

**VOCATIONAL HIGHER SECONDARY
FIRST YEAR**

**LIVESTOCK MANAGEMENT
DAIRYING [MILK PRODUCTS]**

TEACHERS' SOURCEBOOK



**Government of Kerala
Department of Education
2005**

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PREFACE

Dear Teachers,

In Kerala learner centered, activity based and process oriented educational system is introduced to the VHSE. It becomes imperative to make significant changes in the learning process as well as in the evaluation system for its successful implementation.

Being an agricultural country, dairying has emerged as one of the leading subjects in vocational education. The learner need to acquire skill, knowledge and experience so that he may be able to work in industries and firms related to dairying.

This sourcebook for teachers includes many concepts and principles along with suggestions for transactional strategies. The vision, knowledge and experience of teacher should be used for proper application of this source book.

This source book gives necessary guidance for planning the activities to achieve the different curriculum objectives and evaluation process in tune with the prescribed method.

I request the teaching community to forward their comment and suggestions to improve this book.

With regards.

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SECTION I

APPROACH

Introduction

The ultimate aim of education is human refinement. Education should enable the learner to formulate a positive outlook towards life and to accept a stand which suits the well being of the society and the individual as well.

The attitude and potential to 'to work' has determined the destiny, progress and cultural development of the human race. As we all are aware, the objective of education to form a society and individuals having a positive work culture. The educational process expected in and outside our formal schools should concentrate upon inculcating concepts, abilities, attitudes and values in tune with these 'work culture.' Hence vocationalised education cannot be isolated from the main stream of education. In another sense, every educational process should be vocationalised. However, due to our inability to utilize the resources wisely, scarcity of job opportunities is a severe issue of the present society. For overcoming this deep crisis, emergent techniques have to be sorted out and appropriate researches have to be seriously carried out. It is in the sense that the content and methodology of vocational Higher Secondary Education have to be approached.

The Vocational Higher Secondary course was envisaged as a part of the National Policy on Education with the noble idea of securing a job along with education. The relevance of Vocational education is very great in this age of un employment. This education system, which ensures a job along with higher education, stands aloof from other systems of education.

A learning environment which ensures vocational aptitude, vocational training, basic life skills, competencies related to different subjects, appropriate values and attitudes and existential readiness has to be provided here.

The curriculum should be one which recognises the specific personality of the learner and should develop it in a desirable way. It should provide opportunity to imbibe novel ideas to follow a critical approach and for learning through experiences.

The competency to transform ones own resources for the betterment of the society and the individual is to be ensured in each individual. Training in the sense of equality, democratic sense, environmental consciousness and devotion to the constitution is an inseparable factor of the curriculum.

The need of a systematic curriculum is prevailing in vocational subjects. A scientifically structured curriculum incorporating the unique features peculiarity of Kerala ensuring the possibility of higher education and utilising the national and international possibilities of employment is required.

The new curriculum should be capable of assimilating the life skills, scientific temper, attitude of co-existence, leadership qualities and mental health to face the challenges of life. It should be capable of strengthening the competencies imbibed by the learners up to the tenth class.

A curriculum for selecting vocational areas according to the aptitude of the students, learning it in depth, acquire general awareness in the basic areas and to secure jobs has become the social need of the day. A learner centered, process oriented, need based vocational curriculum is envisaged.

What is learning?

- Learning is construction of knowledge and so it is a live and continuous mental process.
- Learning is a process of advancement through adding and correcting in the light of comparing the new issue with the previously learned concepts.
- Learning takes place as a part of the effort to solve problems.
- Learning takes place by assimilating bits of knowledge into ones own cognitive structure.
- Learning is not a linear process. It is a spiral process growing deeper and wider.
- Learning is an intellectual process rather than the mere memorisation of facts. Learning is a conglomeration of a variety activities like problem analysis, elucidation, critical thinking, rational thinking, finding out co-relations, prediction, arriving at conclusions, applications, grouping for other possibilities and extracting the crux. When opportunities are provided for intellectual processes learning will become effective and intellectual ability will get strengthened.

Theoretical foundations of learning

Education is the best device that can be adopted for creation of a new society. It should be democratic in content and process and should acknowledge the rights of

the learner. It should also provide opportunity for better citizenship training. The concept of equality at all areas should get recognition in theory and practice.

There should be conscious programme of action to develop nationality, humanness and love and against the encroachment of the sectarianism of caste and religion.

The learner should be able to take firm steps and deferred against the social crisis like privatisation, liberalisation, globalisation etc. and against all kinds of dominations.

They should develop a discrimination to use the acquired learning as a liberative weapon.

They should be able to view education and life with the perspective of social well being.

They should get opportunity to recognise that co-operation is better than competition and that co-operation is the key to social life and culture.

A basic awareness of all the subjects needed for life essential for all students.

The remnants of perspectives formed in us during the colonial period still influence our educational philosophy. The solution to the present day perplexities of the society which approaches education on the basis of competitions and marketisation is only a comprehensive view of life.

It is high time that education was recognised on the basis of the philosophy of human education. The human approach to education has to reflect in its content, learning process and outlook. The perspective of 'learning to be ' and learning to live together as expressed by the UNESCO and the concepts of existentialist intelligence intrapersonal and interpersonal intelligence.

The basis of new approaches on curriculum, teaching- learning process are derived from the developments place in the east and west of the world.

When we begin to see the learner at the centre of the learning process, the teaching process has to be changed timely. It is the result of the rapid growth and development of Science and Technology and Pedagogy. If we want to undergo the changing process, we have to imbibe the modern hypothesis regarding learner, they have;

- Great curiosity
- Good imagination

- Numerous other qualities and interests
- Independent individuality
- Interest in free thinking and working in a fearless atmosphere.
- Have interest in enquiring and questioning.
- Ability to reach conclusions after logical thinking.
- ability for manifest and establish freely the conclusions arrived at.
- Interest for recognition in the society.
- Determination to face the interference of society and make components which is a part of social life.
-

When we consider the learning system, the domains to be stressed in education according to the modern development becomes relevant.

The **knowledge** domain consists of

- Facts
- Ideas
- Laws
- The temporary conclusions and principles used presently by scientists.

The learning is a process. The continuous procedures we undergo to reach a particular goal is process. The skills which are parts of the process to analyze the collected ideas and proofs and come to a conclusion is called *process skills*. Some important **process skills** are,

the skills;

- To observe
- To collect data and record
- To classify
- To measure and prepare charts
- To experiment
- To predict
- To recognise and control the variables
- To raise questions
- To generalise
- To form a hypothesis and check.

- To conclude
- To communicate
- To predict and infer
- To use tools.
-

Observation is the process of acquiring knowledge through the senses. It is purely objective oriented. Learning experiences which provide the opportunity to use all the senses may be used.

The process of grouping is known as **classifying**. Starting from simple groupings of data, it can extend to the level of classification into minute sub-groups.

In addition to this, consider the skills related to **creative domain** also, they are skills:

- To visualize
- To connect facts and ideas in new ways
- To find out new and uncommon uses of objects
- To fantasize
- To dream
- To develop creative isolated thoughts
-

Creativity is an essential component of process and activities. The element of creativity is involved in finding out problems, formation of hypothesis, finding 'solutions' to problems etc. Through activity oriented learning experiences, opportunities to express creativity can be created.

Again, the following factors consisting in the **Attitudinal domain** are also important as;

- Self confidence
- Love for scientific knowledge
- Attitude to know and value history
- Respect human emotions
- Decide with reasonable present problems
- Take logical decisions regarding personal values

'Hypothesis' is a temporary conclusion drawn using insight. Based on knowledge and experiences relating to the problems the causes and

solutions can be guessed.

As regards the **application domain** the important factors are the ability to:

- observe in daily life examples of ideas acquired.
- take the help of scientific process to solve the problems of daily life.
- choose a scientific life style
- connect the ideas acquired with other subjects.
- integrate the subjects with other subjects.

Some basic stands have to be taken on the new scientific knowledge about intelligence learning and teaching. When such basic concepts are accepted changes are required in the following factors.

- The vision, approach, structure and content of the curriculum.
- The vision, approach, structure and content of the textbooks.
- Role of the teacher and the learner.
- Learner atmosphere, learning materials and learning techniques.

Some scientific perspectives accepted by modern world in educational psychology are given below.

Constructivism

This approach puts forward the concept that the learner constructs knowledge. New knowledge is constructed when ideas are examined and practiced in new situations relating them with the previously acquired knowledge and experience. That is assimilated into the cognitive structure of one's knowledge. This method which gives priority to critical thinking and problem solving provides opportunity for self motivated learning.

Social Constructivism

Social constructivism is a sub section of constructivism. Knowledge is formed, spread and imbibed and it becomes relevant in a social environment. Interactive learning, group learning, co-operative participatory learning, all these are concepts put forward by social constructivism.

The main propounders of constructivism are piaget, Vygotsky and Bruner.

Discovery learning and interactive learning have prime importance. Learning takes place as a part of the attempt for problem solving. The activities of a learner who

confronts cognitive disequilibrium in a learning situation when he tries to overcome it is leaders to the renewal of cognitive structure. It is through this process construction of new knowledge and the assimilation of them that learning take place. Observation and enquiry are unavoidable factors. The learner advances towards new areas of acquisition of knowledge where he tries to compare his new findings with the existing conceptions.

Learning is a live mental process. Rather than the ability for memorisation of facts cognitive process has to be given emphasis. The process of problem analysis, elucidation, critical thinking, rational thinking, finding out co-relation, prediction, hypothesis formation, application, probing for other possibilities, extracting the crux and other processes are of critical importance in learning.

Constructivism gives greater predominance to co-operative learning. Social and cultural factors influence learning. Sharing of knowledge and experience among learners, collective enquiry, assessment and improvement, group activity and collaborative learning, by sharing responsibilities with the objective of public activity, provide opportunity for effective learning.

In learning internal motivation is more important than external motivation. The learner should have interest and initiative in learning. Learning situation should be capable of forming a sense of ownership in of the learner regarding the learning process.

Learning is not a linear process. It progresses in a spiralled way advancing deeper and wider.

Learner-his nature and features

The learners in standard XI has undergone a learner centered and process oriented learning experience up to X standard. He is adequately competent to select vocational subjects according to his aptitude and interest and to acquire higher education and profession as he wishes. The aspirations about future life is framed in this particular age foreseeing national and international job opportunities. Some of the peculiarities of the learner at this stage are:

- Physical, intellectual an emotional planes are intensive changes during this age and their reflections can be observed.
- Ability to enquire, discover and establish cause-effect relationship between phenomena.
- Readiness to undertake challenges.

- Capacity to shoulder leadership roles.
- Attempt to interpret oneself.
- Susceptibility to different pressures.
- Doubts, anxieties and eagerness about sex.
- Longing for social recognition.

Needs of the learner

- To make acquaintance with a job through vocational education.
- To acquire more knowledge in the concerned area through higher education.
- To recognise and encourage the peculiar personality of the later adolescent period.
- To enable him to defend against the unfavorable circumstances without any help

Role of the Learner

- Active participant in the learning process.
- Acts as a researcher
- Sharer of information
- Sharer of responsibilities
- Collects information
- Takes leadership
- Involves in group work
- Acts as a co- participant
- Observes his environment
- Experiments and realises
- Makes interpretations and draws inferences.
-

Role of the Teacher

The teacher should;

- consider the 'Stress and strain' of the teenagers
- understand the socio- economic and cultural background of the students.
- promote and motivate the students to construct knowledge.
- arrange proper situations to interact in and outside of the classroom.
- guide the students by explanations, demonstrations etc.
- promote opportunity for co-operative learning and collaborative learning.
- facilitate interpersonal and intra-personal interactions.
- act as a democratic leader.

- act as a problem solver
- effectively guide the students for the selection and conduct of various continuous evaluation elements.
- continuously evaluate the progress of the learners.
- gives scaffolding/support wherever necessary.
- motivate for learning
- promote divergent thinking.
- act as a democratic group leader.
- act as a co-learner
- gives variety of learning experiences.
- be a constant student
- facilitate for reference/data collection
- have a clear understanding about the age, needs, peculiarities, abilities, nature, aptitude etc. of the learner.
- have the ability to motivate the learner in order to acquire and enrich their knowledge.
- be a guide to the learner in developing insights and creating responses on current affairs.
- be capable to lead the learner into a variety of learning methods and process based on curricular objectives.
- be a link between school and community.
- be a good organiser, guide, friend, philosopher and co-learner.
- have an inter disciplinary approach in learning activities.
- be able to guide the learner in his/her career prospects based on his interest aptitude and ability.
- be impartial and democratic.
- provide ample experiences to attain the basic values and objectives of the curriculum.
-

New Concepts of Learning

1. Discovery Learning-

The teacher has to create a motivating atmosphere for the learner to discover concepts and facts, instead of listening always. Creating occasion to progress towards discovery is preferred. Instead of telling everything before and compelling to initiate the models, situations are to be created to help the children act models as themselves.

2. Learning by discussion

That discussion leads to learning is Burner's theory. Here discussion is not opposing each other. It is a sharing on the plane of ideas. New ideas are arrived at by seeking explanations, by mutual giving and taking of ideas and by problem solving.

3. Problem solving and learning

Only when the learner feels that some thing is a problem to be solved that he takes the responsibility of learning it. It is an inborn tendency to act to solve a problem that causes cognitive disequilibrium in a particular area. It is also needed to have confidence that one is capable of doing it. The problems are to be presented in consideration of the ability and level of attainment of the learner.

4. Collaborative learning

This is the learning in which the responsibilities are distributed among the members of the group keeping common learning objectives. The common responsibility of the group will be successful only if each member discharges his duties. All the members will reach a stage of sharing the result of learning, equally through the activity with mutual understanding. The teachers who arrange collaborative learning will have to make clear the responsibilities to be discharged. This is possible through the discussion with the learners. Collaborative learning will help to avoid the situations of one person working for the whole group.

5. Co-operative learning

This is the learning in which the learners help one another. Those who have more knowledge, experience and competency, will help others. By this exchange of resources the learners develop a plane of social system in learning also. As there are no high ups and low ones according to status among the learners they can ask the fellow students doubts and for helps without any hesitation or in hesitation Care should be taken not to lead this seeking of help to mechanical copying. It should be on the basis of actual needs. So even while encouraging this exchange of ideas among the members of the group cautions acceptance is to be observed as a convention. There should be an understanding that satisfactory responses should come from each member and that the achievement of the group will be assessed on the basis of the achievement of all the members

6 Zone of Proximal Development

Vygotsky observes that these is a stage of achievement where a learner can reach by himself and another higher zone where he can reach with the help of his teachers

and peers and elders. Even though some can fulfil the learning activity by themselves there is the possibility of a higher excellence. If appropriate help is forth covering every learner can better himself.

7 Scaffolding

It is natural that the learner may not be able to complete his work if he does not get support at the proper time. The learner may require the help of the teacher in several learning activities. Here helping means to make the learner complete the activity taking responsibility by himself. The teacher has to keep in mind the objective of enabling the learner to take the responsibility and to make it successful.

8 Learning: a live mental process

Learning is a cognitive process, only a teacher who has an awareness as to what the cognitive process is alone can arrange learning situations to the learner to involve in it. Learning can be made effectively and intellectual sharpness can be improved by giving opportunity for the cognitive processes like reminding, recognising, compromising, co-relating, comparing, guessing, summarising and so on. How is cognitive process considered in language learning? Take guessing and prediction for example.

- Guessing the meaning from the context.
- Guessing the content from the heading.
- Predicting the end of the story.
- Guessing the incident, story from the picture.
- Guessing the facts from indications.
- and other such activities can be given the following activities can be given for the cognitive process of summarisation.
- Preparation of blue print.
- Preparation of list.
- Preparation of flow chart.
- Epitomising in one word.
- Giving titles and so on.
- Symbols, performance of characters indications, lines of a poem, tables, pictures, concepts, actions, body language and such things can be given for interpretation. Process based language given for interpretation. Process based language learning has to give prime importance to the cognitive process.

9 Internal motivation

Internal motivation is given more importance than external motivation. The teacher has to arouse the internal motivation of the learner, A person internally motivated like this alone can immerse in learning and own its responsibility. How motivating is each of the activities is to be assessed.

10 Multiple intelligence

The Theory of Multiple Intelligence put forward by Howard Gardener has created a turning point in the field of education. The National curriculum document has recommended that the curriculum is to be designed taking into consideration of this theory.

Main factors of the intellect :

1. Verbal/linguistic Intelligence -

Ability to read and write, making linguistic creations , ability to lecture competence effective a communication , all these come under this . This can be developed by engaging in language games and by teaching others.

2. Logical /mathematical Intelligence

Thinking rationally with causes and effect relation and finding out patterns and relations come under this area, finding out relations and explaining things sequential and arithmetical calculations are capable of developing this area of intelligence.

3. Visual /spatial Intelligence

In those who are able to visualise models and bringing what is in the imagination into visual form and in philosophers, designers and sculptors this area of intelligence is developed. The activities like modelling using clay and pulp, making of art equipments, sculpture, and giving illustrations to stories can help the development of this ability.

4 Bodily Kinaesthetic Intelligence

The activities using body language come under this. This area of intelligence is more developed in dancers and actors who are able to express ideas through body movements and in experts in sports, gymnastics etc.

5 Musical Intelligence

This is an area of intelligence which is highly developed in those who are able to

recognise the different elements of music in musicians and in those who can hear and enjoy songs. Playing musical instruments, initiating the songs of musicians, listening silently to the rhythms and activities like this are capable of developing this area of intelligence.

6 Interpersonal Intelligence

Those in whom this area of intelligence is developed show qualities of leadership and behave with others in a noble manner. They are capable of understanding the thought of others and carrying on activities like discussion successfully.

7 Intrapersonal Intelligence

This is the ability to understand oneself. These people can recognise their own abilities and disabilities. Writing diaries truthfully and in an analysing way and assessing the ideas and activities of others will help developing this areas of intelligence

8 Naturalistic Intelligence

A great interest in the flora and fauna of the nature, love towards fellow beings interest in spiritual and natural factors will be capable of developing this area.

9. Existential Intelligence

The ability to see and distinguish our own existence as a part of the universe, ability to distinguish the meaning and meaninglessness of life, the ability to realise the ultimate nature of mental and physical existences, all these are the peculiarities of this faculty of intelligence.

Emotional Intelligence

The concept of emotional intelligence put forward by **Daniel Golman** was used in framing the new curriculum. The fact that one's **Emotional Quotient (E.Q)** is the greatest factor affecting success in life is now widely accepted. The teacher who aims to focus on improving the emotional intelligence of students need to concentrate on the following.

i) Ability to take decisions

Rather than imposing decision on students while planning and executing activities, the students may be allowed to take part in the decision making process. Taking decisions through open discussion in the class, inviting students suggestions on common problems etc. are habits to be cultivated.

ii) Ability to reach consensus

- When different opinions, ideas and positions arise the students may be given the responsibility to reach a consensus.
- Imagining what would be the course of action in some situations, allowing to intervene in a healthy way in problems between individuals.

iii) Problem solving

- Developing the idea that there is reason and solution to any problem.
- Training in finding reasons for problems.
- Suggesting solutions through individual or group efforts.
- Discussing social problems.
- Analysing the shortcomings in methods to solve problems.

Whether plastic can be banned within school premises can be given as a problem. Group discussion will provide reasons and solutions. Problems which can influence classroom learning and for which the learner can actively contribute solutions need to be posed.

- Self criticism, evaluation
- Ability to face problem-situation in life
- Thinking what one would do if placed in the situation of others, how one would respond to certain experiences of others - All these foster the growth of emotional intelligence.

iv) Life skills

Life skills need to be given a prominent place in education. W.H.O. has listed ten skills required for success in life.

- Self awareness
- Empathy
- Inter personal relations
- Communication
- Critical thinking
- Creative thinking
- Decision making
- Problem solving
- Coping with emotion
- Coping with stress

The new curriculum addresses these areas.

Knowing the characteristics of the learner, role of the teacher and how to use the teachers handbook help the teacher to plan and effectively implement learning activities.

Objectives of the Vocational Higher Secondary Curriculum.

- To facilitate higher education while giving opportunity to enter in the field of employment.
- To develop environmental awareness, sense of national integration, tolerance and human values so as to ensure social and cultural improvement.
- To enable the learner to find on his own employment.
- To inculcate mental courage in the learner to face unfavourable situations.
- To make human resource development possible.
- To enable the learner to understand social problems and to react appropriately.
- To develop the learner to identify and develop his own competencies.
- To develop vocational aptitude, work culture and attitude in the learner so as to provide useful products and services to the society.
- To create an awareness about mental and physical health.
- To acquire awareness about different job areas and to provide backgrounds for acquiring higher level training in subjects of interest.
- To develop possibilities of higher education by creating awareness about common entrance examinations.
- To provide situation for the encouragement of creative thinking and organising training programmes in each area, creative abilities and to develop artistic talents.

Nature of Approach

The learning device is to be organised in the selected vocational subjects in such a way that adequate practical experience should be given, making use of the modern technology. The development in each area on the basis of information technology is to be brought to the learner. The work experience in the respective fields(OJT, Field trip, Production/Service training, Survey, Workshop, Exhibition, Youth festival, Physical fitness etc.) are to be adjusted suitable to the learning and evaluation process. The participation and leadership of the students in planning and execution is to be ensured through this kind of activities. Social service is to be made a part of the course.

Approach towards Vocational Higher Secondary Education

The learning methodology has to be organised so as the learning provide adequate practical thinking on the opted vocational subject utilising the new technology. The development of information technology should be made available in each sector. Work experience, OJT, Field trip production, Service cum training centre, Survey, Workshops, Exhibitions, Youth festivals, Physical fitness etc should be systematised well appropriate to learning and evaluation. Learner participation should be ensured in the planning and implementation of these activities. Social service should be a part of the course. If a learner has to change his school, he should be provided an opportunity to continue his studies in the new school. While considering criteria for admission to higher courses, grades of vocational subjects should also be given due weightage. In tune with the changes in the Vocational Higher Secondary Education changes should be ensured in the field of higher education.

The teachers have to take special care in arranging learning activities for the development of all the faculties of intelligence.

Learning activities and learning atmosphere.

A proper learning atmosphere is essential for the betterment of learning activities.

They are:

- Proper physical environment
- Healthy mental atmosphere
- Suitable social atmosphere
- Active participation of PTA, Local bodies and SRG
- Reference materials and visual media equipments.
- Academic monitoring
- School Resource Group (SRG)

SUBJECT APPROACH

Introduction

India is basically an agricultural country. More than 50% of Indians depends on livestock farming as their main source of livelihood. Various livestock products were used by human beings since time immemorial. Livestock rearing has played a major role in shaping human civilization. Livestock management is of great significance in generating employment opportunities. The draught power for agricultural industry can also be attained from livestock.

The main aim of this VHSE course on Livestock management is to enable the students to be self employed. There are a lot of opportunities waiting for the students who have successfully completed the livestock management course. It is the basic qualification for a job such as livestock Assistant/Farm Assistant in various veterinary hospitals, livestock farms, dairy plants, Disease diagnostic institutions coming under Kerala Animal Husbandary Department, Kerala Agricultural University, Kerala Livestock Development Board & MILMA. Many of these vacancies are filled annually by the PSC. There is also loan facilities from banks for those who seek self employment.

Objectives

- ◆ *To generate large scale employment opportunities in Animal Husbandry sector.*
- ◆ *To develop a society with self confidence, practical experience and moral values.*
- ◆ *To enable the students seek self employment opportunities.*

Learning Approach

A learner-centered and activity-based learning approach is to be adopted. The many sided intelligence of the students should be explored to gain indepth knowledge, The method of teaching should be based on the student's needs, their expectations and interest. Their participation also should be ensured.

For this we can adopt different strategies & techniques.

1 Discovery learning

The teacher has to create an atmosphere that encourages the learner to discover ideas and facts on his own. For example, the teacher can assign the students to identify the characteristics of different breeds. This gives an opportunity for the learner to observe the different breeds in their surroundings or they can collect information from different sources like Internet & print media. Their observation can be consolidated into the product.

2 Co-operative learning

In this method, the learners learn by helping each other. The negotiations among peers take place here.

For example if, we want to create an awareness among the students about different milking methods, the students can be divided into different groups and a group discussion on the topic can be conducted. The ideas evolved from the discussion can be consolidated and presented in the class.

3 Collaborative learning

The two important aspects of this method of learning are sharing of ideas and negotiation among the learners. Suppose we want to deal with different feeding materials for animals. Here also they can be divided into groups and the teacher can ask them to collect different varieties of feeding materials and their characteristics. Their observation can be consolidated and presented in the class.

4 Socio cultural related learning

This method of learning pertains to the social and cultural aspects of the society. For example: An informal interview can be conducted by the learner to study the influence of different livestock products on the people of a particular locality. A suggested topic can be the problems related to marketing of pork in a Muslim dominated area.

Objectives

1. To create the basic knowledge of Livestock Rearing
2. To familiarize the students with the common terms regarding Dairy farming.
3. To help the students to identify various breeds of cattle, Buffalo & Goat.
4. To create a knowledge about specific methods of Rearing Livestock.
5. To make the students aware of the structure & functions of various organs in the body.
6. To help the students to identify various feed stuffs for livestock available in their locality
7. To make them aware of different breeding strategies.
8. To give the students an idea of milk & its composition.
9. To help the students to identify various adulterants & preservatives used in dairy industry.
10. To create an awareness of clean milk production.
11. To make students aware of the present status of Livestock.

For this topic, group discussion can be used as a study tool. Students are divided into different groups and are given the following topics to deal with groupwise.

1. Population status of cattle
2. Population status of buffalo
3. Population status of goat

Common terms in Dairy farming

For this topic, brainstorming can be used as the study tool. Terms common to students can be consolidated. Additional terms can be supplemented by the teacher.

Merits & Demerits of Dairy farming

The students are divided into different groups and the teacher can ask the students to conduct an informal interview with the farmers. The students are asked to present collected information in the class groupwise. Then the teacher can consolidate all the collected pieces of information.

CURRICULUM OBJECTIVES

Introduction to dairying (14 hours)

- To understand and develop an idea about livestock farming & its importance through discussion.
- To know the present population status of different species of livestock through data collection & charts.
- To create an awareness about merits & demerits of dairy farming.
- Identification of body parts of cattle.
- To create an awareness about different breeds.
- Identification of and understanding the salient features of different dairy breeds, draft breeds & dual purpose breeds of cattle.
- Identification of breeds of buffalo & goat
- Restraining of animals.
- Knowledge about Judging of cattle.
- Familiarization of common terms used in dairy Industry.

Housing of cattle systems of Housing Cattle (12 hours)

- To get an idea about dairy farm.
- To get an awareness about planning of farm building.
- To give an idea about principles of housing.
- To acquire knowledge of different systems of Rearing of Cattle.

General Physiology of Animals (22 hours)

- Create an awareness of the body systems of cattle.
- Understand the structure and function of digestive system.
- Understand the structure and function of reproductive system.
- To give an idea about Normal Physiological Values.
- To give an idea about different systems of breeding.

Cattle Management (12 hours)

- To understand the care of New born calf.
- Understanding different aspects of management of calf
- Understanding of common diseases.

Feeds & Feeding (22 hours)

- To give an idea of classification of different feeds.
- Idea of common terminologies of different feed stuffs.
- To develop basic idea of important nutrients
- To give an idea of ration

Milk Section (22 hours)

- Understanding the physiology of lactation.
- Create an awareness of milking methods.
- Understanding different milking methods.
- Factors influencing milk production

Definition of Milk, Composition of milk (12 hours)

- To create an awareness of milk and its constituents
- To understand the various factors affecting composition of milk.
- To help the students to get an idea of the existing standards of milk for different species.
- To understand various adulterants & preservatives used in milk.
- To understand the various methods of detection of adulterants.

Physical and Chemical Properties of Milk (12 hours)

- Physical - chemical properties of milk.

Clean milk production (12 hours)

- To help the students get an idea of natural microorganisms present in milk.
- To give an awareness about common defects seen in milk/milk products.
- Understand the hygienic practices followed for clean milk production.
- Knowledge about various platform tests.

SYLLABUS

Introduction to Dairying (14 hours)

Introduction to livestock, population of buffaloes, goat of Kerala according to latest census. Advantages & limitations of dairy farming - different parts of body of cattle - common breeds of cattle, buffalo, goat (Hallikar, Kangayam, Sahiwal, Gir, Sindhi, Jersey, HF, Brown Swiss, Murrah, Surti, Jamnapari, - its origin & characters), Restraining of cattle, judging of cattle, common terms used in dairy practices - Definitions for new born calf, young calf, Heifer cow, bull, bullock, teaser bull, steer, kid, doeling, buckling, doe, buck.

Housing of Cattle, Systems of Housing Cattle (12 hours)

Planning of new farm building - dimension of buildings required for a dairy farm (milking barn, sheds for milch & dry cows, calving pens, sick animal shed, calf shed, young stock shed, bull shed) systems of Rearing cattle (Loose Housing, conventional, Free Range).

General Physiology of Animals (22 hours)

Name the different systems of body, Describe digestive & Reproductive Organs with particular mention of the function of each organ, normal physiological values - Temperature, Respiration, Pulse, Gestation Period, Age of Breeding, Methods of breeding - Natural & Artificial Insemination - Advantages & Disadvantages of each system.

Cattle Mangement (12 hours)

Care of newborn calf. Name the systems of Rearing of calf - Advantages and Disadvantages - feeding of colostrum - Dehorning, Deworming, Castration, Identification of Animals (Tattooing, Tagging, Branding), Diseases.

Feeds & Feeding (22 hours)

Classification of feeds - concentrates and Roughages (Definitions and examples). Define Nutrient, classify feed nutrients (water, protein, carbohydrates, fats, minerals, vitamins & their functions) meaning of balanced ration, computation ration, common technologies, Definition of (feed, Legume, forage/fodder, pasture, silage, hay).

Milk Section (22 hours)

Structure of udder, process of milk secretion, letting down of milk, milk removal methods - sucking, hand milking (full hand milking, thumbing & stripping) machine milking, milking disorders, (supernumerary teats, fistulated teat, Bore teat, Teat cracks, Leaky Teats, Hard milkers). Factors affecting milk production, plan of nutrition & diseased condition.

Definition of Milk, Composition of Milk (12 hours)

Major and minor components of milk (water, fat, carbohydrates, proteins, minerals, vitamins) Factors affecting composition of milk, PFA standards for milk (Cow milk, Buffalo milk, Goat milk). Adulterants & Preservatives used and methods of detecting them (water, cane sugar & starch).

Physical and Chemical properties of Milk (12 hours)

Colour, flavour specific gravity, acidity, pH, freezing point, boiling point.

Clean Milk Production (12 hours)

Natural Microbial flora of milk - (Bacteria, Virus Yeasts & Moulds). Its effect on milk constituents, Defects seen in milk/milk products due to microbial action. Sources of contamination of milk & practices for reducing bacterial content of milk. Platform Tests (COB, MBRT, Alcohol), Cooling of milk, Detergents & Sanitizers (Definition, Examples).

PLANNING

Introduction

To make education activity based, we have to provide learning experiences that would help to develop process skills and components of multiple intelligence. Whether the activities are conducted in the class or outside, they are to be completed in a time bound manner.

The teacher has to plan the activities necessary to make learning effective, time required, evaluation methods and all other aspects. Teacher must prepare at least three planning documents.

- Year plan
- Unit plan
- Daily plan

Year plan

The year plan will include the total number of units to be transacted through the three terms, units to be covered during each month and the number of periods required for each unit.

Unit Plan

Teacher may prepare unit plan before the actual transaction of the unit in the classroom. This plan must make clear the curriculum objectives intended, periods required for transaction of these objectives, instructional strategies to be used and materials required. How the outcomes are to be evaluated may also be spelt out. Unit analysis for each unit given in the source book may be utilized for preparing unit plan.

Daily Plan

The daily plan includes curriculum objectives to be transacted during class period, learning activities, learning aids and feedback.

A lesson plan means planning for a lesson

Some models of year plan, unit plan and daily plan are given below.

YEAR PLAN

Unit	Chapter	Title of Chapter	No.of hours	Months when taken to teach	Activity/Strategy
I	1	Introduction	14	June	General discussion, collection of data & photographs, Debate, Demonstration. Preparation of charts & collage, Brainstorming, Farm visit, Seminar
II	2	Housing of Cattle, Systems of Housing Cattle	12	July	Discussion, Diagram, Field visit, Seminar
III	3	General physiology of animals	22	July August	Discussion, Lecture demonstration & practice, charts, assignments, Hospital visit.
IV	4	Cattle Management	12	September	Discussion, Field visit, Seminar, Flash card, Chart Preparation, Photograph collection.
V	5	Feeds and Feeding	22	October November	Discussion, Farm visit, Seminar, Collection of samples, Chart Preparation, Brain Storming, Lecture class.
VI	6	Milk section	22	November December	Discussion, Lecture, Drawing Diagram, Field visit, seminar, photograph collection, chart

Unit	Chapter	Name of Chapter	No.of hours	Months when plan to teach	Activity/Strategy
VII	7	Definition of milk, Composition of milk	12	January	Discussion, Chart preparation, Lecture, Demonstration & Practice
VIII	8	Physical and Chemical properties of Milk	12	January February	Observation and Practice, Lecture class, Milk Society Visit, Discussion, Demonstration and Practice.
IX	9	Clean Milk Production	12	February	Discussion, Chart preparation, Seminar, Collection of Photographs, Flash card, Lecture, Demonstration & Practice, Field visit.

UNIT PLAN

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation	Periods (Hrs)
<ul style="list-style-type: none"> To understand & develop an idea about livestock farming & its importance. (1 hr.) 	<ul style="list-style-type: none"> Livestock farming Agriculture Mixed farming Major livestock products 	<ul style="list-style-type: none"> General discussion 	<ul style="list-style-type: none"> Reference books Journals 	<ul style="list-style-type: none"> Participation in discussion 	1
<ul style="list-style-type: none"> To know the present population status of different species of livestock. (1 hr.) 	<ul style="list-style-type: none"> Cattle population Buffalo population Goat population 	<ul style="list-style-type: none"> Data Collection Charts 	<ul style="list-style-type: none"> Journals Reference books IT Charts 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts 	1
<ul style="list-style-type: none"> To create an awareness about merits & demerits of dairy farming (1 hr.) 	<ul style="list-style-type: none"> Merits of dairy farming Demerits of dairy farming 	<ul style="list-style-type: none"> Debate Discussion 	<ul style="list-style-type: none"> Journals Reference books Dailies 	<ul style="list-style-type: none"> Participation Performance 	1
<ul style="list-style-type: none"> Identification of body parts of cattle (2 hr.) 	<ul style="list-style-type: none"> Important body parts of cattle 	<ul style="list-style-type: none"> Demonstration Chart preparation Discussion 	<ul style="list-style-type: none"> Live animal Chart Journals 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts 	2
<ul style="list-style-type: none"> To create an awareness of different breeds (2 hrs.) 	<ul style="list-style-type: none"> Species Breed 	<ul style="list-style-type: none"> Discussion 	<ul style="list-style-type: none"> Reference books 	<ul style="list-style-type: none"> Participation in discussion 	1

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation	Periods (Hrs)
<ul style="list-style-type: none"> • Identification & understanding salient features of different dairy breeds, & draft breeds, & dual purpose breeds - buffalo breeds, goat breeds (3 hr.) 	<ul style="list-style-type: none"> • Indian breeds of cattle <ul style="list-style-type: none"> • milch draught • dual purpose • Exotic breeds of cattle <ul style="list-style-type: none"> • buffalo breeds • Murrah • Surti • Goat Breeds • Malabari • Jamunapari 	<ul style="list-style-type: none"> • Collection of photographs • Preparation of charts • Preparation of collage • Brain storming • Farm visit • Seminar 	<ul style="list-style-type: none"> • Charts • Journals • Dailies • Reference books 	<ul style="list-style-type: none"> • Analysis of charts • Performance • Visit report 	3
<ul style="list-style-type: none"> • Restraining of Animals (1 hr.) 	<ul style="list-style-type: none"> • What is Restraining • Purpose of Restraining 	<ul style="list-style-type: none"> • Discussion 	<ul style="list-style-type: none"> • Journals • Reference books 	<ul style="list-style-type: none"> • Participation in Discussion 	1
<ul style="list-style-type: none"> • Knowledge about judging of cattle (2 hr.) 	<ul style="list-style-type: none"> • Purpose of Judging • Score card: <ul style="list-style-type: none"> • General • Awareness • Body capacity • Dairy character • Mammary system 	<ul style="list-style-type: none"> • Farm visit • Score Card • Discussion 	<ul style="list-style-type: none"> • Score card • Farm Magazines • Reference books 	<ul style="list-style-type: none"> • Visit Report • Participation in Discussion 	2
<ul style="list-style-type: none"> • Familiarisation of common terms used in Dairying (2 hrs.) 	<ul style="list-style-type: none"> • New born calf, young calf, calf • Heifer, Bull, Cow • Doe, Buck, Doeling, Buckling • Steer, Teaser bull 	<ul style="list-style-type: none"> • Brain Storming • Chart preparation 	<ul style="list-style-type: none"> • Charts • Reference books 	<ul style="list-style-type: none"> • Performance 	2

DAILY PLAN

Name of the teacher : X Name of the School : GVHSS Subject : Dairying (Milk Products) Unit : Definition of Milk, Composition of milk Topic : Constituents of Milk ഉയർന്നതരംഗം ഉപയോഗിക്കേണ്ടതാണ് The students understand the concepts and ideas of constituents in milk giving more importance to nutritive value of milk through discussion, chart preparation etc. Concepts and Ideas Major constituents of milk Minor constituents of milk	Class : XI Strength : 28 Average age : 16+1 Duration : 1 hour ഉയർന്നതരംഗം ഉപയോഗിക്കേണ്ടതാണ് Concepts of nutrients and nutritive value of milk. Materials Required <ul style="list-style-type: none"> • Notes based on discussion points • Chart showing major and minor constituents of milk • Chart showing important functions of nutrients
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Activities/Strategies	Responses/Feed back
<p>കിട്ടിനോരണി</p> <p>Ask the students some questions regarding composition of milk, nutritive value etc. and provide a problem “why milk is considered as an ideal, complete balanced diet?”, “Why doctors prescribe daily one glass milk to growing children, patients, pregnant women & lactating mothers?”, “Why milk or milk products play important role in our daily diet?”. Direct them to write the possible answers for the problems and to present them.</p> <p>From the difficulties to answer the question, they are asked to discuss with fellow students. For this purpose, they are grouped into five. Provide them some hints.</p>	<ul style="list-style-type: none"> • Participation in discussion.
<p>Presentation</p> <p>Activity 1</p> <p>The students are asked to prepare notes with discussion points. Ask the leaders to present the notes in the class. Additional points can be supplemented by the teacher. After this they can easily prepare charts on composition of milk.</p>	<ul style="list-style-type: none"> • Presentation of prepared notes • Preparation of charts

Activities/Strategies	Responses/Feed back
<p>Activity 2</p> <p>When the discussion on milk composition is completed ask the students the importance of major constituents in milk. Teacher has to initiate the group discussion to give necessary assistance. Ask the students to prepare notes and conduct a seminar.</p>	<ul style="list-style-type: none"> • Participation in group discussion. • Preparation of notes • Presentation • Questions
<p>ഉത്തരങ്ങളിനു ചുരുക്കം</p> <ul style="list-style-type: none"> • Is milk a complete food? Why? • Major constituents of milk. • Nutritive value of milk fat, carbohydrate, protein, vitamins & minerals. • Minor constituents of milk. 	<p>Assignment</p> <p>Prepare a chart on major constituents of milk (Functions, percentage composition)</p>

EVALUATION

Introduction

As the curriculum is based on a particular vocation, evaluation becomes an inevitable procedure. Evaluation is done along with learning process throughout the course of study. In order to make an evaluation, the teacher should be able to understand the students, their scholastic and co-scholastic knowledge. Capacity building in the selected vocation is the most important part in vocational education and it should be evaluated accordingly. The technical skills, interest and devotion in the particular field, communication skills, analysis, organising and presentation skills etc. have to be evaluated. The personal and social qualities also have to be evaluated. Thus evaluation is an integral part of learning process which assesses the implementation of the curriculum.

Need and importance of Evaluation

Evaluation is to assess the scientific knowledge of students and to recognise to what extent they have achieved the specified capabilities. A written examination at the end of an year which is purely based on a textbook is not of much use. "Evaluation is a systematic process of collecting, analysing and interpreting evidence of students' progress and achievement both in cognitive and non-cognitive areas of learning for the purpose of taking a variety of discussions".

The teacher can properly assess the level of the learner and can identify his/her strength and weakness. This will help each student to evaluate themselves and to improve their level of learning by taking necessary assistance from the teacher (self evaluation) classmates can evaluate themselves through

interaction (peer group evaluation) Evaluation even help the teacher to analyse and improve their performance. Evaluation helps to integrate the teacher, learner and even the parents. Thus student who are socially useful and can perform productive work are created. This will improve the quality of our young generation.

Features of Evaluation

- Evaluation should be humane in nature. It must help the students grow as social beings.
- Evaluation should be the responsibility of the teacher who teaches the students and is responsible for developing the requisites healthy attributes in them.
- Evaluation should be consistent with its purpose and must provide a reliable and valid measure of the student's performance.
- Evaluation should reflect the outcome of each learning intervention and should provide all the students with equal opportunity to display their individual potential.
- Evaluation should take into account both the background and the prior experience of the students.
- Procedures for grading and their reporting should be appropriate and easily understood by one and all.
- Evaluation should restore the faith and trust of the masses by ensuring transparency in the procedure.

Theories of constructivism and multiple intelligence are the basis of modern learning. So evaluation strategies have also to be changed. Evaluation must be;

- Continuous and comprehensive
- Scholastic and co-scholastic
- Depending on grading system.
- Depending on a vocational or trade proficiency.

Continuous and Comprehensive Evaluation

Most of our traditional evaluation methods are related only to the area of scientific knowledge or the memory of students. To eliminate the limitations of this method we are forced to evaluate the multi-dimensional competencies of the learner with respect to the

practicability and nature of the subject.

Continuous and Comprehensive Evaluation is an essential ingredient of any learning process. It helps the learner to understand and evaluate his own progress and to develop adequate strategy for further improvement. Continuous Evaluation also helps us to measure the attained goals of formulated curriculum objectives.

Merits of Continuous and Comprehensive Evaluation system are:

1. Making student's learning regular
2. Provides for a variety of activities
3. Effective feedback is possible
4. Assess the all round development of the learner on a continuous basis through a variety of activities.
5. Remedial and diagnostic teaching is possible.
6. The process as well as the product is assessed.

Different tools are used to evaluate the multi dimensional competencies of the learners. The Continuous and Comprehensive Evaluation (CCE) includes not only written test (class tests) but also oral tests, observation, interview, debates, discussions, seminars etc.

The learner proceeds through a variety of learning experiences. Therefore the level of progress should be evaluated in a comprehensive and continuous manner. Moreover, the learner is to be made aware of the findings and it helps him to measure his progress. Necessary help should be provided to them in time. As such we can generate the environment and opportunity for Continuous Evaluation.

In order to evaluate the multi- dimensional competencies of the learner, different tools and techniques have to be used. The multi- dimensional competencies of the learner include :

- Class -room interaction
- Task orientation
- Creative expression

- Field/institutional interactions
- Knowledge assessment/ expression

Continuous Evaluation Items

1. Assignment
2. Seminar
3. Class test
4. Project etc.

* For continuous evaluation class test (CT) is made compulsory taking any two of the above said indicators. CT can be a written test, oral test (viva), Practical test.

CE Item	Evaluation Indicators	Weightage	Score
1. Assignment	1. Awareness of the content	4/3/2/1	20
	2. Comprehensiveness of the content	4/3/2/1	
	3. Systematic and sequential arrangement	4/3/2/1	
	4. Observation/suggestions/Views Judgements/ Evaluation	4/3/2/1	
	5. Timely Submission	4/3/2/1	
2. Seminar	1. Ability to plan and organise	4/3/2/1	
	2. Skills in the collection of data	4/3/2/1	
	3. Awareness of the content (presentation of the paper, participation in discussion, ability to substantiate the ideas and views)	4/3/2/1	

	4. Ability to prepare the report (sequence in the presentaionof the concepts, authenticity and clarity of ideas/views/concepts)	4/3/2/1	
	5. Quality of Seminar Document	4/3/2/1	20
3. Project	1. Ability to plan (Selection of the method for solution of the problem, identifying suitable tools, planning the various activities to be carried out in each stage)	4/3/2/1	
	2. Ability to collect data (sufficiency and Relevance of data. Classification and arrangement of data for analysis, reliability and authenticity of the Collected data.)	4/3/2/1	
	3. Ability to analyse the elements and procedure (Structuring of elements and developing logic. Efficiency in using the package/tool. Recognising design errors and correcting them)	4/3/2/1	
	4. Ability to prepare the project report (Reflection of the process skills. Communicability and authenticity of the report in relation with the Project diary)	4/3/2/1	
	5. Viva Voce(Knowledge of the content and Process)	4/3/2/1	20

CE item calculation

Subject		item: Assignment					Total Score (20)
Sl. No	Name	Evaluation Indicators					
		I (4)	II (4)	III (4)	IV (4)	V (4)	
1	Anand	2	3	4	4	4	17
2	Shibu	4	3	4	4	4	19

Consolidated statement of CE

Class: 1st year

Stream: Animal Husbandry

Subject : Dairying (Milk Products)

Sl. No	Name	CE Items			Total (60)	Total CE Out of 20 Score obtained $\times \frac{20}{60}$
		1 Class Test (20)	2 Assignment (20)	3 Seminar/ Project (20)		
1	Anand	18	17	19	54	18
2	Shibu	20	19	18	57	19

No minimum score for CE

Terminal Evaluation (TE)

Terminal Evaluation is in written form. The test should not be aimed to test the memory alone. The terminal evaluation questions give more emphasis on application level, analysis and synthesis. The questions are framed so that the students are able to apply their different mental process. The maximum score is 80 and the minimum score of TE is 24 (30%).

The terminal evaluation questionnaire should be capable of measuring

- Content validity
- Criterion validity
- Constant validity
- Reliability
- Class test, term evaluation and annual examination should be in tune with the new approach.
- Should not be prepared to test the rote memory.
- Questions asked should provoke the thinking abilities of students.
- Questions to test the competency of application analysis, synthesis and evaluation are to be given. In otherwords the questions should be framed in such a way that the students are able to apply their various mental processes.
- Questions should be based on the learning process and the new approach to each subject.
- Results should be scientifically analysed.

- Evaluation results should be analysed and follow up may be carried out at relevant levels (remedial measures).
- Eighty percent marks are set apart for the common examination as the part of the Term Evaluation

The Question Paper must have

- Application level questions
- Synthesis level questions
- Comparison of facts
- Challenging questions
- Scope for obtaining innovative ideas
- Giving creative thinking by the students
- Questions based on the objectives of learning activities
- Practical oriented questions
- Environment related questions
- Divergent thinking level questions

Role of the Teacher in the Evaluation Process

- Preparation for the effective execution of evaluation
- Preparation of daily planning notes (teaching manual) and helping learners in their activities.
- While learners are engaged in doing seminars/collections/assignments/ collections, conduct interim evaluation and provide necessary help.
- Consider assignment, seminar, collections etc. as learning activities and approach them as evaluation materials.
- Prepare a format to record continuous evaluation.
- Identify and evaluate the progress at different stage.
- Find out learner's difficulty by conducting feedback.
- Make use of the support mechanism fully, provided by the department of education.
- Make the parents aware of the new approach to curriculum and evaluation system through class P.T.A.
- Make use of the training programme for professional excellence and transparency in work.
- Make use of the Humanities Teachers Council for academic progress.
- Identify and make use of the possibility of action research to resolve classroom learning problems.

Grading

It is not scientific to assess the achievement of a student solely based in the marks in the terminal examinations. Marking system proved unscientific in evaluating the growth and development of students both in cognitive and non-cognitive areas. To overcome this shortcomings, a popular mode of evaluation based on students' performance- grading system- has been evolved. At the Higher Secondary stage, it is desirable to use a point absolute grading to co-ordinate and record the evaluation. After giving the score, they are changed into percentages and appropriate letter grades are awarded corresponding to each percentage. The score percentage and corresponding letter grade in Dairying (Milk Products) is given below.

Consolidated statement of CE & TE

Score in percentage	Grade
90-100	A+
80-89	A
70 -79	B+
60-69	B
50-59	C+
40-49	C
30-39	D+
20-29	D
Below 20	E

Stream : Animal Husbandry

Class : Ist Year

Subject : Dairying (Milk Products)

Sl. No	Name	CE (20)	TE (80)	Total CE+ TE (100)	Grade
1	Anand	18	60	78	B+
2	Shibu	19	72	91	A+

Practical Evaluation (PE)

PE is the important part of vocational practicals. The practical skills must be evaluated after completing all practical experiments in each term and at the end of the academic year. PE must cover all required indicators to evaluate the technical skill and practical knowledge of the different topics covered.

Syllabus

DAIRYING (MILK PRODUCTS) FIRST YEAR

PRACTICAL

420 hrs

- 1 Identification of different parts of body of the cattle.
- 2 Identification of different breeds of cattle, buffaloes and goats (Hallikar, Kangayam, Sahiwal, Gir, Sindhi, Jersey, Holstein - Friesian, Swiss Brown, Murrah, Surti, Malabari, Jamnapuri)
- 3 Plan and design of cattle sheds.
- 4 Measurement of temperature, respiration and pulse of cattle.
- 5 Identification of animals - Tattooing, tagging and branding.
- 6 Dehorning of cattle.
- 7 Identification of common feeding stuffs.
- 8 Identification of grasses.
- 9 Estimation of fat of milk (Gerber's Method).
- 10 Estimation of specific gravity by lactometer.
- 11 Estimation of specific gravity by specific gravity bottle.
- 12 Estimation TS & SNF (Formula method)
- 13 Estimation of TS (Gravimetric method)
- 14 Estimation of protein (Pyries method)
- 15 Estimation of Chloride content of Milk
- 16 Determination of acidity of Milk
- 17 Detection of adulterants and preservatives (Water, Cane sugar, Starch) 18 Platform tests - COB, MOB, Alcohol.
- 19 Visit diary plant, Milk Co-operatives and Livestock farms.

Indicators for Practical evaluation and their score

No	Indicators	Percentage	Score
1	Procedure and demonstration	20%	30
2	diagnosis or situation analysis	20%	30
3	Identification	20%	30
4	Calculation	20%	30
5	Record	10%	15
6	Viva	10%	15

Consolidated statement of Practical Evaluation

Class: 1st year

Stream: Animal Husbandry

Subject : Dairying (Milk Products)

No	Name	Procedure and demonstration	DIAGNOSIS/ Situation	Identification analysis	Calculation	Record	Viva	Total	Grade
		30	30	30	30	15	15	150	
1	Anand	25	25	25	25	10	10	120	A
2	Shibu	29	29	28	28	14	14	142	A+

How will you find out grade for PE

Convert the total score into percentage and find out the grade

eg: Total score: 120, percentage $\frac{120}{150} \times 100 = 80$, Grade A

The minimum score to be obtained is fixed at 40% that is 60 out of 150. Grade B

Vocational Competency Evaluation

Being a vocational course, a system to judiciously evaluate the required value addition and consequent capacity building in the selected vocational subject is highly essential. As the other evaluation components like CE, PE and TE cannot assess the vocational competencies and professional skills acquired by the students, an internship evaluation (IE) component has been introduced to meet this requirement.

Internship evaluation should be done based on the following components.

I. Regularity and punctuality.

A regular presence and habit of time bound completion of task is a must for attaining maximum efficiency.

Regularity and Punctuality can be evaluated by 5 point scale

Rating Scale

		1	2	3	4	5
1	Regularity	Never regular	Often regular	Usually regular	Most of the time regular	Always regular
2	Punctuality	Never Punctual	Often Punctual	Usually Punctual	Most of the time Punctual	Always Punctual

Regularity and punctuality can be assessed by using attendance of the student and time bound completion of tasks.

II. Value addition

Value addition can be evaluated through conducting field visits/survey. The experiences gained through field visit and survey increases the level of intrinsic motivation and positive attitude towards the vocational field and there by increase his value as a skilled semi- professional.

The aim of value addition is to measure the interest, devotion Group management, perseverance of the learner in specific areas Value addition can be evaluated from field visit, survey and simulated experiments.

III. Capacity building

Capacity building can be evaluated through conducting the following activities.

1. OJT/Simulated experiment
2. Performance- Camp/ Exhibition/ Clinic.
3. Performance- Production/Service cum Training centre.

These components helps the students to practice the acquired skills in the real situation and there by increasing self confidence and promoting self reliance.

Capacity building is aimed at measuring the skills of the learner from OJT/ production cum training centre/ research and development/graded area exposure.

IE Item	Evaluation Indicators	Weightage	Score
1. Regularity and Punctuality			10
2. Value addition	<p>Field Visit</p> <p>1. Attitude and readiness towards the task. 4/3/2/1</p> <p>2. Capacity for observation. 4/3/2/1</p> <p>3. Data collection. 4/3/2/1</p> <p>4. Application of ideas. 4/3/2/1</p> <p>5. Documentation/ recording. 4/3/2/1</p> <p style="text-align: center;">OR</p> <p>Survey</p> <p>1. Planning. 4/3/2/1</p> <p>2. Data collection. 4/3/2/1</p> <p>3. Consolidation of data and analysis. 4/3/2/1</p> <p>4. Drawing inference. 4/3/2/1</p> <p>5. Reporting. 4/3/2/1</p>		20
3. Capacity building	<p>OJT/ Simulated Experiment/ Practical skill</p> <p>1. Involvement/ Participation. 4/3/2/1</p> <p>2. Skills in doing work/ Communication skill. 4/3/2/1</p> <p>3. Time bound action. 4/3/2/1</p> <p>4. Capacity for observation, analysis and innovation. 4/3/2/1</p> <p>5. Documentation, Recording and display. 4/3/2/1</p> <p style="text-align: center;">OR</p> <p>Performance in camp/ Exhibition/ clinic</p> <p>1. Ability for planning and organising. 4/3/2/1</p> <p>2. Mastery of subject. 4/3/2/1</p> <p>3. Ability for communication. 4/3/2/1</p>		20

IE Item	Evaluation Indicators	Weightage	Score
	4. Innovation.	4/3/2/1	
	5. Involvement/Social commitment.	4/3/2/1	
	OR		
	Performace in production/ service cum training centre (PSCTC)		
	1. Mastery of vocational skills.	4/3/2/1	
	2. Managerial capacity.	4/3/2/1	
	3. Promoting self confidence.	4/3/2/1	
	4. Innovative approach.	4/3/2/1	
	5. Promoting self - reliance.	4/3/2/1	

Vocational Competency Items for Internship Evaluation

Items	Score
Regularity & Punctuality	10
Field visit/survey(any one)	20
OJT/simulated experiment/ Practical Skill/ Performance- Camp/exhibition/Clinic Performance- PSCTC (any one)	20
Total	50

A minimum of 80% attendance is required for promotion to the second year. Those who have shortage of attendance should repeat first year. Those who have 80% and above attendance but failed to achieve 30% of Internship Evaluation (IE) will be promoted to the second year. He has to improve the component in which he performed poor. He has to attain the minimum by improving the particular component to get eligible for appearing second year public examination.

Consolidated statement of IE

Stream : Animal Husbandry

Class : Ist Year

Subject : Dairying (Milk Products)

SI No	Name	Regularity & Punctuality	Field visit or survey	OJT or Practical skill	Total Score	Grade
		10	20	20	50	
1	Anand	5	12	10	27	C+
2	Shibu	6	15	16	37	B+

SECTION II

1

INTRODUCTION

Introduction

Dairying involves livestock management for the purpose of milk production. India has basically been an agricultural country and it leads the developing countries. Being an emerging field, dairying receives tremendous attention nowadays.

This chapter provides some ideas about common breeds of livestock which will help the students to identify different breeds of animals from their surroundings and for their proper selection. This chapter also provides some ideas to judge the animal.

Syllabus

Introduction to livestock, population of buffaloes, goat of Kerala according to latest census. Advantages & limitations of dairy farming - different parts of body of cattle - common breeds of cattle, buffalo, goat (Hallikar, Kangayam, Sahiwal, Gir, Sindhi, Jersey, HF, Brown Swiss, Murrah, Surti, Jamnapari, - its origin & characters), Restraining of cattle, judging of cattle, common terms used in dairy practices - Definitions for new born calf, young calf, heifer cow, bull, bullock, teaser bull, steer, kid, doeling, buckling, doe, buck.

Curriculum Objectives (14 hours)

- ◆ To understand and develop an idea about livestock farming & its importance through discussion.
- ◆ To know the present population status of different species of livestock through data collection & charts.
- ◆ To create an awareness about merits & demerits of dairy farming.
- ◆ Identification of body parts of cattle.

- ◆ To create an awareness about different breeds.
- ◆ Identification of and understanding the salient features of different dairy breeds, draft breeds & dual purpose breeds of cattle.
- ◆ Identification of breeds of buffalo & goat
- ◆ Restraining of animals.
- ◆ Knowledge about Judging of cattle.
- ◆ Familiarization of common terms used in dairy Industry.

Livestock farming & its importance

Suggested activities - General discussion

This portion can be introduced to the students by asking questions about livestock.

Points for discussion

- ◆ Livestock farming
- ◆ Agriculture
- ◆ Mixed farming
- ◆ Major livestock products

Population Status

Suggested activity - Data Collection & Charts

Ask the students to collect data about present population status of different species of livestock from journals, reference books and internet and prepare a chart on it.

Points for discussion

- ◆ Cattle Population
- ◆ Buffalo Population
- ◆ Goat Population

Additional Information

Compare the population status of livestock in India with that of other countries.

Merits and Demerits of Dairy farming

Suggested Activity - Debate and Discussion

The students may be divided into two groups. Each group was given the topics for debate as follows.

1. Merits of Dairy farming.
2. Demerits of Dairy farming

This topic should be given in advance to the students. The teacher can ask them to collect relevant information for their points & prepare notes. On the day of debate the class should be properly arranged so as to conduct the debate smoothly. The moderator (the teacher can be the moderator) should brief the students reasoning the debate in the beginning. Then the group representatives are asked to present their arguments. After presentation arrange a discussion followed by consolidation by the moderator. While consolidating the teacher should point out the merits and demerits of livestock farming. After the debate ask the students to prepare notes on debate and submit.

Points for discussion

- ❖ Merits of Dairy farming
 - ◆ Stable income
 - ◆ Nutritional status
 - ◆ Employment
 - ◆ Utilisation of feed materials
- ❖ Demerits of Dairy farming
 - ◆ Perishable
 - ◆ Risk
 - ◆ High capital of dairy farming

Identification of body parts of cattle

Suggested activity - Demonstration, chart preparation & discussion.

Ask the students to identify the body parts known to them. Then the teacher should supplement additional information.

The teacher should ask the students to consolidate all the points in a chart.

Points for discussion

Important body parts of cattle

Restraining of Livestock

Suggested Activity - Discussion

A discussion should be initiated about Restraining.

Points for discussion

- ◆ What is Restraining
- ◆ Purposes of Restraining

Common Terms Used in Dairying

Suggested Activities - Brainstorming, Chart preparation

The teacher may ask the students about familiar terms related to livestock. Additional information should be supplied by the teacher. Then prepare a chart based on these pieces of informations & on reference books.

Points for discussion

- ◆ New born calf, young calf, calf
- ◆ Heifer, Bull calf
- ◆ Doe, Buck, Doeling, Buckling
- ◆ Steer, Teaser bull, Bullock
- ◆ COW

Breed

Suggested Activities - Discussion

The teacher can begin the class by giving examples and collect the feedback from students and assess their previous knowledge. The teacher should supply additional points and lead them to the basic ideas of species & breed.

Points for Discussion

- ◆ What is *species & breed*?

Breeds of cattle - Cow, Buffalo, Goat

Suggested Activities - Collection of photographs, preparation of charts, preparation of collage, brainstorming, farm visit, seminar.

Dividing the students into groups, they may be asked to collect photographs of cattle breeds from journals, newspapers, magazines, etc. Based on the photographs, they may be asked to define the characters of each breed and to represent them in the form of a chart.

For collage preparation, cuttings from periodicals, journals, dailies may be gathered.

The above gained knowledge may be consolidated by an on the spot study by arranging a farm trip.

A brainstorming session may be conducted in the class to differentiate Indian & exotic breeds of cattle.

Based on the knowledge gained from the activity, a seminar should be conducted. For this students may be divided into 6 groups.

Seminar topics

1. Indigenous milch breeds
2. Exotic milch breeds
3. Draught purpose breeds
4. Dual purpose breeds
5. Breeds of Buffalo
6. Breeds of Goat

Points for discussion

Indian breeds - Milch , Draught & Dual Purpose

Exotic breeds - Jersey, H.F, Brown Swiss

Buffalo breeds - Murrah, Surti, Goat Breeds - Jamnapari, Malabari

Origin
Salient Features
Utility/Production

Additional Information

Vechur cattle

Judging of cattle

Suggested Activity - Discussion, Farm visit, Score card, Visit report

A discussion should be initiated about the judging of cattle based on their previous knowledge like cattle show with the help of a standard score card.

Points of discussion

- ◆ Purposes of judging
- ◆ Score card -
 - ◆ General awareness
 - ◆ Body capacity
 - ◆ Dairy character
 - ◆ Mammary system

While conducting farm visit, the students are divided into groups and they may be asked to judge each animal based on each item in the score card.



INTRODUCTION

UNIT - 1

UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> To understand & develop an idea about livestock farming & its importance. (1 hr.) 	<ul style="list-style-type: none"> Livestock farming Agriculture Mixed farming Major livestock products 	<ul style="list-style-type: none"> General discussion 	<ul style="list-style-type: none"> Reference books Journals 	<ul style="list-style-type: none"> Participation in discussion
<ul style="list-style-type: none"> To know the present population status of different species of livestock. (1 hr.) 	<ul style="list-style-type: none"> Cattle population Buffalo population Goat population 	<ul style="list-style-type: none"> Data Collection Charts 	<ul style="list-style-type: none"> Journals Reference books IT Charts 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts
<ul style="list-style-type: none"> Create an awareness about merits & demerits of dairy farming (1 hr.) 	<ul style="list-style-type: none"> Merits of dairy farming Demerits of dairy farming 	<ul style="list-style-type: none"> Debate Discussion 	<ul style="list-style-type: none"> Journals Reference books Dailies 	<ul style="list-style-type: none"> Participation in discussion Performance
<ul style="list-style-type: none"> Identification of body parts of cattle (1 hr.) 	<ul style="list-style-type: none"> Important body parts of cattle 	<ul style="list-style-type: none"> Demonstration Chart preparation Discussion 	<ul style="list-style-type: none"> Live animal Chart Journals 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts
<ul style="list-style-type: none"> To create an awareness about different breeds (2 hrs.) 	<ul style="list-style-type: none"> Species Breed 	<ul style="list-style-type: none"> Discussion 	<ul style="list-style-type: none"> Reference books 	<ul style="list-style-type: none"> Participation in discussion
<ul style="list-style-type: none"> Identification & understanding salient features of different dairy breeds, draft breeds, & dual purpose breeds - buffalo breeds, goat breeds (2 hr.) 	<ul style="list-style-type: none"> Indian breeds of cattle <ul style="list-style-type: none"> milch draught dual purpose Exotic breeds of cattle <ul style="list-style-type: none"> Buffaloe breeds <ul style="list-style-type: none"> Murrah Surti Goat Breeds <ul style="list-style-type: none"> Malabari Jamunapari 	<ul style="list-style-type: none"> Collection of photographs Preparation of charts Preparation of collage Brainstorming Farm visit Seminar 	<ul style="list-style-type: none"> Charts Journals Dailies Reference books 	<ul style="list-style-type: none"> Analysis of charts Performance Visit report

Curriculum	Ideas/	Activities	Materials	Evaluation
<ul style="list-style-type: none"> • Restraining of Animals (1 hr.) 	<ul style="list-style-type: none"> • What is Restraining Purpose of Restraining 	<ul style="list-style-type: none"> • Discussion 	<ul style="list-style-type: none"> • Journals • Reference books 	<ul style="list-style-type: none"> • Participation in Discussion
<ul style="list-style-type: none"> • Knowledge about judging of cattle (2 hr.) 	<ul style="list-style-type: none"> • Purpose of Judging • Score card: <ul style="list-style-type: none"> • General Awareness • Body capacity • Dairy character • Mammary system 	<ul style="list-style-type: none"> • Farm visit • Score Card • Discussion 	<ul style="list-style-type: none"> • Score card • Farm Magazines • Reference books 	<ul style="list-style-type: none"> • Visit Report • Participation in Discussion
<ul style="list-style-type: none"> • Familiarisation of common terms used in Dairying (2 hrs.) 	<ul style="list-style-type: none"> • New born calf, young calf, calf Heifer, Bull, Cow • Doe, Buck, Doeling, Buckling • Steer, Teaser bull 	<ul style="list-style-type: none"> • Brain Storming • Chart preparation 	<ul style="list-style-type: none"> • Charts • Reference books 	<ul style="list-style-type: none"> • Performance

2

HOUSING OF CATTLE, SYSTEMS OF HOUSING CATTLE

Introduction

An efficient management of cattle will be incomplete without a well planned and adequate housing of cattle. Improper planning in the arrangement of animal housing may result in additional labour charges and thus reduce the profit. During construction of a farm building, selection of the site is very important. Care should be taken to provide comfortable accommodation for individual cattle. Give importance to proper sanitation & arrangements for clean milk production.

Syllabus

Planning of new farm building - dimension of buildings required for a dairy farm (milking barn, sheds for milch & dry cows, calving pens, sick animal shed, calf shed, young stock shed, bull shed) systems of rearing cattle (loose housing, conventional, free range system).

Curriculum Objectives (12 hours)

- ◆ To get an idea about dairy farm.
- ◆ To get an awareness about planning of farm building.
- ◆ To give an idea about principles of housing.
- ◆ To acquire knowledge of different systems of Rearing of Cattle.

Principles of Housing

Suggested activities - Discussion & field visit

A discussion should be initiated by the teacher by asking questions to the students on different housing facilities for animals grown in their locality.

A field trip can be arranged to nearby localities for observing the needs of housing.

The above ideas gained from discussions & field visit can be consolidated as principles of housing.

Points for discussion

- ◆ Protection of cattle from adverse weather conditions.
- ◆ Comfortable housing

Planning of Farm Building

Suggested Activity - field visit, discussin and farm visit

Each student should be given an assignment to observe the construction details of cattle sheds. For this students can visit cattle sheds in their locality. They should take measurements of different constructions in the shed. Allow them to compare their observations. From these, they arrive at a common ratio. Then a farm visit can be arranged to observe the standard measurements and compare them with the data formulated by them. Corrections can be done wherever necessary.

The students may also be asked to observe the different sheds and facilities provided in a cattle shed.

Points for discussion

- ◆ Selection of site
 - ◆ Location, soil, drainage facility
 - ◆ Availability of water, feed, electricity
 - ◆ Marketing & Transportation facilities
- ◆ Different sheds required
 - ◆ calf shed, young stock shed, bull shed
 - ◆ calving pen, milking barn
 - ◆ sick animal shed
- ◆ Floor space requirements
 - ◆ manger, feeding passage, standing space, dung/urine channel, central passage

- ◆ Additional facilities - roof, wall, floor

Systems of Rearing Cattle

Suggested Activity - discussion, farm/field visit, diagrams, seminar

A discussion should be initiated by the teacher by asking the students questions about systems of rearing. The discussion can be consolidated by supplementing additional points.

A farm/field visit can be arranged for the students to observe different rearing systems followed in their locality and compare different housing systems.

This comparative study should help to evaluate merits and demerits of each rearing system.

After this an assignment can be given to the students to draw a schematic diagram of arrangement of animals observed in the farm shed.

These ideas should be summarized at a seminar. Each seminar group can be given a name.

Points for discussion

- ◆ Intensive / Conventional System
- ◆ Arrangement of animals (tail to tail and head to head)
- ◆ Loose house system
- ◆ Free range system.

Merits
Demerits



UNIT - 2 HOUSING OF CATTLE - SYSTEMS OF HOUSING (12 hrs)

UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> To give an idea about principles of Housing (2 hrs.) 	<ul style="list-style-type: none"> Comfortable Housing Protection 	<ul style="list-style-type: none"> Discussion Field visit 	<ul style="list-style-type: none"> Journals Reference books 	<ul style="list-style-type: none"> Participation
<ul style="list-style-type: none"> To get an awareness about planning of farm building (4 hrs.) 	<ul style="list-style-type: none"> Selection of site Different sheds required Floor space requirement Additional facilities 	<ul style="list-style-type: none"> Field visit Discussion Farm visit 	<ul style="list-style-type: none"> Reference books Farm Magazines 	<ul style="list-style-type: none"> Participation Visit Report
<ul style="list-style-type: none"> To acquire knowledge about different systems of Rearing (6 hrs.) 	<ul style="list-style-type: none"> Conventional system Arrangement of Animals Loose House System Free Range System 	<ul style="list-style-type: none"> Discussion Farm visit Field visit Diagram Seminar 	<ul style="list-style-type: none"> Reference books Farm Magazines Charts 	<ul style="list-style-type: none"> Participation in discussion Visit Report Performance

3

GENERAL PHYSIOLOGY OF ANIMALS

Introduction

Students are already aware of all the systems and organs of the body of a human being. This unit deals with the systems of the body of animals. The major difference in this will be seen in the digestive and reproductive systems of human beings and that of animals. So these two systems will be dealt with separately in greater detail. This chapter helps the students to get an idea of ruminant digestion.

This chapter also provides some ideas about the prevalent breeding policy.

Syllabus

Name the different systems of body, describe digestive & reproductive organs with particular mention of the function of each organ, normal physiological values - temperature, respiration, pulse, gestation period, age of breeding, methods of breeding - natural & artificial insemination - advantages & disadvantages of each system.

Curriculum Objectives (22 hours)

- ◆ To give an awareness about the body systems of cattle.
- ◆ To understand the structure and function of digestive system.
- ◆ To understand the structure and function of reproductive system.
- ◆ To give an idea about Normal Physiological Values.
- ◆ To give an idea about different systems of breeding.

Body Systems of Animals

Suggested Activities - Discussion

Students have some previous knowledge of different divisions of each system of a human being. Teacher can introduce more points through a general discussion with help of chart models.

Points for discussion

- ◆ Skeletal system.
- ◆ Muscular system
- ◆ Nervous system
- ◆ Circulatory system
- ◆ Respiratory system
- ◆ Excretory system

Digestive System (Cattle)

Suggested activity - lecture, charts and assignments

The teacher can give a lecture on the structure & function of the different organs. Ask the students to draw the diagram of the digestive organs. Students have some previous knowledge of the enzymatic digestion and absorption of food. Teacher can initiate a discussion on the topic with the help of charts. Additional information can be furnished by the teacher.

Points for discussion

- ◆ Digestive organs - accessory organs and functions
- ◆ Rumination

Reproductive System (Cattle)

Suggested Activity - lecture demonstration using charts, assignments

The teacher can give a lecture on the structure & function of different reproductive organs with the help of charts. Ask the students to draw diagrams of reproductive organs. If possible models of reproductive organs can be shown to the students.

Points for discussion

- ◆ Male reproductive system
- ◆ Female reproductive system
 - ◆ Organs
 - ◆ Functions
- ◆ Puberty, Sexual cycle, Age at breeding
- ◆ Gestation period
- ◆ Signs of heat

Physiological values

Suggested Activity

- ◆ Discussion
- ◆ Demonstration & Practice
- ◆ Chart preparation

The teacher should initiate the discussion furnishing the basic ideas of pulse, respiration & temperature.

The teacher should demonstrate the method of recording pulse, respiration & temperature in a live animal and the students should be allowed to practise the same. The observed data should be recorded.

The students are assigned to record the values of pulse, respiration & temperature in cattle and goat. For this, they can visit houses in their localities. The observed data should be verified by the teacher and necessary corrections should be made. A chart can be prepared by the students from these corrected data.

Points for discussion

- ◆ Pulse rate
- ◆ Respiration rate
- ◆ Temperature

Methods of Breeding

Suggested Activity - Hospital visit, farm visit, Demonstration

A farm visit preferably to KLDB, can be conducted & a lecture demonstration can be arranged highlighting all the steps of A.I, by an expert. A visit report should be submitted by each student to make the processes and steps involved more clear. A hospital visit also can be arranged.

Points for discussion

- ◆ Natural breeding
- ◆ Artificial insemination

Merits
Demerits



GENERAL PHYSIOLOGY OF ANIMALS

UNIT - 3

UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> Give an awareness about body systems of cattle (1 hr) 	<ul style="list-style-type: none"> Skeletal system Muscular system Nervous System Circulatory System Respiratory system Excretory system 	<ul style="list-style-type: none"> Discussion 	<ul style="list-style-type: none"> Reference books Models Charts 	<ul style="list-style-type: none"> Participation in discussion
<ul style="list-style-type: none"> Understand the structure and functions of digestive system of cattle (4 hr) 	<ul style="list-style-type: none"> Digestive organs Accessory digestive organs Rumination 	<ul style="list-style-type: none"> Lecture demonstration Charts Assignment 	<ul style="list-style-type: none"> Charts Models Specimens 	<ul style="list-style-type: none"> Analysis of charts
<ul style="list-style-type: none"> Understand the structure and functions of reproductive system of cattle (7 hr) 	<ul style="list-style-type: none"> Male reproductive system Female reproductive system Puberty, Sexual Cycle, Age at breeding, gestation period, signs of heat 	<ul style="list-style-type: none"> Lecture demonstration Charts Assignment 	<ul style="list-style-type: none"> Charts Models Reference books Journals 	<ul style="list-style-type: none"> Analysis of charts Assignment Evaluation
<ul style="list-style-type: none"> To give an idea about normal physiological values (4 hr) 	<ul style="list-style-type: none"> Pulse rate Respiration rate Temperature 	<ul style="list-style-type: none"> Discussion Demonstration & Practice Chart preparation 	<ul style="list-style-type: none"> Reference books Charts Live animal 	<ul style="list-style-type: none"> Performance Participation in discussion Analysis of charts
<ul style="list-style-type: none"> To give an idea about different systems of breeding (6 hr) 	<ul style="list-style-type: none"> Natural breeding Artificial Insemination Merits & Demerits of calf method 	<ul style="list-style-type: none"> Hospital visit Farm visit Demonstration 	<ul style="list-style-type: none"> Journals 	<ul style="list-style-type: none"> Visit Report Preparation of notes

4

CATTLE MANAGEMENT

Introduction

Management is an art and science of combining ideas, facilities, processes, materials and labour to produce and market a worthwhile product or service successfully. Success in dairying depends largely on the proper care and efficient management of the herd. All dairy operations must be planned with due regard to the comfort of the animals.

The identity of an animal has to be established soon after birth. For a small herd, the naming of animals may serve the purpose to some extent, but for large animals and moreover with pure breed animals, it is always necessary to put some sort of identification marks on each animal. This chapter also provides an idea of common disease conditions prevalent in our state.

Syllabus

Care of newborn calf. Name the systems of Rearing of calf - Advantages and Disadvantages - feeding of colostrum - Dehorning, Deworming, Castration, Identification of Animals (Tattooing, Tagging, Branding), Diseases.

Curriculum Objectives (12 hours)

- ◆ To understand the care of New born calf.
- ◆ Understanding different aspects of management of calf
- ◆ Understanding of common diseases.

Care of New born calf

Suggested Activity - Seminar, Discussion, Field visit

The class should be divided into different groups. The topic should be given in advance.

Each student should be asked to collect information and ideas and submit them to the group leader. On the day of seminar, group leader should be asked to deliver the same in an organized way. After the completion of seminar of each groups, a group discussion among students will help to understand the topic more clearly. Additional information should be provided by the teacher at the end of the discussion.

Points for discussion

- ◆ Mucous removal
- ◆ Artificial Respiration
- ◆ Naval cord
- ◆ Colostrum feeding

A field visit can be arranged to nearby livestock farm so as to get an idea about the above points discussed.

Calf Management

Suggested activity - Discussion, Field visit, Seminar, Flash cards

Discussion can be started by asking the students questions about various management practices of a new born calf based on their previous knowledge.

A field visit should be conducted and students asked to observe management practices at a nearby dairy farm. More information should be collected from labourers of the farm. An expert can demonstrate various management practices like identification methods, dehorning, etc.

These ideas should be consolidated in the form of a seminar. Additional information can be provided by teacher. The ideas gained should be arranged into different topics and can be given to each group of students.

Seminar topics

- ◆ Systems of rearing of calf
- ◆ Dehorning
- ◆ Identification methods
- ◆ Deworming

The above topics can be visualized in the form of flash cards and can be shown by the students.

Points for discussion

- ◆ Systems of rearing - weaning & Nurse cow method
- ◆ Dehoming
- ◆ Deworming
- ◆ Castration
- ◆ Identification - Branding, Tagging, Tattooing

Common Diseases

Suggested Activity - Discussion, chart preparation, seminar, photographs, field visit

The teacher should initiate the discussion, by asking questions about common diseases. Additional information can be supplied by the teacher.

The students are assigned to go through some prescribed reference books & prepare notes on this. Necessary corrections should be made by the teacher. And a chart should be prepared.

Students may be asked to collect the pictures of diseased animals.

A hospital visit can be conducted & further information can be collected from the hospital records.

These ideas should be consolidated in the form of a seminar.

Seminar topics

- ◆ Signs of health
- ◆ Signs of ill health
- ◆ Common diseases

Points of discussion

- ◆ Health signs
- ◆ Signs of ill health
- ◆ Common Diseases - Anthrax
Mastitis
FMD



CATTLE MANAGEMENT

UNIT - 4 UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> To understand about care of new born calf (3 hr) 	<ul style="list-style-type: none"> Mucous removal Artificial Respiration Naval cord Colostrum feeding 	<ul style="list-style-type: none"> Seminar Discussion Field visit 	<ul style="list-style-type: none"> Journals Farm magazines Reference books 	<ul style="list-style-type: none"> Performance Participation in discussion Visit Report
<ul style="list-style-type: none"> Understanding different management aspects of calf. (6 hr) 	<ul style="list-style-type: none"> Systems of rearing calf Dehorning Identification methods Deworming Castration 	<ul style="list-style-type: none"> Discussion Field visit Seminar Flash card 	<ul style="list-style-type: none"> Farm magazines Photographs Flash card Reference books 	<ul style="list-style-type: none"> Participation Visit report Performance
<ul style="list-style-type: none"> Understanding about common diseases of cattle. (3 hr) 	<ul style="list-style-type: none"> Signs of health Common diseases <ul style="list-style-type: none"> Antrax Mastitis FMD 	<ul style="list-style-type: none"> Discussion Chart preparation Seminar Photographs Field visit 	<ul style="list-style-type: none"> Journals Farm magazines Reference books Charts Pictures 	<ul style="list-style-type: none"> Participation Analysis of charts Evaluation Visit report

5

FEEDS AND FEEDING

Introduction

Livestock feeds are generally classified according to the amount of a specific nutrient they furnish in the ration. Different feeds differ mostly in the amount of digestible materials. The number of substances used as feeding stuff to different species of livestock exceed over 2000 items. This chapter aims to develop a basis for understanding the various feeding materials given to livestock. In addition to that the chapter also focuses the various methods involved in the preservation of fodders. This chapter should be transacted so as to encourage the students to collect various feed stuffs to formulate a ration. In this chapter they will get an idea about different types of ration.

Syllabus (Feeds & Feeding)

Classification of feeds - concentrates and roughages (Definitions and examples). Define nutrient, classify feed nutrients (water, protein, carbohydrates, fats, minerals, vitamins & their functions) meaning of balanced ration, computation ration, common technologies, definition of (feed, Legume, forage/ fodder, pasture, silage, hay).

Curriculum Objectives (22 hours)

- ◆ To give an idea of classification of different feeds.
- ◆ Idea of common terminologies of different feed stuffs.
- ◆ To develop basic idea of important nutrients
- ◆ To give an idea of ration

Classification of different feeds

Suggested Activity - Farm visit, Discussion, Seminar, Collection of samples

A farm visit should be conducted and students are asked to observe different feeding practices followed in the farm. They are asked to collect samples of different feeds. They should also interact with farmers in the surrounding localities and collect the relevant data. A discussion among teachers and students should be arranged and information gathered may be consolidated.

Students are divided into 2 groups and are given seminar topics the Roughages, Concentrates etc. After the seminar, teacher should furnish additional information needed.

Points for discussion

- ◆ Concentrate - eg:- Animal protein, Cakes
- ◆ Roughages - eg:- Green leaves, Hay, Silage, Fodder, Straw

Nutrients

Suggested activity - Discussion and Chart Preparation

Teacher should initiate the discussion by asking the students questions about important nutrients, their functions. The ideas should be consolidated and any further information if needed should be supplemented by the teacher.

The students are assigned to represent the gathered pieces of information in the form of a chart.

Points for discussion

- ◆ Water
- ◆ Protein
- ◆ Lipids
- ◆ Carbohydrates
- ◆ Minerals
- ◆ Vitamins

Functions

Ration

Suggested Activity - Discussion and Lecture

A discussion should be initiated by eliciting from the students their previous knowledge about ration. A lecture should be given on areas of maintenance Ration, Production Ration, Computation Ration etc.

Points of discussion

- ◆ Ration
- ◆ Balanced Ration
- ◆ Maintenance & Production Ration
- ◆ Computation Ration

Common Terms Used

Suggested Activity - brainstorming, chart preparation

Ask the students about familiar feed stuffs related to livestock feeding. Additional information should be supplemented by the teacher. Then prepare a chart based on these bits of information and from reference books, journals.

Points of discussion

- ◆ Feed
- ◆ Fodder & Forage
- ◆ Legume
- ◆ Pasture
- ◆ Silage & Hay

Definition



FEEDS AND FEEDING

UNIT - 5

UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> To give an idea about classification of different feeds (5 hr) 	<ul style="list-style-type: none"> Concentrates Roughages 	<ul style="list-style-type: none"> Farm visit Discussion Seminar Collection of samples 	<ul style="list-style-type: none"> Feeds (cakes, hay, straw, silage, green leaves, animal protein) Reference books 	<ul style="list-style-type: none"> Participation Seminar Reports
<ul style="list-style-type: none"> Basic idea about important nutrients (10 hr) 	<ul style="list-style-type: none"> Water Protein Lipids Carbohydrates Minerals & Vitamins 	<ul style="list-style-type: none"> Discussion Chart preparation 	<ul style="list-style-type: none"> Reference books Chart Journals 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts
<ul style="list-style-type: none"> To give an idea about ration (5 hr) 	<ul style="list-style-type: none"> Ration Balanced ration Maintenance ration Production ration Computation ration 	<ul style="list-style-type: none"> Discussion Lecture class 	<ul style="list-style-type: none"> Reference books 	<ul style="list-style-type: none"> Participation in discussion
<ul style="list-style-type: none"> Terminologies used in feeds & feeding (2 hr) 	<ul style="list-style-type: none"> Feed Fodder & Forage Legume Pasture Silage & hay 	<ul style="list-style-type: none"> Brain storming Chart preparation 	<ul style="list-style-type: none"> Reference books Charts 	<ul style="list-style-type: none"> Participation Analysis of charts

6

MILK SECTION

Introduction

Students may have some previous knowledge regarding secretion of milk, milk removal methods and some milking disorders. One of the most important characteristics common to all mammals is their ability to secrete milk. This chapter deals with formation of milk and the factors affecting milk production. This chapter gives some more ideas about various milk removal methods. In addition to this, students also get an idea about common milking disorders. After completion of this chapter, the students are able to practise various milk removal methods.

Syllabus (Milk Section)

Structure of udder, process of milk secretion, letting down of milk, milk removal methods - sucking, hand milking (full hand milking, thumbing & stripping) machine milking, milking disorders, (supernumerary teats, fistulated teat, Bore teat, Teat cracks, Leaky Teats, Hard milkers). Factors affecting milk production, plan of nutrition & diseased condition.

Curriculum Objectives (22 hours)

- ◆ Understanding physiology of lactation.
- ◆ Create an awareness about milking methods.
- ◆ Understanding different milking methods.
- ◆ Factors influencing milk production

Physiology of Lactation

Suggested Activity - Discussion, Diagram drawing, Lecture notes

Discussion can be introduced by asking questions about the formation of milk, structure of

udder etc. Additional information can be supplemented with the help of a lecture class; with diagram showing internal structure of udder is an effective method to help students understand.

Points for discussion

- ◆ Structure of Udder
- ◆ Formation of milk
- ◆ Letting down of milk - Hormones

Milking Methods

Suggested activity - Discussion, Field Visit, Seminar, Photograph collection

The students are asked to observe various milking methods followed in their locality. With these ideas, a discussion can be arranged in the class by dividing the students into different groups. Additional information regarding merits and demerits can also be discussed.

A field visit can be arranged to near by livestock farm and an expert can demonstrate all these methods after dividing students into groups. And if possible, students may be allowed to practice this.

A seminar can also be conducted to put these ideas together.

Seminar topics

- ◆ Full hand milking
- ◆ Stripping
- ◆ Knuckling
- ◆ machine milking

Students are asked to collect pictures of the above practices from farm magazines, journals etc.

Points of discussion

- ◆ Sucking
- ◆ Milking methods - Full hand, stripping, knuckling, machine milking

- ◆ Merits and demerits

Milking Disorders

Suggested Activity - Discussion, Field visit, Photograph

Students should be asked to collect different photographs regarding milking disorders and other relevant information collected from various sources like farm magazines, journals, reference books, and from their locality.

Based on this, a discussion class is arranged and additional information can be supplemented by the teacher.

A farm visit should be arranged to create an awareness of the above discussed points.

Points of discussion

- ◆ Supernumerary teats
- ◆ Fistulated teat
- ◆ Bore teat
- ◆ Teat cracks
- ◆ Leaky teat
- ◆ Hards milkers

Factors influencing milk production

Suggested Activity - Discussion, Chart

The teacher can introduce the topic to students by asking questions to each student about the topic. The teacher can consolidate all the points and ask them to prepare charts.

Points of discussion

- ◆ Nutrition
- ◆ Disease condition
- ◆ Miscellaneous - Age, Breed, Species, Climate, etc.



MILK SECTION

UNIT - 6

UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> Understanding physiology of lactation (10 hr) 	<ul style="list-style-type: none"> Structure of udder Formation of milk Letting down of milk - hormones 	<ul style="list-style-type: none"> Discussion Drawing diagram Lecture 	<ul style="list-style-type: none"> Reference books Charts 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts
<ul style="list-style-type: none"> Give an awareness about milking methods (7 hr) 	<ul style="list-style-type: none"> Suckling Hand milking Full hand Stripping & Knuckling Machine milking 	<ul style="list-style-type: none"> Discussion Field visit Seminar Photograph collection 	<ul style="list-style-type: none"> Reference books Farm magazines Journals 	<ul style="list-style-type: none"> Participation in discussion Visit report
<ul style="list-style-type: none"> Understanding about milking disorders. (3 hr) 	<ul style="list-style-type: none"> Supermeracy teats Fistulated teat Bore teat Teat cracks Leaky teat Hard milker 	<ul style="list-style-type: none"> Discussion Field visit Photograph 	<ul style="list-style-type: none"> Reference books Farm magazines 	<ul style="list-style-type: none"> Participation in discussion Visit Report Observation of notes
<ul style="list-style-type: none"> To know the factors influencing milk production (2 hr) 	<ul style="list-style-type: none"> Nutrition Disease condition Miscellaneous (Age, Breed, Species, Climate etc.) 	<ul style="list-style-type: none"> Discussion Chart 	<ul style="list-style-type: none"> Farm magazines Journals Charts 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts

7

DEFINITION OF MILK, COMPOSITION OF MILK

Introduction

Students have some previous knowledge of nutrients in milk. Milk is considered an ideal food. In this chapter students are exposed to wider areas regarding each constituent of and its importance in nutrition. This unit should be so introduced as to build up knowledge about various kinds of adulterants and preservatives used in dairy industry and methods to detect them, by experiments. Apart from gaining knowledge about these aspects, the students should also develop the ability to detect adulterated milk.

Syllabus (Definition of Milk, Composition of Milk)

Major and minor components of milk (water, fat, carbohydrates, proteins, minerals, vitamins)
Factors affecting composition of milk, PFA standards for milk (Cow milk, Buffalo milk, Goat milk).
Adulterants & Preservatives used and methods of detecting them (water, cane sugar & starch).

Curriculum Objectives (12 hours)

- ◆ To create an awareness of constituents of milk.
- ◆ To understand the various factors affecting composition of milk.
- ◆ To give an idea about the existing standards of milk for different species.
- ◆ To have an idea of various adulterants & preservatives used in milk.
- ◆ To understand the various methods of detection of adulterants.

Milk and its constituents

Suggested Activity - Discussion, Chart preparation

The teacher can initiate a discussion by asking students questions on milk & its constituents

based on their previous knowledge. Additional information can be supplemented by the teacher. After the discussion the teacher can ask the students to prepare a chart.

Points for discussion

- ◆ Definition of milk
- ◆ Major constituents of milk (percentage of composition)
- ◆ Minor constituents of milk

Factors affecting composition of milk

Suggested activity - Discussion, Chart

The teacher can introduce the topic to the students and ask questions to each students about the topic. The teacher can consolidate all the points and ask them to prepare chart.

Points of discussion

- ◆ Age
- ◆ Breed & Species
- ◆ Individual variation
- ◆ Season
- ◆ Feed
- ◆ Frequency of milking
- ◆ Miscellaneous factors - disease, milking time, etc.

PFA Standards

Suggested Activity - Lecture Class, Chart

Points of discussion

- ◆ PFA standards for cow milk, buffalo milk & goat milk

Based on the lecture class, the teacher may ask the students to prepare a chart.

DEFINITION OF MILK, COMPOSITION OF MILK

UNIT - 7

UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> To give an awareness of milk and its constituents (3 hr) 	<ul style="list-style-type: none"> Definition of milk Major constituents of milk Minor constituents of milk 	<ul style="list-style-type: none"> Discussion Chart preparation 	<ul style="list-style-type: none"> Reference books Charts Journals 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts
<ul style="list-style-type: none"> To understand the various factors affecting composition of milk. (1 hr) 	<ul style="list-style-type: none"> Age, Breed, Species Individual variation Season, feed Frequency of milking Miscellaneous factors Disease, milking time 	<ul style="list-style-type: none"> Discussion Chart preparation 	<ul style="list-style-type: none"> Journals Farm magazines Dailies Charts 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts
<ul style="list-style-type: none"> To give an idea about the existing standards of milk for different species (1 hr) 	<ul style="list-style-type: none"> PFA Standards 	<ul style="list-style-type: none"> Chart preparation Lecture 	<ul style="list-style-type: none"> Charts Reference books 	<ul style="list-style-type: none"> Analysis of charts
<ul style="list-style-type: none"> To understand various adulterants and preservatives used in milk (4 hr) 	<ul style="list-style-type: none"> Adulterants (water, starch, sugar) Preservatives 	<ul style="list-style-type: none"> Discussion Chart 	<ul style="list-style-type: none"> Journals Dailies Charts 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts
<ul style="list-style-type: none"> To understand various methods of detection of adulterants (3 hr) 	<ul style="list-style-type: none"> Water Lactometer Reading Specific Gravity Freezing point Starch Iodine Test Cane Sugar 	<ul style="list-style-type: none"> Lecture class Demonstration & practice Charts 	<ul style="list-style-type: none"> Reagents Charts Milk samples Instruments 	<ul style="list-style-type: none"> Performance Analysis of charts

8

PHYSICAL & CHEMICAL PROPERTIES OF MILK

Introduction

Students have some already learned about the composition of milk, common adulterants, preservatives used in dairy industries etc. in the previous chapter. In this chapter the students learn about physical & chemical properties of milk. The chapter introduces the students to the different process skills like experimenting. This chapter instructs the students to detect spoilage conditions and adulteration of milk.

Syllabus (Physical and Chemical properties of Milk)

Colour, flavour specific gravity, acidity, pH, freezing point, boiling point.

Curriculum Objectives (12 hours)

- ❖ Physical - chemical properties of milk.

Physical & Chemical Properties of Milk

- ❖ Colour & Flavour

Suggested Activity - observation and practice

The students are asked to observe milks of different species especially cow milk & buffalo milk. They are asked to compare them.

A lecture class is given to the students on the flavour of milk & give a demonstration.

Points for discussion

- ◆ Colour
- ◆ Flavour (Smell & Taste)

❖ **Specific gravity**

Suggested activity - lecture class, demonstration & practice, field visit to nearby society.

A lecture is given to the students on the determination of specific gravity. The teacher gives a demonstration lesson and the students are asked to practice it.

Points of discussion

- ◆ Definition
- ◆ Methods - using Lactometer, specific gravity bottle.

❖ **Acidity & pH**

Suggested Activity - Lecture Class, Demonstration & practice

Demonstration is given by the teacher and the students are asked to practice it.

Points of discussion

- ◆ Natural & Developed Acidity
- ◆ Titration method
- ◆ pH value

❖ **Freezing point and Boiling Point**

Suggested Activity - Lecture Class, Group Discussion

Already they have learned about the components of milk. A discussion may be started about the reasons for elevation of the boiling point of milk when compared with water.

Points of discussion

- ◆ Freezing point value
- ◆ Boiling point value



PHYSICAL AND CHEMICAL PROPERTIES OF MILK

UNIT - 8 UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> To know about physico-chemical properties of milk (12 hr) 	<ul style="list-style-type: none"> Colour Flavour (3 hr) 	<ul style="list-style-type: none"> Observation & Practice 	<ul style="list-style-type: none"> Milk samples 	<ul style="list-style-type: none"> Performance
	<ul style="list-style-type: none"> Specific gravity (3 hr.) Acidity & pH (4 hr.) 	<ul style="list-style-type: none"> Lecture class Demonstration & practice Field visit (nearby society) 	<ul style="list-style-type: none"> Specific gravity bottle Lactometer Burette, Pipette Reagents 	<ul style="list-style-type: none"> Visit Report Performance
	<ul style="list-style-type: none"> Freezing point & Boiling point (2 hr.) 	<ul style="list-style-type: none"> Lecture class Group Discussion 	<ul style="list-style-type: none"> Reference books 	<ul style="list-style-type: none"> Participation in Discussion

9

CLEAN MILK PRODUCTION

Introduction

Clean milk production involves production of milk with minimum amount of bacteria and keeping it in safe condition till the milk is processed. This needs proper hygienic methods in the production and handling of milk as well as keeping the milk cool till processing.

This chapter deals with hygienic measures to achieve clean milk production. By practising these methods we can improve the health status of the society.

Syllabus (Clean Milk Production)

Natural Microbial flora of milk - (Bacteria, Virus Yeasts & Moulds). Their effect on milk constituents, Defects seen in milk/milk products due to microbial action. Sources of contamination of milk & practices for reducing bacterial content of milk. Platform Tests (COB, MBRT, Alcohol), Cooling of milk, Detergents & Sanitizers (Definition, Examples).

Curriculum Objectives (12 hours)

- ◆ To give an idea of natural microorganisms present in milk.
- ◆ To create an awareness about common defects seen in milk/milk products.
- ◆ Understand the hygienic practices followed for clean milk production.
- ◆ Knowledge about various platform tests.

Natural Microbial Flora of Milk

Suggested Activity - Discussion, Chart Preparation

A discussion can be initiated by asking the students questions about spoilage of milk to assess their previous knowledge. The teacher can provide additional information.

Points for discussion

- ◆ Bacteria
- ◆ Virus
- ◆ Yeast & Mold

With the above points for discussion, students may be asked to prepare chart.

Common Defects seen in Milk/Milk Products

Suggested activity - Discussion, Chart preparation, Seminar, Collection of Photographs

The students may be asked to discuss common microbial defects seen in milk & milk products. The teacher can consolidate points from the discussion points.

Points for discussion

- ◆ Natural souring
- ◆ Gassiness & Blowing
- ◆ Lipolysis
- ◆ Ropiness
- ◆ Frothiness

Students may be asked to conduct a seminar on the topics mentioned. They may be asked to collect photographs of these defects from periodicals, dailies.

Clean Milk Production

Suggested Activity - Group Discussion, Flash Card, Seminar

The teacher can start the class by dividing the student into 2 groups. One group can be given topic on source of contamination and the other group can be given the topic - Preventive Measures.

Two sets of flash cards can be shown before the students showing the sources of contamination & preventive measures.

For conducting the seminar, the students may be divided into 2 groups. For each group, each

topic can be given.

Points of discussion [Source of Contamination]

- ◆ Milker
- ◆ Animal
- ◆ Environment
- ◆ Utensils
- ◆ Preventive Measures
 1. Cooling of milk
 2. Cleaning of utensils - detergents & sanitizers with examples
 3. Healthy Animal - Clean Udder
 4. Dry Milking
 5. Check for mastitis

Platform Test

Suggested Activity - lecture class, demonstration and practice, field visit

A lecture class can be given to the students on the common tests done at the dairy plants before the acceptance of milk.

The teacher can demonstrate these tests and ask the students to practise or they can visit nearby dairy plants for the same purpose.

Points of discussion

- ◆ COB
- ◆ MBRT
- ◆ Alcohol
- ◆ Organoleptic Tests (Smell, Taste, Colour)



CLEAN MILK PRODUCTION

UNIT - 9 UNIT ANALYSIS

Curriculum Objectives	Ideas/ Concepts	Activities	Materials	Evaluation
<ul style="list-style-type: none"> To give an idea of natural microbial flora of milk (2 hr) 	<ul style="list-style-type: none"> Bacteria Virus Yeast & Mould 	<ul style="list-style-type: none"> Discussion Chart preparation 	<ul style="list-style-type: none"> Reference books Charts 	<ul style="list-style-type: none"> Participation in discussion Analysis of charts
<ul style="list-style-type: none"> To give an awareness about common defects seen in milk & milk products (3 hr) 	<ul style="list-style-type: none"> Natural Souring Gassiness & Blowing Lipolysis, Ropiness Frothiness 	<ul style="list-style-type: none"> Discussion Chart preparation Photographs Seminar 	<ul style="list-style-type: none"> Journals Reference books Charts 	<ul style="list-style-type: none"> Participation in discussion Performance Analysis of charts
<ul style="list-style-type: none"> To give an idea about clean milk production (4 hr) 	<ul style="list-style-type: none"> Sources of contamination <ul style="list-style-type: none"> Milker Animal Environment Utensils Preventive Measures 	<ul style="list-style-type: none"> Group Discussion Flash card Seminar 	<ul style="list-style-type: none"> Reference books Journals Farm magazines 	<ul style="list-style-type: none"> Performance Participation in discussion
<ul style="list-style-type: none"> To give an idea about platform tests (3 hr) 	<ul style="list-style-type: none"> COB MBRT Alcohol Organoleptic test 	<ul style="list-style-type: none"> Lecture class Demonstration & Practice Field visit 	<ul style="list-style-type: none"> Reagents Milk samples 	<ul style="list-style-type: none"> Visit Report Performance

SECTION III

SAMPLE QUESTIONS

1. Arrange the following breeds of cattle into groups based on utility.
Jersey, Sahiwal, Kangayam, Hallikar, Kankrej, H.F, Haryana, Gir, Sindhi
2. The LR Reading of Sample A is 21 and that of Sample B is 30. Which will you select as adulterated sample.
3. A farmer approaches you to get advice on starting a dairy farm. How will you help him in planning & construction.
4. Suppose you are working in a society. How will you decide a milk sample which is brought to you can accept or not?
5. Suppose you are working in a dairy plant. The manager suspects the quality of some milk samples. How will you help the manager.
6. Suppose you got some defective samples of milk. How will you identify the defects?
7. A farmer regularly brings milk with high microbial load. In what way, can you help the farmer for reducing microbial load.
8. A survey reveals that the milk production per day of two H.F cattle of different places shows varying milk production. Can you suggest the reasons.
9. You are assigned to put identification marks on a group of cattle. Which method would you adopt? Give reasons.
10. A farmer wishes to start a farm in a limited space. Which system of rearing will you suggest for him. Give reasons.

Suggested Assignments

1. Chart preparation on present population status - cattle, buffalo, goat
2. Chart preparation on Body parts of cattle.
3. Collage preparation, after collecting pictures of different breeds of cattle.
4. Seminar on
 - a. Indigenous milch breeds
 - b. Exotic milch breeds
 - c. Breeds of Buffalo
 - d. Breeds of Goat
5. Chart preparation on Different Rearing Systems.
6. Seminar on Different Rearing Systems.
7. Chart preparation on Diagram of Digestive System of Cattle.
8. Chart Preparation on Diagram of Reproductive system of Cattle.
9. Chart preparation on Gestation Period, Age at Breeding.
10. Chart preparation on Normal Physiological Values.
11. Seminar on care of new born calf.
12. Flash cards on
 - Dehorning
 - Pictorials of identification methods
13. Chart preparation on Common Diseases of Cattle.
14. Photograph Collection - Common Diseases of Cattle
15. Collection of samples of feed stuffs
16. Seminar on Roughages and Concentrates.
17. Chart preparation- Importance of Nutrients
18. Chart preparation - Diagram of structure of udder
19. Picture Collection - Different Milking Methods
20. Picture Collection - Different Milking Disorders

21. Chart preparation on factors affecting milk production.
22. Chart preparation - Important constituents of Milk.
23. Chart preparation - PFA Standards of Milk
24. Chart preparation - Methods Adulteration & Methods of Detection of Adulteration.
25. Chart preparation - Common Defects in Milk/Milk Products.
26. Picture Collection - Common defects in milk.
27. Seminar on Clean Milk Production.
28. Flash card preparation
 - a. Sources of Contamination
 - b. Preventive Measures
29. Survey - Collect milk samples from different sources and check quality of milk
 - a. Platform Test
 - b. Detection of Adulterants