy to reach 78 °F (25 °C), irrespective of their initial temperature. With poor air circulation, it may take twice as long. So the recommendation is to:

- Provide good air circulation around the eggs.
- Allow 6 to 12 hours for pre-warming.

setting time

Three factors influence the total incubation time of eggs:

1. Temperature of incubation: normally fixed for any hatchery, but to achieve a desired pull time for chicks, variation in the time at which eggs are set can be modified according to age and size of eggs.
2. Age of the eggs: stored eggs take longer to incubate. You will need to add extra incubation time if eggs are stored over 6 days. (1hour per day of storage)
3. Size of the eggs: larger eggs take longer to incubate.

Self Check -2 Answer

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

1. why candling of eggs?

Answer Sheet

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information sheet -3 Perform routine incubator management activities

3.1.Thermostat:

Keeping a good temperature is so important for a good hatch. Developing embryos are

quite particular about the temperature they need. A good thermostat will help you keep the temperature in the appropriate temperature range. The generally accepted ideal temperature is 99.5 degrees F (37.5 degrees C) for almost all birds. However, there are some exceptions. Emu eggs, for example, require a temperature between 96.5 - 97.5 degrees F.

3.2.Humidity control:

Managing humidity in your incubator is a matter of keeping the appropriate amount of water surface area. As a general rule, the more water surface area, the higher the humidity will be in your incubator. You can use a container to hold water and refill it as needed. Many people find that putting a sponge in the water with part of the sponge above the water level will increase the humidity level. This is particularly helpful during the lock-down period the last 2-3 days of your hatch.

3.3.Thermometer and hygrome:

A thermometer will measure the temperature and allow you to adjust the thermostat accordingly. A hygrometer will measure the relative humidity. There are analog devices and digital types as well. All measurement devices will have some variability, so testing and calibrating your device is always a good idea.

3.4.Egg Turner:

The egg turner will rotate the eggs gently back and forth to keep the yolk sack from sticking to the shell and providing needed exercise for the developing embryo. This can also be done by hand if you prefer not to spend money on an automatic egg turner.

3.5.Candler:

An egg candler is a modified light that allows you to make the egg glow enough to see if the egg is developing. With a good candler, you can see the baby bird moving and how the air sack is developing. If the egg is not developing, you can remove it to make room for good eggs.

Self-Check -3	Written Test

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

1. What are fundamental incubator operation?

.

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information sheet -4 Candle of eggs periodically

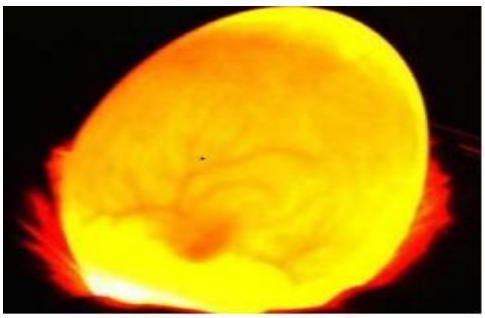
a. Candle

Candling is a method used to observe the growth and development of an embryo inside an egg which uses a bright light source behind the egg to show details through the shell.

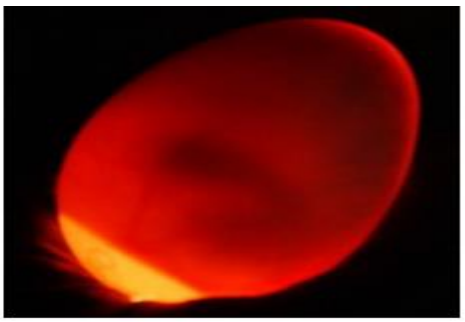
Why candling eggs?

Candling allows you to monitor many things including the egg fertility, embryo development and weight loss rate.

How to candle eggs and what to expect Eggs may be candled after 5 days of incubation and every few days thereafter. The candler should be held right against the shell at the larger end of the egg where the air sac is located. The egg can be rotated to observe blood vessel growth and embryo development. In fertile eggs you will initially see a small spot (the embryo) with a web of blood vessels radiating from it.



Day 5 - developing embryo with healthy blood vessels



Day 10 - growing embryo and healthy spreading vein growth - larger air sac

Day 14 – growing embryo with fully spread vein system - larger air cell

Day 19 – almost fully developed embryo dark mass with larger yet air cell

By day 18 the embryo will take up most of the egg (apart from the air sac) and it will be hard to make out detail even with a good quality candler but you should be able to see movement. Conversely, infertile eggs will remain clear and eggs which have died will show a dark ring.

Self-Check -4	Written Test

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

Why candling is important ?

.

Note: **Satisfactory rating - 2 points** **Unsatisfactory 2below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

LG #66	LO #6. PREVENT AND CONTROL COMMON POULTRY DISEASES

Instruction sheet

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

- Identify common poultry diseases
- Determe and follow routine vaccination program
- Determe farm Bio-security activities

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

- Identifying common poultry diseases
- Determining and following routine vaccination program
- Determining farm Bio-security activities

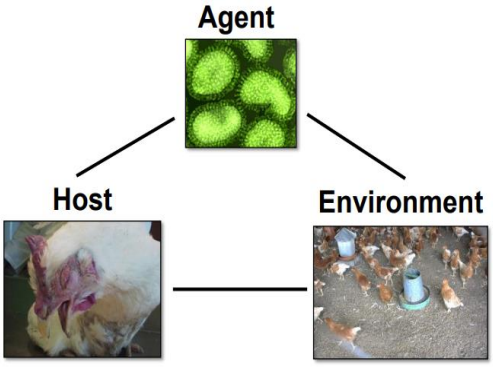
Learning Instructions:

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 “Operation sheets

1.1. Diseasses

What is disease? It is any abnormality which disturb daily movement/activity of an animal by injuring either internal or external part of the body. If an animal's normal activity/movement is disturbed or decreased by injuring all of either the internal or the external part of the body that animal is called diseased/sick animal. Particularly when chicken disease occurs in one area once, it can transmit fast and disturb the production process through death of many chicken which intern cause high economical loss as well as the farm to be closed.

Diseases occur due to the interaction between 3 main factors:



- Not all poultry health and production problems are caused by infectious agents
- Many problems can be traced to management factors

B. Infectious Agents

1. Bacterial: Bacteria cause many diseases, but can usually be treated with antibiotics
2. Viruses: Viruses cause diseases that can not be treated, therefore, prevention is the only way of protecting your birdsVaccines are available to help protect your flock
3. Parasites: Most parasites can be treated with conventional medicine (anthelmintics) as well as traditional remedies
4. Fungus: No good way to treat fungal infections

   Antibiotics may hel

C. Non-infectious Agents

1. Chemical : Birds can come in contact with poisons when farms are not kept clean
   - Poisons used to kill rodents
   - Do not use the chicken barn to store farm chemicals
2. Physical

- Injury to the bird
- Dietary deficiency
- Improper feed formulation or mixing
- Toxins

  – Molds create toxins that the birds can consume in the feed

Management and Environmental Factors

1.Weather

- Temperature
- Humidity
- Wind

2. .Season

3. Geographic location

4. Housing All birds (and feed) need protected from;

- Wind
- Rain
- Direct sunshine (in hot weather)

For best management check for

- Feed quality
- Lighting program
- Air quality and ventilation
- Water quality
- Space requirements
- Sanitation
- Vaccination and medication

Some symptoms of disease are:

- Weakness
- muscular tremors
- drooping wings
- twisting of the
- head and neck, or complete paralysis
- Lameness and tumors
- Swelling around the eyes and in the neck
- Bluish comb and wattles
- Sudden death or an unusual number of birds dying in a flock

Other Symptoms Include

- Loss of production
- Poor appetite
- Huddling
- Depression

- Runting/stunting; poor uniformity
- Ruffled feathers
- Coughing, sneezing, eye-nose
- discharge, difficulty breathing
- Bloody or wet litter
- Increased mortality

WHAT TO LOOK FOR ?

What To Look For Normal

Something is wrong

Some Common Poultry Diseases

1. **Newcastle Disease (Ranikhet)**

Caused by – Paramyxoviridae virus (RNA virus)

Clinical Signs

- Facial swellings
- Red Shanks
- Respiratory Signs
- Nasal/Mouth Discharges
- Eye/Nasal Discharge

- Swollen crusty eyes
- Coughing/gaping, gasping Tracheitis
- Can be zoonotic to humans
- Can cause conjunctivitis

Prevention and Control

- Biosecurity
- Vaccination
- Quarantine of infected premises/areas
- Destruction of infected birds/flocks
- Proper disposal of infected carcasses

✓ Composting

✓ Burial

✓ Incineration

- Cleaning and disinfection

2. Marek's Disease (Range Paralysis)

- Caused by a herpes virus called Alphaherpesvirinae
- Seen only in birds older than 16 weeks of age
- Initially the birds may show paralysis of one or both wings or the paralysis may be in the legs

Less common forms of the disease include

- Enlarged feather follicles that redden and can sometimes lead to brown
- crusty scabs
- Lymphoid tumors in various organs
- The ocular form causes a graying of the eye and or a change in the
- shape of the iris and can result in blindness

Prevention and Control

- Biosecurity
- Vaccination
- Quarantine of infected premises/areas
- Destruction of infected birds/flocks
- Cleaning and disinfection
- Proper disposal of infected carcasses

✓ Composting
✓ Burial
✓ Incineration

3. Mycoplasmosis(Chronic Respiratory Disease)

Caused by Mycoplasma gallisepticum, Secondary E. coli infection is common

Trans mitted through the egg, airborne droplets, or from bird to bird

Signs

- Coughing, sneezing, facial swelling, nasal discharge, cloudy air sacs
- Deformed eggs, drop in egg production
- Pericarditis and perihepatitis (with secondary E. coli infection)

Prevention and Control

- Purchase chicks only from MG-negative sources
- Provide medicated feed (containing Tylan® or Gallimycin®)

✓ Can reduce clinical symptoms but will not completely eliminate MG
✓ Be careful some antibiotics cannot be used for birds raised for meat and eggs

- Even if birds have been treated with antibiotics, they can still spread MG to other birds
- Harvesting (or culling??) meat birds may be better than treating them because treatment can be expensive
- Don’t mix birds of different species and age

4. Infectious Bursal Disease (Gumboro)

Caused by Birnavirus

Affects young birds, not older ones

Adults are immune compromised

Virus is very resistant, persisting for months in barns

Insects can harbor the virus for up to 2 months

Signs and Lesions

- Depression
- Diarrhea
- Vent picking
- Unsteady gait
- Swollen bursa
- Necrotic bursa
- Bursal atrophy
  There is no treatment
- Vaccination programs are used to prevent
- Needs to be for the strain youhave
- Need good biosecurity

prevention and Control

Dry pox

Cutaneous lesions on the feather-lessskin
Some are ulcerated

Wet pox

- Skin lesions and/or plaques in mouth, pharynx, larynx, and sometimes the trach

Prevention and Control

- There is no treatment
- Vaccination programs are used to prevent
- Wing web
- Controlling mosquitos
- Need good biosecurity – Sanitation

5. Fowl Pox

Caused by Avipox virus
There are two forms

6. Internal Parasites

1. Roundworms (Ascarids)
2. Hairworms (Capillaria)
3. Cecal worms (Heterakis)
4. Tapeworms (Cestodes**)**

Signs and Lesions. Unthriftiness, stunted growth, emaciation, enteritis, anemia and decreased egg production

Prevention and Control

- Rotate birds in yards or pens
- Deworm flocks regularly, particularly those raised on the ground or in floor pens
- Provide medicated feed (containing broad-spectrum dewormer)
- Treat infected birds with the proper dewormer
- Piperazine is effective only against roundworms and cecal worms
- Fenbendazole is effective against roundworms, cecal worms, and

Hairworm

Coccidiosis

Caused by Eimeria sp.

9 species in chickens

The main problem in broilers are caused by:

- acervulina
- maxima
- tenella

7 species in turkeys

Transmitted through infected droppings (containing oocysts)

Intestinal coccidiosis (caused by E. acervulina, brunetti, maxima, and necatrix)

- Loss of weight
- Shriveled combs
- Drop in egg prod.
- Pale shanks

Cecal coccidiosis (caused mainly by E. tenella in chickens)

- High mortality
- Bloody feces
- Pale combs

- Ruffled feathers
- Lack of appetite
- Coagulated blood in ceca

Prevention and Control

- Good management
- Provide medicated feed (with coccidiostats)
- Treat infected flocks promptly

There are two types of medications used, coccidiostatic and coccidiocidal

1. Coccidiostatic medications stop the development of coccidia in the middle of the lifecycle
2. Coccidiocidal medications kill the coccidian

These medications are usually used in the feed.

A coccidia vaccine is available commercially in some parts of the world and can be given to chicks at one day of age

Other Diseases

Fowl cholera (pasteurellosis)

Caused by the bacterium Pasteurella multocida

Can affect birds of all ages

Symptoms

Diarrhea, respiratory symptoms, loss of appetite, blue combs and wattles

- No treatment
- Vaccine is usually available

Infectious coryza

Caused by the bacterium Haemophilus paragallinarum

Seen in all ages of birds

Symptoms:

Runny nose, swellings under the eyes, closed eyes, drop in egg production

- Treatment with antibiotics
- Prevent by biosecurity

External Parasites

Mites

1. Scaly leg mite (Knemidocoptes mutans)
2. Chicken mite (Dermanyssus gallinae)
3. Northern fowl mite (Ornithonyssus sylviarum)

Signs and Lesions

Scaly leg mite: scales and crusts in legs, combs, and wattles

Stay-Fast Fleas, fleas attach around the eyes and on the comb and wattles

Poultry ticks, when present, can be found hiding in debris or cracks in the chicken barn

Northern fowl mite: blackened feathers, scabby skin around vent

Prevention and Contro

Mites, Ticks and Fleas

- Monitor all birds and facilities for infestation; check egg flats and cases for mites
- Treat birds with approved insecticide (e.g. permethrin)
- Sulfur powder and wood ashes can also be used
- Fill any cracks or crevices in the chicken barn to eliminate hiding places for parasites

Self-Check -1	Written Test

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

Mention at least 5 common disease of:

1. *Bacteria*
2. *Virus*
3. *Parasite*
4. *Protozoa*

.

Note: **Satisfactory rating - 8 points** **Unsatisfactory 8 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information sheet -2 Determine and following routine vaccination program

6.2. vaccine . Vaccines are used to protect birds from diseases, usually viral diseases

Vaccines are used to prevent:

- Newcastle disease
- Marek's
- Gumboro (Ranikhet)
- Fowl Pox
- Fowl cholera

Methods of Vaccinations

1. Eye drops
2. Injections – under the skin (subcutaneous) and in the muscle
3. Skin piercing
4. Orally (in feed or wate)

Vaccine Basics 1

1. All vaccines should be stored in a refrigerator before use
2. Some vaccines are so-called heat stable, which means that the vaccine can tolerate high temperatures (However, heat stable vaccines should also be stored in a cold place to keep them viable)
3. Always keep vaccines out of direct sunlight.
4. When using vaccines in the field, you should transport them in a cool box with ice
5. Do not use any chemical disinfectants to clean syringes, needles or other equipment used for vaccination, as these may destroy the vaccine (instead use boiling water and let cool before using
6. The vaccines must be mixed or diluted in cold distilled water
7. Make sure any water used for vaccination is free of chlorine
8. It is best to vaccinate birds during the cool hours of the day, either in the morning or evening
9. Some mixed vaccines should be used within a short time frame, otherwise they will be useless and should be thrown away (check instructions for how long vaccine is viable after mixing)
10. Always read and follow the manufactures instructions
11. Don't vaccinate sick birds, wait until they are health

Vaccination

Prevention vaccination: it is provision of vaccine for chickens before the occurrence of the disease which helps them to prevent the disease.

Control vaccination: it is provision of vaccine when there is disease outbreak to prevent expansion of the disease. The diseased chicken will be separated from the healthy chickens and the healthy chickens will be given control vaccination which helps to control the disease

NCD vaccine vaccination program				
No	**Steps**	**Age**	**Vaccine type**	**Vaccination method**
1	1st vaccination	1-7 days	HB1	Eye/nose drop
2	2nd vaccination	18-21 days	Thermostable	Drinking/eye drop
3	3nd vaccination	2 months	Thermostable	Drinking/eye drop
4	4nd vaccination	5-6 months	Thermostable	Drinking/eye drop
5	Every 3 months	Different	Thermostable	Drinking/eye drop

Vaccination program for layers		
Age (days)	**Disease type**	**Vaccination provision**
9-14	Newcastle	Drinking water/eye drop
14	Gumboro	Drinking water/eye drop
28	Gumboro	Drinking water/eye drop
Age (week)	Disease type	Vaccination provision
4	Newcastle	Drinking water/eye drop
8	Fowl pox	Injection on feather
13-14	Newcastle	Drinking water/eye drop
16	Newcastle	Injection under feather

Self-Check -2	Written Test

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

1. Why vaccinate and what what vaccination method required?

Note: **Satisfactory rating - 6 points** **Unsatisfactory 6 below 6 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1.1. Basic Concepts of Biosecurity at the Farm Level

Biosecurity has three main components namely isolation, traffic control and sanitation.

1. **Isolation-** Refers to

- The confinement of animals within a controlled environment.
- A fence keeps the birds in, but it also keeps other animals out.
- Isolation also applies to the practice of separating birds by age group.
- In large poultry operations, all-in/all-out management system allow simultaneous depopulation of facilities between flocks and allow time for periodic clean-up and disinfection to break the cycle of disease.
- Separates birds that are sick with a contagious disease from animals that are not sick.
- Separates new birds that are being introduced to a flock

2. **Traffic Control-** prevent the spread of disease

1. Properly quarantine any new birds that you are introducing to your flock for at least 4 weeks.
2. When you or your visitors are present near your flock, they should always wear clean footwear.
3. Do not share yard equipment with other keepers of livestock or chickens.
4. Change and launder your clothing after handling chickens.
5. Wash your hands with soap and water after spending time with the flock.
6. Thoroughly clean out transportation cages, brooders, incubators, and hospital cages after use with a 10% bleach solution.
7. Properly disposed of dead birds. One technique is burying them deeply in the ground-at least a few feet deep.
8. Properly manage your chicken manure.
9. Keep wild birds away from your flock.

3. **Sanitation-**CLEAN HOME, HEALTHY FLOCK

1. Keep the chicken coop clean, dry and draft free.
2. The chicken run should be clean, tidy and puddle free with good drainage in storms.
3. Deep clean the coop and disinfect it at least annually. A few times per year is best.
4. Clean and disinfect the feeders and waterers regularly.

5. Feed your flock with chickens feed that is mold free and has not spoiled.
6. Fresh water should be provided daily.
7. Deal with rodent issues, like mice and rats, promptly.
8. Store all chicken feed in a lidded bin or container

4. **Quarantine**- Restricts the movement of birds to prevent potential spread of disease
Purpose of isolate/quarantine new birds

- Prevent the spread of disease between new birds and current flock
- Birds can harbor and transmit disease while appearing healthy
- Birds that appear healthy when leaving a location may pick up infectious disease
- Isolation gives owners and veterinarians time to observe new birds for signs of disease
- Newly added birds have time to recover and acclimate to a new environment after movement

Time of isolate/quarantine

- Immediately upon arrival of any bird from another location (off-site)
- Prevent movement of birds on/off property during an outbreak of Newcastle disease, avian influenza, or other contagious diseases

Step 1: Set up an isolation/quarantine area

✓ Set up a separate quarantine area more than 10 meters (approx. 33 feet) from other birds
✓ Only use equipment designated for this area (e.g. water dishes, food, cleaning equipment, cages)
✓ Set up disinfectant stations; change clothes and shoes before entry and exit from the area (see Cleaning and Disinfecting handout)

Step 2: Bird care

✓ Have all birds enter and leave quarantine at the same time
✓ Examine quarantined birds and feces for signs of disease on a daily basis
✓ Keep a daily log of birds and note down if any unusual symptoms are seen
✓ Make sure to visit these birds as a last step after caring for other birds that are not in your designated quarantine area
✓ Acclimate birds to your bird management routine (e.g. vaccination, feeding, etc.)

Step 3: Length of time in isolation/quarantine area

✓ 30 days free of illness
✓ 90 days if birds come from different sources
✓ Thoroughly clean and disinfect the area after birds are removed

Self-Check -3	**Written Test**

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

1. What are the benefits of biosecurity? (1pt)
2. What is the difference between isolation and quarantine? (2pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Operation Sheet- 1 Procedure of carry out post mortem.

Step 1. For post mortem examination on the farm utilize a stable flat surface set at a suitable height in a well-lit but shaded position. Have a basic instrument set to hand (scissors, plane forceps, shears) with water, soap and disinfectant to clean up afterwards and disposal bags for the carcass material.

Examine birds externally for evidence of trauma, soiling of feathers, vent damage, skin lesions, eye lesions, external parasites, foot pad lesions and joint swelling.
Examine the oral cavity and conjunctiva and apply pressure to the infraorbital sinus for evidence of nasal discharge.
Step 2. Place the bird on its back with the head away from you. Incise the skin at the thigh-body wall junction, dislocate the coxo-femoral joints (the bird will now lie flat on its back).and make a small incision through the skin between the caudal end of the breast bone and the cloaca. Pull the breast skin away from you towards the neck and examine the subcutaneous tissue and breast musculature
Step 3. Push strong scissors/shears through the incision and incise the right side (bird's left) coelomic (abdominal) wall, thoracic cage and coracoid bone. Repeat on the bird's right side. Reflect the breast to your left or remove completely taking care not to damage the underlying terminal trachea/tracheal bifurcation The liver, lungs, heart, trachea and airsacs can now be viewed

Step. 4. A longitudinal section of the trachea from the syrinx (tracheal bifurcation) to the larynx will allow careful examination of the mucosa - with collection of samples by swabbing (for bacterial culture or for PCR) to evaluate for important respiratory pathogens such as avian influenza, Newcastle disease, infectious bronchitis virus, infectious laryngotracheitis virus, Turkey rhinotracheitis virus, *Mycoplasma gallisepticum*, *Avibacteriumparagallinarum*
Step. 5. Carefully undermine and remove the bird's left and right liver lobes and gall bladder . Rupture of the gallbladder results in release of bile into the coelomic cavity and bile has potent antibacterial properties which can significantly interfere with bacterial culture results.
The underlying spleen is now visible . Heart is removed and examined.
Step .6. The GIT is excised between the oesophagus and the proventriculus and gently pulled towards you. Excision of the doudenohepatic ligament may be necessary.
The GIT is gently extended and laid out on the left of the bird for further detailed examination
Helminths (roundworms) and (tapeworms) may be found especially in the proximal part of the small intestine (from gizzard to first 30 cm or so of the intestine). Caecal worms may be seen in the caeca.
The whole intestine (including caecae) should be opened and the mucosal wall examined for any evidence of coccidia.
Step. 7. Examination of the thoracic and abdominal air sacs and kidneys (see annotated image below) is now possible
Step. 8. Examine the development and condition of the oviduct, ovary, ovarian follicles or testes with respect to age of the bird

Step. 9. The proventriculus, gizzard and intestine are now opened for examination of their internal surfaces. Closely examine the mucosal surface of the proventriculus for evidence of linear hemorrhages (Newcastle disease, avian influenza, infectious bursal disease) at the junction of the oesophagus and proventriculus plus proventriculus and gizzard – stars Examine the surface of the gizzard for both colour and the presence of erosions

Step. 10. The crop and oesophagus are opened for examination of their mucosal surfaces

Step. 11. Remove the head at the atlanto-occipital joint, peel the skin towards the beak to expose the skull

Incise the skull from the occipital foramen forward in two tangential cuts to both orbits where the incisions join.

Remove the excised cranium to expose the brain.

Gently undermine the brain from the anterior region levering gently upwards and place whole brain into a formalin bottle

LAP Test	**Practical Demonstration**

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2hrs .

Task 1. Carry out manual cervical dislocation

Task 2. Cary out post mortem examination

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