JENN

Training and Consultancy

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SUBJECT: AGRICULTURAL SCIENCES
GRADE 12

AUTUMN CLASSES

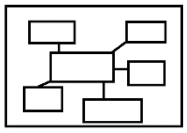
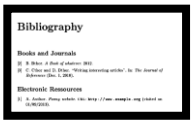
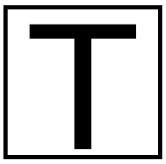
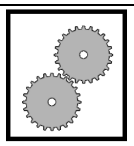
TEACHER AND LEARNER CONTENT MANUAL

Topic

Animal Nutrition

Animal Production

ICON DESCRIPTION

 MIND MAP	 EXAMINATION GUIDELINE	 CONTENTS	 ACTIVITIES
 BIBLIOGRAPHY	 TERMINOLOGY	 WORKED EXAMPLES	 STEPS

CONTENTS **PAGE**

SECTION A ANIMAL NUTRITION

DIGESTIBILITY AND QUALITY OF FEED
EXAMINATION GUIDELINE AND OUTCOME
Digestibility of feeds
• Define the digestibility and digestibility coefficient of feeds
• Understand the different steps in the calculation of digestibility coefficient, interpretation and implication of calculated values
Energy value of feed
• Name the units in which energy value is expressed
• Define and outline gross energy, metabolic energy, digestible and net energy
• Describe the purpose/aims of calculating energy value of the feed
• Identify and draw a schematic representation of feed energy flow
• Use formulae to calculate the feed energy flow and interpret the results
Nutritive ratio
• Define the concept of nutritive ratio (NR)
• Describe the purpose/aims of the nutritive ratio in animal feeding
• Use different formulae to calculate and interpret the nutritive value of a feed
Pearson square
• A brief overview of the Pearson square method (feed formulation)
• Calculate and draw the feed requirements using a single Pearson square method
• Interpret the Pearson square results for feed mixtures
• Conversion of the feed ratios into kilograms and percentages

IMPORTANT TERMS AND DEFITIONS	T
Digestibility refers to the proportion of a feed or nutrient that can be broken down and absorbed by the digestive system.	Digestibility
Biological Value is a measure of the proportion of absorbed protein from a food that becomes incorporated into the proteins of the organism's body	Biological Value
The Essential Amino Acid Index evaluates the quality of a protein based on its content of essential amino acids relative to a reference protein	Essential amino acid index
Combination of heat and potential energ	Gross energy (GE)
Energy available for maintenance, production, or growth	Net energy (NE)
The indicator of the protein content of a feed	Nutritive ratio

DIGESTIBILITY AND DIGESTIBLE COEFFICIENT OF FEED

The digestibility of a feed refers to the proportion of the feed's nutrients that can be broken down and absorbed by an animal's digestive system.

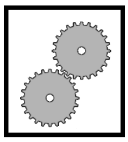
Digestibility Coefficient

The digestible coefficient (or coefficient of digestibility) is a numerical representation of digestibility of a feed and expressed as a percentage of dry material. It quantifies the portion of each nutrient in the feed that is **digested and absorbed** versus what is **excreted** by an animal.

Formula:

$$\textbf{DC} = \frac{\textbf{Dry material intake(kg)- Dry material excreted(kg) X 100}}{\textbf{Dry material intake(kg)}}$$

A result of less than 60 % indicates a roughage/less digestible feed, while
A higher percentage of 60% and above means more nutrients were absorbed.



A cow eats 30 kg of concentrate with a moisture content of 10% and 16 kg material is excreted in the manure with a moisture content of 35%.

Use an appropriate formula to calculate the digestibility coefficient of this feed.
Show
ALL your calculations.

STEP 1: Change the value of feed and manure to dry value

Feed intake	Feed excreted(manure)
30kg × 10% = 3 kg (moisture) 30kg — 3kg (moisture) = 27kg (DM)	16kg × 35% = 5.6kg (moisture) 16kg — 5.6kg (moisture) = 10.4kg(DM)

Note: If the feed consumed and excreted does not contain moisture content, you exclude step 1 and go straight to step 2 with dry matter content provided

STEP 2: Use the formula to determine the coefficient of digestibility.

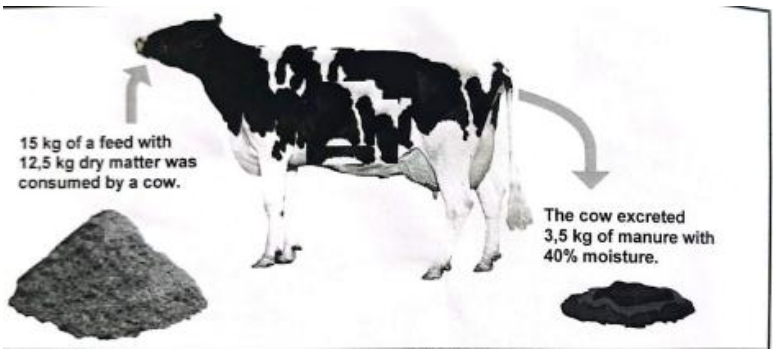
$$DC = \frac{\text{Dry material intake(kg) – dry mass of manure excreted (kg)} \times 100}{\text{Dry material intake (kg)}}$$

$$= \frac{(27kg - 10.4kg) \times 100}{27kg}$$

$$= 61.48\%$$

Activity 1

The diagram below shows the digestibility of a feed in a dairy cow



1.1.1 Calculate the dry matter of the feed that is absorbed by the animal (3)

1.1.2 State ONE animal factor that might have influenced the digestibility of the feed above (1)

1.2. In a feed digestibility trial, two ruminant animals were each given 12 kg of dry feed. The dry mass of the manure was determined. The results are shown below.

	ANIMAL A	ANIMAL B
Dry mass of manure (kg)	2	7
Digestible co-efficient (%)	83	?

1.2.1 Calculate the digestibility coefficient of Feed B including the formula (4)

1.2.2 Deduce TWO plant related factors that might have influenced the digestibility of feed given to ANIMAL A and ANIMAL B. (2)

1.2.3 Name TWO methods by which to increase the digestibility of the feed (2)

1.3 Calculate the dry matter content of a feed in kg if an animal ingested 25 kg of a feed containing 15% moisture. Show ALL calculations. (2)

2 ENERGY VALUE OF FEEDS

Units of energy value

Energy contained in feed is expressed in joules (J). To understand the flow of energy from feed through the animal body you need to understand some terminology

Gross /Potential energy (GE) is the total amount of chemical energy contained in feed. The gross energy of food is not the total amount of energy available to the animal because energy can be lost in various ways.

Digestible energy (DE) is the energy available after subtracting the energy lost in the faeces from the gross energy contained in the feed.

Metabolic (or metabolisable) energy (ME) is the energy available in feed after the energy lost in the excretion of urine and methane gas production has been subtracted from the digestible energy.

The nett energy (NE) is the quantity of energy that remains after the energy lost in the form of heat has been subtracted from the ME. It is the proportion of energy from the feed that is available for the animal for the following purpose:

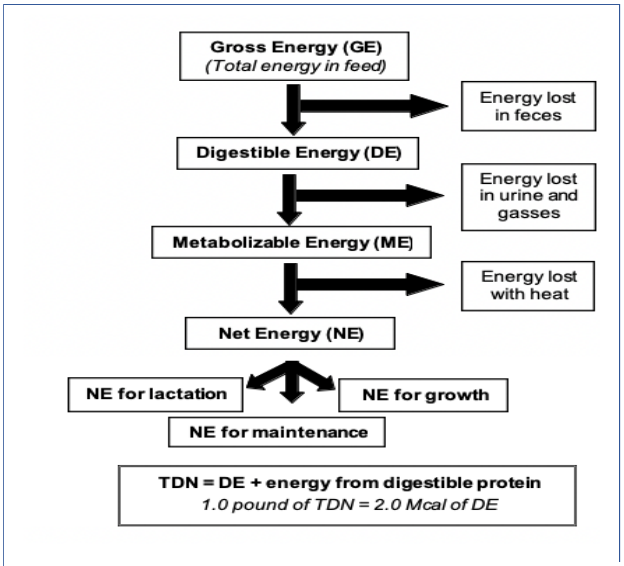
- Production (egg, meat, milk)
- Maintenance/work
- Reproduction

ME = GE- energy lost in faeces, urine, and gas from gross energy

Reasons for calculating the energy value of feeds

- To determine feeding standards
- For ration formulation
- To determine animal's diet

Schematic representation of energy in feeds



Note:

DE = GE – Energy in faeces

ME = DE – Energy in urine and methane gases

NE = ME –Heat energy lost

Activity 2

2.1 A lactating dairy cow was fed 30kg of fish meal with a gross energy value (GE) value of Mj/kg of dry atter. The following energy losses occurred in the dry matter consumed

35% in the fees
5% in the urine
5% in the fermentation gases
10% in body heat

2.1.1 Calculate the digestible energy value of fish meals consumed by the cow. Show all calculations, including the formula. (4)

2.1.2 Name the energy that remains after all energy loses from gross energy (1)

2.1.3 A cow consumes 20 kg of dry matter (DM) feed with a gross energy (GE) of 19 MJ/kg. The total energy lost in the faeces is 133 MJ/day. Calculate the Digestible Energy (DE) per kg of DM.

3 NUTRITIVE RATIO (NR)

A measure in animal science that defines the ratio of digestible protein (DP) to digestible non-nitrogenous nutrients (carbohydrates and fats) in a feed ration. It is expressed as 1:x (where 1 is DP and x is the **energy portion), indicating whether a feed is high in protein or energy.**

$$\text{NR} = 1: \frac{\%\ \text{total digestible nutrient (TDN)} - \%\ \text{digestible protein (DP)}}{\%\ \text{digestible protein (DP)}}$$

OR

$$\text{NR} = 1: \frac{\%\ \text{digestible non-nitrogenous substances (DNNS)}}{\%\ \text{digestible protein (DP)}}$$

Interpretation of NR values

- Narrow Ratio (1:1 to 1:6): Indicates a high protein content relative to energy, ideal for young, growing animals, or milk production.
- Wide Ratio (1:6 or wider, e.g., 1:10): Indicates a lower protein content but high energy/carbohydrates, suitable for fattening adult animals or maintenance

Activity 3

3.1 A feed has total digestible nutrients (TDN) 0f 89% and digestible protein (DP) 0f 15**%. The formula for calculating the nutritive ratio is:**

Nutritive ratio = 1: % digestible non-nitrogenous substances (DNNS)

% digestible protein (DP)

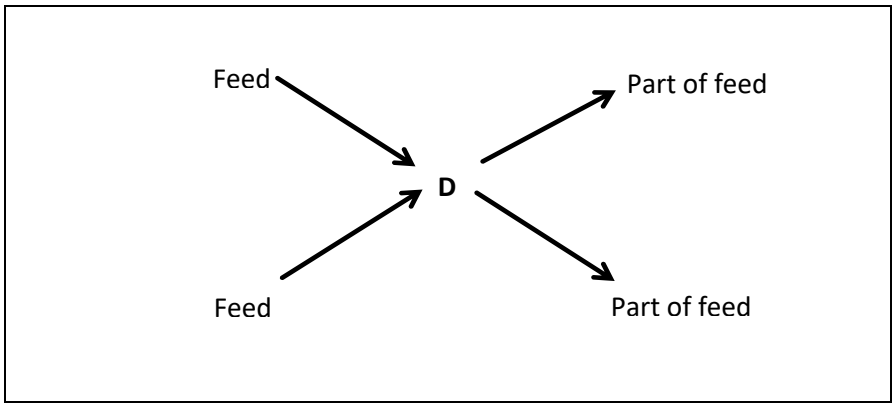
3.1.1 Use the above formula to calculate the nutritive ratio (NR) of this feed. Show ALL calculations including the formula. (3)

3.1.2 State the purpose of feeding animals with the feed containing the nutritive ration calculated in QUESTION 3.1 (1)

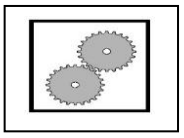
3.1.3 Give a reason for the answer to QUESTION 3.1.2 (1)

4 PEARSON SQUARE

Pearson square method is a useful tool to determine the nutritional value of a feed mixture. It can be used to calculate the quantities of each component that must be included in the feed mixture to get to required value.



Example



Problem

Desired Crude Protein Level: 16%

Ingredient 1 (maize): 8% Crude Protein

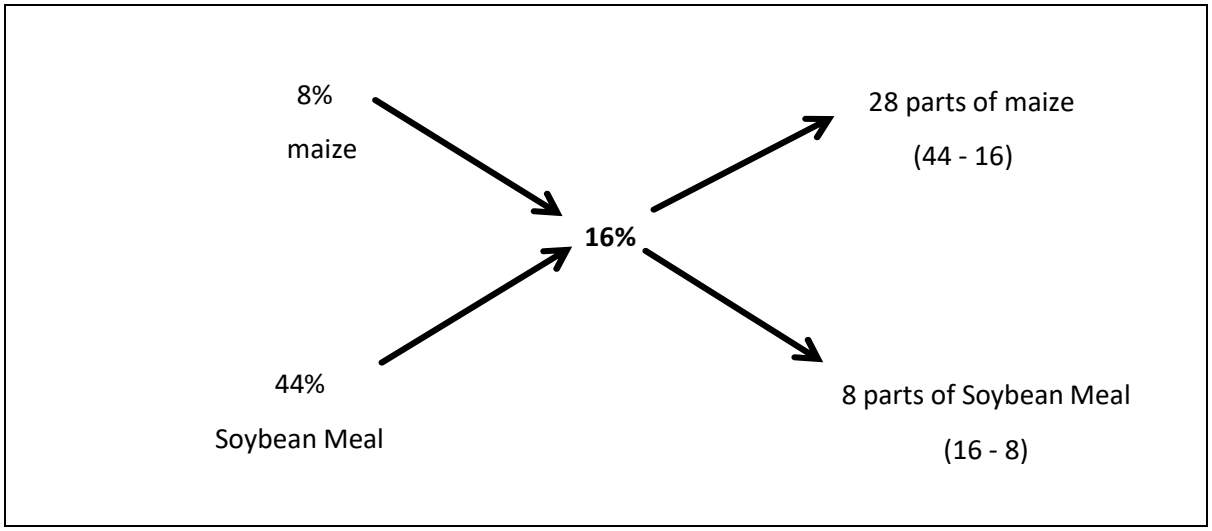
Ingredient 2 (Soybean Meal): 44% Crude Protein

Step 1

Draw the square and place values:

Step 2

Subtract values **diagonally** with the smaller **% DP value from the larger %DP value**
Make sure the value for parts is always positive.



Ratio of maize: Soybean meal

28: 8

Calculate Proportions:	**Including masses: How much maize and soybean meal must be added to 230 kg of the mixture.**
Total parts = 8+28=36 maize: 28 ÷ 36 × 100=77.78% Soybean Meal: 8 ÷ 36 × 100 = 22.22% Answer: To achieve a 16% crude protein mix: Use 77.78% maize.	77.78 % x 230 kg = 178.89 kg maize 22.22 % × 230 kg = 51.11kg soybean

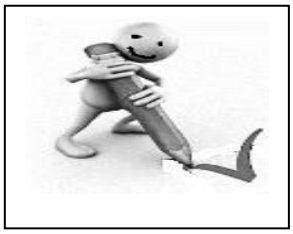
Activity 4

4.1 A farmer mixed oatmeal and fishmeal to prepare a ration containing 14% digestible protein (DP). The oatmeal contains 12% DP and fishmeal 28% DP.

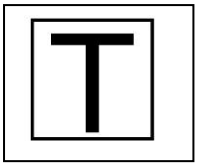
4.1.1 Use the Pearson square method to calculate the ratio at which oatmeal and fishmeal will be mixed. (4)

4.1.2 Calculate the percentage of fishmeal in the mixture. (3)

SECTION B ANIMAL PRODUCTION

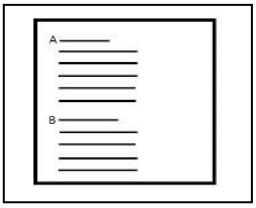


Animal production
Animal production systems
Describe and compare between intensive and extensive animal production systems
Distinguish between small-scale and subsistence, large-scale and commercial farming systems, subsistence and commercial
Intensive animal production systems
Study examples of intensive farming productions including broiler production, battery system, feedlots and a piggery
• Describe how factors like nutrition/feeding, environment, reproduction/breeding and general enterprise management are used to increase animal production in extensive farming (beef production)



Definition	Term
Animals are carefully bred to convert feed more efficiently and kept at high stocking density	Intensive production system
Animals are kept at low stocking density in a large area of land	Extensive production system
Involves raising animals or growing crops on large scale which are traded for money	Large scale/commercial farming
Involving growing crops or raising livestock to meet the needs of the family	Small scale/subsistence farming
	Feedlot
The number of grazing animals a management unit can support without depleting rangeland vegetation or soil resources	Carrying capacity
	Battery system
The mating and production of offspring by animals.	Breeding

Is the number of animals on a given piece of land over a particular period	Stock rate
The surroundings including all external factors where the animal lives and operates	Environment



Differences between intensive and extensive production systems

	Intensive	**Extensive production system**
Area of land occupied	Small/less	Large/more
Inputs	High level	Low level
Number of animals	High/more	Low/less
Nutrition	Food provided	Animals fend for themselves
Housing	Quality housing provided	Relies on open housing/shelters

Differences between small scale and large-scale farming systems

Aspect	**Small scale /subsistence farming**	**Large scale/commercial farming**
Size of farm	Small holding/less than 5 hectares	Large areas
Capital investment	Low/less	High/more
Labour	Primarily family or local	Mechanized operations
Technology	Limited used	Use of advanced machinery
Market orientation	Often produced for home consumption	Primarily for large scale markets

Negative impact of commercial farming on environment

- Use of fertilizers, pesticides and herbicides(weedkillers) cause water pollution as rain washes chemicals into rivers and lakes leading to eutrophication
- Continuous farming and heavy machinery can reduce fertility and cause erosion
- It may lead to deforestation and habitat loss since commercial farms require large areas of land

INTENSIVE AND EXTENSIVE PRODUCTION SYSTEMS

Intensive and semi-intensive systems include closed animal houses, open houses with pens, holding pens for handling animals, shearing sheds or milking parlours, and feed stores. The system will be chosen based on the type of animal being raised.

Examples of intensive animal production systems:

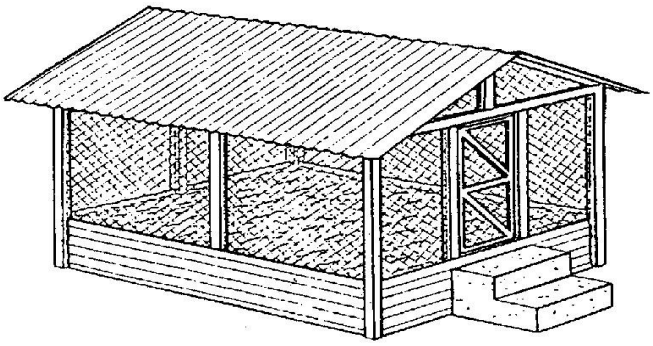
1 **Battery Cages**

Description: Chickens, particularly laying hens, are kept in small, confined cages (often in large, industrial-sized buildings) where they are provided with food and water. These systems maximize egg production but often result in poor welfare conditions for the birds

Battery cage

2 Deep **Litter system**

Deep litter is an animal housing system, based on the repeated spreading of straw or sawdust material in indoor booth to absorb urine from chickens.



Common Products: Eggs and chicken meat (broilers).

3 **Pig Farming**

Description: Pigs are kept in small pens or gestation crates, where they have limited movement. These systems are designed to keep the pigs in close quarters for the efficient use of space, feed, and labour. Growth rates are often rapid due to controlled feeding and environment. o **Common Products**: Pork.

4 **Beef Production (Feedlots)**

Description: Cattle are raised in confined feedlots and fed a high-energy diet (such as maize) to promote rapid weight gain before slaughter. These systems allow for the maximization of meat production but often raise concerns about animal welfare and environmental sustainability.

Common Products: Beef.

5 **Sheep Farming (Feedlot Systems)**

Description: Sheep are raised in confined environments where they are fed supplemental feed to accelerate growth for meat production. In some systems, sheep may be raised for wool or milk as well. **Common Products**: Lamb, mutton, wool, and milk.

Note

In these systems, animal welfare can sometimes be compromised due to the high-density housing and lack of natural behaviours, leading to concerns about health, stress, and ethical treatment. Additionally, intensive systems often raise environmental concerns related to waste management, pollution, and resources.

Factors to increase animal production under intensive production system.

Several factors can be used to increase animal production. These include:

1 Genetics/Breeding/Reproduction

- ***Choosing High-Quality Breeds*:** Selecting fast-growing, disease-resistant breeds can significantly impact productivity.
- ***Breeding Programs*:** Regular monitoring and improving the genetics of the flock through controlled breeding programs can further enhance productivity.

2 Nutrition /Feeding

- ***Balanced Diet*:** Provide a well-balanced, nutrient-rich diet containing adequate proteins, carbohydrates, fats, vitamins, and minerals. The right ratio will ensure optimal growth and feed conversion

- ***Optimal Feed Conversion Ratio (FCR*):** Efficient feed management ensures that chickens convert feed into body weight in the most cost-effective manner. Reducing wastage and optimizing the feed-to-body-weight ratio are essential.
  Broiler chickens require different types of food nutrients and environmental conditions for optimal growth at various stages of their life.

AGE (weeks)	FEED	NUTRITIONAL VALUE	TEMPERATURE REQUIREMENTS
0–1	Starter mash	23% protein fortified with vitamins and mineral salts	32,2 °C to 35 °C
1–2	Starter mash	23% protein fortified with vitamins and mineral salts	29,4 °C to 32,2 °C
3–4	Grower mash	20% protein fortified with vitamins and mineral salts	26,7 °C to 29,4 °C
5–slaughter	Finisher mash	18% protein fortified with carbohydrates	Normal room temperature (25 °C)

3 Housing and Environment

- ***Temperature Control:*** Maintaining an optimal temperature in the poultry house (around 2124°C) is essential to avoid stress that could stunt growth. Use heaters in cold weather and ventilation systems in warm weather. Proper ventilation, cleanliness and well managed space management can help improve broiler production

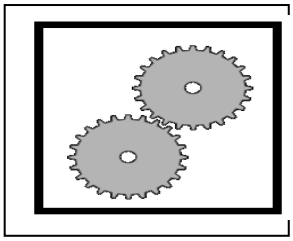
4 Management and Record Keeping

- ***Record Keeping*****:** Keep track of all key parameters such as growth rates, feed consumption, health status, and mortality rates. This helps in identifying and addressing any problems early.
- ***Training and Knowledge*****:** Regular training for farm workers ensures they understand best practices in broiler management, including feeding, handling, and biosecurity.

Intensive/semi-intensive systems

Intensive and semi-intensive systems include closed animal houses, open houses with pens, holding pens for handling animals, shearing sheds or milking parlours, and feed stores. The system will be chosen based on the type of animal being raised.

EXAMPLES OF EXTENSIVE ANIMAL PRODUCTION SYSTEMS



 **Sheep production**	**Animals graze over large areas of natural pastures with low inputs**

 **Cattle production**	**Cattle are grazed on a large area of natural pasture. Animals depend mainly on grazing and minimal external inputs**
 **Extensive chicken production system**	**Chickens are kept under low input free range conditions and depend partly on natural food sources**

Factors to increase animal production under Extensive farming systems

Feeding: Farmers use natural vegetation for animal nutrition. Feed supplements may be necessary during periods of drought since natural grazing supply is seasonal.

Environment: Animals need to be adapted to local climate and environment. Indigenous cattle breeds such as the Nguni, Afrikander and Drakensberg breeds are better adapted to local environment which includes climate, vegetation and diseases.

Breeding: Breeding and calving season should be planned to start when there is enough grazing of high nutritional value.

General production enterprise management: Animals must be adapted to local environment (natural resources and diseases). Human activity (record-keeping, marketing and health management) in beef production must be minimal.

Activity 1

1.1 The table below shows two farmers involved in farming activities.

FARMER A	FARMER B
A farmer has one worker and 58 goats, which depend on natural pastures in a large communal land. Goats are kept in a kraal at night and get water from a stream.	A farmer keeps 540 sheep on 30 ha land, 9 workers, 2 boreholes, 2 feed sheds, a feedlot and a sheep handling facility. The farmer buys feeds and also grows lucerne.

1.2.1 Identify the production system practised by each of the following:

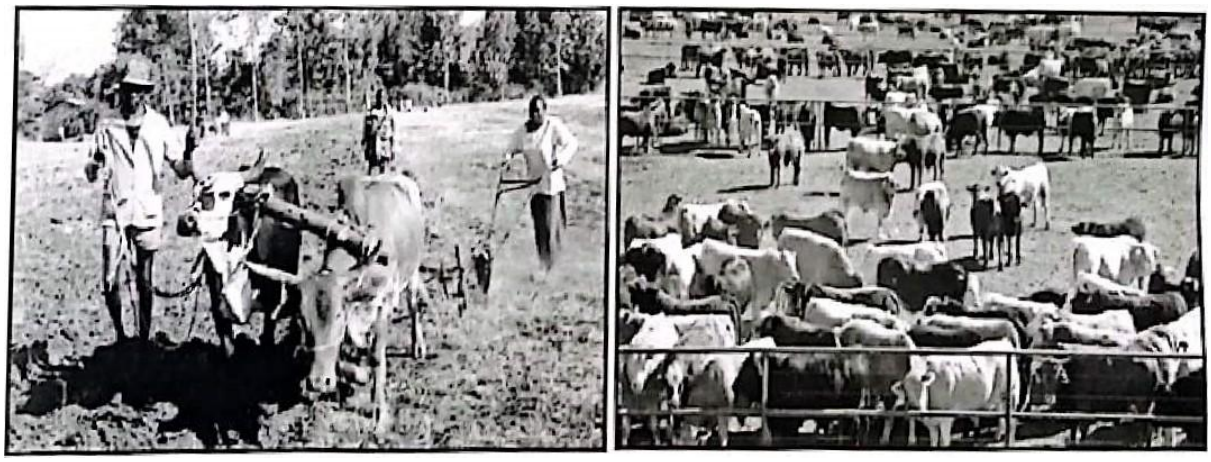
(a) Farmer B (1)

(b) Farmer A (1)

1.2.2 Give TWO reasons in the table above to support the answer to QUESTION 1.1.1 (2)

1.2.3 State TWO factors that **FARMER A** should consider increasing production of the farm animals. (2)

1.2 The diagrams below show TWO different farming systems practiced by farmers. Study the diagrams and answer the following questions.



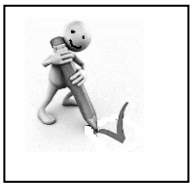
1.2.1 Identify the farming system represented in EACH of the following:

(a) Picture B

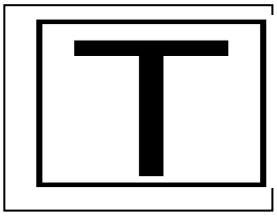
(b) Picture-A

1.2.2 Give a reason for the answers to QUESTIONS 3.1.1(a) and (b).

ANIMAL BEHAVIOUR



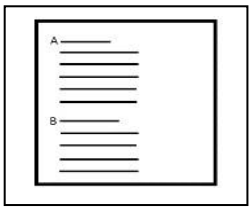
Behaviour of farm animals
Describe the common behaviour of cattle, sheep, pigs and poultry under various conditions
Handling of farm animals
Give the reasons/importance of handling farm animals Describe the effect of incorrect handling on farm animals (harm and effect)
State the basic guidelines for handling cattle, sheep, pigs and poultry
Identify and describe the different techniques/tools/aids/facilities (design features, e.g. loading ramps, crush vehicle) utilised to handle farm animals
The basic guidelines/requirements for transporting/moving farm animals from one farm to another/abattoirs



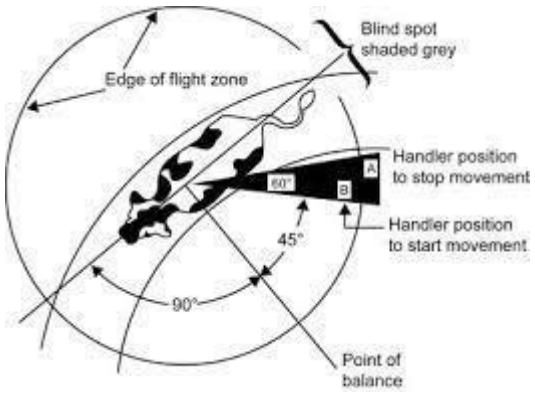
Term	Definition
the tendency of a hen to sit on eggs.	Broodiness
a plot of ground/building where livestock are fattened for the market	Feedlots
is a distance that agricultural and wild animals like to keep between themselves and a threat of danger.	Flight zone
to touch or hold or move animals from one place to another.	handling

containers for grain which narrow near the bottom and release grain from this end.	Hoppers
some animals can see all around e.g. cattle	Panoramic vision
is when chickens settle for rest especially when they have laid eggs.	Roost
involves moving animals between different grazing camps so as to achieve veld management objectives.	Rotational grazing
fattening or growing animals for market readiness	Rounding off
is the place where livestock receive their water.	Watering points

Common behaviour of cattle



Cattle display various behaviours that reflect their natural instincts, social structures, and environmental interactions**.**

	The flight zone is the distance within which a person can approach an animal before it moves away. Herd animals usually turn and face a potential threat when it is outside of their flight zone, but when it enters the flight zone, the animal turns and moves away.

Grazing and feeding behaviour

Cattle spend a large portion of their day (6-10 hours) grazing and prefer to graze in the early morning and late afternoon.

Social behaviour

Cattle are social animals and form hierarchical herds, where dominance is established through interactions

Defence and aggressive behaviour

Cattle can defend themselves or their calves by charging, kicking, or using their horns.

Aggression can also occur during competition for food.

Response to stress/threats

- Vocalizing/mooing • pawing and pacing.
- Feigning charges

Milling or circling

	
A stressed cow	A stressed bull

Behaviour of sheep. Sheep form strong social groups and bonds within a flock, and they stay close together while grazing or being herded. This is called mobbing behaviour. - If you handle sheep routinely, they become tame and will readily learn to enter camps or chutes. - Unlike cattle, sheep have a poorly defined hierarchy and they seldom show aggression, except among rams during the breeding season.

Breeding behaviour of small ruminants - Ewes on heat will seek out the rams and stay close beside them. The smell of the ewe in oestrus will stimulate the ram. The ram will smell the ewe's urine, and he will extend his neck and curl his lip (flehmen) in response. - An ewe on heat will stand for mating.

Maternal behaviour of small ruminants - Many ewes look for an isolated spot in which to lamb. - They will lick the lamb and eat the foetal membranes after the lamb is born. - The lamb finds the ewe's teats and begins to suckle within an hour or two of birth. - Abnormal behaviour of small ruminants.

Behaviour of pigs

Aggression towards other pigs

Piglets show aggression to other piglets within the first week of life while forming a teat order. Later, introducing new pigs into a group may lead to aggression as the pigs establish social ranks. Pigs may spend 1–2 min nosing each other, vocalizing, and then biting until one of the pigs retreats. It may take several days to establish a hierarchy in older pigs. Once the hierarchy is established, fights are rare and ranks are preserved mostly by threats from the dominant pig and submissive gestures from subordinates (e.g., twisting the head away

Tail biting

Tail biting is seen mostly in confined pigs. Overcrowding and boredom seem to be the main causes. Free-ranging pigs spend 5–10 hr daily looking for food and rooting, whereas pigs kept in pens consume meals in a short time. Slatted floors without bedding, low-salt diets, and low-iron soil seem to predispose pigs to tail biting. Once the problem starts, blood from the injured tail seems to arouse the other pigs and can even lead to death of the victim but rarely advances to pure cannibalism

Mostly seen in primiparous gilts, cannibalism accounts for 4% of piglet deaths and is estimated to affect ~18% of litters. It is most common immediately after parturition when the sow is stressed. Usually, the sow will bark to warn piglets walking by her head and then later attack them, biting them to death. Farrowing crates have been used successfully to reduce the incidence of cannibalism.

Crushing piglets

Heavy snows may lie on their piglets, killing them. This normally occurs when there are weak, underdeveloped, or sick piglets that cannot move fast enough to avoid the snow.

Signs of stress in pigs

- Lying down
- Refusal to move
- Panting
- Snouting

	
Heat stress in pigs	**Signs of environmental stress in pigs**

General behaviour of fowls

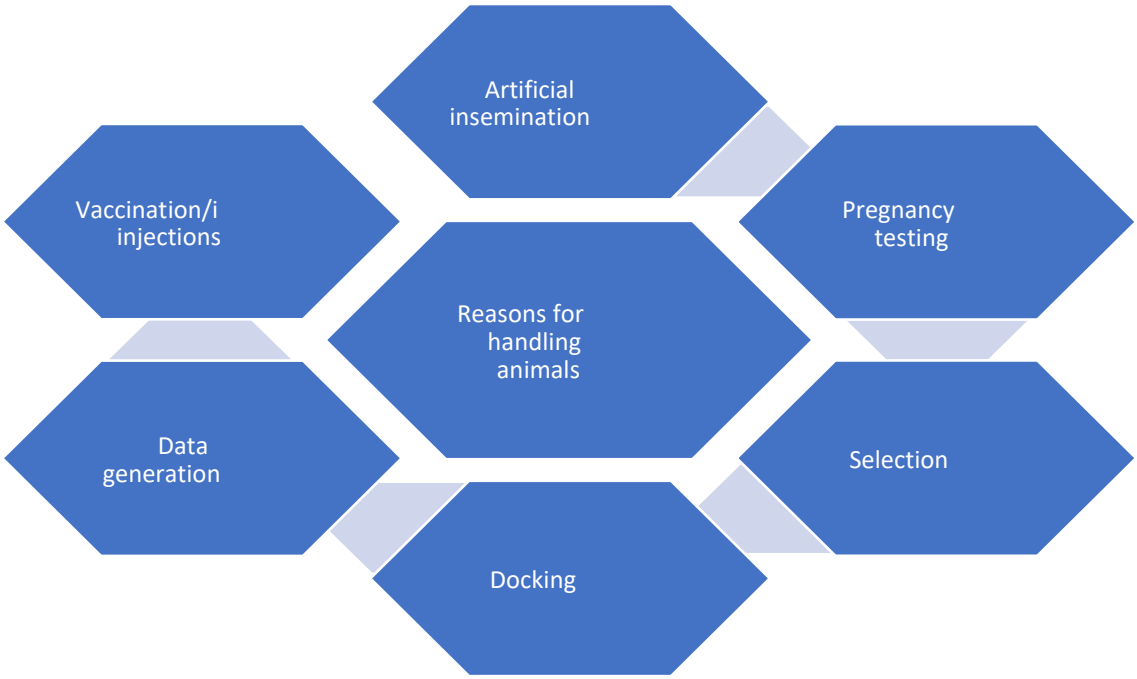
- Newly hatched chicks can look for their own food and water
- They are born with a strong pecking instinct which drives them to investigate all objects on the ground as possible food.
- Fowls show dominant-submissive behaviour a few weeks after hatching - Dominant birds will peck less aggressive birds, especially at food troughs.
- Breeding behaviour of poultry - Breeding is initiated by the male who does a courtship display. He spreads his wings and uses calls and postures.

Poultry in stress display the following behaviour

- Sudden flight
- Sharp squarks
- Ruffled feathers
- They may seek hiding spots

Reasons for handling farm

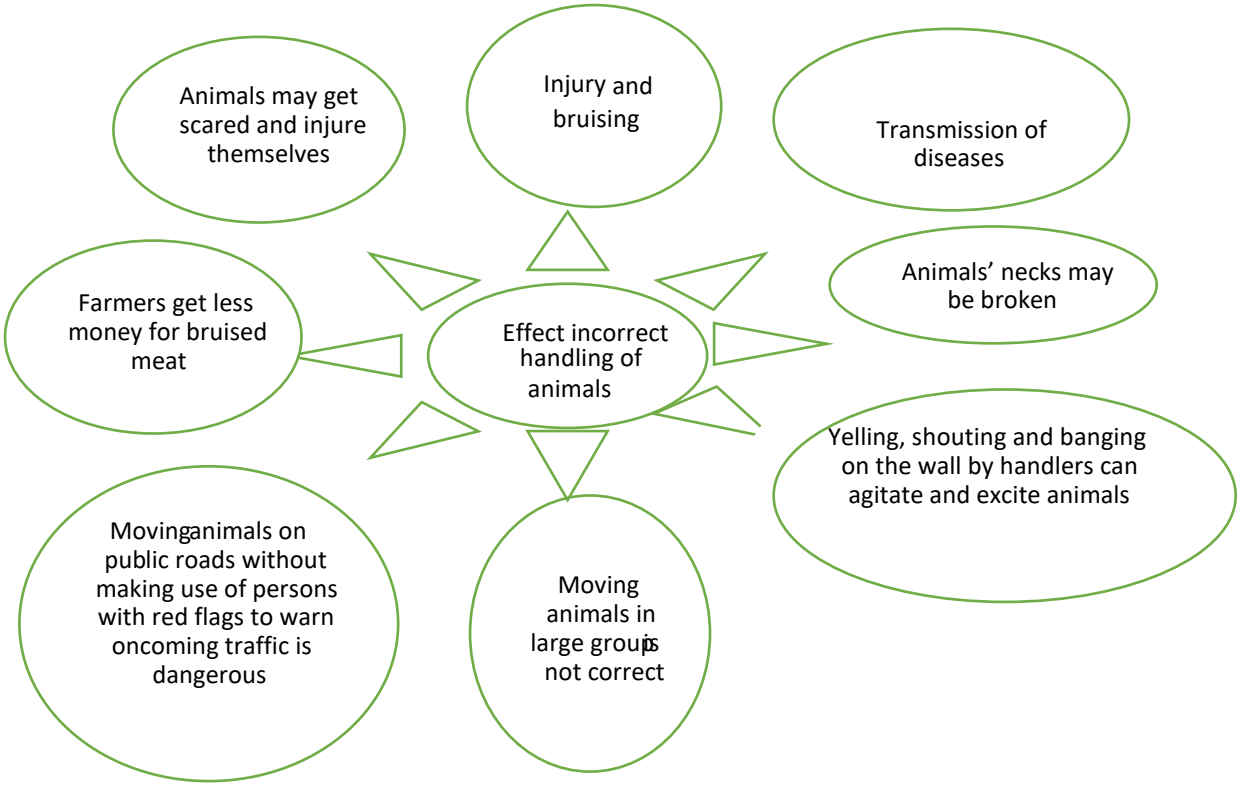
Handling animals involves interacting with large animals on farms and in agricultural environments. The temperaments and behaviours of animals differ depending on the species, breed, gender, and time of year. Working with livestock can be physically challenging and requires careful attention to the animals.



How to handle farm animals

Different animals are handle differently as depicted in the diagram below.

Fowl	Sheep	Pig
		



Mind map of the effects of incorrect handling of animals

Guidelines for handling livestock (cattle, sheep and poultry)

The following must be considered when handling farm animals:

- The handler must approach animals calmly.
- Do not yell at livestock.
- Be cautious to animals that are blind to one eye.
- Never approach animal from the back.
- Talk softly to animal when approaching it.
- Do not work with big and small animals in the same crush. Crush should be wide without sharp objects.

Equipment/tools for handling livestock

Some of the equipment/tools used to handle cattle are shown below**:**

An electric prodder/stock prod/hot stick  	**A handheld device commonly used to make cattle or other livestock move by striking or poking them**
A halter/headgear  *Used to tie up livestock.* *A small rope is normally attached for large farm animals like cattle.*	**Cattle neck clamp**  *Used to securely hold the cattle's head in place while working on them, reducing the risk of injury to both the animal and the handler*

Cattle ear tag plier  *Used to apply identification tags on livestock*	**Head clamp for calves**  *It is used to secure head of calves during handling*
Rubber ring elastrator  *Used for castration of cattle, goats and sheep. They can also be used for tail docking and dehorn*	**Burdizzo**  *Bloodless when used to castrate cattle*

Cattle nose ring  *It is used to lead and restrain the cow easier*	**Calf dehorning iron**  *It is used for disbudding and dehorning*
Branding iron  *To help identify cattle*	**Syringe and needle**  For/injecting and administering of medication
Cattle loading ramp  *For loading farm animals for transportation*	**Smart neck tracker**  *It checks cattle's movement, heart rate, and body temperature may all be read via a collar gadget*

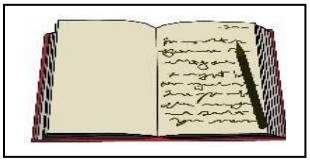
Shearing knife

Used for shearing wool

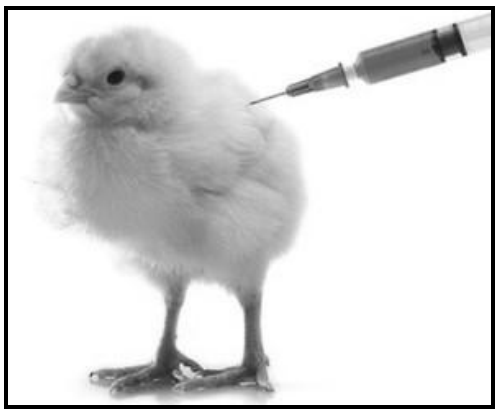
Basic guidelines for transporting farm animals

Transport	Treatment
Before transport	⟹ Transport permit must be completed before transporting animals ⟹ Keep farm animals together for two to three days before transporting them ⟹ Dehorn animals before transporting them ⟹ Group animals of the same size for transportation
Loading and unloading	⟹ Loading ramp must be properly designed ⟹ Crush for unloading should be wide and straight ⟹ Crush for loading should have high solid sides ⟹ Steps must be part of the design for loading and unloading crushes for cattle and pigs

Activity 2

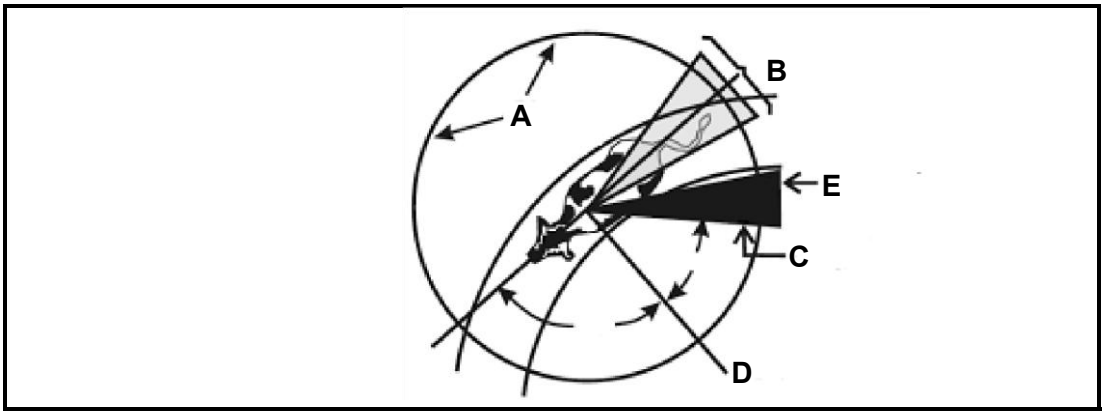


2.1 The picture below shows the handling of a chick.



2.1.1 Identify the reason for handling a chick as indicated in the picture above (1)
2.1.2 Name the tool used in the picture above. (1)
2.1.3 Indicate TWO basic guidelines for handling poultry. (2)
2.1.4 Name TWO types of equipment or tools that are used by farmers to restrain farm animals. (2)

2.1 The diagram below illustrates an important aspect in animal behaviour



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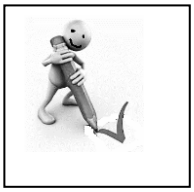
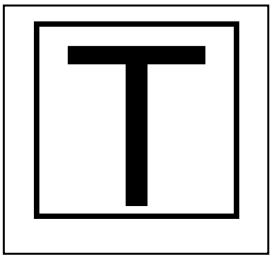
3.1.1 Identify the points labelled A and B (2)
3.1.2 Indicate the letter showing the point of balance. (1)
3.1.3 Indicate TWO consequences of approaching an animal from direction B in the diagram above. (2)
3.1.4 Mention ONE abnormal behaviour shown by pigs when under (1)

ANIMAL HOUSING



Learning objectives: At the end of this unit the learners should be able to demonstrate knowledge of the following content:
• Give the importance or reasons for shelter/housing)
• Explain the basic housing or shelter requirements/guidelines for an intensive production system, like a holding shed, feed shed and holding pens
• Identify and describe the different equipment/tools for intensive housing systems, like feeders, water supply, bedding and lighting



DEFINITION	CONCEPTS
It is a building that is used to keep animal feed	Feed shed
It is a building that is used to shelter animals for a limited period	Holding shed
Is a place giving temporary protection from bad weather or predators, includes, simple shelters, open and closed housing, sheds, holding pens and crushes.	Shelter

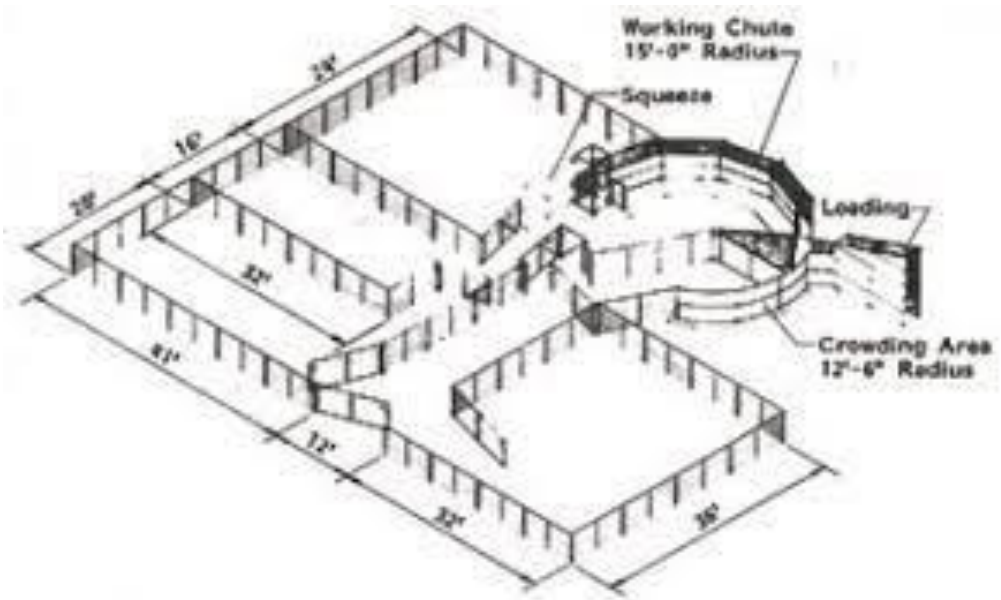
Importance of Animal Housing

- A good housing system plays a crucial role in profitable animal production.
- Proper housing protects animals from health problems and enables them to perform better.
- The purpose of animal housing is to improve the environment and provide comfort and protection from climatic stresses and diseases.
- A good housing system allows farmers to control the inside environment, which affects animal behaviour and productivity.
- Animals respond to changes in temperature, relative humidity, air movement, sun radiation, and rain through changes in behaviour.
- High temperatures, for example, reduce feed intake, affecting milk, meat, egg, and wool production, and impact reproduction.

Holding sheds: used to keep a lot of animals and protect them from elements Water and food are provided especially when the animals are kept for extended periods.

Holding pens: these are used to keep animals before handling them. These are generally in the open without overheard covers. Water and food are provided.

Handling facilities: these are used to handle animals for a number of reasons.



EQUIPMENTS USED IN INTENSIVE ANIMAL PRODUCTION SYSTEMS

Feeders: Tube and pan feeders are used in feeding. Strong feed troughs are used so that pigs do not turn them over. Common cattle feeders are bunk feeders, creep feeders, bale feeders.

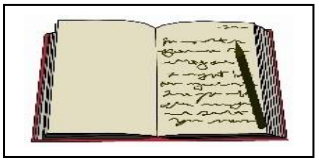
Water supply: There are different types of drinkers- Automatic bell drinkers, fountain drinkers and nipple drinkers are mainly used for animals. Big water troughs are used in South Africa

Bedding Animals need a bedding that is safe, absorbent and provide insulation. Straw, sawdust, wood shavings are common bedding materials for livestock.

Wood shavings used in poultry houses.

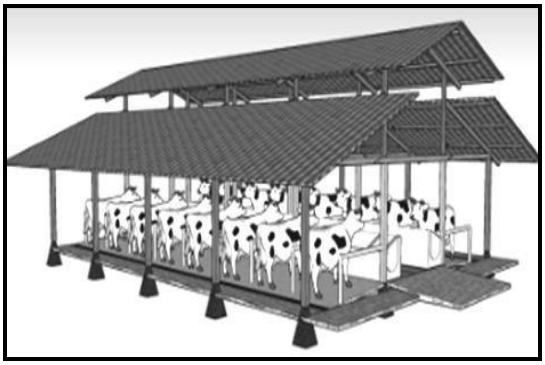
Lighting Fluorescent and infrared lights are used for chickens, pigs and cattle production.

Activity 4



4.1 The pictures below show two facilities that are used under different environmental conditions.

PICTURE A



PICTURE B

4.1.1 Identify the picture of the facility that is used under EACH of the following environmental conditions:

(a) Very cold and windy conditions (1)

(b) Hot summer conditions (1)

4.1.2 Give the term for the material that covers the floor in PICTURE B, which will act as an insulator (1)

Activity 5

5.1 The picture below shows a structure used to shelter farm animals

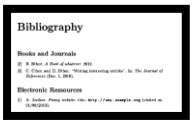
5.1.1 Identify the structure in the picture above. (1)

5.1.2 Briefly explain TWO requirements that should be met by the shelter shown above. (2)

5.2 The pictures below show equipment used in animal production

5.2.1 Identify the equipment encircled in pictures **A** and **B** above. (1)

5.2.2 Name the type of lighting that is essential for keeping the newborns of the animals above warm. (1)



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