



Artificial Insemination

Level-I

Learning Guide #37

Unit of Competence: Support Pregnancy

Diagnosis to Livestock

Module Title:

Supporting Pregnancy

Diagnosis to Livestock

LG Code:

AGR ATI1 M07 0919 LO1-

LG-37

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LO No:

Prepare animals and

Equipment's for

Pregnancy diagnosis



Instruction Sheet	Learning Guide #37
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- ✓ Preparing relevant data for Pregnancy Diagnosis (PD)
- ✓ Preparing and restraining animals safely
- ✓ Assembling necessary materials and equipment's

Recognizing mechanisms of milk synthesis and secretion This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- ✓ Prepare relevant data for Pregnancy Diagnosis (PD)
- ✓ Prepare and restrain animals safely
- ✓ Assemble necessary materials and equipment's

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2 and Sheet 3”.
4. Accomplish the “Self-check 1, Self-check 2, and Self-check 3” in **page -6, 16 and 20** respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1,” in **page -21**.
6. Do the “LAP test” in **page – 22** (if you are ready).



1. Prepare relevant data for Pregnancy Diagnosis (PD)

1.1. Introduction To Pregnancy Diagnosis

Pregnancy: - Pregnancy is the condition of a female animal while young are developing within her uterus. The interval, the **gestation period**, extends from **fertilization** of the ovum to the birth of the offspring. It includes fertilization, the union of the ovum and sperm; **early embryonic development** in the lumen of the female reproductive tract; **implantation** of the **embryo** in the uterine wall; **placentation**, the development of fetal membranes; and continued growth of the **fetus**. Normal gestation periods vary greatly from species to species

The diagnosis of pregnancy (cyesiognosis) has been sought since long by farmers for curiosity however, it is essential for profitable animal husbandry especially in the productive animal species. For an economical dairy farm, cows must calve every year, and to maintain this sequence, identifying pregnant animals at an early date seems imperative.

In the current systems of planned breeding, diagnosis of pregnancy would help to evaluate the therapies at an early date and devise alternative manipulations. It therefore, appears that early diagnosis of pregnancy is essential in animal management for economic reasons. In many developing countries, farmers often present their animals for pregnancy diagnosis very late when much of their time is lost in maintaining non pregnant cows.

If accurate records of estrus periods and breeding dates are available, the earliest indication of pregnancy in most animals is the failure to have another estrous cycle at the expected time. Such an absence of estrus is not, however, proof of pregnancy. A non-pregnant animal may miss an estrous cycle because of failure of the corpus luteum to regress normally or some other reproductive abnormality.



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An animal may also have a delay of one or two estrous cycles if an initial conception is followed by inability to sustain that pregnancy. Palpation of the reproductive tract via the rectum in the mare and cow can be useful for pregnancy diagnosis and estimation of the stage of pregnancy. In the cow, the presence of a corpus luteum in an ovary and a slight enlargement of one uterine horn as compared to the other suggest an early pregnancy.

Pregnancy diagnosis by rectal palpation is considered to be more difficult in the mare than in the cow, but an early diagnostic feature is a bulge in the uterus due to the development of the amniotic sac.

Ultrasonography is used to diagnose pregnancy in a variety of domestic species, including cattle, horses, sheep, goats, llamas, and swine. The earliest time for verification of pregnancy is dictated in part by the size of the gestational sac, which in turn varies among species.

In general, the times vary between about 2 weeks for mares to about 5 weeks for ewes. In large animals, the ultrasound probe can be inserted rectally so that it is closer to the uterus.

In dairy cattle, pregnancy diagnosis is an important tool to measure the success of a reproductive management, to allow for early detection of problems and to achieve resynchronization of non-pregnant cows. Here are some examples of how pregnancy diagnosis can affect the performance of dairy cattle operations:

- After the end of breeding season, in the absence of pregnancy diagnosis, non-pregnant cows that will not produce a calf will remain in the herd and increase costs to the producer. If non-pregnant cows are detected after the end of the breeding season, they may be culled from the herd to reduce these costs
- Consider the following hypothetical example: Pregnancy diagnosis is performed routinely on a dairy farm. It is observed that monthly pregnancy rates went from 40 % in the previous month to 5 % in the present month. The significant



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decrease in pregnancy rates prompts the manager to review the dairy's artificial insemination program. It is observed that the frozen semen is not being stored properly. When semen is replaced and storage conditions changed, pregnancy rates return to normal.

- Consider a second hypothetical example: A dairy herd is using oestrus synchronization for the first service after calving. Pregnancy rates are acceptable to this synchronized o oestrus. However, oestrus detection is not being done properly after the first service.

Therefore, it is easy to appreciate why the decision to perform pregnancy diagnosis may significantly increase the profitability of cattle operations.

1.2. Understanding Reproductive Physiology

1.2.1. Structures of the Reproductive Tract

Thorough knowledge of the structures associated with the female reproductive system is essential for successful Pregnancy Diagnosis. Only the reproductive tract and the associated organs will be discussed here, but you should be aware that endocrine glands located in other parts of the body, particularly the brain, are also involved in the sexual cycle. Figure 2 is a general diagram of the reproductive tract.

The vulva is the external portion of the reproductive tract and can be seen as two prominent lips. The size of the vulva may vary with age of the animal and between breeds.

The next portion of the tract (moving right to left, as shown in Figure 2) is the vagina, and it serves as a receptacle for semen during natural mating.

The urinary bladder (not shown in Figure 1) is located underneath the vagina and may extend beyond the pelvic brim and slightly into the body cavity, particularly when it is full of urine.

During urination, the bladder empties through a small opening (urethral orifice) on the floor of the vagina, eventually exiting the body through the vulva.



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The cervix is a thick-walled structure attached to the vagina. It is composed of connective tissue, which feels much like gristle. Because of its thickness and firm feel, the cervix is a good landmark for orientation while you are palpating.

The internal walls of the cervix are folded and protrude toward the exterior of the reproductive tract. These folds are sometimes called cervical rings.

The cervix may also act as a sperm sieve, trapping some abnormal sperm cells and allowing normal sperm cells to travel into the uterus and oviducts.

The uterus is Y-shaped, with a right and a left horn. The horns share a connecting region known as the body. During artificial insemination, semen is deposited in the uterine body. The walls of the uterus are lined with special glands that secrete “uterine milk,” the substance that nourishes an early embryo. By about 16 to 18 days of gestation, the placental membranes are well developed and extend into both horn of the uterus. About 38 days into gestation, these membranes begin attaching to the uterine wall at special, raised areas known as caruncles.

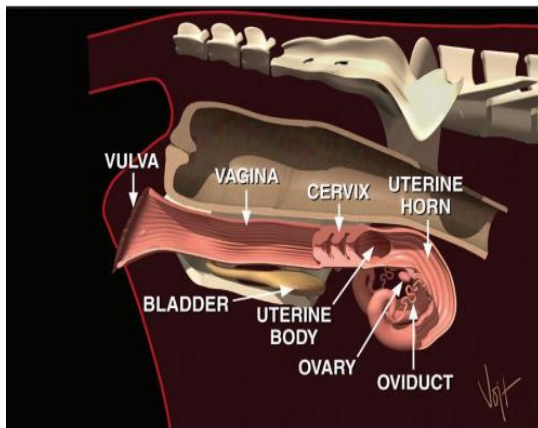


Figure 1. Side view of the cow's reproductive system.

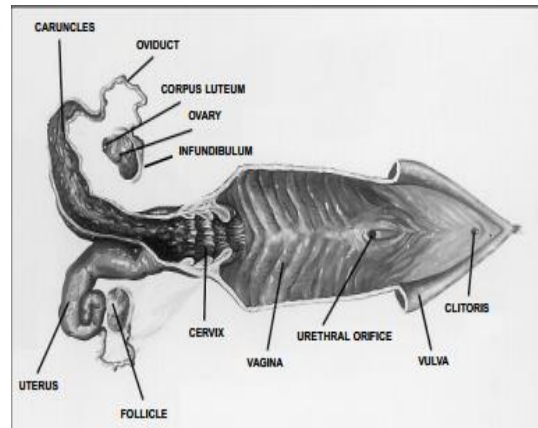


Figure 2 anatomy of the reproductive tract

1.3. Preparing for pregnancy diagnosis

- ✓ Pregnancy testing preparations including the preparation of relevant **documentation** are completed according to **organisation requirements and procedures.**



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- ✓ **Animals** are mustered, yarded and safely restrained in line with organisation policy.
- ✓ Animals to be tested are drafted according to breeding or management program requirements.
- ✓ Physical and human resources for pregnancy testing are assembled according to organisation policy.

1.4. Requirement for pregnancy diagnosis

Cows are commonly said to show oestrus approximately every 21 days (20 days for a heifer). The actual average length in lactating dairy cows is about 23 days. After insemination, cows can either conceive or fail to conceive to that service. If a cow is pregnant after insemination, the corpus luteum will not regress, progesterone concentrations will remain high, and the cow will not return to oestrus.

Alternatively, if a cow is not pregnant after insemination, the corpus luteum will regress, plasma progesterone concentrations will decrease, and the cow will return to oestrus approximately 20-23 days after insemination. Therefore, if a cow is observed in oestrus after insemination, it can be concluded that she is non-pregnant.

The use of oestrus detections methods in addition to visual observation (such as tail paint or chalk, pedometers, pressure sensors, etc) can potentially increase the efficacy of oestrus detection and the identification of non-pregnant cows.

The use of oestrus detection following insemination is useful to detect non-pregnant cows and allow for re-synchronization of such a group of cows. Relying on oestrus detection to diagnose **pregnant cows** is very unreliable, however. Listed below are some of the reasons this is so:

- If oestrus detection is not properly performed, many non-pregnant cows will not be observed in oestrus and will erroneously be considered pregnant. About 50% of dairy cows are not detected in oestrus when they are actually in oestrus. This number increases during heat stress.



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- Cows with reproductive problems such as ovarian cysts, uterine infections or an oestrus also fail to return to oestrus and may be misdiagnosed as pregnant cows.
- Pregnant cows can be mistakenly detected in oestrus and either re-inseminated (which would probably cause an abortion) or culled as a non-pregnant cow.

Importance of pregnancy diagnosis: it is expected that a productive cow produces a calf per year. To realize this objective it is crucial to identify pregnancy on time and make the mating. To perform pregnancy diagnosis one has to have the desired record, the materials and protective equipments.



Self-Check -1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page: (2 points Each)

1. A condition were young is developed in the uterus of female animal is____
A, Gestation B, Pregnancy C, Ovulation D, None
2. The interval between fertilization of ovum to the birth of offspring is____
A, Gestation Length B, Implantation C, Embryo D, all
3. An External Portion of the reproductive tract that vary in size and breeds is ____
A, Cervix B, Urinary Bladder C, Vulva D, Except B, all are correct
4. The internal wall of cervix folded and protrude toward the exterior of reproductive tract.
A, Vagina B, Cervical Rings C, Bladder D, All
5. The place were semen is deposited during insemination
A, Uterine Body B, Vagina C, Vulva D, none

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

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

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____
2. _____
3. _____
4. _____
5. _____

Information sheet 2	Preparing and restraining animals safely
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2. Preparing and Restraining animals for pregnancy diagnosis

The animal to be examined should be properly restrained. Cows can be securely restrained in a Travis or chute. At many situations when this is not available the hind legs of cows are tied with a rope to avoid kicking and the head is held securely.

The tail is held to one side by an assistant. Pressing on the back relaxes the pelvic structures and reduces peristalsis. Palpators must take every care to avoid damage to themselves by the kick of the animal.

The examiners must wear proper clothing including coveralls, gum boots and disposable plastic or rubber full arm sleeves. This is essential to protect the examiner from contracting zoonotic disease and spoiling his clothes. Separate trousers and shirts made of dark coloured (green or blue) slightly thick cloth are easier for working compared to a single cover all. Plastic long sized aprons are used by many clinicians in the field. Sufficient lubrication must be used while introducing the hand in the rectum. Non-irritating soap and water or liquid paraffin is a suitable lubricant.

2.1. Diagnosis Efficiency

Diagnosis efficiency is measured by the ability to hygienically place the Cattle in the correct place. Correct Cattle handling is vital and depends on **proper facilities**.

2.1.1. Technical competence

Only people who have had adequate training should be attempting a pregnancy Diagnosis program, so most of the faults in technique will be due to complacency and not to incompetence. Poor facilities cause anxiety for the Technician and the cow, resulting in poor restraint and poor insemination technique. The test crush should be approximately 1.5 m long and 66 cm wide. It should have a concrete floor for hygiene and to minimize wear.



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The crush and its surrounding area must be roofed. A head bail is useful but should only be used in extreme cases. Restraint of the cow and safety of the operator can be achieved easily with a britching chain (Tindall chain) or backing gate.

Timber yards and crushes are preferable in some cases to steel, as the noise made by steel facilities will upset the cows unless they are worked through the yards regularly. Nervous and frightened cattle will not go in to calf as easily as quiet cows. Where possible, water should be connected at the yards, for washing equipment and for settling dust if necessary.

In a normal program, using adequate facilities, inseminator efficiency should approach 100%.



Figure 3. Handling Facilities Covered with roof

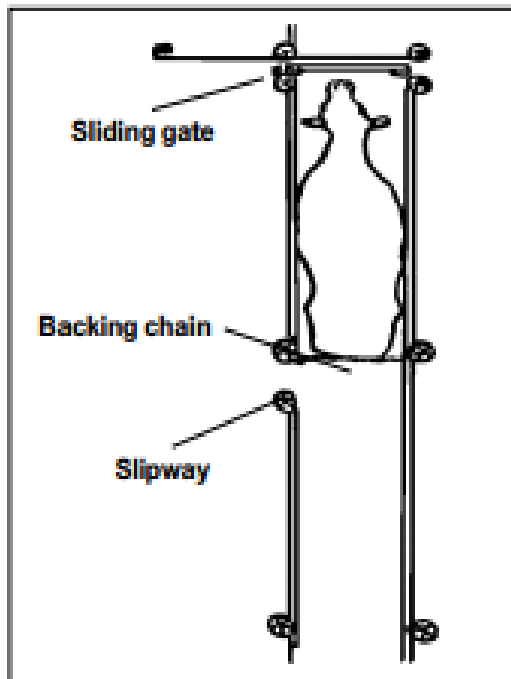


Figure 4. Good Diagnosis Ball in race

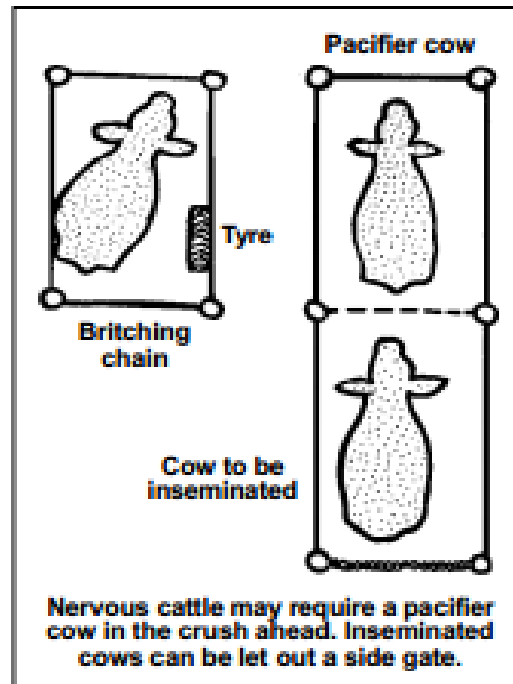


Figure 5. Tyre in right hand side of the crush to aid restraint and operator comfort and use of a pacifier

2.1.2. Basic Guidelines for Performing Animal Restraint

To work safely with an animal a person should:

- understand basic animal behavior in relation to their interactions with people during handling
- appreciate the "flight zones" typical of a species
- understand how to communicate with the animal
- use appropriate restraint techniques
- use restraint equipment properly
- identify any animals that may be unpredictable
- wear appropriate protective clothing and equipment
- maintain appropriate vaccination status



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- Physiologic, biochemical and hormonal changes occur in any restrained animal and veterinary staff should consider how these effects will influence their proposed restraint procedures.
- Consultation should be sought with those experienced in the restraint procedures to be invoked, prior to its initial use, to ensure that minimal restraint is used to accomplish the procedure goals.

2.1.3. Important guidelines for restraint of any duration

- Restraint devices should not be used simply as a convenience in handling or managing animals.
- When restraint devices are used, they should be specifically designed to accomplish healthcare goals that are impossible or impractical to accomplish by other means or to prevent injury to animals or personnel.
- The period of restraint should be the minimum required to accomplish the procedure.
- If possible, animals placed in restraint devices should be given training to adapt to the equipment and personnel.
- Provision should be made for observation of the animal at appropriate intervals.
- Veterinary care should be provided if lesions or illnesses associated with restraint are observed. The presence of lesions, illnesses, or severe behavioral change often necessitates temporary or permanent removal of the animal from restraint.

2.1.4. The principles of low stress restraint are:

- a. Solid sides or barriers around the cattle to prevent them from seeing people deep inside their flight zone. This is especially important for wild or excitable cattle.
- b. To prevent lunging at the head gate, the bovine's view of an escape pathway must be blocked until it is fully restrained. This principle does not apply to pigs.
- c. Provide non-slip flooring for all species of animals.
- d. Slow steady motion of a restraint device is calming, while sudden jerky motion excites. Applies to all species.
- e. Use the concept of optimal pressure. Sufficient pressure must be applied to provide the feeling of restraint, but excessive pressure that causes pain or discomfort must be avoided. This principle applies to all species.



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- f. The entrance of the restraint device must be well lighted. All species must be able to see a place to go.
- g. Livestock will remain calmer if they can see other animals close to them.
- h. Engineer equipment to minimize noise. High pitched noise is more disturbing to livestock than a low pitched rumble from a conveyor.
- i. Restraint devices must be designed to avoid uncomfortable pressure points on the animal's body.
- j. Restrain animal in an upright position.

Because every restraint incident will affect the life, activities and behavior of an animal the following points should be considered:

- Restraint of an animal should be used only when absolutely necessary and never as part of a daily maintenance routine (except where the animal may be routinely moved through a squeeze cage, or chained, for example).
- Only use the minimum amount of force necessary to accomplish the task.

2.1.5. Indications / circumstances requiring restraint

Animals can be unpredictable and might not react the way you expect. Animals in pain can be very aggressive and/or defensive. Restraint is used to protect the animal and the veterinary staff.

Animals can be injured by trying to get away from the veterinary staff, such as a horse receiving a laceration on a protruding nail.

To avoid discomfort for the animal veterinarians should use the least amount of restraint for a procedure as possible.

Without proper restraint an animal can injure itself during and/or after a procedure.

Without proper restraint an animal can injure the staff; Injuries may result in loss of income or efficiency; Bites and scratches from small animal; Kicks and body slams from large animals.



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The goal of restraint is to handle an animal in such a way that a procedure can be done without injuring the animal and without causing any injury to the humans involved in the procedure.

In general, restraint is required :

- For many production and management practices, such as :
 - Health care: physical examination, sampling and therapeutic procedures
 - Identification: ear tagging, tattooing, branding
 - Weighing
 - Breeding
 - Showing
 - Transportation
 - Pregnancy diagnosis
 - Implanting growth stimulants
- For Safety
 - Animal
 - Persons
 - Equipments/facility
- For Animal escape
- For Success of a procedure
- For Wise use of resources
- For Time management

Complications of restraint

Restraint is required for proper transportation, examination and treatment of any animal species.

The degree of restraint required reflects:

- The species and/or breeds
- The animal's familiarity with handling
- Anticipated invasiveness and
- The duration of the procedure



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It is the handler's responsibility to use appropriate techniques that facilitate the success and safety of all humans and animals involved in a procedure. Unfortunately, despite all attempts to minimize complications, restraint can adversely affect some animals.

Undesirable effects that can be associated with restraint include:

- Trauma, including contusions, bruising, lacerations, and nerve paralysis
- Metabolic disturbances: acidosis, hypoxia, hypocalcaemia, hyperglycemia, & hypoglycemia
- Hyperthermia
- Regurgitation
- Pregnancy complications and displaced abomasums
- Pneumonia and bloat
- Emotional stress



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

1. Define the term restraining in general concepts (4 points)
2. Explain the basic Gide line in animal restraining (6 points)
3. Explain the general requirements of restraining (6 points)

Note: Satisfactory rating - 10 and 12 points Unsatisfactory - below 10 and 12 points

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

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____



Information Sheet 3	Assembling Necessary Materials and Equipment
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3. Ensure the safe use of machinery, equipment and tools

- **Machinery:-** They are those machinery services I pregnancy diagnosis in cattle that may vary in quality and types depending on the status
- **Equipment's:-** Are those equipment's used in PG test
- **Tools:-** Are simple hand tools served during pregnancy diagnosis

3.1. Maintain and check equipment correctly

A maintenance schedule should be in place to ensure that your equipment is maintained at least at intervals indicated in the manufacturer's operating instructions or more frequently if indicated by the risk assessment. Any daily checks should be undertaken as recommended by the manufacturer. This will help prevent problems such as blockages, leaks or breakdowns, which can increase risks.

Some types of equipment - from gas appliances and lifting equipment to pressure systems and power presses - require examinations by law, often known as thorough examinations by a **competent person**, in addition to normal repair and servicing. You need to keep the certificates and records of such checks, detailing the findings and any remedial work carried out to correct faults that were identified.

In addition to the equipment itself, you'll also need to maintain safety devices around the equipment such as guards, alarms, safety cages and warning signs.

If you use heat-producing equipment you should regularly check the environment around it. Floors should be kept clear and there must be adequate ventilation at all times. You also need to remove all combustible materials from the area and regularly maintain and check fire detectors.



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If any equipment is to be checked or repaired, it should always be turned off and isolated so it can't be started in error.

Most equipment now comes with guidelines for maintenance, including advice on how to carry out equipment checks safely.

Many businesses find it useful to establish documented procedures for maintenance and repair work, such as a permit to work scheme. You can also use warning signs as a visible reminder that equipment is temporarily out of use and/or a lock out system, ie the person doing the maintenance work has a key that prevents the equipment starting up while they work on it

3.2. Dismantling and reassembling

Dismantling equipment allows it to be meticulously cleaned improving its effectiveness and often extending its life. It is important that all staff involved in this stage are fully trained to prevent damage to the equipment and reduce the risk of them injuring themselves.

Wiping over, washing and rinsing

At the end of the activity day, each piece of equipment should be wiped over and where appropriate washed and rinsed to prevent build up of grime. Some items of equipment may also need to be dismantled before they are washed and rinsed by using appropriate cleaning procedures based on the guide line.

- I. **Stethoscope:** - to detect abnormal sounds of internal hollow organs.
- II. **Thermometer:-** to record temperature of the body.
 - ✓ The thermometer kept immersed in water bath shall be cleaned daily to have precise temperature reading or water bath fitted with digital display temperature indicator should be used.

III. Ultrasonography

In the 1980s, real time ultrasonography was developed for use in domestic animals. An ultrasound machine resembles a radar device. A probe is inserted through the rectum and



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positioned above the uterus. This probe generates pulses of ultrasound that are transmitted to adjacent tissues. These pulses are then reflected back to the probe from different tissue surfaces. The reflected pulses to the probe produce an electrical signal that is processed by a scan converter and displayed on a video monitor. On the video, the intensity of the ultrasound pulses returned to the probe is converted to different shades of gray, as compared to black and white. Structures that contain fluid (such as the fluid-filled placenta) absorb most of the ultrasound pulses and the result is a black image on the video screen. On the other hand, more dense structures (such as an embryo) are more ecogenic (i.e., have greater reflectivity) and result in a light gray or white image on the screen.

The main advantages of the use of ultrasound for pregnancy diagnosis are

- the high reliability of the results that are generated and
- The fact that pregnancy diagnosis may be conducted relatively early after insemination (i.e., as early as 25 days after insemination).

The main disadvantages of the use of ultrasonography are related to cost and time involved with the use of this technique.

- Ultrasound machines are expensive and it takes more time to perform a pregnancy diagnosis with an ultrasound machine than by rectal palpation.
-
- Vaginal speculum (optional) :- used for examination of vagina.
 - Gloves of different size:- used during pregnancy diagnosis
 - Disinfectants:- Used to clean and disinfect the tools and machinery before and after use.



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

1. Explain the function of following machines and equipment's. (6 points)
 - A. Stethoscope
 - B. Thermometer
 - C. Ultrasonography
 - D. Vaginal speculum

Note: Satisfactory rating - 4and 6 points

Unsatisfactory - below 4and 6points

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

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

a. _____

_____ b. _____

c. _____

d. _____



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<i>Operation sheet 1</i>		LO1. Prepare relevant data for Pregnancy Diagnosis (PD)
Operation Title	Prepare for Restraining animals	
Purpose	<ul style="list-style-type: none"> ▪ To acquaint the trainees with Prepare for restraining procedures. 	
Equipment, tools and materials	This may include boots, hats/hard hat, overalls, gloves, specialized gloves for conducting large animal restraining parlor , Large sized rope, relevant breeding records.	
Conditions or situation for the operation	<ul style="list-style-type: none"> ▪ All the tools and equipment should be ready on time. 	
Procedure	<ul style="list-style-type: none"> ❖ Wear personal protective equipment while you are Preparing for restraining animals ❖ Completing preparation for materials and equipment's for restraining ❖ Mustering, Yard and safe restraining of animals ❖ Drafting dairy animals to be tested ❖ Safely complete the restraining procedure and release the anima safely 	
Precautions	<ul style="list-style-type: none"> ▪ Care should be taken not to be kicked 	
Quality criteria	<ul style="list-style-type: none"> ▪ Did personal protective equipment worn while Preparing for pregnancy ✓ Did materials, tools and equipment used for restraining are identified? 	



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LAP Test	Practical Demonstration
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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. Perform the restraining procedure for dairy animals



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References