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AG. 310 - APPLIED LIVESTOCK MANAGEMENT

AG 310

APPLIED

LIVESTOCK

MANAGEMENT

FOR

IDAHO

SECONDARY AGRICULTURE INSTRUCTORS

Developed and written by:
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Administered through the
Department of Agricultural and Extension Education
University of Idaho
By
Douglas A. Pals, Project Director

FOREWORD

The Agricultural Science and Technology Curriculum Guides are the product of many years of careful planning and development. In 1987, an Agricultural Education Technical Committee was assembled to determine the competencies necessary to prepare students for careers in agriculture. In 1989, a committee of secondary agriculture instructors, state supervisory staff and University of Idaho Agricultural and Extension Education faculty arranged the competencies into an outline of courses appropriate for secondary agriculture programs in Idaho. These curriculum guides have been written to provide the secondary agriculture instructor with up-to-date instructional materials to be used in developing lessons for the student interested in pursuing a career in agriculture.

The arrangement of the guide follows the courses outlined in the Agricultural Science and Technology Curriculum Outline - The Guide to the 90's (Vo. Ed. #240) published in 1989. The format used in this guide was adapted from the curriculum guides developed for Idaho secondary agriculture instructors during the period of 1981-1985.

The original Idaho Agricultural Curriculum Guides used in the development of these materials were:

1981 - Livestock Production
1981 - Agricultural Mechanics
1982 - Farm Business Management
1985 - Crop and Soil Science

Many individuals made the original guides possible. The format used was adapted from curriculum developed by the Curriculum and Instructional Materials Center of the Oklahoma State Department of Vocational and Technical Education. Selected information and many of the transparency masters used in the guides were provided by the Vocational Instructional Services, Texas A & M University. Additional information and transparency masters were provided by the Department of Agricultural Communications and Education, College of Agriculture, University of Illinois and the Agricultural Education Program, Department of Applied Behavioral Sciences, University of California, Davis.

Laboratory exercises incorporated into the units of instruction were used from the Holt, Rinehart and Winston, Inc. book, Modern Biology, Biology Investigations and the Scott, Foresman, and Company Lab Manual for Biology. Credit appears on the first page of the materials used from these two sources.

Without the following individuals' dedication and commitment, this project would not have been completed.

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USE OF THIS PUBLICATION

Introduction

This material must be taught. It does not replace the teacher, nor the teacher's expertise. The teacher needs to adapt the material to the local area and individual students. The teacher must also provide the necessary motivating techniques to help the students learn the material.

The pages in the guide are color coded to assist in identifying and locating the desired pages. The colors used are:

Table of Contents	Ivory
Semester Course Title Page	Green
Foreword	Yellow
Use of Publication	Salmon
Divider Page Between Units	Tan
Refer to Another Unit Page	Grey
Unit Objectives/Specific Competencies	White
Suggested Activities	Blue
Information Sheets	White
Transparency Masters	White
Assignment Sheets	White
Answers to Assignment Sheets	Gold
Instructors Notes for Laboratory Exercises	Blue
Laboratory Exercises	White
Answers to Laboratory Exercises	Gold
Unit Test	White
Answers to Test	Gold

Instructional Units

These units are not geared to a particular age level and must be adapted for the students with whom they are used. Units include objectives and competencies, suggested activities for the instructor and students, information sheet, transparency masters, assignment sheets, laboratory exercises, instructor notes for laboratory exercises, answers to assignment sheets and laboratory exercises, test and answers to test. Units are planned for more than one lesson or class period.

The teacher should carefully study each instructional unit to determine:

A. The appropriateness of the material for the age level

B. The amount of material that can be covered during a class period

C. Additional objectives and/or assignments, which could be developed

D. The skills that must be demonstrated

1. Supplies needed

2. Equipment needed

3. Amount of practice needed

4. Amount of class time needed for demonstrations

E. Supplementary materials, such as pamphlets, filmstrips and slides that must be ordered

F. Resource people who must be contacted

Objectives and Competencies

Each unit of instruction is based on stated objectives. These objectives state the goals of the unit, thus providing a sense of direction and accomplishment for the student.

The objectives are stated in two forms: unit objectives, stating the subject matter to be covered in a unit of instruction; and specific objectives, stating the student performances necessary to reach the unit objective.

Since the objectives of the unit provide direction for the teaching-learning process, it is important for the teacher and students to have a common understanding of the intent of the objectives. A limited number of performance terms have been used in the objectives for this curriculum to assist in promoting the effectiveness of the communication among all individuals using the materials.

Following is a list of performance terms and their synonyms that may have been used in this material:

Name	Identify	State a Rule	Apply a Rule
Label	Select	Calculate	
List in writing	Mak		
List orally	Point out		
Letter	Pick out		
Record	Choose		
Repeat	Locate		
Give	Match		

Describe	Order	Distinguish
Define	Arrange	Discriminate
Discuss in writing	Sequence	
Discuss orally	List in order	
Interpret	Classify	
Tell how	Divide	
Tell what	Isolate	
Explain	Sort	

Construct		Demonstrate	
Draw	Transcribe	Show your work	Replace
Make	Reduce	Show procedure	Turn on/off
Build	Increase	Perform an experiment	(Dis) assemble
Design	Figure	Perform the steps	(Dis) connect
Formulate	Conduct	Operate	
Reproduce	Compare	Remove	

Reading of the objectives by the student should be followed by a class discussion to answer any questions concerning performance requirements for each instructional unit.

Teachers should feel free to add objectives, which will fit the material to the needs of the students and community. When a teacher adds objectives, he/she should remember to supply the needed information, assignment sheets and/or laboratory exercises and criterion tests.

Suggested Activities

Each unit of instruction has a suggested activities sheet outlining steps to follow in accomplishing specific objectives. Duties of the instructor will vary according to the particular unit. However, for best use of the material they should include the following: provide students with objective sheet, information sheet, assignment sheets, and laboratory exercises; preview filmstrips, make transparencies, and arrange for resource materials and people; discuss unit and specific objectives and information sheet; give test. Teachers are encouraged to use any additional instructional activities and teaching methods to aid students in accomplishing the objectives.

Information Sheet

The information sheet provides content essential for meeting the cognitive (knowledge) requirements of the unit. The teacher will find that the information sheet serves as an excellent guide for presenting the background knowledge necessary to develop the skills specified in the unit objective.

Students should read the information sheet before the information is discussed in class. Students may take additional notes on the information sheet.

Transparency Masters

Transparency masters provide information in a special way. The students may see as well as hear the material being presented, thus reinforcing the learning process. Transparencies may present new information or they may reinforce information presented in the information sheet. They are particularly effective when identification is necessary.

Transparencies should be made and placed in the notebook where they will be immediately available for use. Transparencies direct the class's attention to the topic of discussion. They should be left on the screen only when topics shown are under discussion. (NOTE: Stand away from the overhead projector when discussing transparency material. The noise of the projector may cause the teacher to speak too loudly.)

Assignment Sheets

Assignment sheets give direction to study and furnish practice for paper and pencil activities to develop the knowledge which is a necessary prerequisite to skill development. These may be given to the student for completion in class or used for homework assignments. Answer sheets are provided which may be used by the student and/or teacher for checking student progress.

Laboratory Exercises

Laboratory exercises are found in selected units. The laboratory exercises include both science and agricultural mechanics activities. The science laboratory exercises often have instructions to the instructor prior to the actual laboratory. Procedures outlined in the laboratory exercise for agricultural mechanics give direction to the skill being taught and allow both student and teacher to check student program toward the accomplishment of the skill.

Test and Evaluation

Paper-pencil and performance tests have been constructed to measure student achievement of each objective listed in the unit of instruction. Individual test items may be pulled out and used as a short test to determine student achievement of a particular objective. This kind of testing may be used as a daily quiz and can help the teacher spot difficulties being encountered by students in their efforts to accomplish the unit objective. Test items for objectives added by the teachers should be constructed and added to the test.

Test Answers

Test answers are provided for each unit. These may be used by the teacher and/or student for checking student achievement of the objectives.

Care of Materials

The cost of reproduction of this guide prohibits the replacement of these materials. Therefore, please be extremely careful in handling originals. Make the necessary copies of the information sheets, transparencies, assignments and tests and replace originals in the curriculum guide notebook. Take extra care in keeping originals clear for future reproduction.

MAINTAINING HEALTHY LIVESTOCK

AG 310 - A

UNIT OBJECTIVE

After completion of this unit, students should be able to recognize healthy and unhealthy livestock and be able to develop a program to promote healthy livestock. Students should also be able to describe some laws dealing with livestock health and be able to administer oral medicines to animals. This knowledge will be demonstrated by completion of assignment sheet, laboratory exercise and unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with maintaining healthy livestock to their definitions.
2. Describe five reasons for preventing diseases as compared to simply curing diseases.
3. List five signs indicating healthy livestock.
4. List five signs of poor livestock health.
5. List the four general causes of disease.
6. Describe an effective overall livestock health program.
7. Select the maximum environmental temperatures desirable for cattle.
8. Match disinfectants to their uses and limitations.
9. Describe how immunity is supplied from different sources.
10. List the general types of vaccines.
11. Describe how vaccines should be cared for and used.
12. Name three methods of giving animals oral medicines.
13. Name the agencies responsible for enforcing livestock health regulations in Idaho.
14. Describe four general health regulations for livestock in Idaho.
15. Describe the regulation dealing with feeding garbage to swine in Idaho.
16. Develop a herd health plan for a livestock operation.
17. Demonstrate the ability to administer oral medicines to cattle.

MAINTAINING HEALTHY LIVESTOCK

AG 310 - A

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

- A. Make transparencies and necessary copies of material.
- B. Provide students with objectives and discuss.
- C. Provide students with information and discuss.
- D. Give students assignment sheet and laboratory exercise.
- E. Discuss assignment sheet.
- F. Demonstrate laboratory exercise.
- G. Develop a chart of economic losses from disease in the local area using veterinarians, farmers and ranchers, and extension agents as sources.
- H. Become familiar with specific health regulations that affect the local area.
- I. Invite a veterinarian to talk about a good general health program.
- J. Invite a state health official to talk about health problems in Idaho.
- K. Collect and display samples of disinfectants.
- L. Arrange a field trip to demonstrate drenching, vaccination, taking blood samples, etc.
- M. Review and give test.
- N. Reteach and retest if necessary.

II. Instructional materials

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Transparency masters
  1. TM 1--Vital Signs of Livestock
  2. TM 2--Causes of Disease
  3. TM 3--Livestock Housing

4. TM 4--Handling Livestock

5. TM 5--Relationship Between Maximum Desirable Temperature and Humidity (Cattle)

E. Assignment sheet

1. AS 1--Develop a Herd Health Plan for a Livestock Operation

F. Laboratory exercise

1. LE 1--Administer Oral Medicines to Cattle

G. Test

H. Answers to test

III. Unit references

A. Baker, James K. and Greer, William J., *Animal Health*. The Interstate Printers and Publishers, Inc., Danville, Illinois, 1980.

B. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

C. Berrier, Harry H., *Animal Sanitation and Disease Prevention*. Kendall/Hunt Publishing Co., Dubuque, Iowa, 1977.

D. Campbell, John R. and Lasley, John F., *The Science of Animals That Serve Mankind*. McGraw-Hill Book Company, New York, 1975.

E. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

F. *Cow-Calf Management Guide*, Cattleman's Library, University of Idaho Cooperative Extension Service, 1980.

G. Haynes, N. Bruce, *Keeping Livestock Healthy*. Garden Way Publishing, Charlotte, Vermont, 1978.

H. *Idaho State Department of Agriculture Rules*, August, 1980.

I. *Instructional Materials for Vocational Agriculture II*. Teaching Materials Center, Agricultural Education Department, Texas A & M University, College Station, Texas.

MAINTAINING HEALTHY LIVESTOCK

AG 310 - A

INFORMATION SHEET

I. Terms and definitions

A. Contagious disease--Infectious disease that can be spread from one animal to another
(Note: A disease can be infectious and not be contagious.)

B. Infection--Entry and development of a disease-causing organism causing harm to an animal's body

C. Diagnose--Recognize and identify a disease

D. Cud--A ball of regurgitated food which ruminants chew and then re-swallow

E. Feces--Manure expelled from the intestinal tract

F. Disinfectant--Substance that kills bacterial or other microorganisms

G. Immunity--The ability of an animal to resist or overcome an infection

H. Immunization--Process of giving an animal immunity

I. Parasite--Organism that lives on or in a living animal

J. Parturition--Act of giving birth

K. Humidity--Amount of moisture in the air

L. Organic matter--Any substance from living organisms

M. Spores--Single cells from which some lower organisms reproduce

N. Bacteria--One-celled, plant-like organisms

O. Fungi--Plants that live only off of other dead or living organic matter

P. Virus--Tiny agent that causes disease; not even a complete cell

Q. Protozoa--One-celled animals

R. Mucous membrane--Lining of body openings and digestive tract that secretes a watery substance

S. Serum--Extract of blood that contains antibodies

T. Antibody--Substance produced by an animal to defend against a specific disease-causing agent

U. Vaccine--Organisms or viruses which produce an immunity in animals

V. Vaccinate--Process of giving an animal a vaccine

W. Drenching--Giving an animal a liquid by pouring or squirting the liquid into the mouth

X. Quarantine--Isolating animals to prevent spread of disease

II. Importance of disease prevention

A. Diseases cost producers money by lowering production and increasing costs

(Note: It has been estimated that livestock diseases in the United States cause losses of 3 to 6 billion dollars a year. A single major livestock disease such as brucellosis may cost Idaho producers 4 to 5 million dollars each year!)

B. Diseases are often difficult to diagnose

C. Many diseases cannot be cured

D. Disease problems restrict markets, particularly for breeding stock and dairy animals

E. Some livestock diseases can be passed on to man

III. Signs that indicate good health (Transparency 1)

A. Contentment

B. Alertness

C. Chewing of cud (ruminants)

D. Sleek coat

E. Bright eyes and pink eye membrane

F. Normal feces and urine

G. Normal temperature

H. Normal pulse rate

I. Normal respiration

IV. Signs of poor animal health

A. Loss of appetite

B. Rough hair coat

C. Abnormal feces

D. Dull eyes

E. High temperature

F. Discolored urine

G. Ruminants not chewing their cud

V. Causes of disease (Transparency 2)

A. Unbalanced diet or poisonous substances (in feed or otherwise)

B. Improper functioning of body parts

C. Physical disabilities

D. Tiny living things capable of causing disease

VI. Herd health program (Transparencies 3, 4)

A. Provide adequate nutrition

B. Maintain adequate livestock facilities; avoid overcrowding

C. Keep facilities clean and disinfected

D. Use proper immunizations

E. Develop procedure for parasite control

F. Isolate new or returning animals for 3 to 4 weeks before combining with herd

G. Rotate pastures

H. Keep animal stress to a minimum

(Note: This is especially important when moving and handling and at crucial times such as weaning and parturition.)

I. Control possible disease spread by visiting humans

(Note: This is particularly important for visitors coming from other livestock farms where a disease might exist. Some swine operations even require visitors to put on special clothing and facemasks before entering the building.)

J. Work closely with veterinarian in developing <u>prevention</u> programs as well as treating diseases

K. Bring only clean animals into herd

L. Drain lots so that they will remain dry and free of stagnant water (paved lots are best)

M. Isolate all animals known to have contagious infections

N. Treat open wounds and navels of newborn calves with reliable disinfectant

O. Provide plenty of exercise for breeding herd

P. If cows calve in places other than clean pastures, be sure area is well-bedded and disinfected

Q. Provide plenty of clean, fresh water

VII. Maximum temperatures desirable for cattle (Transparency 5)

A. 95^{o}F at 0% humidity

B. 75^{o}F at 100% humidity

(Note: The maximum desirable temperature would increase from 75^{o}F to 95^{o}F in proportion to the decrease in humidity.)

VIII. Disinfectants

A. Lye

1. Mix as a 2% solution or 5% for anthrax spores

2. Effective against most bacteria and many viruses

3. Very caustic; will harm painted or varnished surfaces and aluminum

B. Lime

1. Scatter around lots or floors

2. Inexpensive

3. Dries skin and hooves of animals, which may cause cracking

C. Soaps--Mainly aid in removal of dirt and manure

D. Iodine

1. Used for skin infections

2. Used on dairy utensils and equipment and for dipping teats

(Note: This type of iodine is an iodaphor or tamed iodine.)

3. Very active in the presence of organic matter, but can be irritating to skin

E. Chlorine

1. Effective against spores, bacteria, fungi and viruses

2. Combines readily with organic matter and must therefore be used in large amounts when used around abundant organic matter

F. Cresol

(Note: Cresol is often mixed with soap to make mixing with water easier. Lysol is one such product.)

1. Inexpensive

2. Should be used with hot water

3. Has strong odor that may be absorbed into milk; should not be used in dairies

G. Sodium orthophenylphenate

1. Effective against tuberculosis organisms

2. Can be used in dairies

3. Irritating to eyes and mucous membranes

H. Alcohol--Must be mixed with at least 30% water to be effective

I. Formaldehyde

1. Effective against viruses, bacteria, fungi and spores

2. Must be used at proper temperature (65^{o}F or greater) and humidity (60% or greater)

3. Building must be sealed for 8 hours and then allowed to air for 12 to 24 hours

IX. Sources of livestock immunity

A. Colostrum--Provides antibodies already developed by the mother

B. Serums or antitoxins made from blood of an immune animal--Provide antibodies developed by the immune animal

(Note: These can usually only be given to animals of the same species and the immunity only lasts about 10 days. However, some antitoxins, such as the one for rabies, can be given to different species.)

C. Exposure to the disease--Animal builds it own antibodies to combat the disease

(Note: Deliberately using this method is dangerous as it may well result in lost production and prevent eradication of the disease.)

D. Vaccine--Stimulate animal to develop antibodies against the disease

X. Types of vaccines

A. Bacterial

1. Killed

(Note: These are more correctly referred to as bacterins.)

Example: Blackleg vaccine

2. Live

Example: Brucellosis vaccine

B. Viral

(Note: Although killed vaccines are safer, they usually have to be given more often to maintain protection.)

1. Killed

Example: Vaccine for encephalomyelitis in horses

2. Live

Example: Vaccine for soremouth in sheep

3. Modified live

(Note: This virus has been changed so that it is different from the original disease-causing virus, but will still cause the animal to develop the protecting antibodies.)

Example: Vaccine for IBR in cattle

XI. Care and use of vaccines

(Caution: Vaccines should only be used by people trained in their use. Consult a veterinarian for specific guidelines.)

A. Only vaccinate healthy animals

B. Vaccinate after immunity from the mother is gone

(Note: This is usually between 4 and 6 months.)

C. Read and follow all directions

D. Keep vaccines refrigerated

E. Do not use chemical disinfectants when using live vaccines--they will inactivate the vaccine

F. Keep records including serial number of vaccines

(Note: Procedures for giving injections are found in AG 310-N--Livestock Skills.)

XII. Methods of giving oral medicines

A. Liquids

1. Drenching

2. Esophageal tube

(Note: This tube has a ball on the end that fits into the opening of the esophagus, but not the windpipe. This allows liquids to be poured directly into the esophagus without the animal having to swallow.)

B. Dry pills--Balling gun

XIII. Agencies responsible for enforcing livestock health regulations

(Note: Federal health officials often supply personnel and administer federal regulations for many of the major animal diseases, but they work within the state agencies.)

A. Bureau of Animal Health

(Note: This is under the Division of Animal Industries, State Department of Agriculture.)

B. Idaho Sheep Commission

XIV. General health regulations for livestock in Idaho

A. Animals being brought into the state

1. Infected animals may not be shipped into Idaho

2. Breeding and dairy cattle must have health certificate specifying freedom from infectious and contagious diseases

3. Slaughter cattle without health certificates must be taken directly to specified place of slaughter

B. Live and dead animals may not be shipped together

C. State may quarantine animals if they present a major threat to other livestock

XV. Garbage, except for private household waste, may not be fed to swine

(Note: Garbage should generally be cooked to prevent spread of disease.)

Vital Signs Of Livestock

Species	Normal Temperature(°F)	Pulse Rate [1] Per Minute	Respiratory Rate Per Minute
Cattle	100.4 - 103.0	60 - 70	10 - 30 Beef 18 - 28 Dairy
Swine	101.0 - 104.0	60 - 80	8 - 18
Sheep	102.2 - 104.9	70 - 80	12 - 20
Horse	99.5 - 101.3	28 - 40	8 - 16
Foal	99.5 - 102.2	45 - 60[2]	

[1] A REGULAR RHYTHM AND A STRONG PULSE IS ALSO IMPORTANT

[2] NEWBORN FOALS HAVE A HEARTBEAT OF 100 TIMES A MINUTE

Causes Of Disease

NUTRITIONAL DEFECTS—**result from unbalanced diets**

PHYSIOLOGICAL DEFECTS—**improper functioning of body parts**

MORPHOLOGICAL DEFECTS—**physical disabilities**

PATHOGENIC ORGANISMS— **tiny living things capable of causing disease**

VIRUSES- sub-microscopic organisms, not complete cells

BACTERIA- microscopic, one-celled, usually classified as plants

FUNGI- small heterotrophic plants, often found in the soil

PROTOZOA- microscopic, one-celled animals

Livestock Housing

- PROVIDE ADEQUATE SPACE FOR ALL ANIMALS
- PROVIDE ADEQUATE FRESH AIR AND CONTROL TEMPERATURE
- PROVIDE ADEQUATE DRAINAGE AND DRY, CLEAN QUARTERS
- ROTATE PASTURES
- USE DISINFECTANTS AS NEEDED

Handling Livestock

Use canvas slappers rather than clubs or whips

Eliminate protruding nails and broken boards

Remove machinery and equipment from the feedlot

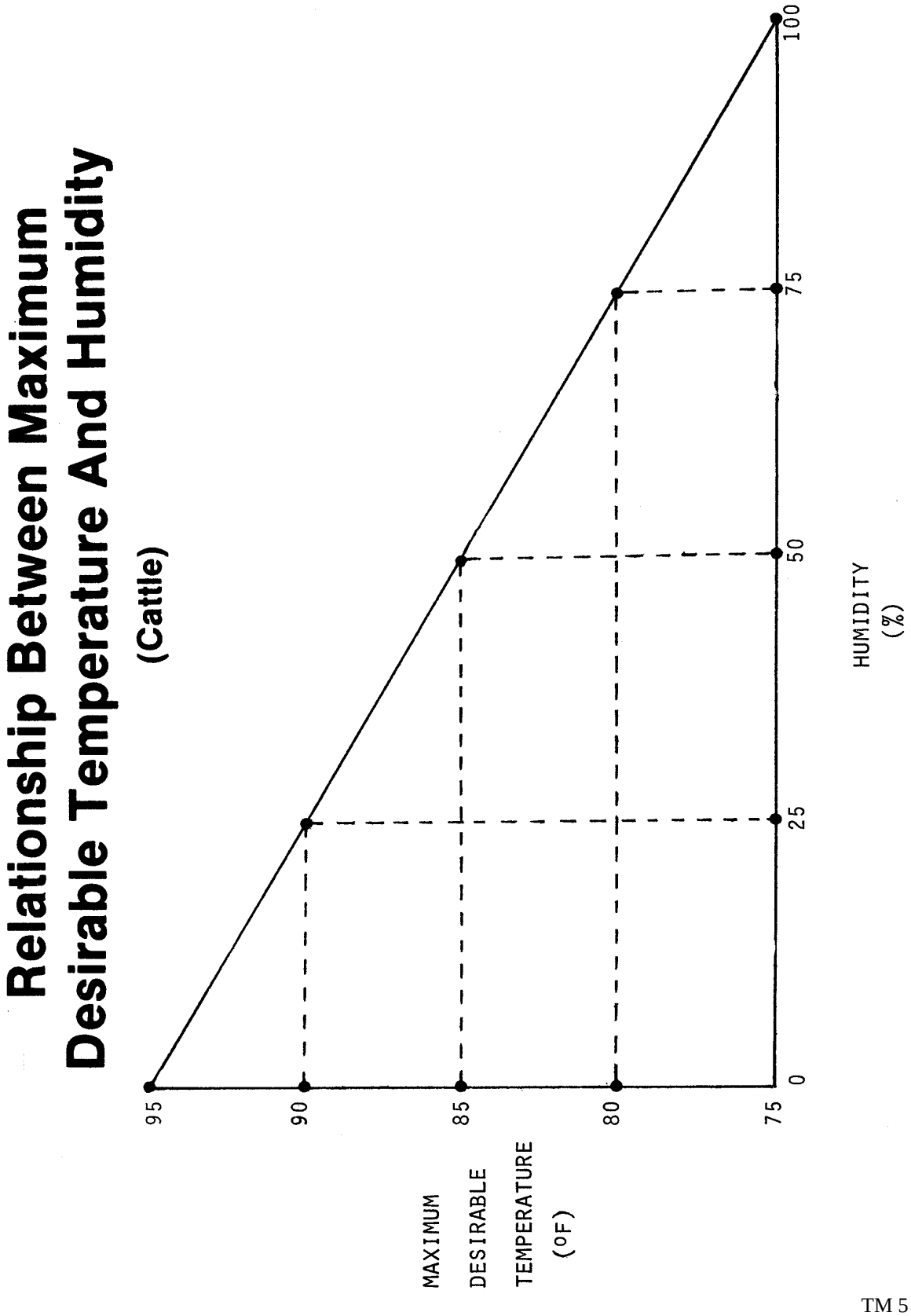
Dehorn cattle

Use proper bedding in barns and trucks

Load animals slowly and carefully

Load wisely - use partitions to separate classes of livestock

Protect livestock from weather


Relationship Between Maximum
Desirable Temperature And Humidity
(Cattle)
MAXIMUM
DESIRABLE
TEMPERATURE
(°F)
95
90
85
80
75
0
25
50
75
100
HUMIDITY
(%)

TM 5

MAINTAINING HEALTHY LIVESTOCK

AG 310 - A

ASSIGNMENT SHEET #1--DEVELOP A HERD HEALTH PLAN
FOR A LIVESTOCK OPERATION

Name_____ Score_____

Using livestock in your supervised experience program, develop a plan for improving and maintaining animal health. If you do not have animals, use those on the home farm or use another local livestock operation you can get information on. Use health information presented in class and also use outside sources such as ranchers, veterinarians and livestock magazine articles.

MAINTAINING HEALTHY LIVESTOCK

AG 310 - A

LABORATORY EXERCISE #1--ADMINISTER ORAL MEDICINES TO CATTLE

Name_____ Score_____

I. Tools and equipment

A. Restraining chute for animal

B. Long-necked bottle or drenching gun

C. Balling gun

D. Animals that need to be treated with oral medicines

(Note: The procedures for both giving liquids and giving a dry pill are included in this laboratory exercise.)

II. Procedure

A. Mix medicine with liquid or obtain a dry pill

B. Restrain animal in a way that will not interfere with movement of head and neck

C. Raise animal's head slightly; do not raise the nose higher than the eyes

D. Place gun or bottle into the mouth from the side and place on the top of the tongue towards the rear

E. Pour or squirt liquid into mouth allowing time for animal to swallow

F. For pills, place the end of the balling gun in the forepart of the esophagus and deposit pill; be careful not to deposit pill in windpipe

(Caution: This procedure can also be used with sheep, but extreme care needs to be taken when drenching to prevent choking.)

MAINTAINING HEALTHY LIVESTOCK

AG 310 - A

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Process of giving an animal immunity	1. Antibody
_____b.	Substance that kills bacterial or other microorganisms	2. Immunity
_____c.	One celled, plant-like organisms	3. Protozoa
_____d.	Entry and development of a disease-causing organism causing harm to an animal's body	4. Cud
_____e.	Any substance from living organisms	5. Virus
_____f.	Organisms or viruses which produce an immunity in animals	6. Parasite
_____g.	Process of giving an animal a vaccine	7. Fungi
_____h.	Recognize and identify a disease	8. Serum
_____i.	Giving an animal a liquid by pouring or squirting the liquid into the mouth	9. Feces
_____j.	Act of giving birth	10. Diagnose
_____k.	Plants that live only off of other dead or living organic matter	11. Bacteria
_____l.	Tiny agent that causes disease; not even a complete cell	12. Vaccine
_____m.	One-celled animals	13. Humidity
_____n.	Manure expelled from the intestinal tract	14. Drenching
_____o.	Single cells from which some lower organisms reproduce	15. Mucous membrane
_____p.	A ball of regurgitated food which ruminants chew and then re-swallow	16. Immunization
_____q.	Organism that lives on or in a living animal	17. Organic matter
_____r.	Isolating animals to prevent spread of disease	18. Contagious disease
		19. Quarantine
		20. Vaccinate
		21. Disinfectant
		22. Spores

_____s. Lining of body openings and digestive tract that secretes a watery substance

_____t. Infectious disease that can be spread from one animal to another

_____u. Extract of blood that contains antibodies

_____v. Substance produced by an animal to defend against a specific disease-causing agent

_____w. Amount of moisture in the air

_____x. The ability of an animal to resist or overcome an infection

23. Infection

24. Parturition

2. Describe five reasons for preventing diseases as compared to simply curing diseases.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

e. _____

_____

3. List five signs indicating healthy livestock.

a. _____

b. _____

c. _____

d. _____

e. _____

4. List five signs of poor livestock health.

a. _____

b. _____

c. _____

d. _____

e. _____

5. List the four general causes of disease.

a. _____

b. _____

c. _____

d. _____

6. Describe an effective overall livestock health program. Include at least eight points in the program.

_____

_____

_____

_____

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_____

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_____

7. Select the maximum temperatures desirable for cattle.

_____a. 65^{o}F at 80% humidity

_____b. 95^{o}F at 50% humidity

_____c. 75^{o}F at 100% humidity

_____d. 90^{o}F at 85% humidity

_____e. 95^{o}F at 0% humidity

8. Match the disinfectants on the right to their uses and limitations. (Note: Disinfectants may be used more than once.)

_____a. Very caustic; will harm painted or varnished surfaces and aluminum

_____b. Must be used at a proper temperature (65^{o}F or greater) and humidity (60% or greater)

_____c. Must be mixed with at least 30% water to be effective

_____d. Scatter around lots or floors; inexpensive

_____e. Combines readily with organic matter and must therefore be used in large amounts when used around abundant organic matter

_____f. Used for skin infections; very active in the presence of organic matter, but can be irritating to skin

_____g. Should be used with hot water; has strong odor that may be absorbed into milk; should not be used in dairies

_____h. Used for dairy utensils and for dipping teats in the form of an iodaphor

_____i. Mainly aids in removal of dirt and manure

_____j. Mix as 2% solution or 5% for anthrax spores

_____k. Dries skin and hooves of animals which may cause cracking

_____l. Effective against tuberculosis organisms; can be used in dairies; irritating to eyes and mucous membranes

_____m. Effective against viruses, bacteria, fungi and spores; building must be sealed for 8 hours and then allowed to air for 12 to 24 hours

1. Lye
2. Cresol
3. Sodium orthophenylphenate
4. Lime
5. Chlorine
6. Formaldehyde
7. Iodine
8. Alcohol
9. Soap

9. Describe how immunity is supplied from each of the sources listed below.

   a. Colostrum _____

   _____

   b. Serums or antitoxins _____

   _____

   c. Exposure to the disease _____

   _____

   d. Vaccines _____

   _____

10. List the general types of vaccines.

    a. _____

    b. _____

11. Describe how vaccines should be cared for and used.

    a. _____

    b. _____

    c. _____

    d. _____

    e. _____

    f. _____

12. Name three methods of giving animals oral medicines.

    a. _____

    b. _____

    c. _____

13. Name the agencies responsible for enforcing livestock health regulations in Idaho.

    a. _____

    b. _____

14. Describe four general health regulations for livestock in Idaho.

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

15. Describe the regulation dealing with feeding garbage to swine.

_____

_____

MAINTAINING HEALTHY LIVESTOCK

AG 310 - A

ANSWERS TO TEST

1.

a.	16	g.	20	m.	3	s.	15
b.	21	h.	10	n.	9	t.	18
c.	11	i.	14	o.	22	u.	8
d.	23	j.	24	p.	4	v.	1
e.	17	k.	7	q.	6	w.	13
f.	12	l.	5	r.	19	x.	2

2. Diseases cost producers money by lowering production and increasing costs; Diseases are often difficult to diagnose; Many diseases cannot be cured; Disease problems restrict markets, particularly for breeding stock and dairy animals; Some livestock diseases can be passed on to man

3. Answer should include at least five of the following:

   Contentment; Alertness; Chewing of cud (ruminants); Sleek coat; Bright eyes and pink eye membrane; Normal feces and urine; Normal temperature; Normal pulse rate; Normal respiration

4. Answer should include at least five of the following:

   Loss of appetite; Rough hair coat; Abnormal feces; Dull eyes; High temperature; Discolored urine; Ruminants not chewing their cud

5. Unbalanced diet or poisonous substances; Improper functioning of body parts; Physical disabilities; Tiny living things capable of causing disease

6. Answer should include at least eight of the following:

   Provide adequate nutrition; Maintain adequate livestock facilities, avoid overcrowding; Keep facilities clean and disinfected; Use proper immunizations; Develop procedure for parasite control; Isolate new or returning animals for 3 to 4 weeks before combining with herd; Rotate pastures; Keep animal stress to a minimum; Control possible disease spread by visiting humans; Work closely with veterinarian in developing prevention programs as well as treating diseases; Bring only clean animals into herd; Drain lots; Isolate all animals known to have contagious infections; Treat open wounds and navels of newborn calves with reliable disinfectant; Provide plenty of exercise for breeding herd; If cows calve in places other than clean pastures, be sure area is well-bedded and disinfected; Provide plenty of clean, fresh water

7. c, e

8.

a.	1	e.	5	i.	9	m.	6
b.	6	f.	7	j.	1		
c.	8	g.	2	k.	4		
d.	4	h.	7	l.	3		

9. a. Provides antibodies already developed by the mother
   b. Provides antibodies developed by the immune animal
   c. Animal builds its own antibodies to combat the disease
   d. Stimulates animal to develop antibodies against the disease

10. a. Bacterial--live; killed
    b. Viral--live; killed; modified live

11. Only vaccinate healthy animals; Vaccinate after immunity from the mother is gone; Read and follow all directions; Keep vaccines refrigerated; Do not use chemical disinfectants when using live vaccines; Keep records including serial number of vaccine

12. Drenching; Esophageal tube; Balling gun

13. Bureau of Animal Health; Idaho Sheep Commission

14. Answer should include at least four of the following:

    Infected animals may not be shipped into Idaho; Breeding and dairy cattle must have health certificate specifying freedom from infectious and contagious diseases; Slaughter cattle without health certificates must be taken directly to specified place of slaughter; Live and dead animals may not be shipped together; State may quarantine animals if they present a major threat to other livestock

15. Garbage, except for private household waste, may not be fed to swine

CARE AND FEEDING OF THE BEEF BREEDING HERD

AG 310 - B

UNIT OBJECTIVE

After completion of this unit, students should be able to describe how to care for cows, bulls and calves. They should also be able to decide how to feed different members of the breeding herd. This knowledge will be demonstrated by completion of assignment sheets and a unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit the student should be able to:

1. Match terms associated with care and feeding of the beef breeding herd to their correct definitions.
2. Describe three reasons roughages are the primary feed for beef cattle.
3. Name three supplemental nutrients most likely to be needed for a breeding herd on good quality pasture in Idaho.
4. Name the nutrients that need to be fed to the breeding herd during the winter.
5. Describe the changes in a normal beef cow's nutrient requirements and the changes that should be made in her ration during a year cycle.
6. Calculate the TDN requirement for a dry and lactating cow.
7. Match breeding stock to an appropriate sample ration.
8. Describe two specific goals to consider when feeding replacement heifers.
9. Name four of the factors that determine the best time to breed.
10. Distinguish between advantages for fall and spring calving.
11. List three advantages of combining fall and spring calving.
12. Describe how a short breeding season contributes to improved reproductive efficiency.
13. Select ways to shorten the breeding season.
14. Describe the three stages of parturition.
15. Name the primary cause of death in baby calves.
16. Describe three main contributing factors to calving problems.
17. Describe five ways to reduce calving difficulties.

18. Describe six steps to take right after calving.

19. Describe why baby calves need colostrum as soon after birth as possible.

20. Select the conditions under which creep feeding is most likely to be profitable.

21. Name the normal weaning age for beef calves.

22. Describe four steps to take at weaning.

23. Select reasons for dehorning.

24. Name three of the key elements in a successful beef AI program.

25. List five advantages and three disadvantages of artificial insemination in beef cattle.

26. Describe two reasons for purchasing bulls at least 40 to 60 days before breeding season.

27. Write the best age to determine a young bull's genetic superiority.

28. Write the optimum number of cows a young and a mature bull should breed.

29. Identify factors for proper management of the herd bull.

30. Select advantages of fertility testing in bulls.

31. Describe the quality of bovine semen based on color, foreign material, wave pattern and progressive motility.

32. Name the two best times to check for fertility in bulls.

33. List four advantages of pregnancy testing.

34. List four indications of pregnancy.

35. Calculate the estimated size of a fetus given the months a cow has been pregnant.

36. Describe the reason for using the left hand in rectal examinations.

37. List five factors to consider when planning facilities for beef cattle.

38. Compare spring and fall calving.

39. Develop a breeding and feeding program for a cow-calf herd.

CARE AND FEEDING OF THE BEEF BREEDING HERD

AG 310 - B

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

- A. Make transparencies and necessary copies of material.
- B. Provide students with objectives and discuss.
- C. Provide students with information and discuss.
- D. Provide students with assignment sheets and discuss.
- E. Arrange a field trip of a cow-calf operation, preferably at a time when they are "working" the calves.
- F. Obtain information on local feeding and management practices.
- G. Show a film on cow-calf operations or the Idaho cattle industry.

  (Note: Agri-educator provides film reviews.)
- H. Review and give test.
- I. Reteach and retest if necessary.

II. Instructional materials

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Transparency master
  1. TM 1--Stages of Pregnancy
- E. Assignment sheets
  1. AS 1--Compare Fall and Spring Calving
  2. AS 2--Develop a Breeding and Feeding Program for a Cow-Calf Herd
- F. Test
- G. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

C. Ensminger, M.E., *Beef Cattle Science*. The Interstate Printers and Publishers, Inc., Danville, Illinois, 1976.

D. Thomas, Verl M., *Beef Cattle Science Manual*. University of Idaho Department of Animal Sciences, College of Agriculture, Moscow, Idaho.

CARE AND FEEDING OF THE BEEF BREEDING HERD

AG 310 - B

INFORMATION SHEET

I. Terms and definitions

A. Forage--Grasses, legumes or other high quality roughage fed to or grazed by cattle

B. Legume--Plant having the ability to utilize nitrogen from the air and is therefore high in protein

C. Supplemental nutrient--Nutrient added to the basic feed of an animal to help correct a deficiency in that feed

D. Ration--Combination of feeds fed to an animal

E. TDN--Total digestible nutrients

F. Parturition--Act of giving birth

G. Freshening--Cow coming into milk after calving

H. Lactating--Giving milk

I. Weaning--Removing a calf from its dam so it can no longer nurse

J. Sterility--Inability to produce offspring

K. Heritability--Percentage of differences in a trait that can be explained by inheritance as opposed to environment

L. Dystocia--Calf death resulting from injuries caused by a difficult birth

M. Reproductive efficiency--Ability of heifers and cows to produce a calf

N. AI--Artificial insemination

O. Trait--Distinguishing characteristic of an animal

P. Colostrum--First milk from a cow, containing high levels of antibodies and nutrients
(Note: While the cow produces colostrum for several days, the antibiotic level is the highest in the very first milking.)

Q. Immunity--Ability to resist and/or overcome an infection

R. Antibody--Protein substance manufactured by the animal as a defense against a particular disease

S. Creep feeding--Giving calves extra feed by putting the feed inside of an area only small animals can get into

II. Reasons roughages are the primary beef cattle feed

A. Cattle can convert low quality roughages into high quality protein

(Note: Since man cannot, this makes roughages a non-competitive food source.)

B. Cattle can manufacture many of the nutrients they need and therefore can get by with a less complete ration

C. Roughages are almost always the most economical feed

III. Supplemental nutrients most likely to be needed on good quality pasture in Idaho

(Note: Pasture quality will fluctuate depending on time of year, type of soil, weather conditions and location. Supplemental nutrients will also need to fluctuate to satisfy local requirements.)

A. Salt

B. Phosphorus

C. Water

IV. Nutrients that need to be fed to the breeding herd in the winter

A. Energy--Carbohydrates and fats

(Note: A high quality roughage such as alfalfa grass hay will supply this need, but grain or corn silage need to be added to a ration of a low quality roughage, such as mature grass hay.)

B. Protein

(Note: This is best obtained from legume forages and oil meals. Urea can also be used, but utilization is not as good.)

C. Minerals

(Note: Phosphorus is the mineral most likely to be lacking in low quality roughages. Salt should be fed free choice.)

D. Vitamin A--Carotene

(Note: This can be injected, fed with the protein supplement or fed with the mineral mix.)

E. Water

V. Changes in nutrient requirements and corresponding ration of a beef cow

A. Weaning until 1 to 2 months before calving

1. Lowest nutrient requirements

2. Needs only low quality roughages plus a mineral mixture and vitamin A

3. High quality forages, if fed, should be limited to prevent too much weight gain

B. One to two months before calving up to calving

1. Nutrients are needed for both the cow and developing calf

2. Needs additional protein with low quality roughages

3. High quality forages should be limited to prevent excessive weight gain

C. Calving to rebreeding

1. Highest nutrient requirements

2. Needs plenty of high quality forages to provide necessary weight gain

D. Rebreeding to weaning

1. Nutrients are needed to maintain good milk supply

2. High quality spring pasture or alfalfa forages are necessary

VI. TDN requirement for a dry and a lactating cow

A. Dry cow--.8 pounds of TDN per 100 pounds of body weight per day

B. Lactating cows--Dry cow requirement plus .3 pounds of TDN per pound of milk produced

Example: Determine the energy requirement for an 800-pound cow producing 11 pounds of milk per day

.8 x 8	=	6.4 lbs
.3 x 11	=	3.3 lbs
Total energy needed	=	9.7 lbs of TDN

VII. Sample rations for beef breeding herd

(Note: Each number represents a different ration.)

A. 900-1200 pound cows in good condition

1. 16-20 pounds grass hay

2. 20-25 pounds corn silage plus 10 pounds poor quality hay

3. 30 pounds corn silage plus 1 pound 30-35% protein supplement or 2 pounds of legume hay

4. Pasture, free choice--Brome, crested wheat, orchard grass, timothy or any grass legume pasture

5. 10 pounds of alfalfa or legume hay plus 10 pounds of a cereal straw or grass seed straw

B. First and second-calf heifers and thin cows

(Note: These animals need to gain approximately 1/2 pound per day.)

1. 20 pounds good quality grass or legume hay

2. Good pasture, free choice

C. Lactating cows

1. Good quality grass-legume hay or haylage, free choice

2. 16-18 pounds grass-legume hay plus 5 pounds barley or 20 pounds corn silage

3. Good pasture, free choice

D. Mature bulls during the winter--Any of the lactating cow rations

E. Young and thin bulls during the winter--8 to 10 pounds barley plus grass-legume hay free choice

VIII. Goals for feeding replacement heifers

A. Should weigh 600 to 700 pounds at 15 months of age to be bred to calve as two-year-olds

(Note: To do this a heifer needs to gain 1 to 1 1/4 pounds per day using quality summer pastures and high quality winter forages.)

B. Should not be overfed as fat is first deposited in the udder and permanently decreases milk production

IX. Factors that determine time to breed

A. Time calves are to be ready for sale

B. Feed availability

C. Seasonal disease problems

D. Weather conditions

E. Market availability

F. Other competing farm enterprises

X. Fall versus spring calving

(Note: Calving occurs at these times primarily because weather conditions are better than winter or summer.)

A. Advantages of fall calving

1. Cows are usually in better condition at calving time because of good pastures

2. Young calves escape summer heat, pink eye and flies

3. Calves may be sold in fall as short yearlings weighing 200 more pounds than the spring calves

4. Cows freshening in the fall give milk longer

5. Labor is more available during the winter

6. Cows are bred in winter when hand mating or AI can be more easily used

7. Creep feeding is easier to manage

8. Calves are weaned at a better marketing time

B. Advantages of spring calving

1. Cows are dry during the winter and are therefore cheaper to feed

2. Calves are older and can stand the winter better

3. Cows milk better on grass than winter-feed

4. Less labor required with cows and calves running together on pasture

5. Calves can be sold at weaning with no wintering or as yearlings with only one wintering

6. Less shelter and equipment is necessary

7. Condition of cows at calving can be better regulated because winter feeding conditions are more controlled

XI. Advantages of combining fall and spring calving

A. Can increase pounds of calf per cow

B. Allows more flexibility on breeding dates of first-calf heifers since they can be bred to calve at about 2 1/2 years

Example: A replacement heifer born in the late spring could be bred to calve in the fall at about 2 1/2 years. The same heifer might be too young to breed for calving in the spring at less than two years old

C. Income is more regular

XII. Improving reproductive efficiency by shortening breeding season

A. A short breeding season means a short calving season

B. A short calving season allows more time between calving and rebreeding

C. Increased time between calving and rebreeding allows the uterus to recover and the cow to get into better condition

XIII. Ways to shorten breeding season

A. Get cows in good condition at calving

B. Feed cows to gain weight after calving

C. Start breeding heifers 20 days before rest of herd

D. Cull open heifers after 40 days of trying to breed

XIV. Stages of parturition

A. Preparatory--Calf rotates to an upright position and contractions begin

B. Delivery--Calf is born

C. Cleaning--Placenta is delivered

XV. Primary cause of death in baby calves--Injuries resulting from calving difficulties

XVI. Factors contributing to calving problems

A. Birth weight is too high

(Note: This can be caused by a large bull, long gestation period or being a male calf.)

B. Cow's pelvis is too small

(Note: This usually occurs with younger cows or heifers that may have only reached 75% of their mature size at calving.)

C. Incorrect fetal position

(Note: Abnormal positions are found in AG 534-V--Parturition and the Postpartum Period.)

XVII. Ways to reduce calving difficulties

A. Provide cows the right rations for proper condition and weight gain

B. Breed heifers to bulls, which sire calves with low birth weights

C. Have proper calving facilities and equipment

D. Supervise calving herd closely and provide assistance when needed

(Note: Information on birth assistance can be found in AG 310-N--Livestock Skills.)

E. Keep records of birth weight and ease-of-calving to identify problem spots

XVIII. Steps to take right after calving

A. Clean mucus from the nose and make sure calf is breathing

B. Disinfect navel

C. See that calf nurses and gets at least 1 quart in the first 4 hours

D. Eartag or tattoo calf for identification

E. Record birth weight, sex, calf number and cow number

F. Inject with 2 cc of selenium--vitamin E if white muscle disease has been a problem

XIX. Reason newborn calves need colostrum as soon as possible--Calves are born with no natural defense against disease or immunity

(Note: Calves also lose their ability to absorb the antibodies after 24 to 36 hours.)

XX. Conditions under which creep feeding is most likely to be profitable

(Note: Some research indicates once creep feeding is started, it must continue from one generation to the next in order to maintain weaning weight.)

A. Dams are first calf heifers

B. Calves are born in fall

C. Summer pastures become dry

D. Feeder calf prices are high relative to feed costs

E. Cows and calves are in confinement

XXI. Normal weaning age for beef calves - 7 to 8 months

(Note: This may have to be earlier if feed supplies are limited.)

XXII. Weaning

A. Separate calves from dams so they cannot hear or see each other

B. Feed a high roughage ration for at least the first 28 days after weaning with only 3 to 4 pounds of grain per head daily

(Note: A high concentrate diet will cut average daily gain and feed efficiency dramatically.)

C. Continue feeding same ration if calves have been creep fed

D. Treat calves gently and with as little commotion as possible

(Note: Dehorning and castration should occur well before weaning.)

XXIII. Reasons for dehorning

A. Cattle use less space

B. Helps avoid costly carcass bruises

C. Cattle eat better

D. Cattle bring a higher market price

XXIV. Key elements in a successful beef AI program

A. Quality semen

B. Well managed herd with short breeding season

C. Healthy herd

D. Adequate facilities for handling cows during insemination

E. Adequate, trained labor

XXV. Advantages of using artificial insemination

A. Rapid genetic and herd improvement

B. Wider selection and use of outstanding sires

C. Prevention of certain reproduction related diseases

(Note: The Sire Health Code regulates use of artificial insemination in order to insure quality and reduce chances of disease.)

D. Increase in offspring uniformity

E. Elimination of cost of keeping sire

F. Improvement of herd management due to increased observation

G. Safety

H. Can overcome some physical barriers to mating

Example: Very large bull with young heifers

XXVI. Disadvantages of using artificial insemination

A. Skilled technician required

B. Closer supervision of female required

(Note: Cattle need to be supervised two to four times per day to detect heat.)

C. May be subject to abuses

D. Semen storage for sheep, swine and poultry is not yet practical

XXVII. Bulls should be purchased at least 40 to 60 days before breeding season

A. Bulls need time to adjust to surroundings

B. Sperm needs 40 days to develop after forming

(Note: Sterility caused by the stress of moving would therefore take 40 days to correct itself.)

XXVIII. A young bull's genetic superiority is best determined as a yearling

Example: A bull calf's superiority at weaning has a 30% heritability while a yearling bull calf's superiority has a 50-60% heritability

XXIX. Number of cows a bull can breed

A. Young bull of 15 months--15 to 20 cows

B. Two-year-old and older bull--25 to 30 cows

(Note: Over 25 cows may cause calving period to last 4 to 6 months.)

XXX. Management of bull

A. If in good condition; feed same ration as cow

B. Thin bulls need 5-6 lbs grain per day above cow ration

C. Keep in medium flesh--May need to feed 1 lb protein supplement and 5 lbs grain 30-60 days prior and during the breeding season

D. Bulls lose 50-100 lbs during breeding season. Must feed enough during rest of year to gain this weight back

XXXI. Advantages of fertility testing bulls

A. Prevents loss of calf crop

B. Increases calf crop

C. Provides means of selecting bulls

D. Provides means of culling bulls from herd

E. Shortens calving season

F. Increases profit

XXXII. Evaluating quality of bovine semen

A. Color--Acceptable color ranges from milky to creamy

(Note: This indicates sperm per cubic millimeter of 500,000 or above. Other colors indicating less than 500,000 sperm/cu. mm. would be opalescent (cloudy to watery.)

B. Foreign material--Blood or pus in the semen indicates a serious problem and is unacceptable; bedding, dust or fecal material should be disregarded

(Note: Pus may appear as snowflakes around the edges of a tilted vial.)

C. Wave pattern

(Note: This is best determined by placing a thick drop of semen on a slide under a microscope on low power and with reduced light.)

1. Acceptable

a. Very good - 4 -- Dark, distinct waves moving rapidly

b. Good - 3 -- Waves apparent, but with moderate motion

2. Not acceptable

a. Fair - 2 -- Waves barely distinguishable

b. Poor - 1 -- No waves, but motile sperm are present

c. Very poor - 0 -- No waves and no sperm motility

D. Progressive motility

(Note: Other types of motility which involve circling or jerking without forward motion are undesirable. Motility is best determined by putting a thin, diluted drop of semen on a slide under a microscope on low power, X100.)

1. Acceptable samples should have a progressive motility exceeding 50%

2. Ratings

a. Very good - 5 -- 80-100% motile sperm cells

b. Good - 4 -- 60-80% motile sperm cells

c. Fair - 3 -- 40-60% motile sperm cells

d. Poor - 2 -- 20-40% motile sperm cells

e. Very poor - 1 -- 0-20% motile sperm cells

XXXIII. When to check for fertility

A. Just before breeding season

(Note: By testing at this time, you can identify sterile or near-sterile bulls at the time they are expected to settle cows.)

B. Soon after breeding season

(Note: Semen collected at the end of the breeding season should be evaluated carefully because heavy service temporarily lowers the semen quality in most bulls. Checking fertility at this time, however, saves the cost of keeping an infertile bull.)

XXXIV. Advantages of pregnancy testing

A. Cuts winter feed bills

B. Identifies pregnant cows

C. Provides means of culling cows from herd

D. Increases profit

Example: Setting goal of 90% to 95% calf crop within 30 days

(Note: Slaughter cows will bring a higher return if known to be open. Purebred animals will bring more money if known to be safely with calf.)

XXXV. Indications of pregnancy (Transparency 1)

A. Palpation of fetus

B. Presence of fluid in uterine horn

(Note: The uterine horn changes in shape and size during different stages of pregnancy.)

C. Presence of "fetal membrane slip"

D. Palpation of amnionic vesicle

(Caution: If this is not done carefully it can result in hemorrhaging and should be avoided unless necessary.)

E. Presence and size of cotyledons

(Note: These can be detected by about the 65th day of pregnancy.)

F. Diameter and pulse rate of uterine artery

G. Location of uterus

(Note: Uterus begins to descend over front of pelvic girdle after 75 days of pregnancy.)

XXXVI. Rule of thumb for estimating fetus size in a cow--Square the month of gestation and divide by two

Example: Cow has been bred 4 months

4 x 4 = 16 divided by 2 = 8
Fetus should be about 8 inches long

XXXVII. Reasons for using left hand and arm for rectal examination of cows

A. Most pregnancies occur on right side

(Note: Research shows that most pregnancies occur on the right side in mares also.)

B. Body is positioned in such a manner that the left arm has a tendency to move to the right side of the cow

XXXVIII. Factors to consider when planning facilities for beef cattle

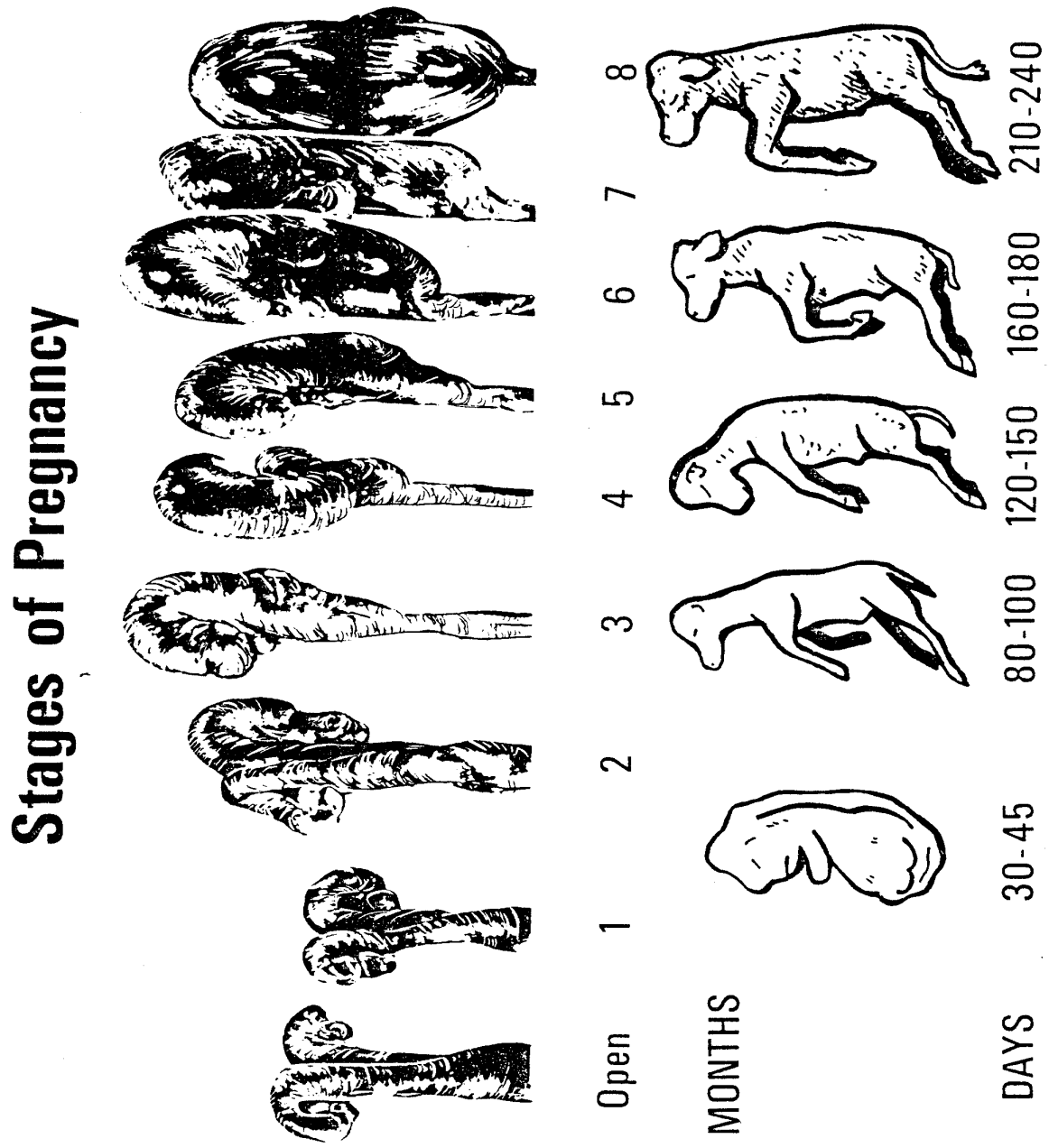
A. Type of operation

B. Number of animals

C. Climate conditions in the area

D. Availability and cost of labor

E. Supply and cost of facilities or equipment needed


Stages of Pregnancy
Open
1
2
3
4
5
6
7
8
MONTHS
DAYS
30-45
80-100
120-150
160-180
210-240

TM 1

TM 1

CARE AND FEEDING OF THE BEEF BREEDING HERD

AG 310 B

ASSIGNMENT SHEET #1 – COMPARE FALL AND SPRING CALVING

Name_____ Score_____

Whether a cow herd should be bred to calve in the fall, spring or both depends on climate, labor, feed, markets and many other factors.

List the advantages and disadvantages of the different calving times for your particular area. Decide the calving time(s) you would use if you had a cow-calf operation. Write your recommendations.

Spring calving:

_____

_____

_____

Fall calving:

_____

_____

_____

Combination:

_____

_____

_____

Recommendations:

_____

_____

_____

_____

CARE AND FEEDING OF THE BEEF BREEDING HERD

AG 310 - B

ASSIGNMENT SHEET #2--DEVELOP A BREEDING AND FEEDING PROGRAM FOR A COW-CALF HERD

Name_____ Score_____

Livestock operations vary across the state partly because of physical limitations and partly because of knowledge differences. Developing a program based on modern information, but tailored to a particular area is important for a successful operation.

Choose a cow-calf herd that would be an appropriate size for your area. Using all the available resources, develop a breeding and feeding program tailored to your area. Include information about feeding, pastures (or confinement), facilities, time of calving and weaning, type of breeding program and approved techniques you would use.

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CARE AND FEEDING OF THE BEEF BREEDING HERD

AG 310 - B

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a. Nutrient added to the basic feed of an animal to help correct a deficiency in that feed

_____b. Cow coming into milk after calving

_____c. Removing a calf from its dam so it can no longer nurse

_____d. Calf death resulting from injuries caused by a difficult birth

_____e. Distinguishing characteristic of an animal

_____f. Giving milk

_____g. Combination of feeds fed to an animal

_____h. Grasses, legumes or other high quality roughages fed to or grazed by cattle

_____i. Act of giving birth

_____j. Ability of heifers and cows to produce a calf

_____k. Plant having the ability to utilize nitrogen from the air and is therefore high in protein

_____l. Inability to produce offspring

_____m. Percentage of differences in a trait that can be explained by inheritance as opposed to environment

_____n. First milk from a cow, containing high levels of antibodies and nutrients

_____o. Protein substance manufactured by the animal as a defense against a particular disease

_____p. Artificial insemination

1. Forage
2. Ration
3. Dystocia
4. Colostrum
5. AI
6. Heritability
7. Lactating
8. TDN
9. Supplemental nutrient
10. Legume
11. Parturition
12. Immunity
13. Weaning
14. Reproductive efficiency
15. Trait
16. Sterility
17. Freshening
18. Antibody
19. Creep feeding

_____q. Total digestible nutrients

_____r. Ability to resist and/or overcome an infection

_____s. Giving calves extra feed by putting the feed inside of an area only small animals can get into

2. Describe three reasons roughages are the primary feed for beef cattle.

a. _____

_____

b. _____

_____

c. _____

_____

3. Name three supplemental nutrients most likely to be needed for a breeding herd on good quality pasture in Idaho.

a. _____ b. _____ c. _____

4. Name the nutrients that need to be fed to the breeding herd during the winter.

a. _____ b. _____ c. _____

d. _____ e. _____

5. Describe the changes in a normal beef cow's nutrient requirements and the changes that should be made in her ration during a year cycle.

a. Calving to rebreeding _____

_____

b. Rebreeding to weaning _____

_____

c. Weaning until 1 to 2 months before calving _____

_____

d. One to 2 months before calving up to calving _____

_____

6. Calculate the TDN requirement for each cow in the following examples. (Note: Be sure to indicate whether your TDN calculation is a daily, weekly, monthly, etc. requirement.)

   Cow A --- dry; weighs 1,050 pounds

   a. TDN = _____

   Cow B --- lactating; 15 pounds of milk per day; 1,000 pounds

   b. TDN = _____

7. Match the sample rations on the right to the type of breeding stock they would be used for. (Note: Rations may be used more than once.)

_____a. 900 - 1,200 pound cows in good condition	1. Good quality grass-legume hay, free choice
_____b. Lactating cows	2. 16-20 pound grass hay
_____c. Mature bulls	3. 20 pounds good quality grass or legume hay
_____d. Young and/or thin bulls during the winter	
_____e. First and second-calf heifers and/or thin cows	4. 8-10 pounds barley, grass-legume hay free choice

8. Describe two specific goals to consider when feeding replacement heifers.

   a. _____

   b. _____

9. Name four of the factors that determine the best time to breed.

   a. _____

   b. _____

   c. _____

   d. _____

10. Distinguish between advantages for fall and spring calving by putting an "F" by the advantages for fall calving and an "S" by the advantages for spring calving.

    _____a. Condition of cows at calving can be better regulated

    _____b. Calves may be sold in fall as short yearlings

    _____c. Less heat, pink-eye and fly problems for calves

    _____d. Calves are weaned at a better marketing time

    _____e. Calves are best able to withstand the rigors of winter

_____f. Cows milk better at the time the calf is suckling

_____g. Cows are bred at a time when AI and hand mating can more easily be used

_____h. Cows are dry during the time when feed is the most expensive

_____i. Less shelter and equipment is necessary

_____j. Cows freshen at a time that is most likely to be associated with a longer lactation

_____k. Less labor required

_____l. Creep feeding is easier to manage

_____m. Cows are usually in better condition at calving time because of good pastures

_____n. Calves can be sold at weaning with no wintering or as yearlings with only one wintering

_____o. Labor is more available when the calves are young

11. List three advantages of combining fall and spring calving.

a. _____

b. _____

c. _____

12. Describe how a short breeding season contributes to improved reproductive efficiency.

_____

_____

_____

13. Select ways to shorten the breeding season by placing an "X" in front of the correct answers.

_____a. Breed heifers for at least 60 days

_____b. Cut back feed after calving to prevent cows from getting fat

_____c. Get cows in good condition at calving

_____d. Start breeding heifers 20 days before rest of herd

14. Describe the three stages of parturition listed.

a. Preparatory _____

b. Delivery _____

c. Cleaning _____

15. Name the primary cause of death in baby calves.

_____

16. Describe three main contributing factors to calving problems.

a. _____

b. _____

c. _____

17. Describe five ways to reduce calving difficulties.

a. _____

b. _____

c. _____

d. _____

e. _____

18. Describe six steps to take right after calving.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

19. Describe why baby calves need colostrum as soon after birth as possible.

_____

_____

20. Select the conditions under which creep feeding is most likely to be profitable by placing an "X" in the blank before the correct answers.

_____a. Dams are first-calf heifers

_____b. Cows and calves are on good pasture

_____c. Calves are born in the spring

_____d. Feeder calf prices are high compared to feed costs

_____e. Summer pastures become dry

_____f. Cows are high milk producers

21. Name the normal weaning age for beef calves.

_____

22. Describe four steps to take at weaning.

a. _____

b. _____

c. _____

d. _____

23. Select reasons for dehorning from the following list by placing an "X" in the blank before the correct answers.

_____a. Cattle eat better

_____b. Helps avoid costly carcass bruises

_____c. Cattle use less space

_____d. Cattle bring a higher market price

_____e. Bulls sire larger calves

24. Name three of the key elements in a successful beef AI program.

a. _____

b. _____

c. _____

25. List five advantages and three disadvantages of using artificial insemination.

Advantages:

a. _____

b. _____

c. _____

d. _____

e. _____

Disadvantages:

a. _____

b. _____

c. _____

26. Describe two reasons bulls should be purchased at least 40 to 60 days before breeding season.

a. _____

b. _____

27. Write the best age to determine a young bull's genetic superiority.

_____

28. Write the optimum number of cows a young and a mature bull should breed.
(Note: This is assuming natural servicing is being used and not AI.)

a. Young bull of 15 months _____

b. Two-year-old and older bull _____

29. Identify factors for proper management of the herd bull. Fill in the blanks with the correct information.

a. Thin bulls need _____ lbs grain per day above the cow ration.

b. Keep bulls in _____ flesh--bulls may need to be fed _____ lb protein supplement and _____ lbs grain 30-60 days prior to and during the breeding season.

c. Bulls lose _____ lbs during the breeding season.

30. Select advantages of fertility testing bulls by placing an "X" in the spaces provided.

_____a. Provides means of selecting bulls

_____b. Helps determine heritability factors

_____c. Increases length of calving season

_____d. Increases profit

_____e. Prevents loss of calf crop

_____f. Provides means of culling bulls from herd

_____g. Helps eliminate problems such as dwarfism by eliminating carriers

31. Describe the quality of the following semen sample by putting "acceptable" or "unacceptable" by each area.

    Semen sample #3 has 35% progressive motile sperm cells, 8% abnormal sperm cells, a barely noticeable wave pattern, several specks of bedding material and a milky color.

    a. Color _____

    b. Foreign material _____

    c. Wave pattern _____

    d. Progressive motility _____

    e. Abnormal sperm _____

32. Name the two best times to check for fertility in bulls.

    a. _____

    b. _____

33. List four advantages of pregnancy testing.

    a. _____

    b. _____

    c. _____

    d. _____

34. List four indications of pregnancy.

    a. _____

    b. _____

    c. _____

    d. _____

35. Calculate the estimated size of a fetus in a cow pregnant for six months.

    _____

36. Describe the reason for using the left hand in rectal examinations.

    _____

    _____

    _____

37. List five factors to consider when planning facilities for beef cattle.

a. _____

b. _____

c. _____

d. _____

e. _____

CARE AND FEEDING OF THE BEEF BREEDING HERD

AG 310 - B

ANSWERS TO TEST

1.

a.	9	f.	7	k.	10	p.	5
b.	17	g.	2	l.	16	q.	8
c.	13	h.	1	m.	6	r.	12
d.	3	i.	11	n.	4	s.	19
e.	15	j.	14	o.	18		

2. Cattle can convert low quality roughages into high quality protein; Cattle can manufacture many of their own nutrients, and can get by with less complete ration; Roughages are almost always the most economical feed

3. Water; Phosphorus; Salt

4. Energy-carbohydrates and fat; Protein; Minerals; Vitamin A--carotene; Water

5.
   a. Highest nutrient requirement; Large quantities of high quality forage needed
   b. Nutrients needed to maintain good milk supply; High quality spring pasture or alfalfa forages needed
   c. Lowest nutrient requirements; Low quality roughages are sufficient, when mineral mixture and vitamin A added; Limited high quality forages if fed
   d. Nutrients needed for cow and calf; Additional protein needed with low quality roughages; Limit high quality forages to avoid excessive weight gain

6. a. 8.4 lbs per day b. 12.5 lbs per day

7.

a.	2	d.	4
b.	1	e.	3
c.	1		

8. Should weigh 600 to 700 pounds at 15 months, to be bred to calve as two-year-olds; Should not be overfed, as fat is deposited first in udder and permanently reduces milk production

9. Answer should include 4 of the following:

   Time calves are to be ready for sale; Feed availability; Seasonal disease problems; Weather conditions; Market availability; Competing farm enterprises

10.

a.	S	e.	S	i.	S	m.	F
b.	F	f.	S	j.	F	n.	S
c.	F	g.	F	k.	S	o.	F
d.	F	h.	S	l.	F		

11. Increases pounds of calf per cow; Allows more flexibility in breeding first-calf heifers; Provides a more regular income

12. Shortens calving season and this gives a cow more time to get into condition and the uterus more time to heal and recover

13. c, d

14. a. Calf rotates to upright position; contractions begin
    b. Calf is born
    c. Placenta is delivered

15. Injuries resulting from calving difficulties

16. Birth weight too high; Cow's pelvis too small; Incorrect fetal position

17. Provide cows proper rations; Breed heifers to bulls which sire calves with low birth weights; Have proper calving facilities and equipment; Supervise calving herd closely and provide appropriate assistance; Keep records to identify problem spots

18. Clean mucus from the nose and make sure calf is breathing; Disinfect navel; See that calf gets 1 quart of colostrum in the first 4 hours; Eartag or tattoo calf for identification; Record birth weight, sex, calf and cow number; Inject with 2 cc selenium--vitamin E if white muscle disease is a problem

19. Newborn calves are born with no natural immunity

20. a, d, e

21. 7 to 8 months

22. Separate calves from dams; Feed a high roughage ration with only 3 to 4 pounds of grain daily for at least first 28 days after weaning; Continue feeding same ration if calves have been creep fed; Treat calves gently and with little commotion

23. a, b, c, d

24. Answer should include 3 of the following:

    Quality semen; Well managed herd with short breeding season; Healthy herd; Adequate facilities; Adequate, trained labor

25. Answer should include 5 advantages and 3 disadvantages:

    Advantages: Rapid genetic and herd improvement; Wider selection and use of outstanding sires; Prevention of certain reproduction related diseases; Increase in offspring uniformity; Elimination of cost of keeping sire; Improvement of herd management due to increased observation; Safety; Can overcome some physical barriers to mating

    Disadvantages: Skilled technician required; Closer supervision of female required; May be subject to abuses; Semen storage for sheep, swine and poultry is not yet practical

26. Give time to adjust to surroundings; Sperm needs 40 days to develop after forming

27. As a yearling

28. a. 15 to 20 cows
    b. 25 to 30 cows

29. a. 5-6
    b. medium, 1, 5
    c. 50-100

30. a, d, e, f

31. a. Acceptable
    b. Acceptable
    c. Unacceptable
    d. Unacceptable
    e. Acceptable

32. Just before breeding season; Soon after breeding season

33. Cuts winter feed bills; Identifies pregnant cows; Provides means of culling cows from herd; Increases profit

34. Answer should include four of the following:

    Palpation of fetus; Presence of fluid in uterine horn; Presence of "fetal membrane slip"; Palpation of amnionic vesicle; Presence and size of cotyledons; Diameter and pulse rate of uterine artery; Location of uterus

35. 18 inches long

36. Most pregnancies occur on right side; Body is positioned in such a manner that the left arm has a tendency to move to the right side of the cow

37. Type of operation; Number of animals; Climate conditions in the area; Availability and cost of labor; Supply and cost of facilities or equipment needed

BEEF CATTLE MANAGEMENT

AG 310 - C

UNIT OBJECTIVE

After completion of this unit, students should be able to develop a feeding program for market cattle. Students should also be able to describe and use management techniques including production records, crossbreeding and calculation of profit or loss. This knowledge will be demonstrated by the completion of the assignment sheets and unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with beef cattle management to their correct definitions.
2. Describe three reasons for keeping records on cattle.
3. Describe three reasons for cattle identification.
4. Match the components of the Idaho Beef Cattle Production Test Records to their description.
5. Describe three advantages of crossbreeding.
6. Match the best method of improvement to the three livestock traits of reproduction, growth and carcass quality.
7. Match types of crossbreeding systems to their description.
8. Describe the six criteria by which feeder cattle can be classified.
9. Describe three types of feeding programs for market cattle.
10. Describe three methods of getting faster gains in beef cattle.
11. Describe two methods of increasing feed efficiencies in beef cattle.
12. Select guidelines for feeding bulls for slaughter.
13. Describe the type of animal most likely to exhibit compensatory gain.
14. Compare the relative cost of feeding older, heavier cattle to the relative cost of feeding younger, lighter cattle.
15. Describe the four conditions that affect pasture supplementation.
16. Describe two reasons for developing a grazing system.
17. Identify the different types of grazing systems.
18. Distinguish between symptoms of bloat and grass tetany.

19. Describe two controls each for bloat and grass tetany.

20. Name the four primary parts of a basic livestock handling system.

21. Select methods for handling shipped-in cattle.

22. Calculate estimated production costs for feeder cattle in a feedlot.

23. Distinguish among margin profits, gain profits and net profits.
(Note: These can also be losses.)

24. Define dressing percentage.

25. Determine the adjusted weaning weight of a calf.

26. Define efficiency of gain and describe how it is determined.

27. Calculate estimated maximum purchase price for feeder cattle.

28. List four methods of buying cattle.

29. Calculate pay weight from a shrinkage agreement for buying or selling calves.

30. List ten major production expenses for a cow-calf operation.

31. Calculate estimated production cost for a beef cow.

32. Develop a crossbreeding system.

33. Develop a feeding program for market animals.

34. Fill out a New Herd Weaning Record.

35. Calculate profit or loss on a feeder cattle operation.

36. Balance a feedlot ration using the trial-and-error method.

BEEF CATTLE MANAGEMENT

AG 310 - C

SUGGESTED ACTIVITIES

I. Suggested activities for instructor

- A. Make transparencies and necessary copies of material.
- B. Provide students with objectives and discuss.
- C. Provide students with information and discuss.
- D. Provide students with assignment sheets.
- E. Review information on balancing rations and develop additional ration problems using the information found on Handout #1.
- F. Arrange field trip of a cattle feedlot operation.
- G. Have students sketch a livestock handling facility they are familiar with.
- H. Invite a rancher with good cattle records to share them with the students.
- I. Invite a nutritionist or feed store specialist to talk about different ration formulations used in the local area.
- J. Review and give test.
- K. Reteach and retest if necessary.

II. Instructional materials

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Transparency masters
    1. TM 1--Crossbreeding/Criss-Cross Method
    2. TM 2--Crossbreeding/Three-Breed Rotational Cross Method
    3. TM 3--Crossbreeding/Three-Breed Terminal Cross Method
    4. TM 4--Immediate Finishing Programs
    5. TM 5--Deferred Finishing Programs
    6. TM 6--Pasture Feeding Programs

7. TM 7--Effect of Age on Weight Gain and Feed Use

E. Handout

1. HO 1--Nutritional Requirements of Beef Cattle

F. Assignment sheets

1. AS 1--Develop a Crossbreeding System

2. AS 2--Develop a Feeding Program for Market Animals

3. AS 3--Fill Out a New Herd Weaning Record

4. AS 4--Calculate Profit or Loss on a Feeder Cattle Operation

5. AS 5--Balance a Feedlot Ration Using the Trial-and-Error Method

G. Answers to assignment sheets

H. Test

I. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

C. Ensminger, M.E., *Beef Cattle Science.* The Interstate Printers and Publishers, Inc., Danville, Illinois, 1976.

D. Thomas, Verl M., *Beef Cattle Science Manual.* University of Idaho Department of Animal Sciences, College of Agriculture, Moscow, Idaho.

BEEF CATTLE MANAGEMENT

AG 310 - C

INFORMATION SHEET

I. Terms and definitions

A. Feeders--Cattle carrying enough flesh to be put in the feedlot and fattened

B. Stockers--Cattle used for wintering on roughage with little or no grain

C. Crossbreeding--Mating an animal of one breed to an animal of another

D. Reproduction traits--Characteristics dealing with the ability of an animal to produce offspring

E. Growth traits--Characteristics dealing with the ability of an animal to convert feed into meat

F. Carcass traits--Characteristics indicating the ability of an animal to produce a high quantity of desirable meat cuts

G. Condition--Degree of fatness in meat animals

H. Quality grade--Evaluation of the palatability of a beef animal based on amount of fat and age

I. Heterosis--Hybrid vigor or the increased energy obtained by mating animals of two different breeds

J. Heritability--Percentage of differences in a trait that can be explained by inheritance as opposed to environment

K. Production testing--Evaluation of individual cows based on their offspring's weaning weight

L. Performance testing--Evaluation based on weight gain from weaning to two years of age

M. Growth stimulant--Substance that increases the rate of gain, but is not a nutrient

N. Nutrient--Substance that nourishes and becomes a part of the body cells

O. Creep feeding--Giving calves extra feed by putting the feed inside of an area only small animals can get into

P. Preconditioning--Preparing animals for a major change in environment and ration

Q. Compensatory growth--Rapid growth resulting from moving an animal from a poor ration to a good one
(Note: This growth is above and beyond the normal growth of an animal, which has always had a good ration.)

R. Shrink--Reduction in weight due to excretory and tissue loss of water

S. Pay weight--Calculated weight after shrinkage

T. CWT--Hundred weight or 100 pounds
(Note: This abbreviation was developed by combining the Roman Numeral "C" for 100 with the abbreviation "wt" for weight.)

II. Reasons for keeping records

A. Identify effects of management decisions

B. Identify superior breeding stock

C. Improve profits

III. Reasons for identifying cattle

(Note: Information on identification can be found in AG 310-N--Livestock Skills.)

A. Establish or verify ownership

B. Participate in performance testing programs

C. Register purebreds

IV. Components of the Idaho Beef Cattle Improvement Program

(Note: A more detailed description of this program is available through the University of Idaho cooperative extension.)

A. Corrected 205 day weight--Weaning weight of an animal adjusted to reflect exact age, age of dam and sex

B. Calf index--Ratio of an individual calf's 205 day adjusted weight to the average of all the calves' adjusted weights

C. MPPA or most probable producing average--Adjustment to the average weaning weight ratio to facilitate comparison of cows which have dropped different numbers of calves

D. Performance testing--Measures weight gain between weaning and 2 years of age

V. Advantages of crossbreeding

(Note: These advantages are the result of heterosis or hybrid vigor. Heterosis generally increases as breeds that are increasingly different are mated.)

A. Increased calf crop

B. Increased weaning weights

C. Greater profits

VI. Best methods of improvement for reproduction, growth and carcass quality

Type of Trait	Heritability of Trait	Heterosis of Trait	Best Method Improvement
Reproduction	Low	High	Crossbreeding
Growth	Moderate	Moderate	Crossbreeding and Selection
Carcass	High	Low	Selection

(Note: Although reproduction cannot be improved very effectively by selecting bulls and cows that have proven reproductive efficiency, unproven heifers and bulls which have characteristics that raise doubt about their ability to reproduce should always be selected against.)

VII. Types of crossbreeding systems (Transparencies 1, 2, 3)

A. Two-Breed Crisscross--Cows of one breed are bred to a bull of another; heifers from first cross are bred to bull of either of the original two breeds; heifers from this cross are bred to a bull opposite the breed their dams were bred to

B. Three-Breed Rotation--Cows of one breed are bred to a bull of another; heifers from first cross are then bred to a third breed of bull; heifers from this cross are bred to a bull of the original cow breed

C. Three-Breed Terminal--Two-breed crossbred cows are bred to a purebred bull of a third breed

(Note: In this case, replacement heifers are not produced in the herd.)

VIII. Criteria by which feeder cattle can be classified

A. Age--Calves, yearlings and 2-year-olds

B. Condition--Thin, medium and fleshy

C. Weight--Light (300-500 lbs), medium (500-700 lbs), and heavy (800+ lbs)

D. Sex--Steers and heifers

(Note: Heifers can do as well as steers if fed for short periods and marketed at lighter carcass weights.)

E. Quality grade--Prime, choice, select, standard, utility

(Note: Plain animals are better suited to grazing while higher grade animals can utilize a high concentrate ration.)

F. Breed or origin--Angus, Hereford, English breed, etc.

IX. Types of feeding programs for market cattle (Transparencies 4, 5, 6)

A. Immediate finishing--Cattle are quickly moved to a high concentrate ration and are finished as rapidly as possible

(Note: This program is best suited for high quality, heavy cattle with rapid gaining potential.)

B. Deferred finishing--Cattle utilize roughages for a growing period of 2 to 5 months before finishing

C. Pasture feeding--Cattle utilize pasture for the growing phase and as a supplement to the finishing phase

X. Methods of getting faster gains in beef cattle

A. Improving genetics through crossbreeding and selection

B. Improving rations

C. Eliminating or controlling disease and parasites

D. Feeding young bulls instead of steers

E. Feeding high levels of antibiotics

F. Using non-carcinogenic growth stimulants

(Note: Carcinogenic growth stimulants such as DES are currently banned.)

XI. Increasing feed efficiencies

A. Implanted growth hormones

Example: Ralgro

B. Feed additives

Example: Rumensin, antibiotics

XII. Feeding bulls for slaughter

A. Start on full-feed at weaning age of 6 to 7 months

B. Use high energy rations

C. Finish before 18 months

D. Keep separate from other bulls or cattle to reduce activity

E. Sell to slaughter the same day

XIII. Light cattle fed roughages during growing period and then switched to a high-energy ration are most likely to exhibit compensatory gain

XIV. Older, heavier cattle take more feed per pound gain than do younger, lighter cattle (Transparency 7)

XV. Conditions that affect pasture supplementation

A. Amount of forage available

B. Quality of forage available

C. Desirable weight gain

D. System of pasture rotation

XVI. Reasons for using grazing systems

A. Prevent overgrazing to allow rapid regrowth of plants

B. Provide maximum nutrient value to animals

XVII. Types of grazing systems

A. Continuous grazing--Pastures are grazed all season

(Note: Careful control of animal numbers is necessary with this system.)

B. Rotational grazing--Pastures are divided up and grazed in rotation

C. Deferred rotation--Pastures are divided up and some pastures are allowed to seed before being grazed, while the others are grazed all season

D. Rest rotation--Pastures are divided up and cattle are rotated with one pasture getting a one-year rest

E. Strip grazing--Pastures are divided into a large number of small areas with cattle rotated every 1 to 2 days

(Note: This requires extensive management and is generally only used on high quality, irrigated pastures.)

XVIII. Symptoms of bloat and grass tetany

A. Bloat

(Note: This is generally caused by eating large amounts of green legumes.)

1. Enlarged rumen

2. Labored breathing

3. Excessive salivation

4. Collapse

B. Grass tetany

(Note: This is caused by low magnesium levels.)

1. Excited behavior with erect ears and a wild stare

2. Uncoordinated movement

3. Grinding teeth

4. Violent convulsions

XIX. Controlling bloat and grass tetany

A. Bloat

1. Keep pasture legumes at 50% or less

2. Feed 10 pounds dry, fibrous hay before grazing pastures with high legume content

3. Feed Polaxalene

(Caution: Check with veterinarian to determine appropriateness of any drug before administering.)

B. Grass tetany

1. Diagnose with blood test if suspected

2. Feed magnesium mineral supplements

3. Use legume pastures, especially for lactating cows

4. Fertilize soil with magnesium fertilizer such as a dolomitic limestone

XX. Primary parts of a basic livestock handling system

A. Head gate

B. Holding or squeeze chute

C. Crowding pen

D. Loading pen

XXI. Handling shipped-in cattle

A. Avoid excessive handling

B. Load and unload quietly

C. Provide clean, accessible water

D. Provide free-choice minerals

E. Feed non-legume or grass-legume hay along with corn or barley and a protein supplement

(Note: Corn silage can be substituted for hay. Wheat should be avoided as a grain substitute because it causes more acid to be produced and this could cause acute indigestion in shipped cattle.)

F. Feed high levels of antibiotics

G. Feed vitamin A

H. Treat for grubs and lice

I. Worm if necessary

J. Separate sick cattle

XXII. Feedlot production costs estimation

A. Feed costs usually make up about 80% of production costs

(Note: Production costs do not include purchase price or transportation costs in this calculation.)

B. Production cost = Feed cost divided by 80% or .8

Example: Feed cost = $152.00
$152.00 divided by .8 = $190.00 production cost

C. Production cost figured per cwt

Example: Animal gains 400 pounds or 4 cwt

$152.00 divided by 4 cwt = $38.00 feed cost per cwt
$ 38.00 divided by .8 = $47.50 production cost per cwt

XXIII. Profit or loss on the margin and gain and net profit or loss

A. Profit or loss on the margin--The difference between the cost of the original weight and the sale price for the original weight

Example: 400 pound calf purchased at $0.65 per pound and sold at 900 pounds for $0.59 per pound

400# x 0.59 = $236.00 sale price for original weight

400# x 0.65 = $260.00 purchase price for original weight

$236.00 - $260.00 = $ 24.00 loss on the margin

B. Profit or loss on the gain--The difference between the selling price of the weight gained by the animal and the cost of producing that gain

(Note: This would include feed as well as all other production costs.)

Example: Calf in previous example used $220.00 worth of feed

900# - 400# = 500# gained

$220.00 - .8 = $275.00 for producing gain

500# x 0.59 = $295.00 selling price for weight gained

$295.00 - $275.00 = $ 20.00 profit on the gain

C. Net profit or loss--Profit or loss on the margin plus the profit or loss on the gain

Example: - $24.00 loss on the margin
+ $20.00 profit on the gain
= $ 4.00 net loss

XXIV. Dressing percentage

A. Percentage yield of chilled carcass in relation to the weight of the live animal

B. Depends on quality grade of animal

Prime	62%
Choice	60%
Select	59%
Standard	57%

Example: A 1,000 lb select steer would produce a 590 lb carcass. (The head, feet, hide, internal organs, etc. make up the rest of the 410 lbs)

XXV. Adjusted weaning weights

A. The weaning weight of the animal is adjusted to reflect the exact age of the animal and the age of the dam

B. Formula

1. $\frac{\text{Actual weight - 70}}{\text{age in days}} \times 205 + 70 = 205 \text{ day weight}$

2. Then correct the adjusted weight for the age of the dam

Age of dam	% added to calf weights
2	15
3	10
4	5
5-10	none
11+	5

XXVI. Efficiency of gain

A. How efficient the animal is in converting feed to weight gain

B. Divide the total pounds of feed fed to the animal by the total pounds it has gained

XXVII. Calculating maximum profitable purchase price for feeder cattle

A. Determine expected selling price

B. Figure total production costs including transportation

C. Decide on profit needed per animal

D. Subtract total production costs and profit per animal from expected selling price and divide by weight of animal at purchase

Example: Want to buy 500 pound animal
Expect to sell 1,000 pound steer for $0.56 per pound

$560.00	Expected selling price (1000 x .56)
-240.00	Total production costs
- 10.00	Transportation
- 10.00	Profit needed per head
$300.00	
divided by 5 cwt	Animal weight at purchase
$ 60.00	Maximum purchase price per cwt

XXVIII. Methods of buying cattle

A. Direct from a rancher

B. Direct from a dealer

C. Commission firm

D. Auction

XXIX. Shrinkage and pay weight

A. Amount of shrinkage depends on travel time or time in drylot, but is generally estimated at 3 percent

B. Weight - (% shrinkage x weight) = pay weight

Example:	Original weight per calf	450.0 lbs
	Shrinkage (3% x 450)	-13.5 lbs
	Pay weight per calf	436.5 lbs

XXX. Production expenses for a cow-calf operation

A. Feed

(Note: This should include both homegrown and purchased.)

B. Labor

(Note: This should include both operator's labor and hired labor.)

C. Veterinary and drug

D. Fuel

E. Bull

F. Taxes

G. Insurance

H. Equipment and depreciation

I. Interest on operating capital

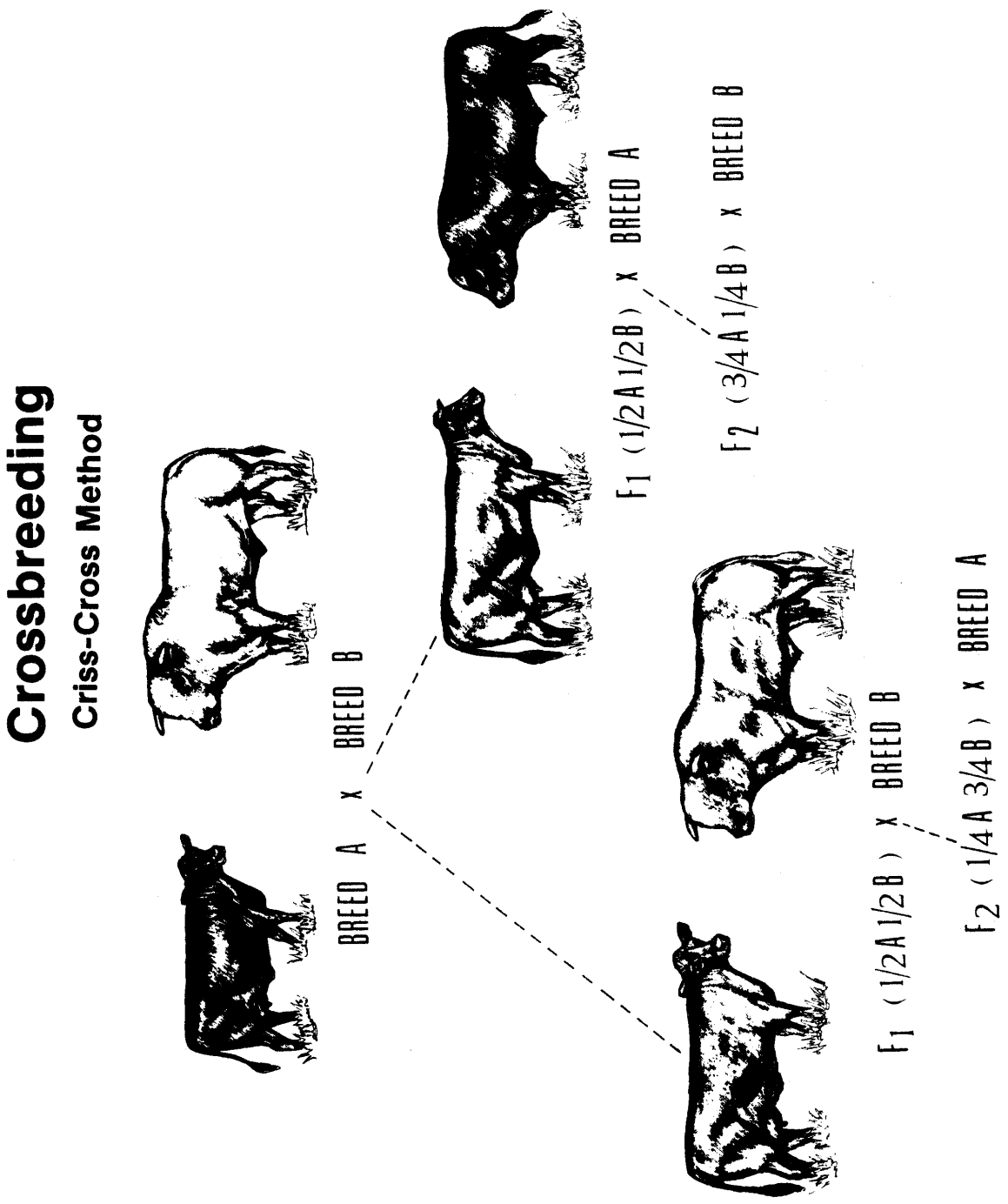
J. Miscellaneous business expenses

XXXI. Calculating the total estimated production cost for a beef cow

A. Feed cost is approximately 60% of the total production cost

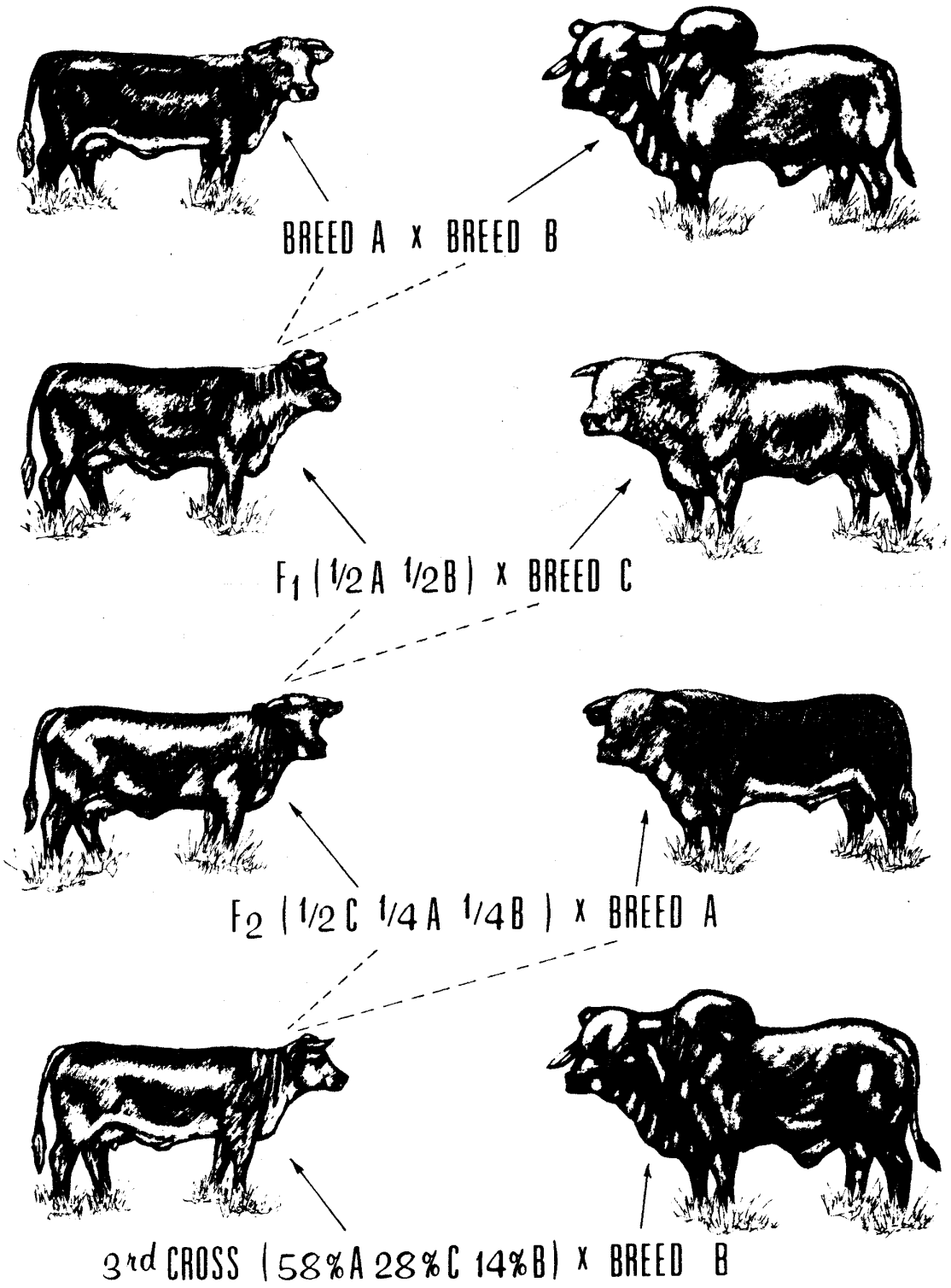
B. Production cost = feed cost divided by 60% or .6

Example:	Feed cost for one year	=	$137.00
	Production cost	=	$137.00 divided by .6
	Production cost	=	$228.34


Crossbreeding
Criss-Cross Method
BREED A x BREED B
F1 (1/2 A 1/2 B) x BREED A
F2 (3/4 A 1/4 B) x BREED B
F1 (1/2 A 1/2 B) x BREED B
F2 (1/4 A 3/4 B) x BREED A

Crossbreeding

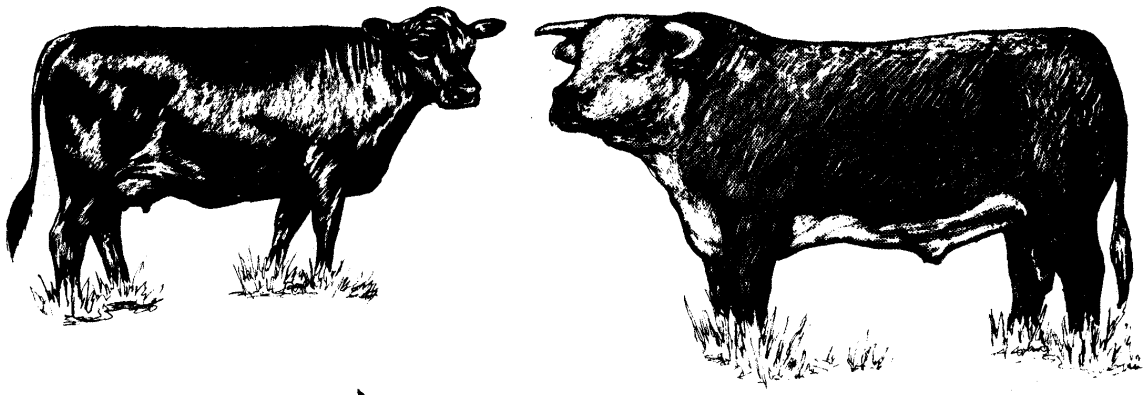
Three-Breed Rotational Cross Method



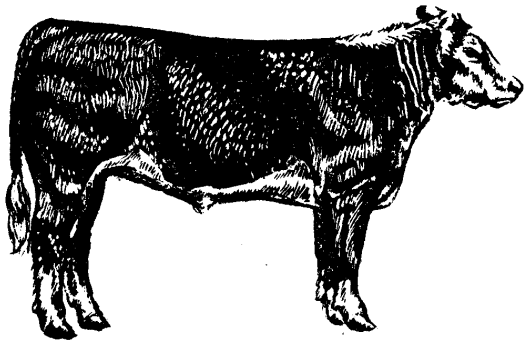
TM 2

Crossbreeding

Three-Breed Terminal Cross Method



(1/2 A 1/2 B) x BREED C



(1/4 A 1/4 B 1/2 C)

Immediate Finishing Programs

FULL FEED RATION FOR STEER CALF BEGINNING AT 450 POUNDS

FEEDS	FIRST 14 DAYS	DAYS 15-28	DAYS 29-240	TOTALS
RATION 1				
CORN SILAGE	FF (25 LBS)*	20 LBS	10-15 LBS	1.4 TONS
CORN OR BARLEY	--	5 LBS	14 LBS	1.5 TONS
SUPPLEMENT--32%	2 LBS	2 LBS	2 LBS	480 LBS
RATION 2				
HAY (LEGUME OR MIXED)	FF (10 LBS)*	FF (7 LBS)*	2-4 LBS	.4 TON
CORN OR BARLEY	2-3 LBS	6 LBS	FF (15 LBS)*	1.6 TONS
SUPPLEMENT--32%	1 LB	1 LB	1 LB	240 LBS
TOTAL WEIGHT GAIN -- 550 LBS		DAILY GAIN -- 2.3 LBS		
FINAL MARKET WEIGHT -- 1000 LBS				

FULL FEED RATION FOR YEARLING STEER BEGINNING AT 700 POUNDS

FEEDS	FIRST 14 DAYS	DAYS 15-28	DAYS 29-140	TOTALS
RATION 1				
CORN SILAGE	FF (40 LBS)*	25 LBS	10-15 LBS	1.0 TON
CORN OR BARLEY	--	7 LBS	18 LBS	1.1 TONS
SUPPLEMENT--32%	2 LBS	2 LBS	2 LBS	280 LBS
RATION 2				
HAY	11 LBS	8 LBS	2-4 LBS	.25 TON
CORN	7 LBS	10 LBS	20 LBS	1.2 TONS
SUPPLEMENT--32%	1 LB	1 LB	1.5 LBS	195 LBS
TOTAL WEIGHT GAIN -- 350 LBS		DAILY GAIN -- 2.5 LBS		
FINAL MARKET WEIGHT -- 1050 LBS				

*FF = FULL-FED. NUMBERS IN PARENTHESES () ARE ESTIMATES OF FEED CONSUMED FOR THE AVERAGE OF THE PERIOD INDICATED.

Deferred Finishing Programs

RATION FOR STEER CALF BEGINNING AT 450 POUNDS IN THE FALL

FEEDS	GROWING PERIOD	FINISHING PERIOD	
	FIRST 170 DAYS	DAYS 171 - 290	TOTALS
HAY (ALFALFA GRASS)	16 LBS	5-6 LBS	1.66 TONS
BARLEY (GRAIN MIXTURE)	--	18 LBS	1.1 TONS
SUPPLEMENT--32%	1 LB	1 LB	290 LBS
WEIGHT GAINED	300 LBS	300 LBS	600 LBS
FINAL MARKET WEIGHT--1050 LBS			

RATION FOR YEARLING STEER BEGINNING AT 600 POUNDS IN THE LATE SUMMER

FEEDS	GROWING PERIOD		FINISHING PERIOD	
	FIRST 60 DAYS	DAYS 61-135	DAYS 136-235	TOTALS
GRAZING STALKS	FREE CHOICE	--	--	1-2 TONS
CORN SILAGE	--	45 LBS	10-15 LBS	2.2 TONS
CORN	--	--	18 LBS	.9 TONS
SUPPLEMENT--32%	2 LBS	2 LBS	2 LBS	470 LBS
WEIGHT GAIN	50 LBS	150 LBS	250 LBS	450 LBS
FINAL MARKET WEIGHT--1050 LBS				

Pasture Feeding Programs

RATION FOR STEER CALF BEGINNING AT 450 POUNDS IN THE FALL

FEEDS	GROWING PERIOD		FINISHING PERIOD	
	FIRST 150 DAYS	DAYS 151-330	DAYS 331-440	TOTALS
PASTURE	--	FREE CHOICE	--	1 ACRE
HAY	FF (12 LBS)*	--	4 LBS	1.1 TONS
CORN	2 LBS	--	18 LBS	1.1 TONS
SUPPLEMENT--32%	0.1 LB	--	1 LB	110-250 LBS
WEIGHT GAIN	210 LBS	140 LBS	300 LBS	650 LBS
FINAL MARKET WEIGHT -- 1100 LBS				

RATION FOR STEER CALF BEGINNING AT 450 POUNDS IN THE FALL

FEEDS	GROWING PERIOD		FINISHING PERIOD	
	FIRST 150 DAYS	DAYS 151-210	DAYS 211-350	TOTALS
PASTURE		FREE CHOICE	FREE CHOICE	.5-1 ACRE
HAY	FF (12 LBS)*	--	--	.9 TON
CORN	2 LBS	--	SF (16 LBS)*	1.2 TONS
SUPPLEMENT--32%	0-1 LB	--	0-1 LB	140-290 LBS
WEIGHT GAIN	150 LBS	100 LBS	350 LBS	600 LBS
FINAL MARKET WEIGHT -- 1050 LBS				

RATION FOR STEER CALF BEGINNING AT 450 POUNDS IN THE FALL

FEEDS	GROWING PERIOD	FINISHING PERIOD	
	FIRST 170 DAYS	DAYS 171-290	TOTALS
PASTURE	--	FREE CHOICE	.5 ACRE
CORN SILAGE	35 LBS	--	3 TON
CORN	--	SF (16 LBS)*	.9 TON
SUPPLEMENT--32%	2 LBS	0-1 LB	340-460 LBS
WEIGHT GAIN	300 LBS	300 LBS	600 LBS
FINAL MARKET WEIGHT --1050 LBS			

*FF = FULL-FED; SF = SELF-FED. NUMBERS IN PARENTHESES () ARE ESTIMATES OF FEED CONSUMED FOR THE AVERAGE OF THE PERIOD INDICATED.

Effect Of Age On Weight Gain And Feed Use

	CALVES	YEARLINGS
INITIAL WEIGHT, LBS	449	746
FINAL WEIGHT, LBS	1078	1154
DAYS FED	278	168
AVERAGE DAILY GAIN	2.26	2.43
DAILY FEED LBS.		
GROUND CORN	6.9	8.5
PROTEIN SUPPLEMENT	2.0	2.0
CORN SILAGE	27.4	35.5
FEED PER CWT GAIN		
AIR-DRY FEED, LB	751	875
TOTAL TDN (LB)	512	592
$ FEED COST/CWT GAIN[2]	32.66	36.66

[1]ADAPTED FROM INDIANA AGRICULTURAL EXPERIMENT STATION RESEARCH PROGRESS REPORT #113

[2]FEED COST = $20/TON CORN SILAGE; 2.52/BU CORN; PROTEIN SUPPLEMENT $160/TON

Nutrient Requirements of Beef Cattle Sixth Revised Edition 1984

TABLE 10 Nutrient Requirements for Growing and Finishing Cattle (Nutrient Concentration in Diet Dry Matter, avoirdupois system)[a,b,c]

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
Medium-frame steer calves										
300	0.5	7.8	0.75	9.6	0.89	0.50	0.25	54.0	0.31	0.20
	1.0	8.4	0.95	11.4	0.96	0.57	0.31	58.5	0.45	0.24
	1.5	8.7	1.14	13.2	1.04	0.64	0.38	63.0	0.58	0.28
	2.0	8.9	1.32	14.8	1.11	0.70	0.44	67.5	0.72	0.32
	2.5	8.9	1.48	16.7	1.21	0.79	0.51	73.5	0.87	0.37
	3.0	8.0	1.60	19.9	1.39	0.95	0.64	85.0	1.13	0.47
400	0.5	9.7	0.87	8.9	0.89	0.50	0.25	54.0	0.27	0.18
	1.0	10.4	1.06	10.3	0.96	0.57	0.31	58.5	0.38	0.21
	1.5	10.8	1.24	11.5	1.04	0.64	0.38	63.0	0.47	0.25
	2.0	11.0	1.41	12.7	1.11	0.70	0.44	67.5	0.56	0.26
	2.5	11.0	1.56	14.2	1.21	0.79	0.51	73.5	0.68	0.30
	3.0	10.0	1.65	16.6	1.39	0.95	0.64	85.0	0.86	0.37
500	0.5	11.5	0.98	8.5	0.89	0.50	0.25	54.0	0.25	0.17
	1.0	12.3	1.16	9.5	0.96	0.57	0.31	58.5	0.32	0.20
	1.5	12.8	1.33	10.5	1.04	0.64	0.38	63.0	0.40	0.22
	2.0	13.1	1.49	11.4	1.11	0.70	0.44	67.5	0.47	0.24
	2.5	13.0	1.63	12.5	1.21	0.79	0.51	73.5	0.56	0.27
	3.0	11.8	1.69	14.4	1.39	0.95	0.64	85.0	0.69	0.32
600	0.5	13.2	1.08	8.2	0.89	0.50	0.25	54.0	0.23	0.18
	1.0	14.1	1.26	9.0	0.96	0.57	0.31	58.5	0.28	0.19
	1.5	14.7	1.42	9.8	1.04	0.64	0.38	63.0	0.35	0.21
	2.0	15.0	1.57	10.5	1.11	0.70	0.44	67.5	0.40	0.22
	2.5	14.9	1.69	11.4	1.21	0.79	0.51	73.5	0.46	0.24
	3.0	13.5	1.73	12.9	1.39	0.95	0.64	85.0	0.57	0.29
700	0.5	14.8	1.18	7.9	0.89	0.50	0.25	54.0	0.22	0.18
	1.0	15.8	1.35	8.6	0.96	0.57	0.31	58.5	0.27	0.18
	1.5	16.5	1.50	9.2	1.04	0.64	0.38	63.0	0.31	0.20
	2.0	16.8	1.65	9.8	1.11	0.70	0.44	67.5	0.34	0.21
	2.5	16.7	1.75	10.5	1.21	0.79	0.51	73.5	0.40	0.22
	3.0	15.2	1.77	11.7	1.39	0.95	0.64	85.0	0.49	0.26

TABLE 10 Nutrient Requirements for Growing and Finishing Cattle (Nutrient Concentration in Diet Dry Matter, avoirdupois system)[a,b,c]—*Continued*

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
800	0.5	16.4	1.27	7.7	0.89	0.50	0.25	54.0	0.22	0.17
	1.0	17.5	1.44	8.3	0.96	0.57	0.31	58.5	0.24	0.19
	1.5	18.2	1.58	8.8	1.04	0.64	0.38	63.0	0.28	0.19
	2.0	18.6	1.72	9.2	1.11	0.70	0.44	67.5	0.31	0.20
	2.5	18.5	1.81	9.8	1.21	0.79	0.51	73.5	0.35	0.21
	3.0	16.8	1.81	10.8	1.39	0.95	0.64	85.0	0.42	0.25
900	0.5	17.9	1.36	7.6	0.89	0.50	0.25	54.0	0.21	0.18
	1.0	19.1	1.52	8.0	0.96	0.57	0.31	58.5	0.23	0.18
	1.5	19.9	1.66	8.4	1.04	0.64	0.38	63.0	0.25	0.19
	2.0	20.3	1.79	8.8	1.11	0.70	0.44	67.5	0.28	0.20
	2.5	20.2	1.87	9.3	1.21	0.79	0.51	73.5	0.31	0.20
	3.0	18.3	1.85	10.1	1.39	0.95	0.64	85.0	0.37	0.23
1000	0.5	19.3	1.45	7.5	0.89	0.50	0.25	54.0	0.21	0.18
	1.0	20.7	1.60	7.8	0.96	0.57	0.31	58.5	0.21	0.18
	1.5	21.5	1.74	8.1	1.04	0.64	0.38	63.0	0.24	0.18
	2.0	22.0	1.85	8.4	1.11	0.70	0.44	67.5	0.25	0.19
	2.5	21.9	1.92	8.8	1.21	0.79	0.51	73.5	0.27	0.19
	3.0	19.8	1.88	9.5	1.39	0.95	0.64	85.0	0.32	0.22
Large-frame steer calves and compensating medium-frame yearling steers										
300	0.5	8.2	0.77	9.5	0.86	0.48	0.23	52.5	0.30	0.19
	1.0	8.7	0.99	11.3	0.92	0.54	0.28	56.0	0.46	0.23
	1.5	9.1	1.19	12.9	0.98	0.59	0.33	59.5	0.58	0.27
	2.0	9.4	1.37	14.6	1.04	0.64	0.38	63.5	0.70	0.30
	2.5	9.6	1.55	16.3	1.11	0.70	0.44	67.5	0.85	0.34
	3.0	9.6	1.73	18.0	1.18	0.77	0.49	72.0	0.99	0.39
	3.5	9.3	1.88	20.3	1.29	0.86	0.57	78.5	1.16	0.45
400	0.5	10.1	0.89	8.9	0.86	0.48	0.23	52.5	0.26	0.17
	1.0	10.8	1.10	10.2	0.92	0.54	0.28	56.0	0.37	0.20
	1.5	11.3	1.30	11.4	0.98	0.59	0.33	59.5	0.47	0.23
	2.0	11.7	1.47	12.7	1.04	0.64	0.38	63.5	0.57	0.26
	2.5	11.9	1.64	13.9	1.11	0.70	0.44	67.5	0.65	0.30
	3.0	11.9	1.81	15.2	1.18	0.77	0.49	72.0	0.76	0.33
	3.5	11.5	1.94	16.9	1.29	0.86	0.57	78.5	0.90	0.36
500	0.5	12.0	1.0	8.5	0.86	0.48	0.23	52.5	0.24	0.17
	1.0	12.8	1.21	9.5	0.92	0.54	0.28	56.0	0.33	0.19
	1.5	13.4	1.40	10.4	0.98	0.59	0.33	59.5	0.39	0.21
	2.0	13.8	1.57	11.4	1.04	0.64	0.38	63.5	0.46	0.24
	2.5	14.0	1.73	12.4	1.11	0.70	0.44	67.5	0.55	0.25
	3.0	14.0	1.88	13.4	1.18	0.77	0.49	72.0	0.63	0.28
	3.5	13.6	2.00	14.7	1.29	0.86	0.57	78.5	0.73	0.32
600	0.5	13.8	1.11	8.2	0.86	0.48	0.23	52.5	0.22	0.18
	1.0	14.6	1.31	9.0	0.92	0.54	0.28	56.0	0.29	0.18
	1.5	15.3	1.50	9.7	0.98	0.59	0.33	59.5	0.35	0.20
	2.0	15.8	1.66	10.5	1.04	0.64	0.38	63.5	0.40	0.22
	2.5	16.1	1.81	11.3	1.11	0.70	0.44	67.5	0.47	0.23
	3.0	16.1	1.95	12.1	1.18	0.77	0.49	72.0	0.52	0.26
	3.5	15.6	2.05	13.2	1.29	0.86	0.57	78.5	0.61	0.28
700	0.5	15.4	1.21	7.9	0.86	0.48	0.23	52.5	0.21	0.17
	1.0	16.4	1.41	8.6	0.92	0.54	0.28	56.0	0.27	0.19
	1.5	17.2	1.59	9.2	0.98	0.59	0.33	59.5	0.31	0.19
	2.0	17.8	1.74	9.8	1.04	0.64	0.38	63.5	0.36	0.21
	2.5	18.0	1.88	10.5	1.11	0.70	0.44	67.5	0.40	0.22
	3.0	18.0	2.01	11.1	1.18	0.77	0.49	72.0	0.45	0.23
	3.5	17.5	2.10	12.0	1.29	0.86	0.57	78.5	0.52	0.26

TABLE 10 Nutrient Requirements for Growing and Finishing Cattle (Nutrient Concentration in Diet Dry Matter, avoirdupois system)[a,b,c]—*Continued*

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
800	0.5	17.1	1.31	7.7	0.86	0.48	0.23	52.5	0.21	0.18
	1.0	18.2	1.51	8.3	0.92	0.54	0.28	56.0	0.24	0.18
	1.5	19.0	1.68	8.8	0.98	0.59	0.33	59.5	0.28	0.19
	2.0	19.6	1.82	9.3	1.04	0.64	0.38	63.5	0.32	0.20
	2.5	19.9	1.96	9.8	1.11	0.70	0.44	67.5	0.35	0.21
	3.0	19.9	2.07	10.4	1.18	0.77	0.49	72.0	0.40	0.22
	3.5	19.3	2.15	11.1	1.29	0.86	0.57	78.5	0.45	0.24
900	0.5	18.6	1.40	7.6	0.86	0.48	0.23	52.5	0.20	0.18
	1.0	19.8	1.60	8.0	0.92	0.54	0.28	56.0	0.23	0.18
	1.5	20.8	1.77	8.5	0.98	0.59	0.33	59.5	0.27	0.18
	2.0	21.4	1.90	8.9	1.04	0.64	0.38	63.5	0.29	0.20
	2.5	21.8	2.03	9.3	1.11	0.70	0.44	67.5	0.31	0.20
	3.0	21.7	2.13	9.8	1.18	0.77	0.49	72.0	0.36	0.21
	3.5	21.1	2.19	10.4	1.29	0.86	0.57	78.5	0.40	0.23
1000	0.5	20.2	1.49	7.5	0.86	0.48	0.23	52.5	0.20	0.17
	1.0	21.5	1.69	7.8	0.92	0.54	0.28	56.0	0.23	0.17
	1.5	22.5	1.85	8.2	0.98	0.59	0.33	59.5	0.25	0.18
	2.0	23.2	1.98	8.6	1.04	0.64	0.38	63.5	0.27	0.18
	2.5	23.6	2.09	8.9	1.11	0.70	0.44	67.5	0.29	0.19
	3.0	23.6	2.19	9.3	1.18	0.77	0.49	72.0	0.32	0.20
	3.5	22.8	2.24	9.8	1.29	0.86	0.57	78.5	0.35	0.21
1100	0.5	21.7	1.58	7.4	0.86	0.48	0.23	52.5	0.19	0.18
	1.0	23.1	1.77	7.7	0.92	0.54	0.28	56.0	0.21	0.18
	1.5	24.1	1.93	8.0	0.98	0.59	0.33	59.5	0.23	0.18
	2.0	24.9	2.05	8.3	1.04	0.64	0.38	63.5	0.25	0.18
	2.5	25.3	2.16	8.5	1.11	0.70	0.44	67.5	0.26	0.18
	3.0	25.3	2.25	8.9	1.18	0.77	0.49	72.0	0.29	0.19
	3.5	24.5	2.28	9.3	1.29	0.86	0.57	78.5	0.32	0.21
Medium-frame bulls										
300	0.5	7.8	0.76	9.7	0.88	0.49	0.24	53.5	0.31	0.20
	1.0	8.3	0.96	11.6	0.94	0.56	0.30	57.5	0.48	0.24
	1.5	8.6	1.15	13.4	1.01	0.62	0.35	61.5	0.62	0.28
	2.0	8.8	1.34	15.2	1.08	0.68	0.41	65.5	0.75	0.33
	2.5	8.9	1.52	17.0	1.15	0.74	0.47	70.0	0.92	0.37
	3.0	8.7	1.68	19.3	1.26	0.84	0.54	76.5	1.09	0.43
400	0.5	9.6	0.87	9.0	0.88	0.49	0.24	53.5	0.28	0.18
	1.0	10.3	1.07	10.4	0.94	0.56	0.30	57.5	0.39	0.21
	1.5	10.7	1.26	11.8	1.01	0.62	0.35	61.5	0.49	0.25
	2.0	11.0	1.44	13.1	1.08	0.68	0.41	65.5	0.60	0.28
	2.5	11.1	1.60	14.4	1.15	0.74	0.47	70.0	0.70	0.32
	3.0	10.8	1.74	16.1	1.26	0.84	0.54	76.5	0.84	0.37
500	0.5	11.4	0.98	8.6	0.88	0.49	0.24	53.5	0.25	0.17
	1.0	12.1	1.17	9.7	0.94	0.56	0.30	57.5	0.35	0.20
	1.5	12.7	1.35	10.7	1.01	0.62	0.35	61.5	0.42	0.23
	2.0	13.0	1.52	11.7	1.08	0.68	0.41	65.5	0.49	0.25
	2.5	13.1	1.68	12.8	1.15	0.74	0.47	70.0	0.59	0.27
	3.0	12.8	1.81	14.1	1.26	0.84	0.54	76.5	0.69	0.31
600	0.5	13.1	1.08	8.3	0.88	0.49	0.24	53.5	0.24	0.19
	1.0	13.9	1.27	9.2	0.94	0.56	0.30	57.5	0.30	0.19
	1.5	14.5	1.44	10.0	1.01	0.62	0.35	61.5	0.36	0.21
	2.0	14.9	1.61	10.8	1.08	0.68	0.41	65.5	0.43	0.24
	2.5	15.0	1.75	11.6	1.15	0.74	0.47	70.0	0.50	0.25
	3.0	14.7	1.86	12.7	1.26	0.84	0.54	76.5	0.57	0.29

Nutrient Requirements of Beef Cattle

TABLE 10 Nutrient Requirements for Growing and Finishing Cattle (Nutrient Concentration in Diet Dry Matter, avoirdupois system)[a,b,c]—*Continued*

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
700	0.5	14.7	1.18	8.0	0.88	0.49	0.24	53.5	0.23	0.18
	1.0	15.6	1.37	8.8	0.94	0.56	0.30	57.5	0.28	0.20
	1.5	16.3	1.53	9.4	1.01	0.62	0.35	61.5	0.32	0.20
	2.0	16.7	1.69	10.1	1.08	0.68	0.41	65.5	0.38	0.22
	2.5	16.8	1.82	10.8	1.15	0.74	0.47	70.0	0.43	0.24
	3.0	16.5	1.92	11.7	1.26	0.84	0.54	76.5	0.49	0.25
800	0.5	16.2	1.27	7.8	0.88	0.49	0.24	53.5	0.22	0.19
	1.0	17.3	1.45	8.4	0.94	0.56	0.30	57.5	0.25	0.19
	1.5	18.0	1.61	9.0	1.01	0.62	0.35	61.5	0.29	0.20
	2.0	18.5	1.76	9.5	1.08	0.68	0.41	65.5	0.33	0.21
	2.5	18.6	1.89	10.1	1.15	0.74	0.47	70.0	0.38	0.23
	3.0	18.2	1.97	10.8	1.26	0.84	0.54	76.5	0.44	0.24
900	0.5	17.7	1.36	7.7	0.88	0.49	0.24	53.5	0.21	0.19
	1.0	18.9	1.54	8.2	0.94	0.56	0.30	57.5	0.25	0.19
	1.5	19.7	1.69	8.6	1.01	0.62	0.35	61.5	0.28	0.19
	2.0	20.2	1.83	9.1	1.08	0.68	0.41	65.5	0.31	0.21
	2.5	20.3	1.95	9.6	1.15	0.74	0.47	70.0	0.34	0.22
	3.0	19.9	2.02	10.2	1.26	0.84	0.54	76.5	0.39	0.23
1000	0.5	19.2	1.45	7.5	0.88	0.49	0.24	53.5	0.21	0.18
	1.0	20.4	1.62	8.0	0.94	0.56	0.30	57.5	0.24	0.18
	1.5	21.3	1.77	8.4	1.01	0.62	0.35	61.5	0.26	0.19
	2.0	21.8	1.90	8.7	1.08	0.68	0.41	65.5	0.28	0.19
	2.5	22.0	2.01	9.1	1.15	0.74	0.47	70.0	0.31	0.20
	3.0	21.5	2.07	9.6	1.26	0.84	0.54	76.5	0.35	0.22
1100	0.5	20.6	1.54	7.4	0.88	0.49	0.24	53.5	0.20	0.19
	1.0	21.9	1.70	7.8	0.94	0.56	0.30	57.5	0.22	0.19
	1.5	22.9	1.85	8.1	1.01	0.62	0.35	61.5	0.24	0.19
	2.0	23.4	1.97	8.4	1.08	0.68	0.41	65.5	0.26	0.19
	2.5	23.6	2.07	8.7	1.15	0.74	0.47	70.0	0.28	0.20
	3.0	23.1	2.11	9.2	1.26	0.84	0.54	76.5	0.32	0.21
Large-frame bull calves and compensating large-frame yearling steers										
300	0.5	7.9	0.77	9.7	0.86	0.48	0.23	52.5	0.31	0.20
	1.0	8.4	0.98	11.7	0.92	0.54	0.28	56.0	0.47	0.24
	1.5	8.8	1.18	13.5	0.98	0.59	0.33	59.5	0.63	0.28
	2.0	9.0	1.38	15.1	1.03	0.63	0.37	62.5	0.76	0.32
	2.5	9.2	1.56	17.0	1.09	0.69	0.42	66.5	0.91	0.36
	3.0	9.2	1.74	18.8	1.16	0.75	0.47	70.5	1.08	0.43
	3.5	9.1	1.91	20.9	1.24	0.82	0.53	75.5	1.24	0.48
	4.0	8.2	2.04	24.7	1.41	0.96	0.66	86.0	1.53	0.59
400	0.5	9.8	0.89	9.0	0.86	0.48	0.23	52.5	0.27	0.18
	1.0	10.4	1.09	10.5	0.92	0.54	0.28	56.0	0.40	0.21
	1.5	10.9	1.29	11.9	0.98	0.59	0.33	59.5	0.51	0.24
	2.0	11.2	1.48	13.1	1.03	0.63	0.37	62.5	0.61	0.28
	2.5	11.4	1.65	14.5	1.09	0.69	0.42	66.5	0.72	0.31
	3.0	11.5	1.82	15.9	1.16	0.75	0.47	70.5	0.82	0.35
	3.5	11.3	1.98	17.5	1.24	0.82	0.53	75.5	0.96	0.39
	4.0	10.2	2.08	20.3	1.41	0.96	0.66	86.0	1.19	0.48
500	0.5	11.6	1.00	8.6	0.86	0.48	0.23	52.5	0.25	0.19
	1.0	12.3	1.20	9.8	0.92	0.54	0.28	56.0	0.36	0.21
	1.5	12.9	1.39	10.9	0.98	0.59	0.33	59.5	0.43	0.22
	2.0	13.2	1.58	11.8	1.03	0.63	0.37	62.5	0.52	0.25

TABLE 10 Nutrient Requirements for Growing and Finishing Cattle (Nutrient Concentration in Diet Dry Matter, avoirdupois system)[a,b,c]—*Continued*

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
	2.5	13.5	1.74	12.9	1.09	0.69	0.42	66.5	0.59	0.28
	3.0	13.6	1.90	14.0	1.16	0.75	0.47	70.5	0.68	0.31
	3.5	13.4	2.05	15.3	1.24	0.82	0.53	75.5	0.77	0.35
	4.0	12.0	2.13	17.5	1.41	0.96	0.66	86.0	0.97	0.40
600	0.5	13.3	1.10	8.3	0.86	0.48	0.23	52.5	0.23	0.18
	1.0	14.1	1.30	9.2	0.92	0.54	0.28	56.0	0.31	0.20
	1.5	14.8	1.48	10.1	0.98	0.59	0.33	59.5	0.37	0.21
	2.0	15.2	1.67	10.9	1.03	0.63	0.37	62.5	0.44	0.23
	2.5	15.5	1.82	11.8	1.09	0.69	0.42	66.5	0.51	0.26
	3.0	15.5	1.97	12.7	1.16	0.75	0.47	70.5	0.58	0.27
	3.5	15.3	2.11	13.7	1.24	0.82	0.53	75.5	0.66	0.30
	4.0	13.8	2.16	15.6	1.41	0.96	0.66	86.0	0.81	0.37
700	0.5	14.9	1.20	8.0	0.86	0.48	0.23	52.5	0.22	0.18
	1.0	15.9	1.40	8.8	0.92	0.54	0.28	56.0	0.29	0.19
	1.5	16.6	1.57	9.6	0.98	0.59	0.33	59.5	0.35	0.21
	2.0	17.0	1.75	10.2	1.03	0.63	0.37	62.5	0.39	0.22
	2.5	17.4	1.90	11.0	1.09	0.69	0.42	66.5	0.44	0.24
	3.0	17.5	2.04	11.7	1.16	0.75	0.47	70.5	0.50	0.25
	3.5	17.2	2.16	12.5	1.24	0.82	0.53	75.5	0.56	0.28
	4.0	15.5	2.20	14.1	1.41	0.96	0.66	86.0	0.70	0.33
800	0.5	16.5	1.30	7.9	0.86	0.48	0.23	52.5	0.21	0.19
	1.0	17.5	1.49	8.5	0.92	0.54	0.28	56.0	0.26	0.19
	1.5	18.3	1.66	9.1	0.98	0.59	0.33	59.5	0.31	0.20
	2.0	18.8	1.84	9.7	1.03	0.63	0.37	62.5	0.35	0.21
	2.5	19.2	1.97	10.3	1.09	0.69	0.42	66.5	0.40	0.23
	3.0	19.3	2.11	10.9	1.16	0.75	0.47	70.5	0.45	0.24
	3.5	19.0	2.22	11.6	1.24	0.82	0.53	75.5	0.50	0.26
	4.0	17.1	2.24	13.0	1.41	0.96	0.66	86.0	0.61	0.31
900	0.5	18.0	1.39	7.7	0.86	0.48	0.23	52.5	0.22	0.18
	1.0	19.2	1.58	8.3	0.92	0.54	0.28	56.0	0.25	0.18
	1.5	20.0	1.74	8.8	0.98	0.59	0.33	59.5	0.29	0.20
	2.0	20.6	1.92	9.2	1.03	0.63	0.37	62.5	0.32	0.20
	2.5	21.0	2.04	9.8	1.09	0.69	0.42	66.5	0.36	0.21
	3.0	21.1	2.17	10.3	1.16	0.75	0.47	70.5	0.40	0.23
	3.5	20.8	2.27	10.9	1.24	0.82	0.53	75.5	0.45	0.24
	4.0	18.7	2.27	12.1	1.41	0.96	0.66	86.0	0.53	0.28
1000	0.5	19.5	1.48	7.6	0.86	0.48	0.23	52.5	0.21	0.18
	1.0	20.7	1.66	8.1	0.92	0.54	0.28	56.0	0.25	0.19
	1.5	21.7	1.83	8.5	0.98	0.59	0.33	59.5	0.27	0.19
	2.0	22.3	1.99	8.9	1.03	0.63	0.37	62.5	0.30	0.20
	2.5	22.7	2.11	9.3	1.09	0.69	0.42	66.5	0.33	0.20
	3.0	22.8	2.23	9.7	1.16	0.75	0.47	70.5	0.36	0.21
	3.5	22.5	2.32	10.3	1.24	0.82	0.53	75.5	0.40	0.24
	4.0	20.2	2.30	11.3	1.41	0.96	0.66	86.0	0.48	0.27
1100	0.5	20.9	1.57	7.5	0.86	0.48	0.23	52.5	0.21	0.19
	1.0	22.3	1.75	7.9	0.92	0.54	0.28	56.0	0.23	0.19
	1.5	23.3	1.91	8.3	0.98	0.59	0.33	59.5	0.26	0.19
	2.0	23.9	2.07	8.6	1.03	0.63	0.37	62.5	0.28	0.19
	2.5	24.2	2.18	9.0	1.09	0.69	0.42	66.5	0.30	0.20
	3.0	24.5	2.29	9.3	1.16	0.75	0.47	70.5	0.32	0.21
	3.5	24.1	2.37	9.8	1.24	0.82	0.53	75.5	0.36	0.22
	4.0	21.7	2.33	10.7	1.41	0.96	0.66	86.0	0.43	0.25

TABLE 10 Nutrient Requirements for Growing and Finishing Cattle (Nutrient Concentration in Diet Dry Matter, avoirdupois system)[a,b,c]—*Continued*

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
Medium-frame heifer calves										
300	0.5	7.5	0.73	9.6	0.92	0.54	0.28	56.0	0.29	0.21
	1.0	8.0	0.91	11.4	1.02	0.63	0.36	62.0	0.44	0.22
	1.5	8.2	1.08	13.1	1.13	0.72	0.44	68.5	0.59	0.27
	2.0	8.0	1.22	15.1	1.26	0.84	0.55	77.0	0.74	0.33
400	0.5	9.3	0.84	8.9	0.92	0.54	0.28	56.0	0.26	0.19
	1.0	9.9	1.01	10.2	1.02	0.63	0.36	62.0	0.36	0.20
	1.5	10.2	1.17	11.4	1.13	0.72	0.44	68.5	0.45	0.24
	2.0	10.0	1.29	12.9	1.26	0.84	0.55	77.0	0.57	0.29
500	0.5	11.0	0.94	8.5	0.92	0.54	0.28	56.0	0.24	0.18
	1.0	11.8	1.11	9.4	1.02	0.63	0.36	62.0	0.30	0.21
	1.5	12.1	1.25	10.3	1.13	0.72	0.44	68.5	0.38	0.22
	2.0	11.8	1.35	11.4	1.26	0.84	0.55	77.0	0.45	0.24
600	0.5	12.6	1.04	8.1	0.92	0.54	0.28	56.0	0.23	0.18
	1.0	13.5	1.19	8.8	1.02	0.63	0.36	62.0	0.28	0.20
	1.5	13.8	1.32	9.5	1.13	0.72	0.44	68.5	0.32	0.21
	2.0	13.5	1.41	10.4	1.26	0.84	0.55	77.0	0.38	0.23
700	0.5	14.1	1.13	7.9	0.92	0.54	0.28	56.0	0.22	0.19
	1.0	15.1	1.28	8.4	1.02	0.63	0.36	62.0	0.25	0.19
	1.5	15.5	1.39	9.0	1.13	0.72	0.44	68.5	0.28	0.20
	2.0	15.2	1.46	9.6	1.26	0.84	0.55	77.0	0.32	0.22
800	0.5	15.6	1.22	7.7	0.92	0.54	0.28	56.0	0.21	0.18
	1.0	16.7	1.36	8.1	1.02	0.63	0.36	62.0	0.22	0.18
	1.5	17.2	1.46	8.5	1.13	0.72	0.44	68.5	0.24	0.19
	2.0	16.8	1.51	9.0	1.26	0.84	0.55	77.0	0.28	0.20
900	0.5	17.1	1.31	7.5	0.92	0.54	0.28	56.0	0.21	0.18
	1.0	18.3	1.44	7.8	1.02	0.63	0.36	62.0	0.22	0.18
	1.5	18.8	1.53	8.1	1.13	0.72	0.44	68.5	0.22	0.19
	2.0	18.3	1.56	8.5	1.26	0.84	0.55	77.0	0.25	0.19
1000	0.5	18.5	1.39	7.4	0.92	0.54	0.28	56.0	0.20	0.19
	1.0	19.8	1.51	7.6	1.02	0.63	0.36	62.0	0.20	0.18
	1.5	20.3	1.59	7.8	1.13	0.72	0.44	68.5	0.21	0.18
	2.0	19.8	1.61	8.1	1.26	0.84	0.55	77.0	0.22	0.19
Large-frame heifer calves and compensating medium-frame yearling heifers										
300	0.5	7.8	0.76	9.5	0.89	0.50	0.25	54.0	0.31	0.20
	1.0	8.4	0.95	11.3	0.98	0.58	0.32	59.0	0.45	0.24
	1.5	8.8	1.13	13.0	1.05	0.65	0.39	64.0	0.58	0.25
	2.0	8.9	1.30	14.6	1.14	0.74	0.46	69.5	0.69	0.30
	2.5	8.7	1.45	16.7	1.26	0.84	0.55	77.0	0.86	0.35
400	0.5	9.7	0.87	8.9	0.89	0.50	0.25	54.0	0.27	0.18
	1.0	10.5	1.06	10.1	0.98	0.58	0.32	59.0	0.36	0.21
	1.5	10.9	1.23	11.3	1.05	0.65	0.39	64.0	0.45	0.22
	2.0	11.1	1.38	12.6	1.14	0.74	0.46	69.5	0.54	0.26
	2.5	10.8	1.51	14.1	1.26	0.84	0.55	77.0	0.65	0.31
500	0.5	11.5	0.98	8.4	0.89	0.50	0.25	54.0	0.23	0.17
	1.0	12.4	1.16	9.4	0.98	0.58	0.32	59.0	0.30	0.20
	1.5	12.9	1.32	10.3	1.05	0.65	0.39	64.0	0.38	0.20
	2.0	13.1	1.46	11.2	1.14	0.74	0.46	69.5	0.44	0.24
	2.5	12.8	1.57	12.4	1.26	0.84	0.55	77.0	0.53	0.26
600	0.5	13.2	1.08	8.1	0.89	0.50	0.25	54.0	0.22	0.18
	1.0	14.1	1.25	8.9	0.98	0.58	0.32	59.0	0.28	0.19

TABLE 10 Nutrient Requirements for Growing and Finishing Cattle (Nutrient Concentration in Diet Dry Matter, avoirdupois system)[a,b,c]—*Continued*

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
	1.5	14.8	1.41	9.6	1.05	0.65	0.39	64.0	0.33	0.19
	2.0	15.0	1.54	10.3	1.14	0.74	0.46	69.5	0.38	0.22
	2.5	14.6	1.63	11.2	1.26	0.84	0.55	77.0	0.44	0.24
700	0.5	14.8	1.18	7.9	0.89	0.50	0.25	54.0	0.21	0.18
	1.0	15.9	1.34	8.5	0.98	0.58	0.32	59.0	0.25	0.18
	1.5	16.6	1.49	9.0	1.05	0.65	0.39	64.0	0.29	0.19
	2.0	16.8	1.61	9.6	1.14	0.74	0.46	69.5	0.33	0.20
	2.5	16.4	1.68	10.3	1.26	0.84	0.55	77.0	0.38	0.22
800	0.5	16.4	1.27	7.7	0.89	0.50	0.25	54.0	0.20	0.17
	1.0	17.6	1.43	8.2	0.98	0.58	0.32	59.0	0.24	0.18
	1.5	18.3	1.57	8.6	1.05	0.65	0.39	64.0	0.25	0.18
	2.0	18.6	1.67	9.0	1.14	0.74	0.46	69.5	0.28	0.19
	2.5	18.1	1.74	9.6	1.26	0.84	0.55	77.0	0.33	0.21
900	0.5	17.8	1.36	7.5	0.89	0.50	0.25	54.0	0.20	0.18
	1.0	19.2	1.52	7.9	0.98	0.58	0.32	59.0	0.22	0.18
	1.5	20.0	1.64	8.2	1.05	0.65	0.39	64.0	0.23	0.18
	2.0	20.3	1.74	8.6	1.14	0.74	0.46	69.5	0.26	0.18
	2.5	19.8	1.78	9.0	1.26	0.84	0.55	77.0	0.29	0.20
1000	0.5	19.3	1.45	7.4	0.89	0.50	0.25	54.0	0.19	0.18
	1.0	20.8	1.60	7.7	0.98	0.58	0.32	59.0	0.21	0.18
	1.5	21.7	1.71	8.0	1.05	0.65	0.39	64.0	0.21	0.18
	2.0	22.0	1.80	8.2	1.14	0.74	0.46	69.5	0.23	0.18
	2.5	21.5	1.83	8.6	1.26	0.84	0.55	77.0	0.25	0.18
1100	0.5	20.8	1.54	7.3	0.89	0.50	0.25	54.0	0.19	0.18
	1.0	22.3	1.68	7.5	0.98	0.58	0.32	59.0	0.20	0.18
	1.5	23.3	1.78	7.7	1.05	0.65	0.39	64.0	0.20	0.18
	2.0	23.6	1.86	7.9	1.14	0.74	0.46	69.5	0.21	0.18
	2.5	23.1	1.88	8.2	1.26	0.84	0.55	77.0	0.22	0.18

[a]Shrunk liveweight basis, see text.

[b]Vitamin A requirements are 1000 IU per pound of diet.

[c]This table gives reasonable examples of nutrient concentrations that should be suitable to formulate diets for specific management goals. It does not imply that diets with other nutrient concentrations when consumed in sufficient amounts would be inadequate to meet nutrient requirements.

TABLE 11 Nutrient Requirements of Breeding Cattle (avoirdupois system)

Weight[a] (lb)	Gain[b] (lb)	Daily DM[c] (lb)	Energy: Daily ME (Mcal)	Energy: Daily TDN (lb)	Energy: Daily NE_m (Mcal)	Energy: Daily NE_g (Mcal)	Energy: In Diet DM ME (Mcal/lb)	Energy: In Diet DM TDN (%)	Energy: In Diet DM NE_m (Mcal/lb)	Energy: In Diet DM NE_g (Mcal/lb)	Total Protein: Daily (lb)	Total Protein: In Diet DM (%)	Calcium: Daily (g)	Calcium: In Diet DM (%)	Phosphorus: Daily (g)	Phosphorus: In Diet DM (%)	Vitamin A[d] Daily (1000's IU)
Pregnant yearling heifers—Last third of pregnancy																	
700	0.9	15.3	13.9	8.5	7.95	NA[e]	0.91	55.4	0.52	NA[e]	1.3	8.4	19	0.27	14	0.20	19
700	1.4	15.8	15.7	9.6	7.95	0.87	0.99	60.3	0.60	0.34	1.4	9.0	24	0.33	15	0.21	20
700	1.9	15.8	17.4	10.6	7.95	1.89	1.10	67.0	0.70	0.43	1.5	9.8	27	0.33	16	0.21	20
750	0.9	16.1	14.6	8.9	8.25	NA	0.90	55.1	0.52	NA	1.3	8.3	20	0.27	14	0.19	20
750	1.4	16.6	16.4	10.0	8.25	0.92	0.98	59.9	0.60	0.33	1.5	8.9	24	0.32	16	0.21	21
750	1.9	16.6	18.2	11.1	8.25	1.99	1.09	66.5	0.69	0.42	1.6	9.5	28	0.37	17	0.23	21
800	0.9	16.8	15.2	9.2	8.56	NA	0.90	54.8	0.51	NA	1.4	8.2	21	0.28	15	0.20	21
800	1.4	17.4	17.1	10.4	8.56	0.96	0.98	59.6	0.59	0.33	1.5	8.8	25	0.33	16	0.21	22
800	1.9	17.5	19.0	11.6	8.56	2.09	1.08	66.1	0.69	0.42	1.6	9.3	28	0.35	17	0.21	22
850	0.9	17.6	15.7	9.6	8.85	NA	0.89	54.5	0.51	NA	1.4	8.2	21	0.26	16	0.20	22
850	1.4	18.2	17.8	10.8	8.85	1.01	0.97	59.3	0.59	0.32	1.6	8.6	25	0.30	17	0.21	23
850	1.9	18.3	19.8	12.1	8.85	2.19	1.08	65.7	0.68	0.41	1.7	9.1	28	0.34	18	0.22	23
900	0.9	18.3	16.3	9.9	9.15	NA	0.89	54.3	0.51	NA	1.5	8.1	22	0.26	17	0.20	23
900	1.4	19.0	18.5	11.3	9.15	1.05	0.97	59.1	0.58	0.32	1.6	8.5	26	0.30	18	0.21	24
900	1.9	19.2	20.6	12.5	9.15	2.28	1.07	65.4	0.68	0.41	1.7	9.0	28	0.32	19	0.21	24
950	0.9	19.0	16.9	10.3	9.44	NA	0.89	54.1	0.50	NA	1.5	8.0	23	0.27	17	0.20	24
950	1.4	19.8	19.1	11.7	9.44	1.09	0.97	58.9	0.58	0.32	1.7	8.4	26	0.29	19	0.21	25
950	1.9	20.0	21.3	13.0	9.44	2.38	1.07	65.1	0.67	0.40	1.8	8.8	29	0.32	19	0.21	25
Dry pregnant mature cows—Middle third of pregnancy																	
800	0.0	15.3	12.3	7.5	6.41	NA	0.80	48.8	0.42	NA	1.1	7.1	12	0.17	12	0.17	19
900	0.0	16.7	13.4	8.2	7.00	NA	0.80	48.8	0.42	NA	1.2	7.0	14	0.18	14	0.18	21
1000	0.0	18.1	14.5	8.8	7.57	NA	0.80	48.8	0.42	NA	1.3	7.0	15	0.18	15	0.18	23
1100	0.0	19.5	15.6	9.5	8.13	NA	0.80	48.8	0.42	NA	1.4	7.0	17	0.19	17	0.19	25
1200	0.0	20.8	16.6	10.1	8.68	NA	0.80	48.8	0.42	NA	1.4	6.9	18	0.19	18	0.19	26
1300	0.0	22.0	17.7	10.8	9.22	NA	0.80	48.8	0.42	NA	1.5	6.9	20	0.20	20	0.20	28
1400	0.0	23.3	18.7	11.4	9.75	NA	0.80	48.8	0.42	NA	1.6	6.9	21	0.20	21	0.20	30
Dry pregnant mature cows—Last third of pregnancy																	
800	0.9	16.8	15.0	9.2	8.56	NA	0.89	54.5	0.51	NA	1.4	8.2	20	0.26	15	0.20	21
900	0.9	18.2	16.2	9.8	9.15	NA	0.89	54.0	0.50	NA	1.5	8.0	22	0.27	17	0.21	23
1000	0.9	19.6	17.3	10.5	9.72	NA	0.88	53.6	0.50	NA	1.6	7.9	23	0.26	18	0.20	25
1100	0.9	21.0	18.3	11.2	10.28	NA	0.87	53.2	0.49	NA	1.6	7.8	25	0.26	20	0.21	26
1200	0.9	22.3	19.4	11.8	10.83	NA	0.87	52.9	0.49	NA	1.7	7.8	26	0.26	21	0.21	28
1300	0.9	23.6	20.4	12.5	11.37	NA	0.87	52.7	0.48	NA	1.8	7.7	28	0.26	23	0.21	30
1400	0.9	24.9	21.5	13.1	11.90	NA	0.86	52.5	0.48	NA	1.9	7.6	29	0.26	24	0.21	32
Two-year-old heifers nursing calves—First 3-4 months postpartum—10 lb milk/day																	
700	0.5	15.9	17.0	10.3	9.20[f]	0.87	1.07	65.1	0.67	0.40	1.8[g]	11.3	26	0.36	17	0.24	28
750	0.5	16.7	17.7	10.8	9.51[f]	0.92	1.06	64.4	0.66	0.40	1.8[g]	11.0	26	0.34	18	0.24	30
800	0.5	17.6	18.4	11.2	9.81[f]	0.96	1.05	63.8	0.66	0.39	1.9[g]	10.8	27	0.34	19	0.24	31
850	0.5	18.4	19.1	11.6	10.11[f]	1.01	1.04	63.2	0.65	0.38	1.9[g]	10.6	27	0.33	19	0.23	33
900	0.5	19.2	19.8	12.0	10.40[f]	1.05	1.03	62.7	0.64	0.37	2.0[g]	10.4	28	0.32	20	0.23	34
950	0.5	20.0	20.5	12.5	10.69[f]	1.09	1.02	62.3	0.63	0.37	2.0[g]	10.2	28	0.31	21	0.23	35
1000	0.5	20.8	21.1	12.9	10.98[f]	1.14	1.02	61.9	0.62	0.36	2.1[g]	10.0	29	0.31	22	0.23	37

Cows nursing calves—Average milking ability—First 3-4 months postpartum—10 lb milk/day																	
800	0.0	17.3	16.6	10.1	9.81[f]	NA	0.96	58.2	0.57	NA	1.8[g]	10.2	23	0.30	17	0.22	31
900	0.0	18.8	17.7	10.8	10.40[f]	NA	0.94	57.3	0.55	NA	1.9[g]	9.9	24	0.28	19	0.22	33
1000	0.0	20.2	18.8	11.5	10.98[f]	NA	0.93	56.6	0.55	NA	2.0[g]	9.6	25	0.28	20	0.22	36
1100	0.0	21.6	19.9	12.1	11.54[f]	NA	0.92	56.0	0.54	NA	2.0[g]	9.4	27	0.27	22	0.22	38
1200	0.0	23.0	21.0	12.8	12.09[f]	NA	0.91	55.5	0.53	NA	2.1[g]	9.3	28	0.27	23	0.22	41
1300	0.0	24.3	22.0	13.4	12.63[f]	NA	0.90	55.1	0.52	NA	2.2[g]	9.1	30	0.27	25	0.22	43
1400	0.0	25.6	23.0	14.0	13.15[f]	NA	0.90	54.7	0.51	NA	2.3[g]	9.0	32	0.27	26	0.22	46
Cows nursing calves—Superior milking ability—First 3-4 months postpartum—20 lb milk/day																	
800	0.0	15.7	19.9	12.1	13.22[f]	NA	1.27	77.3	0.85	NA	2.2[g]	14.2	34	0.48	22	0.31	28
900	0.0	18.7	21.5	13.1	13.81[f]	NA	1.15	69.8	0.74	NA	2.4[g]	12.9	35	0.41	24	0.28	33
1000	0.0	20.6	22.7	13.8	14.38[f]	NA	1.10	67.0	0.70	NA	2.5[g]	12.3	36	0.39	25	0.27	37
1100	0.0	22.3	23.8	14.5	14.94[f]	NA	1.07	65.2	0.67	NA	2.6[g]	11.9	38	0.38	27	0.27	40
1200	0.0	23.8	24.9	15.2	15.49[f]	NA	1.05	63.7	0.65	NA	2.7[g]	11.5	39	0.36	28	0.26	42
1300	0.0	25.3	26.0	15.9	16.03[f]	NA	1.03	62.6	0.64	NA	2.8[g]	11.2	41	0.36	30	0.26	45
1400	0.0	26.7	27.1	16.5	16.56[f]	NA	1.01	61.7	0.62	NA	2.9[g]	11.0	42	0.35	31	0.26	47
Bulls, maintenance and slow rate of growth (regain body condition)																	
<1300	For growth and development use requirements for bulls in Tables 1, 2, 3, and 10.																
1300	1.0	25.4	23.3	14.2	9.22	2.20	0.92	55.8	0.53	0.28	1.9	7.6	25	0.22	22	0.19	45
1300	1.5	26.1	25.5	15.6	9.22	3.43	0.98	59.7	0.59	0.33	2.0	7.9	28	0.24	23	0.19	46
1300	2.0	26.2	27.6	16.8	9.22	4.71	1.05	64.0	0.65	0.39	2.2	8.2	31	0.26	24	0.20	46
1400	1.0	26.8	24.6	15.0	9.75	2.33	0.92	55.8	0.53	0.28	2.0	7.5	26	0.21	23	0.19	48
1400	1.5	27.6	27.0	16.5	9.75	3.63	0.98	59.7	0.59	0.33	2.1	7.7	29	0.23	24	0.19	49
1400	2.0	27.7	29.1	17.8	9.75	4.98	1.05	64.0	0.65	0.39	2.2	8.0	31	0.25	25	0.20	49
1500	0.0	25.2	20.0	12.2	10.26	NA	0.79	48.4	0.41	NA	1.7	6.9	23	0.20	23	0.20	45
1500	1.0	28.3	25.9	15.8	10.26	2.45	0.92	55.8	0.53	0.28	2.1	7.4	27	0.21	24	0.19	50
1500	1.5	29.0	28.4	17.3	10.26	3.82	0.98	59.7	0.59	0.33	2.2	7.6	29	0.22	25	0.19	51
1600	0.0	26.5	21.0	12.8	10.77	NA	0.79	48.4	0.41	NA	1.8	6.9	23	0.19	24	0.20	47
1600	1.0	29.7	27.2	16.6	10.77	2.57	0.92	55.8	0.53	0.28	2.2	7.3	29	0.22	26	0.19	53
1600	1.5	30.4	29.8	18.2	10.77	4.01	0.98	59.7	0.59	0.33	2.3	7.4	31	0.22	27	0.20	54
1700	0.0	27.7	22.0	13.4	11.28	NA	0.79	48.4	0.41	NA	1.9	6.8	26	0.21	26	0.21	49
1700	0.5	29.6	25.3	15.4	11.28	1.26	0.85	52.0	0.47	0.22	2.1	7.0	27	0.20	26	0.19	52
1800	0.0	28.9	23.0	14.0	11.77	NA	0.79	48.4	0.41	NA	2.0	6.8	27	0.21	27	0.21	51
1800	0.5	30.9	26.4	16.1	11.77	1.31	0.85	52.0	0.47	0.22	2.2	7.0	28	0.20	28	0.20	55
1900	0.0	30.1	23.9	14.6	12.26	NA	0.79	48.4	0.41	NA	2.0	6.8	29	0.21	29	0.21	53
1900	0.5	32.2	27.5	16.8	12.26	1.37	0.85	52.0	0.47	0.22	2.2	6.9	29	0.20	29	0.20	57
2000	0.0	31.3	24.9	15.2	12.74	NA	0.79	48.4	0.41	NA	2.1	6.8	30	0.21	30	0.21	55
2100	0.0	32.5	25.8	15.7	13.21	NA	0.79	48.4	0.41	NA	2.2	6.8	32	0.22	32	0.22	58
2200	0.0	33.6	26.7	16.3	13.68	NA	0.79	48.4	0.41	NA	2.3	6.8	33	0.22	33	0.22	60

[a] Average weight for a feeding period.

[b] Approximately 0.9 ± 0.2 lb of weight gain/day over the last third of pregnancy is accounted for by the products of conception. Daily 2.15 Mcal of NE_m and 0.1 lb of protein are provided for this requirement for a calf with a birth weight of 80 lb.

[c] Dry matter consumption should vary depending on the energy concentration of the diet and environmental conditions. These intakes are based on the energy concentration shown in the table and assuming a thermoneutral environment without snow or mud conditions. If the energy concentrations of the diet to be fed exceed the tabular value, limit feeding may be required.

[d] Vitamin A requirements per pound of diet are 1273 IU for pregnant heifers and cows and 1773 for lactating cows and breeding bulls.

[e] Not applicable.

[f] Includes 0.34 Mcal NE_m/lb of milk produced.

[g] Includes 0.03 lb protein/lb of milk produced.

BEEF CATTLE MANAGEMENT

AG 310 - C

ASSIGNMENT SHEET #1--DEVELOP A CROSSBREEDING SYSTEM

Name_____ Score_____

Choose one of the three types of crossbreeding systems (Two-Breed Crisscross, Three-Breed Rotation or Three-Breed Terminal) and develop it for a real or hypothetical herd in the local area. You may also choose to modify one of these systems. Decide on the source of the original stock, the source of the replacement heifers and the breeds involved for both the cows and the bulls. Research the strengths and weaknesses of the different breeds and explain why you chose the particular combinations you did.

Type of crossbreeding system _____

Breed or breeds of the original cow herd_____

Breed of the bulls

Source of replacement heifers _____

Diagram the crossbreeding system and the different breeds of cows, replacement heifers and bulls.

Reasons for choosing the breeds you did.

_____

_____

_____

_____

_____

_____

BEEF CATTLE MANAGEMENT

AG 310 - C

ASSIGNMENT SHEET #2--DEVELOP A FEEDING PROGRAM FOR MARKET ANIMALS

Name_____ Score_____

Develop a feeding program for a herd of 100 feeder animals averaging 450 lbs each. Fit the program to the local area. Decide on type of feeding system, final market weight goal, facilities or pasture needed, approximate amounts and costs of feeds used and approximate time to market.

(Note: Good sources for information are local ranchers, feed store people, extension personnel, magazines and other reference material.)

BEEF CATTLE MANAGEMENT

AG 310 - C

ASSIGNMENT SHEET #3--FILL OUT A NEW HERD WEANING RECORD

Name_____ Score_____

The Idaho Beef Herd Improvement Program is a service provided by the University of Idaho, designed to help cattle producers obtain and summarize performance data on their herds.

Imagine you have a small herd of 12 cows. Choose ID numbers, breeds, weaning weights, etc., that seem appropriate to you. Put this information on the New Herd Weaning Record form using the following instructions. The form follows the example.

1. Cow ID--Four characters or less of identification. Avoid duplications

2. Cow breed--Breeds should be coded as two numbers: One for the dam's breed and one for the sire's. Use the following codes:

1.	Hereford	4.	Charolais	7.	Simmental
2.	Angus	5.	Red Angus	8.	Santa Gertrudis
3.	Shorthorn	6.	Polled Herefords	9.	Other

   Example: A straight-bred Hereford cow would be coded 11. A cross-bred Hereford-Angus cow would be coded 12

3. Cow year born--Give the last two numbers, as 91 for 1991

4. Cow disp. code--Cow disposal code. Code cows that are no longer in the herd as follows (leave blank if cow is still in herd)

1.	Died	5.	Culled--udder problems
2.	Culled--did not calve	6.	Culled--crippled
3.	Culled--did not wean calf	7.	Culled--other
4.	Culled--cancer eye	8.	Unknown

5. Bull ID--Four characters or less of identification. Avoid duplications

6. Bull breed--Refer to item #2, "COW BREED"

7. Calf ID--Four characters or less of identification. Avoid duplications

8. Calf birthdate--Give as MM-DD-YY. February 8, 1992 would be coded 02-08-92

9. Calf sex--Code as follows:

1.	Bull	3.	Steer
2.	Heifer	4.	Spayed heifer

10. Calf death code--Two number code for time and reason of calf loss (leave blank for live weaned calves):

Time of Death	Reason for Death
1. Abortion	1. Abortion
2. At birth	2. Scours
3. 1 - 7 days of age	3. Pneumonia
4. 8 - 14 days of age	4. White muscle
5. 15 - 30 days of age	5. Enterotoxemia
6. More than 30 days of age	6. Birth-related
	7. Accident
	8. Cold stress
	9. Other

Example: A calf that died of birth-related factors would be coded 26.
A calf that drowns at 2 months of age would be coded 67.

11. TRT--Treatments are coded at rancher's option

12. Weaning date--Give as MM-DD-YY

13. Remarks--Up to 20 characters of comment

14. Date bull turned in with cows--Give as MM-DD-YY

15. Average calf birth weight--Approximate average calf birth weight for herd if significantly different from 70 pounds

(Note: Cow ID, Calf birthdate, and Cow year born must be completed for every cow.)

Return these forms with the completed submittal sheet and any comments to your County Agent or mail to:

Management Information Specialist
Cooperative Extension System
Ag Science
University of Idaho
Moscow, ID 83843

Example: The following is an example of a New Herd Weaning Record filled out after weaning and portions of the computer printout based on that record

IDAHO BEEF HERD IMPROVEMENT PROGRAM

NEW HERD WEANING RECORD

COW ID (1-4)	COW BREED (5-6)	COW YEAR BORN (7-8)	COW DISP. CODE (9)	BULL ID (10-13)	BULL BREED (14-15)	CALF ID (16-19)	CALF BIRTH DATE (20-25)	CALF SEX (26)	CALF DEATH CODE (27-28)	TRT. (29)	WEANING DATE (30-35)	CALF WEANING WEIGHT (36-38)	CALF WEANING GRADE (39-40)	REMARKS (41-60)
B1	66	76		AB 13	22	U1B	02 22 81	3		2	10 03 81	494		
B32	66	76		AB 13	22	U2	02 24 81	2		2	10 03 81	460		
B36	22	77		HB 6	66	U3B	03 04 81	3		2	10 03 81	450		
C4	22	77		HB6	66	U4B	02 20 81	3		2	10 03 81	488		
C13	62	77		HB6	66	U5	03 8 81	2	44	2				
C45	64	78		AB13	22	U6B	02 28 81	3		2	10 03 81	495		
S20	67	78		AB13	22	U7	03 15 81	2		2	10 03 81	435		BLIND LEFT EYE
S21	22	78		HB6	66	U8	03 13 81	2		2	10 03 81	430		
S28	64	78	1	HB6	66		02 26 81	2	26					
S46	66	79		AB13	22	U9B	03 3 81	3		2	10 03 81	454		
T4	66	79		AB 13	22	U10B	03 3 81	3		2	10 03 81	422		CAUGHT PNEUMONIA
T10	66	79		AB 13	22	U11B	03 6 81	3		2	10 03 81	435		

PLEASE READ INSTRUCTIONS

NAME: Sally Co Wranchek

YEAR: 1981

AVERAGE CALF BIRTH WEIGHT: _____
(IF NOT 70 POUNDS)

DATE BULL TURNED IN WITH COWS: May 18, 1980

IDAHO BEEF HERD IMPROVEMENT PROGRAM
UNIVERSITY OF IDAHO,MOSCOW,IDAHO

WEANING INFORMATION

1981

SALLY CO WRANCHER
RURAL ROUTE
COLUMBIA,IDAHO

TOTAL COWS IN HERD IN 1981: 12
NUMBER OF CALVES WEANED: 10
% CALVES WEANED OF TOTAL COWS: 83.3
AVERAGE COW AGE: 3.3 YEARS
LENGTH OF CALVING SEASON: 21 DAYS
DATE BULLS TURNED IN: 5-18-80

AVERAGE WEANING AGE: 214.4 DAYS
AVERAGE WEANING WEIGHT: 456.3 POUNDS
AVERAGE 205 DAY WEIGHT: 472.4 POUNDS
AVERAGE A.D.G.: 1.80 POUNDS
TOTAL POUNDS WEANED: 4563
POUNDS CALF WEANED PER COW IN HERD: 380.3

AVERAGES BY SEX:

SEX	COUNT	WEANING WEIGHT	ADJUSTED 205-DAY WEIGHT	AVERAGE DAILY GAIN
2	3	441.7	458.7	1.78
3	7	462.6	478.3	1.81

AVERAGES BY TREATMENT CODES:

TREATMENT	COUNT	WEANING WEIGHT	ADJUSTED 205-DAY WEIGHT	AVERAGE DAILY GAIN
2	10	456.3	472.4	1.80

COW ID	MPPA RANK	MPPA	COW AGE	CP	CI	---COW AVERAGES AND LIFE PRODUCTION--- NO. OF CALVES	WEAN WT	205 WT	ADG	INDEX	TOTAL POUNDS	----------1981 INFORMATION---------- CALF SEX	CALF AGE	WEAN WT	205 WT	WEAN ADG	INDEX	COMMENTS
C45	1	116	3	3	***	1	495	511	1.96	107	495	3	217	495	511	1.96	107	
S46	2	110	2	4	***	1	454	498	1.79	104	454	3	214	454	498	1.79	104	
T10	3	105	2	4	***	1	435	485	1.73	101	435	3	211	435	485	1.73	101	
S20	4	102	3	4	***	1	435	476	1.81	104	435	2	202	435	476	1.81	104	BLIND LEFT EYE
C4	5	100	4	3	***	1	488	471	1.86	98	488	3	225	488	471	1.86	98	
T4	7	98	2	4	***	1	422	467	1.64	98	422	3	214	422	467	1.64	98	CAUGHT PNEUMONIA
S21	6	98	3	4	***	1	430	468	1.76	102	430	2	204	430	468	1.76	102	
B1	8	95	5	3	***	1	494	460	1.90	96	494	3	223	494	460	1.90	96	
B36	9	94	4	4	***	1	450	456	1.78	95	450	3	213	450	456	1.78	95	

****

THE COWS BELOW THIS LINE ARE IN THE BOTTOM 20% OF THE HERD BY MPPA RANK

****

B32	11	84	5	3	***	1	460	432	1.76	94	460	2	221	460	432	1.76	94	
C13	0	****	4	4	***	0	0	0	0.0	0	0	2	DID NOT RAISE CALF TO WEANING					

* MPPA DOES NOT REFLECT THE FACT THAT THIS COW HAS NOT WEANED A CALF AT LEAST ONCE IN HER LIFETIME

*** INFORMATION IS NOT AVAILABLE OR CANNOT BE CALCULATED

IDAHØ BEEF HERD IMPRØVEMENT PRØGRAM

NEW HERD WEANING RECORD

COW ID (1-4)	COW BREED (5-6)	COW YEAR BØRN (7-8)	COW DISP. CØDE (9)	BULL ID (10-13)	BULL BREED (14-15)	CALF ID (16-19)	CALF BIRTH DATE (20-25)	CALF SEX (26)	CALF DEATH CØDE (27-28)	TRT. (29)	WEANING DATE (30-35)	CALF WEANING WEIGHT (36-38)	CALF WEANING GRADE (39-40)	REMARKS (41-60)

PLEASE READ INSTRUCTIONS

NAME: _____

YEAR: _____

AVERAGE CALF BIRTH WEIGHT: _____
(IF NØT 70 PØUNDS)

DATE BULL TURNED IN WITH CØWS: _____

BEEF CATTLE MANAGEMENT

AG 310 - C

ASSIGNMENT SHEET #4--CALCULATE PROFIT OR LOSS
ON A FEEDER CATTLE OPERATION

Name_____ Score_____

You have an opportunity to buy 150 head of feeder cattle averaging 550 lbs each. They are selling for $0.75/lb, but due to a long hauling distance you can negotiate a 4% shrinkage agreement. You expect to sell these animals at 1,050 lbs each for $0.61/lb. You expect feed to cost $40.00 per 100 pounds gained. Calculate the following expected values:

(Note: All calculations are per calf unless specified.)

Pay weight _____

Purchase price _____

Pounds gained _____

Profit or loss on the margin _____

Production cost per cwt gained _____

Total production cost _____

Profit or loss on the gain _____

Net profit or loss _____

Net profit or loss for the herd _____

If transportation is $11.00 per head and you want a profit of $12.00 per head, what is the maximum the purchase price could be per cwt?

Maximum purchase price per cwt _____

BEEF CATTLE MANAGEMENT

AG 310 - C

ASSIGNMENT SHEET #5--BALANCE A FEEDLOT RATION USING THE TRIAL-AND-ERROR METHOD

Name_____ Score_____

(Note: A review of how to balance rations may be necessary before completing this assignment. Information can be found in AG 530-I--Feeding Livestock.)

Using the feeds listed, balance a ration for dry matter, protein and total digestible nutrients for a finishing steer having the nutrient requirements listed in the chart. Figure nutrient requirements on a dry matter basis and then convert them to an as-fed basis as the final step after balancing the ration. Roughage should make up approximately 15 percent of the ration.

Requirements for a finishing steer weighing 822 lbs with a desired gain of 2.9 lbs/day
(all requirements are in lbs)

Dry Matter	Crude Protein	TDN	Calcium	Phosphorus
19 minimum	1.98	16.1	.055	.048

Worksheet (dry matter basis--lb)

Feeds (dry matter basis)	Dry Matter--lbs	Crude Protein--lbs	TDN--lbs
Alfalfa 17% CP, 55% TDN			
Barley 13.0% CP, 83% TDN			
Protein supplement 49% CP, 86% TDN			
Totals			

Converting to as-fed basis:

Feeds	Dry Matter Content	Pounds of feed actually needed
Alfalfa	89.2	_____
Barley	89	_____
Protein supplement	90	_____

BEEF CATTLE MANAGEMENT

AG 310 - C

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1--Breeds should be chosen to fit a particular area. Climate, market availability, availability of breeding stock, facilities, land and capital are all important considerations in choosing a system.

Assignment Sheet #2--Type of feeding system could be immediate finishing, deferred finishing or pasture feeding. System and feeds chosen should be compatible with local area. Current feed prices should be obtained. Type of program will also depend on demand and market price versus feed costs. Sample rations for the different feeding systems are outlined on Transparencies 4, 5 and 6.

Assignment Sheet #3--Answer should be similar to the following:

IDAHO BEEF HERD IMPROVEMENT PROGRAM
NEW HERD WEANING RECORD

COW ID (1-4)	COW BREED (5-6)	COW YEAR BORN (7-8)	COW DISP. CODE (9)	BULL ID (10-13)	BULL BREED (14-15)	CALF ID (16-19)	CALF BIRTH DATE (20-25)	CALF SEX (26)	CALF DEATH CODE (27-28)	TAT. (29)	WEANING DATE (30-35)	CALF WEANING WEIGHT (36-38)	CALF WEANING GRADE (39-40)	REMARKS (41-60)
B1	66	76		AB 13	22	U1B	02 22 81	3		2	10 03 81	494		
B32	66	76		AB 13	22	U2	02 24 81	2		2	10 03 81	460		
B36	22	77		HB 6	66	U3B	03 04 81	3		2	10 03 81	450		
C4	22	77		HB6	66	U4B	02 20 81	3		2	10 03 81	488		
C13	62	77		HB6	66	U5	03 8 81	2	44	2				
C45	64	78		AB13	22	U6B	02 28 81	3		2	10 03 81	495		
S20	67	78		AB13	22	U7	03 15 81	2		2	10 03 81	435		BLIND LEFT EYE
S21	22	78		HB6	66	U8	03 13 81	2		2	10 03 81	430		
S28	64	78	1	HB6	66		02 26 81	2	26					
S46	66	79		AB13	22	U9B	03 3 81	3		2	10 03 81	454		
T4	66	79		AB 13	22	U10B	03 3 81	3		2	10 03 81	422		CAUGHT PNEUMONIA
T10	66	79		AB 13	22	U11B	03 6 81	3		2	10 03 81	435		

PLEASE READ INSTRUCTIONS ON BACK

NAME: Sally Co Weaner

YEAR: 1981

AVERAGE CALF BIRTH WEIGHT: _____
(IF NOT 70 POUNDS)
DATE BULL TURNED IN WITH COWS: May 18, 1980

Assignment Sheet #4--

Pay weight	528#	550 - (550 x .04)
Purchase price	$ 396.00	528 x .75
Pounds gained	522#	1050 - 528
Profit or loss on margin	$ -73.92	(528 x .61) - (528 x .75)
Production cost per cwt gained	$ 50.00	40 divided by .8
Total production costs	$ 261.00	50 x 5.22 cwt
Profit or loss on the gain	$ 57.42	(.61 x 522) - 261
Net profit or loss	$ -16.50	-73.92 + 57.42
Net profit or loss for the herd	-$2475.00	-16.50 x 150
Maximum purchase price per cwt	$ 67.52	(1050 x .61) - (261 + 11 + 12) / 5.28 cwt

Assignment Sheet #5--Answer should be similar to the following:

	Dry Matter--lbs	Crude Protein--lbs	TDN-lbs
Alfalfa	2.8	.48	1.5
Barley	17.6	2.3	14.6
Protein supplement	0	0	0
Totals	20.4	2.78	16.1

As-fed basis	Pounds of feed actually needed
Alfalfa	3.14
Barley	19.78
Protein supplement	0

BEEF CATTLE MANAGEMENT

AG 310 - C

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a. Mating an animal of one breed to an animal of another

_____b. Percentage of differences in a trait that can be explained by inheritance as opposed to environment

_____c. Evaluation of individual cows based on their offspring's weaning weight

_____d. Characteristics indicating the ability of an animal to produce a high quantity of desirable meat cuts

_____e. Degree of fatness in meat animals

_____f. Evaluation based on weight gain from weaning to two years of age

_____g. Reduction in weight due to excretory and tissue loss of water

_____h. Cattle carrying enough flesh to be put in the feedlot and fattened

_____i. Characteristics dealing with the ability of an animal to convert feed into meat

_____j. Substance that increases the rate of gain, but is not a nutrient

_____k. Evaluation of the palatability of a beef animal based on amount of fat and age

_____l. Hundred weight or 100 pounds

_____m. Substance that nourishes and becomes a part of the body cells

_____n. Cattle used for wintering on roughage with little or no grain

1. Growth traits
2. Heterosis
3. Production testing
4. Performance testing
5. Creep feeding
6. Shrink
7. CWT
8. Feeders
9. Crossbreeding
10. Condition
11. Heritability
12. Nutrient
13. Preconditioning
14. Pay weight
15. Stockers
16. Reproduction traits
17. Carcass traits
18. Growth stimulant
19. Compensatory growth
20. Quality grade

_____o. Giving calves extra feed by putting the feed inside of an area only small animals can get into

_____p. Preparing animals for a major change in environment and ration

_____q. Hybrid vigor or the increased energy obtained by mating animals of two different breeds

_____r. Calculated weight after shrinkage

_____s. Rapid growth resulting from moving an animal from a poor ration to a good one

_____t. Characteristics dealing with the ability of an animal to produce offspring

2. Describe three reasons for keeping records on cattle.

a. _____

b. _____

c. _____

3. Describe three reasons for cattle identification.

a. _____

b. _____

c. _____

4. Match the components of the Idaho Beef Cattle Production Test Records listed on the right to their description.

_____a. Adjustment to the average weaning weight ratio; helps put cows on the same basis for comparison

_____b. Ratio of a calf's 205 day adjusted weight to the average of all the calves' adjusted weights

_____c. Measures weight gain between weaning and two years of age

_____d. Weaning weight of animal adjusted to reflect exact age, age of dam and sex

1. Performance testing
2. Calf index
3. Corrected 205 day weight
4. MPPA

5. Describe the advantages of crossbreeding.

   a. _____

   b. _____

   c. _____

6. Match the best method of improvement to the three livestock traits listed below.

_____a.	Carcass	1.	Crossbreeding
_____b.	Growth	2.	Selection
_____c.	Reproduction	3.	Crossbreeding and selection

7. Match the types of crossbreeding systems to their description.

_____a.	Two-breed crossbred cows are bred to a purebred bull of a third breed	1.	Three-Breed Rotation
_____b.	Cows of one breed are bred to a bull of another; heifers from first cross are bred to a bull of either of the original two breeds; heifers from this cross are bred to a bull opposite the breed their dams were bred to	2.	Two-Breed Crisscross
		3.	Three-Breed Terminal
_____c.	Cows of one breed are bred to a bull of another; heifers from first cross are then bred to a third breed of bull; heifers from this cross are bred to a bull of the original cow breed		

8. Describe the six criteria by which feeder cattle can be classified.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

   f. _____

9. Describe the following feeding programs for market cattle.

   a. Immediate finishing _____

      _____

b. Deferred finishing _____

_____

c. Pasture feeding _____

_____

10. Describe three methods of getting faster gains in beef cattle.

a. _____

b. _____

c. _____

11. Describe two methods of increasing feed efficiencies in beef cattle.

a. _____

b. _____

12. Select guidelines appropriate for feeding bulls for slaughter by placing an "X" in the blank before the correct answers.

_____a. Start on full-feed at 12 months

_____b. Feed lots of roughage

_____c. Sell and have slaughtered the same day if possible

_____d. Use high energy rations

_____e. Finish before 18 months

_____f. Provide active exercise

13. Describe the type of animal most likely to exhibit compensatory gain.

_____

_____

14. Compare the relative cost of feeding older, heavier cattle to the relative cost of feeding younger, lighter cattle.

_____

_____

15. Describe the four conditions that affect pasture supplementation.

a. _____

b. _____

c. _____

d. _____

16. Describe two reasons for developing a grazing system.

a. _____

b. _____

17. Identify the different types of grazing systems described below. Choose from continuous grazing, rotational grazing, deferred rotation, rest rotation and strip grazing.

_____ a. Pastures are grazed all season

_____ b. Pastures are divided into a large number of small areas with cattle rotated every 1 to 2 days

_____ c. Pastures are divided up and cattle are rotated with one pasture remaining idle all year

_____ d. Pastures are divided up and cattle are rotated from one to the next

_____ e. Pastures are divided up and some pastures are allowed to seed before being grazed, while others are grazed all season

18. Distinguish between the symptoms of bloat and grass tetany by putting a "B" by the bloat symptoms and a "G" by the grass tetany symptoms.

_____a. Excessive salivation

_____b. Uncoordinated movement

_____c. Violent convulsions

_____d. Enlarged rumen

_____e. Excited behavior with erect ears and wild stare

_____f. Labored breathing

_____g. Grinding teeth

19. Describe two controls each for bloat and grass tetany.

Bloat _____

_____

_____

Grass tetany_____

_____

_____

20. Name the four primary parts of a basic livestock handling system.

a._____ c._____

b._____ d._____

21. Select methods for handling shipped-in cattle by placing an "X" in the blank before the correct answers.

_____a. Feed all legume hay for extra protein and energy

_____b. Avoid excessive handling

_____c. Provide free-choice minerals

_____d. Provide clean, accessible water

_____e. Feed some corn or barley

_____f. Substitute wheat for corn when price is favorable

_____g. Feed vitamin A

_____h. Separate sick cattle

_____i. Avoid feeding antibiotics

_____j. Treat for grubs, lice and worms

22. Calculate estimated production costs for 100 head of feeder cattle in a feedlot if feed cost per head is $200.00.
(Note: Show your work.)

Total production cost _____

23. Distinguish among margin profits (M), gain profits (G) and net profits (NP) by putting an "M", "G", or "NP" in front of the appropriate description.

_____a. Profit after paying production costs and purchase price

_____b. Selling animal for a higher price per pound than it was purchased

_____c. Selling the weight gained by an animal for more than it cost to produce that gain

24. Define dressing percentage.

_____

_____

25. Determine the adjusted weaning weight of a 200 day old steer that weighs 670 lbs. The dam is 7 years old. (Show your calculations in the space provided.)

Adjusted weaning weight _____

26. Define efficiency of gain and describe how it is determined.

_____

_____

_____

27. Calculate the estimated maximum purchase price and price per cwt for the steer in the following problem.

Transportation cost -- $5.00; Expected selling price -- $0.64 per lb; Expected selling weight -- 1,100 lbs; Total estimated production costs -- $340.00; Profit needed -- $20.00; Original weight -- 550 lbs.

Maximum purchase price _____

Price per cwt_____

28. List four methods of buying cattle.

a. _____

b. _____

c. _____

d. _____

29. Calculate the pay weight for a 600 lb steer with 3% shrinkage.

Pay weight _____

30. List ten major production expenses for a cow-calf operation.

a. _____ f. _____

b. _____ g. _____

c. _____ h. _____

d. _____ i. _____

e. _____ j. _____

31. Calculate the total estimated production expense for a beef cow if the feed cost was $120.00.

Total production cost_____

BEEF CATTLE MANAGEMENT

AG 310 - C

ANSWERS TO TEST

1.

a.	9	g.	6	m.	12	s.	19
b.	11	h.	8	n.	15	t.	16
c.	3	i.	1	o.	5		
d.	17	j.	18	p.	13		
e.	10	k.	20	q.	2		
f.	4	l.	7	r.	14		

2. Identify effects of management decisions; Identify superior breeding stock; Improve profits

3. Establish or verify ownership; Participate in performance testing programs; Register purebreds

4. a. 4 b. 2 c. 1 d. 3

5. Increased calf crop; Increased weaning weights; Greater profits

6. a. 2 b. 3 c. 1

7. a. 3 b. 2 c. 1

8.
   a. Age--calves, yearlings, two-year-olds
   b. Condition--thin, medium, fleshy
   c. Weight--light, medium, heavy
   d. Sex--steers, heifers
   e. Quality--prime, choice, select, standard, utility
   f. Breed or origin--Angus, Hereford, English breed, etc.

9.
   a. Cattle are moved quickly to high concentrate ration and finished as rapidly as possible
   b. Cattle utilize roughages for 2 to 5 months before finishing
   c. Cattle utilize pasture for growing phase and to supplement finishing phase

10. Answer should include three of the following:

    Improving genetics; Improving rations; Eliminating or controlling diseases and parasites; Feeding young bulls; Feeding high levels of antibiotics; Using non-carcinogenic growth stimulants

11. Implanted growth hormones, such as Ralgro; Feed additives, such as Rumensin and antibiotics

12. c, d, e

13. Light cattle fed roughages during growing period and then switched to a high energy ration

14. Older, heavier cattle take more feed and therefore cost more per pound gain than younger, lighter cattle

15. Amount of forage available; Quality of forage available; Desirable weight gain; System of pasture rotation

16. Prevent overgrazing to allow rapid regrowth of plants; Provide maximum nutrient value to animals

17. a. continuous b. strip grazing c. rest rotation d. rotational grazing e. deferred

18. a. B c. G e. G g. G
b. G d. B f. B

19. Answer should include two controls for each of the following:

Bloat--Keep pasture legumes at 50% or less; Feed 10 lbs of dry, fibrous hay before grazing pastures with high legume content; Feed Poloxalene

Grass tetany--Blood test if suspected; Feed magnesium; Use legume pastures, especially for lactating cows; Fertilize soil with magnesium fertilizer

20. Head gate; Holding or squeeze chute; Crowding pen; Loading chute

21. b, c, d, e, g, h, j

22. $25,000 (200 divided by .8) x 100

23. a. NP b. M c. G

24. Percentage yield of chilled carcass in relation to the weight of the live animal; Depends on quality grade of animal

25. $\frac{670 - 70}{200} \times 205 + 70 = 685$ lbs (No adjustment is made for age of dam)

26. How efficient the animal is in converting feed to weight gain; Determine by dividing the total pounds of feed fed to the animal by the total pounds it has gained

27. Maximum purchase price $339.00 (.64 x 1100) - (340 + 20 + 5)
Price per cwt 61.63 339 divided by 5.5 cwt

28. Direct from a rancher; Direct from a dealer; Commission firm; Auction

29. 582# 600 - (600 x .03)

30. Feed; Labor; Veterinary and drug; Fuel; Bull; Taxes; Insurance; Equipment and depreciation; Interest on operating capital; Miscellaneous business expenses

31. $200 120 divided by .6

FEEDING DAIRY CATTLE

AG 310 - D

UNIT OBJECTIVE

After completion of this unit, students should be able to describe various feeds used for dairy cattle and describe when they should be fed. Students should also be able to develop general feeding programs for dairy animals at different ages and stages of production. This knowledge will be demonstrated by completion of assignment sheets and a unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with feeding of the dairy herd to their definitions.
2. List the seven nutritional areas of concern when balancing a dairy cattle ration.
3. Describe four advantages of using pastures for dairy cattle feed.
4. Describe three reasons pastures are becoming less important in commercial dairy herds.
5. Select advantages of good quality hay for dairy feed.
6. Describe four characteristics of good quality hay.
7. Describe the effects of poor quality hay on milk production and grain requirements.
8. Compare high quality alfalfa hay to corn silage with respect to TDN, protein content and feeding rates.
9. Select the main advantages of using silage.
10. Distinguish between advantages of corn silage and grass silage.
11. Name five types of silos.
12. Name the four most common grains fed to dairy cattle.
13. Name two of the most common protein supplements for dairy cattle in the western United States.
14. Describe four reasons for taking precautions when feeding by-products.
15. Name two ways minerals can be fed.
16. Select three minerals most commonly fed to dairy cattle.
17. Name the vitamin most likely to be deficient in dairy cattle.
18. List five types of information necessary to successfully balance a ration.

19. Name four ways to process grain.

20. Describe the effects of using cubed and finely ground hay for dairy cattle feed.

21. List the minimum requirements for roughage and fiber for a lactating cow.

22. State one general rule of thumb used to determine the amount of concentrate to feed large dairy breeds.

23. Match the four phases of a dairy cow's feeding period to their proper descriptions.

24. Describe challenge feeding.

25. Describe group feeding.

26. Match feedstuffs to the time they should be fed.

27. Describe general feeding tips for dry cows.

28. Describe five advantages of properly feeding dry cows.

29. Describe general feeding tips for replacement heifers.

30. Match dairy cows at different stages of the production cycle to an appropriate sample ration.

31. Describe the timing involved in feeding colostrum and the reasons for that timing.

32. Match the age to the ration which should be fed at that age in a calf feeding program.

33. Balance a dairy cattle ration.

34. Develop a feeding program for a dairy herd.

FEEDING DAIRY CATTLE

AG 310 - D

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

- A. Make transparencies and necessary copies of material.
- B. Provide students with objective sheet.
- C. Provide students with information and discuss.
- D. Provide students with assignment sheets and discuss.
- E. Obtain information about price and availability of feeds used in the local area.
- F. Obtain samples of good and poor alfalfa hay and also of cubed hay if possible.
- G. Obtain samples of different forms of grain.
- H. Arrange a field trip to point out different types of silos.
- I. Arrange a field trip of a large, commercial dairy.
- J. Arrange a trip to an extension office or a private computer ration firm to show students how computer ration formulation works.
- K. Review and give test.
- L. Reteach and retest if necessary.

II. Instructional materials

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Transparency master
  1. TM 1--Types of Silos
- E. Handout
  1. HO 1--Nutrient Requirements for Dairy Animals
- F. Assignment sheets
  1. AS 1--Balance a Dairy Cattle Ration
  2. AS 2--Develop a Feeding Program for a Dairy Herd

G. Answers to assignment sheets

H. Test

I. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

C. Ensminger, M.E., *Dairy Cattle Science*. The Interstate Printers and Publishers, Inc., Danville, Illinois, 1980.

D. Miron, A.E., *GTA Dairy Guide*. GTA Feed Division, Sioux Falls, South Dakota, 1979.

FEEDING DAIRY CATTLE

AG 310 - D

INFORMATION SHEET

I. Terms and definitions

A. Hay--Dry forage; 10%-25% moisture content

B. Silage--Fermented forage plants usually ensiled at 60%-67% moisture content

C. Haylage--Low moisture silage made from legumes and/or grasses; 35%-50% moisture content

D. High moisture grain--Grain containing between 24%-40% moisture and stored in an air-tight silo

E. Pre-mix--Feed purchased already combined in set amounts to provide a specified nutritional content

F. TDN--Total digestible nutrients

G. Carbohydrate--Nutrient supplying most of the energy needs for animals; usually easily digested and absorbed

H. Fiber--Carbohydrate with a digestibility of less than 50%

I. Lignin--Non-digestible portion of fiber that provides the "bulk" necessary for dairy animals

J. Protein--Nutrient made up of chains of amino acids which contain nitrogen; "building blocks" of muscles

K. Palatability--Flavor of the feed

L. NE--Net energy or energy left in feeds after energy used in digestion has been subtracted

M. NE_{lac}--Net energy value used for maintenance and milk production in lactating cows

N. Milk fat--Fat found in milk composed of short-chain fatty acids; contains vitamin A

O. Colostrum--First "milk" of a cow after calving, high in nutrients and antibodies

P. Antibody--Protein substance in the blood that protects against disease

Q. Ketosis--Dairy disease caused by high milk production in which cow is forced to use body fat to supply production demands; this fat breakdown creates an oversupply of ketones

R. Longevity--Length of time a cow remains in herd

S. Lactating--Secreting milk

T. Replacement heifers--Young females being raised to remain in the herd as cows

U. Milk fever--A nutritional disease occurring at calving caused by a calcium-phosphorus imbalance

II. Nutritional areas of concern in balancing a dairy ration (Handout 1)

A. Dry matter intake

B. Crude protein

C. TDN

D. Calcium

E. Phosphorus

F. Fiber

G. Trace mineral salt

III. Advantages of pastures for feed

A. Lowers feed costs

B. Lessens chance of nutritional deficiencies

C. Lessens disease spread

D. Lowers building costs

E. Increases flexibility

F. Improves reproduction

G. Provides outlet for manure

IV. Disadvantages of pastures for feed

A. Increases land requirements

B. Limits expansion

C. Does not provide enough dry matter and therefore energy to maintain high production

D. Decreases feed efficiency

(Note: Cows must use more energy obtaining feed.)

E. Increases variability in production and growth

F. Increases worm problems

V. Advantages of feeding hay

A. Provides relatively inexpensive nutrients

B. Is important in maintaining proper digestion

C. Maintains proper rumen function

D. Maintains milk fat levels

VI. Characteristics of good hay

(Note: Good hay has over 15% protein and less than 30% fiber.)

A. Cut at an early maturity--1/10 bloom

B. Leafy

C. Bright green

D. Free from mold or dust

E. Pleasant aroma

VII. Effects of poor hay quality on lactating cows

A. Lowers milk production

B. Lowers hay consumption

C. Increases grain requirements

VIII. Comparison of high quality hay and corn silage

(Note: Forty pounds of silage fed with 20 pounds of hay per day has proven to be a good balance for a dairy ration.)

A. Corn silage has 11% more TDN than hay on a dry matter basis

B. Corn silage has a little over 1/4 the protein of alfalfa hay on a dry matter basis

C. Feeding 3 pounds of corn silage is approximately equivalent to feeding 1 pound of hay on an as-fed basis

(Note: This is due to the much higher moisture content of silage figured at 70% in this case.)

IX. Advantages of using silage

A. Retains over 85% of crop feed value

B. Allows maximum utilization of land in feed production

(Note: Corn can produce more TDN per acre as silage than any other crop.)

C. Can be harvested in relatively wet weather

(Note: This means it can also be harvested over a longer period without losing quality.)

D. Requires less storage space per pound of TDN than hay

E. Improves utilization of by-products and other feeds with low palatability

F. Can be stored with very little loss

X. Merits of corn versus grass silage

A. Corn silage

1. Generally yields better

2. Easier to produce high quality silage consistently

3. More palatable

4. Higher in TDN

B. Grass silage

1. Higher in protein

2. Can be produced in shorter and cooler growing seasons

3. Can be used for summer feeding by ensiling first cutting grass

XI. Types of silos (Transparency 1)

A. Tower

B. Oxygen-limiting

C. Pit

D. Horizontal

(Note: These can either be the bunker types which are above ground or the trench types which are below ground.)

E. Temporary

(Note: These include stack type and plastic tubes.)

XII. Most common grains for dairy cattle

A. Corn

B. Barley

(Note: This is the most common grain fed in Idaho and the western states and has about 90% of the TDN of corn.)

C. Oats

D. Three-way mix--Wheat, barley and oats

(Note: This mixture has been used extensively in the Magic Valley area in Idaho.)

XIII. Most common protein supplements for dairy cattle in the western United States

A. Soybean meal

B. Cottonseed meal

C. Whole soybean

D. Whole cottonseed

(Note: Whole soybeans and cottonseeds supply oil and increase the energy level of the supplement.)

E. Alfalfa

(Note: Urea is a nitrogen source that ruminants can use to manufacture protein. It can be used in limited quantities in dairy feed.)

XIV. Reasons for taking precautions when feeding by-products

A. Widely varying nutrient value

B. Possible pesticide contaminations

C. Possible low palatability

D. Possible presence of toxic substances

XV. Feeding methods for minerals

A. Free choice

B. Mixed with ration

XVI. Most common minerals for dairy cattle

A. Salt

(Note: A trace mineral salt is often used to insure an adequate supply of trace minerals.)

B. Calcium

C. Phosphorus

XVII. Vitamin A is most likely to be deficient in dairy cattle

(Note: A pre-mix can be helpful in preventing vitamin deficiencies since vitamins in feeds are easily destroyed.)

XVIII. Necessary information for balancing rations

(Note: Ration formulation by computer is available through private companies and the universities, but the following information must still be available.)

A. Feeds available

B. Nutrient values of feeds

C. Feed costs

D. Nutritional levels needed to meet production goals

E. Other requirements or limitations such as minimum fiber

XIX. Alternative ways to process grain

A. Fine grinding

(Note: This method is generally not as satisfactory as it reduces palatability because of the powdery texture and dust.)

B. Coarse grinding

C. Steam rolling

D. Pelleting

(Note: This method increases consumption, but slightly lowers butterfat content.)

XX. Effects of cubed and finely ground hay on dairy cattle

A. Cubed hay--May increase production and does not affect butterfat content

B. Finely ground and pelleted hay--Lowers fat content in milk; increases digestion problems

XXI. Minimum requirements for roughage and fiber for a lactating cow

(Note: These amounts are necessary for proper digestive function.)

A. 1 to 1 1/2 lbs of roughage per 100 lbs of body weight

B. 17% crude fiber

XXII. Rule of thumb for determining concentrate levels to feed large dairy breeds--Feed 1 lb of grain for each 2 lbs of milk above a base of 20-30 lbs of milk

(Note: Jerseys and Guernseys should have 1 lb of grain for each 1 1/2 lbs of milk above a base of 15-20 lbs.)

XXIII. Phase feeding

(Note: Each phase would represent a different energy requirement and therefore a different ration.)

A. Phase 1

1. First 10 weeks after calving

2. Rapidly increasing milk production

3. Cow is usually not able to eat enough and draws on body reserves to maintain production

B. Phase 2

1. Second 10 weeks after calving

2. Maximum level of feed intake reached

C. Phase 3

1. Last half of lactation

2. Milk production is decreasing

D. Phase 4

1. Dry period of 7 to 8 weeks

2. Time for feeding calf and restoring body reserves

XXIV. Challenge feeding

A. Cow is "challenged" to produce more milk by increasing concentrates before freshening

B. Grain amounts are then increased until production no longer increases

C. Grain amounts are then adjusted according to milk production

(Note: Maximum production may not always be the most economical, especially on cows that are not real efficient feed converters or when grain prices are high. A cow's response to challenge feeding is best early in lactation.)

XXV. Group feeding

A. Cows are divided into groups based on production

(Note: Number of groups will vary with size of herd and type of operation.)

B. Cows are fed in groups in some type of feed bunk

C. Little or no grain is fed in milking parlor

XXVI. Timing of feeding different feeds

(Note: Consumption is increased as number of feedings are increased. Some dairies are using "total rations" where all the feeds are fed together.)

A. Hay--Generally free choice at all times

(Note: Waste can be controlled by feeding smaller amounts several times a day.)

B. Silage--Once or twice a day depending on labor; fed after milking

C. Grain--Twice a day

(Note: High producing cows need additional grain outside of the milking parlor since they are not there long enough to eat sufficient amounts.)

D. Water--Always readily available

XXVII. Feeding dry cows

A. Roughages, especially grass or oat hay, should be the main feed to restore digestive system

B. Corn silage can help maintain a proper phosphorus to calcium ratio

C. Weight gain is desirable to recondition cows

(Caution: Cows must not be fat at calving, however.)

D. Grain should be started or increased 2 weeks prior to calving to condition digestive system; this should be limited to not more than 1% of body weight

XXVIII. Advantages of proper dry cow feeding

A. Increased milk production

(Note: It has been estimated that 1 lb of gain will result in an increase of 25 lbs of milk during lactation.)

B. Better conception rate

C. Fewer calving problems

D. Healthier calves

E. Increased herd longevity

XXIX. Feeding replacement heifers

A. Under 6 months or 400 lbs

1. High quality forage

2. 3 to 5 lbs of supplemental grain

3. Very limited high-moisture forage if at all

B. Six months to breeding age

1. Adequate forages

2. Grain 2 weeks before breeding

XXX. Sample rations for dairy cows at different stages

(Note: All rations are on a dry matter basis.)

A. Cows in early lactation averaging 65 lbs of milk

1. Ration 1--21.5 lbs of alfalfa; 16.9 lbs of corn; 4.6 lbs of 44% protein supplement; .47 lb of 20-24% Ca/18% P; .25 lb of trace mineral salt

2. Ration 2--5.4 lbs of alfalfa; 16.1 lbs of corn silage; 10.7 lbs of corn; 9.0 lbs of 44% protein supplement; .41 lb of 20-24% Ca/18% P; .16 lb of 38% Ca-O-P mineral mix; .25 lb of trace mineral salt

B. Cows in mid-lactation averaging 50 lbs of milk

1. Ration 1--26.3 lbs of alfalfa; 13.2 lbs of corn; .28 lb of 20-24% Ca/18% P; .19 lb of trace mineral salt

2. Ration 2--5.8 lbs of alfalfa; 17.4 lbs of corn silage; 8.4 lbs of corn; 4.8 lbs of 44% protein supplement; .28 lb of 20-24% Ca/18% P; .06 lb of 38% Ca-O-P mineral mix; .19 lb of trace mineral salt

C. Cows in late lactation averaging 35 lbs of milk plus replenishing body reserves

1. Ration 1--27 lbs of alfalfa; 10 lbs of corn; .25 lb of 20-24% Ca/18% P; .125 lb of trace mineral salt

2. Ration 2--6 lbs of alfalfa; 17.8 lbs of corn silage; 7.5 lbs of corn; 2.5 lbs of 44% protein supplement; .25 lb of 20-24% Ca/18% P; .06 lb of 38% Ca-O-P mineral mix; .125 lb of trace mineral mix

D. Dry cows

1. Ration 1--10 lbs of alfalfa; 15 lbs of cornstalks; 2.6 lbs of corn; 1-1.5 lbs of 20-24% Ca/18% P; 1 lb of trace mineral salt

2. Ration 2--7 lbs of alfalfa; 18 lbs of grass hay; 1 lb 44% protein supplement; 1 lb 20-24% Ca/18% P; 1 lb of trace mineral salt

XXXI. Feeding colostrum

(Note: Colostrum can be frozen to feed later, but only the first milking colostrum should be fed at the first feeding. Freezing colostrum in ice cube trays and then putting it in bags speeds thawing and warming.)

A. Feed at least 1 quart within 2 hours

B. Feed one gallon within 24 hours

C. Calves are born without natural defenses against disease

D. Colostrum contains antibodies which can be readily absorbed only during the first 24 hours of life

XXXII. Calf feeding program

A. Day 1--Allow calf to nurse

B. Day 1-4--Feed colostrum

(Note: This can be done by either letting the calf nurse or by milking and feeding.)

(Caution: If scouring occurs, colostrum should be diluted by mixing half and half with water.)

C. Day 5-30--Feed milk replacer or milk

(Note: Extra colostrum can also be fed during this time, but should be diluted with equal amounts of water to prevent scouring.)

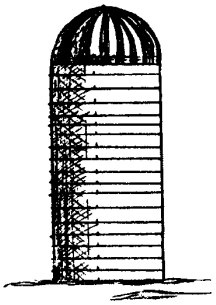
D. Day 10--Start good, leafy hay and a calf starter with 80% TDN and 21% protein

E. Day 21--Start to wean and increase calf starter

F. Months 1-5--Feed calf starter and hay free choice

G. Month 5--Switch to a starter ration with 75% TDN and 14% protein

Types Of Silos



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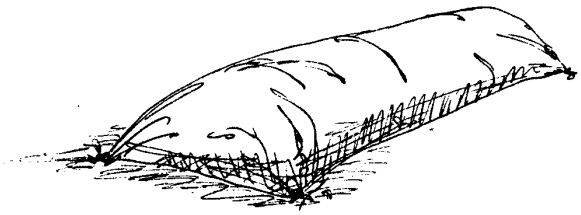

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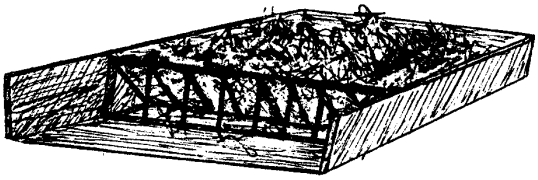

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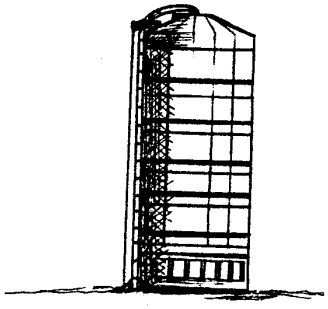

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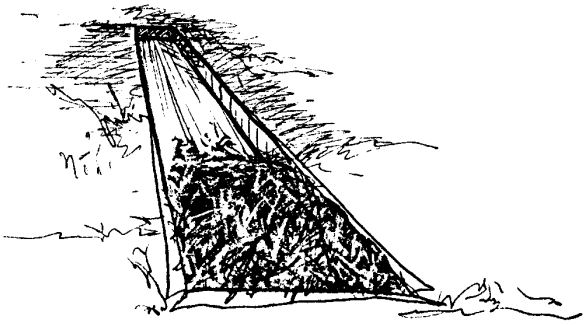

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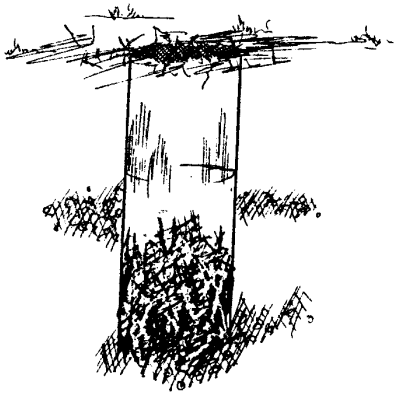

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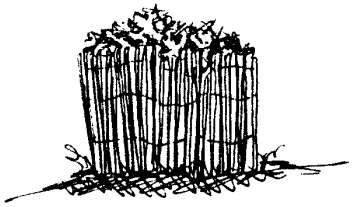

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Nutrient Requirements of Dairy Cattle
Sixth Revised Edition
Update 1989

APPENDIX TABLE 2 Daily Nutrient Requirements of Growing Dairy Cattle and Mature Bulls

Live Weight (lb)	Gain (lb)	Dry Matter Intake[a] (lb)	Energy					Protein			Minerals		Vitamins	
			NEM (Mcal)	NEG (Mcal)	ME (Mcal)	DE (Mcal)	TDN (lb)	UIP (lb)	DIP (lb)	CP (lb)	Ca (lb)	P (lb)	A (1,000 IU)	D
Growing Large-Breed Calves Fed Only Milk or Milk Replacer														
90	0.6	1.08	1.39	0.37	2.59	2.79	1.32	—	—	0.24	0.015	0.009	1.73	0.27
110	0.8	1.32	1.61	0.52	3.17	3.41	1.70	—	—	0.29	0.019	0.013	2.20	0.33
Growing Large-Breed Calves Fed Milk Plus Starter Mix														
100	1.0	2.00	1.50	0.64	4.11	4.48	2.24	—	—	0.44	0.018	0.012	1.93	0.30
150	1.8	3.50	2.04	1.29	7.20	7.84	3.92	—	—	0.77	0.034	0.017	2.90	0.50
Growing Small-Breed Calves Fed Only Milk or Milk Replacer														
60	0.4	0.80	1.02	0.23	1.92	2.06	1.03	—	—	0.18	0.013	0.008	1.16	0.18
75	0.5	1.20	1.21	0.36	2.88	3.10	1.55	—	—	0.26	0.016	0.009	1.44	0.22
Growing Small-Breed Calves Fed Milk Plus Starter Mix														
100	1.1	2.00	1.50	0.70	4.11	4.48	2.24	—	—	0.44	0.021	0.013	1.93	0.30
150	1.3	3.50	2.04	0.92	7.20	7.84	3.92	—	—	0.77	0.030	0.017	2.90	0.45
Growing Veal Calves Fed Only Milk or Milk Replacer														
85	0.5	0.80	1.33	0.30	1.92	2.06	1.03	—	—	0.18	0.015	0.009	1.64	0.26
100	0.8	1.20	1.50	0.57	2.88	3.10	1.55	—	—	0.26	0.018	0.010	1.93	0.30
125	1.0	1.50	1.78	0.67	3.60	3.87	1.94	—	—	1.33	0.030	0.018	2.41	0.38
150	1.8	2.50	2.04	1.29	4.76	5.23	2.60	—	—	0.55	0.032	0.019	2.90	0.45
200	2.6	4.00	2.53	2.06	7.62	8.36	4.16	—	—	0.88	0.041	0.023	3.85	0.60
250	2.8	5.00	2.99	2.42	9.52	10.45	5.20	—	—	1.16	0.046	0.027	4.82	0.75
300	2.6	5.60	3.43	2.37	10.67	11.71	5.82	—	—	1.23	0.050	0.031	5.78	0.90
Large-Breed Growing Females														
200	1.30	5.43	2.53	1.16	6.58	7.61	3.81	0.71	0.08	0.87	0.036	0.018	3.85	0.60
200	1.50	5.80	2.53	1.35	7.03	8.13	4.07	0.77	0.12	0.93	0.038	0.019	3.85	0.60
200	1.70	6.17	2.53	1.54	7.48	8.65	4.33	0.83	0.15	0.99	0.039	0.020	3.85	0.60
300	1.30	7.15	3.43	1.36	8.50	9.86	4.93	0.64	0.27	1.14	0.040	0.023	5.77	0.90
300	1.50	7.60	3.43	1.59	9.04	10.49	5.24	0.69	0.31	1.22	0.041	0.024	5.77	0.90
300	1.70	8.06	3.43	1.81	9.58	11.12	5.56	0.74	0.36	1.29	0.043	0.025	5.77	0.90
400	1.30	8.90	4.25	1.55	10.33	12.03	6.02	0.58	0.45	1.39	0.043	0.028	7.69	1.20
400	1.50	9.44	4.25	1.80	10.96	12.76	6.38	0.62	0.50	1.50	0.045	0.029	7.69	1.20
400	1.70	9.98	4.25	2.06	11.59	13.50	6.75	0.66	0.55	1.60	0.047	0.030	7.69	1.20
500	1.30	10.68	5.03	1.72	12.11	14.15	7.08	0.52	0.62	1.37	0.047	0.033	9.62	1.50
500	1.50	11.31	5.03	2.01	12.83	14.99	7.49	0.56	0.68	1.48	0.049	0.034	9.62	1.50
500	1.70	11.95	5.03	2.30	13.55	15.84	7.92	0.60	0.75	1.58	0.050	0.035	9.62	1.50
600	1.30	12.54	5.76	1.89	13.87	16.27	8.13	0.48	0.80	1.50	0.050	0.037	11.54	1.80
600	1.50	13.27	5.76	2.20	14.68	17.21	8.61	0.51	0.87	1.59	0.051	0.038	11.54	1.80
600	1.70	14.00	5.76	2.52	15.50	18.17	9.09	0.54	0.94	1.68	0.053	0.039	11.54	1.80
700	1.30	14.49	6.47	2.05	15.63	18.40	9.20	0.44	0.97	1.74	0.052	0.039	13.46	2.10
700	1.50	15.32	6.47	2.39	16.53	19.47	9.73	0.47	1.05	1.84	0.053	0.040	13.46	2.10
700	1.70	16.17	6.47	2.74	17.44	20.54	10.27	0.49	1.13	1.94	0.055	0.041	13.46	2.10
800	1.30	16.56	7.15	2.20	17.41	20.59	10.30	0.42	1.15	1.99	0.054	0.041	15.39	2.40
800	1.50	17.52	7.15	2.57	18.41	21.77	10.89	0.44	1.24	2.10	0.055	0.042	15.39	2.40
800	1.70	18.48	7.15	2.95	19.43	22.97	11.49	0.46	1.33	2.22	0.056	0.043	15.39	2.40
900	1.30	18.79	7.81	2.35	19.24	22.85	11.43	0.40	1.33	2.26	0.062	0.042	17.31	2.69
900	1.50	19.88	7.81	2.75	20.35	24.16	12.08	0.41	1.43	2.39	0.062	0.044	17.31	2.69
900	1.70	20.97	7.81	3.15	21.47	25.49	12.75	0.43	1.53	2.52	0.063	0.046	17.31	2.69
1,000	1.30	21.22	8.45	2.49	21.13	25.21	12.61	0.39	1.51	2.55	0.062	0.043	19.23	2.99
1,000	1.50	22.44	8.45	2.92	22.35	26.67	13.33	0.40	1.63	2.69	0.062	0.044	19.23	2.99
1,000	1.70	23.68	8.45	3.34	23.59	28.14	14.07	0.41	1.74	2.84	0.063	0.046	19.23	2.99
1,100	1.30	23.87	9.08	2.64	23.12	27.71	13.86	0.38	1.71	2.86	0.062	0.043	21.16	3.29
1,100	1.50	25.26	9.08	3.08	24.46	29.33	14.66	0.39	1.84	3.03	0.062	0.044	21.16	3.29
1,100	1.70	26.67	9.08	3.53	25.83	30.96	15.48	0.40	1.97	3.20	0.063	0.046	21.16	3.29
1,200	1.30	26.81	9.69	2.77	25.23	30.39	15.20	0.39	1.92	3.22	0.062	0.043	23.08	3.59
1,200	1.50	28.39	9.69	3.24	26.71	32.18	16.09	0.40	2.06	3.41	0.063	0.045	23.08	3.59

Nutrient Requirements of Dairy Cattle

APPENDIX TABLE 2 Daily Nutrient Requirements of Growing Dairy Cattle and Mature Bulls—*Continued*

Live Weight (lb)	Gain (lb)	Dry Matter Intake[a] (lb)	Energy					Protein			Minerals		Vitamins	
			NEM (Mcal)	NEG (Mcal)	ME (Mcal)	DE (Mcal)	TDN (lb)	UIP (lb)	DIP (lb)	CP (lb)	Ca (lb)	P (lb)	A (1,000 IU)	D
1,200	1.70	29.99	9.69	3.72	28.22	34.00	17.00	0.40	2.20	3.60	0.063	0.046	23.08	3.59
1,300	1.30	30.10	10.29	2.91	27.49	33.30	16.65	0.42	2.15	3.61	0.062	0.043	25.00	3.89
1,300	1.50	31.90	10.29	3.40	29.14	35.30	17.65	0.42	2.30	3.83	0.063	0.045	25.00	3.89
1,300	1.70	33.73	10.29	3.90	30.81	37.32	18.66	0.42	2.46	4.05	0.063	0.047	25.00	3.89
						Small-Breed Growing Females								
200	0.90	4.99	2.53	0.89	5.98	6.93	3.47	0.57	0.05	0.80	0.033	0.016	3.85	0.60
200	1.10	5.42	2.53	1.11	6.49	7.52	3.76	0.62	0.09	0.87	0.034	0.017	3.85	0.60
200	1.30	5.84	2.53	1.32	7.00	8.11	4.06	0.67	0.13	0.93	0.036	0.018	3.85	0.60
300	0.90	6.79	3.43	1.07	7.89	9.18	4.59	0.51	0.23	1.09	0.036	0.021	5.77	0.90
300	1.10	7.33	3.43	1.32	8.51	9.91	4.95	0.55	0.29	1.17	0.038	0.022	5.77	0.90
300	1.30	7.87	3.43	1.58	9.15	10.65	5.32	0.60	0.34	1.26	0.040	0.023	5.77	0.90
400	0.90	8.63	4.25	1.22	9.71	11.36	5.68	0.46	0.41	1.14	0.040	0.026	7.69	1.20
400	1.10	9.29	4.25	1.52	10.46	12.23	6.12	0.50	0.48	1.24	0.042	0.027	7.69	1.20
400	1.30	9.97	4.25	1.82	11.21	13.11	6.56	0.53	0.54	1.34	0.043	0.028	7.69	1.20
500	0.90	10.58	5.03	1.37	11.51	13.54	6.77	0.42	0.59	1.27	0.044	0.031	9.62	1.50
500	1.10	11.38	5.03	1.71	12.38	14.56	7.28	0.45	0.66	1.37	0.045	0.032	9.62	1.50
500	1.30	12.19	5.03	2.05	13.26	15.59	7.80	0.48	0.74	1.46	0.047	0.033	9.62	1.50
600	0.90	12.68	5.76	1.51	13.33	15.77	7.88	0.40	0.77	1.52	0.047	0.034	11.54	1.80
600	1.10	13.63	5.76	1.88	14.33	16.95	8.47	0.42	0.86	1.64	0.048	0.036	11.54	1.80
600	1.30	14.60	5.76	2.26	15.35	18.14	9.07	0.44	0.95	1.75	0.050	0.037	11.54	1.80
700	0.90	14.99	6.47	1.65	15.21	18.09	9.05	0.38	0.95	1.80	0.049	0.036	13.46	2.10
700	1.10	16.11	6.47	2.05	16.35	19.44	9.72	0.40	1.06	1.93	0.050	0.038	13.46	2.10
700	1.30	17.26	6.47	2.46	17.51	20.82	10.41	0.41	1.16	2.07	0.052	0.039	13.46	2.10
800	0.90	17.57	7.15	1.78	17.18	20.56	10.28	0.38	1.15	2.11	0.051	0.039	15.39	2.40
800	1.10	18.90	7.15	2.22	18.48	22.12	11.06	0.39	1.27	2.27	0.052	0.040	15.39	2.40
800	1.30	20.25	7.15	2.66	19.80	23.70	11.85	0.40	1.39	2.43	0.054	0.041	15.39	2.40
900	0.90	20.50	7.81	1.91	19.29	23.25	11.62	0.39	1.36	2.46	0.060	0.039	17.31	2.69
900	1.10	22.08	7.81	2.38	20.78	25.03	12.52	0.40	1.50	2.65	0.061	0.041	17.31	2.69
900	1.30	23.68	7.81	2.85	22.28	26.85	13.42	0.41	1.64	2.84	0.062	0.042	17.31	2.69
1,000	0.90	23.75	8.45	2.03	21.54	26.13	13.06	0.42	1.58	2.85	0.060	0.039	19.23	2.99
1,000	1.10	25.61	8.45	2.53	23.23	28.18	14.09	0.42	1.74	3.07	0.061	0.041	19.23	2.99
1,000	1.30	27.50	8.45	3.04	24.95	30.26	15.13	0.42	1.91	3.30	0.062	0.043	19.23	2.99
						Large-Breed Growing Males								
200	1.80	5.91	2.53	1.40	7.16	8.28	4.14	0.91	0.11	0.95	0.040	0.021	3.85	0.6
200	2.00	6.23	2.53	1.57	7.54	8.73	4.36	0.98	0.14	1.00	0.042	0.022	3.85	0.6
200	2.20	6.55	2.53	1.73	7.93	9.17	4.59	1.04	0.16	1.05	0.044	0.023	3.85	0.6
300	1.80	7.50	3.43	1.61	9.04	10.46	5.23	0.83	0.29	1.20	0.044	0.026	5.77	0.9
300	2.00	7.87	3.43	1.80	9.48	10.98	5.49	0.89	0.33	1.26	0.046	0.027	5.77	0.9
300	2.20	8.24	3.43	1.99	9.93	11.50	5.75	0.95	0.36	1.32	0.047	0.028	5.77	0.9
400	1.80	9.17	4.25	1.81	10.85	12.60	6.30	0.77	0.47	1.47	0.048	0.031	7.69	1.2
400	2.00	9.60	4.25	2.02	11.36	13.19	6.59	0.82	0.51	1.54	0.049	0.032	7.69	1.2
400	2.20	10.03	4.25	2.23	11.87	13.78	6.89	0.88	0.55	1.60	0.051	0.033	7.69	1.2
500	1.80	10.85	5.03	1.99	12.60	14.67	7.33	0.71	0.64	1.74	0.051	0.036	9.62	1.5
500	2.00	11.34	5.03	2.22	13.17	15.33	7.67	0.76	0.69	1.81	0.053	0.037	9.62	1.5
500	2.20	11.83	5.03	2.46	13.74	16.00	8.00	0.81	0.73	1.89	0.055	0.037	9.62	1.5
600	1.80	12.55	5.76	2.16	14.30	16.70	8.35	0.66	0.81	1.73	0.053	0.040	11.54	1.8
600	2.00	13.11	5.76	2.41	14.94	17.44	8.72	0.70	0.86	1.84	0.055	0.041	11.54	1.8
600	2.20	13.67	5.76	2.67	15.57	18.18	9.09	0.75	0.91	1.96	0.056	0.042	11.54	1.8
700	1.80	14.31	6.47	2.32	15.99	18.72	9.36	0.61	0.97	1.72	0.055	0.042	13.46	2.1
700	2.00	14.93	6.47	2.60	16.69	19.54	9.77	0.65	1.03	1.83	0.057	0.043	13.46	2.1
700	2.20	15.56	6.47	2.87	17.39	20.36	10.18	0.69	1.09	1.94	0.058	0.044	13.46	2.1
800	1.80	16.13	7.15	2.48	17.67	20.76	10.38	0.57	1.14	1.94	0.057	0.044	15.39	2.4
800	2.00	16.83	7.15	2.78	18.43	21.65	10.83	0.61	1.20	2.02	0.059	0.045	15.39	2.4
800	2.20	17.52	7.15	3.07	19.20	22.55	11.27	0.64	1.27	2.10	0.060	0.046	15.39	2.4
900	1.80	18.04	7.81	2.63	19.36	22.82	11.41	0.54	1.31	2.16	0.063	0.047	17.31	2.6
900	2.00	18.81	7.81	2.95	20.19	23.79	11.90	0.57	1.38	2.26	0.064	0.048	17.31	2.6

APPENDIX TABLE 2 Daily Nutrient Requirements of Growing Dairy Cattle and Mature Bulls—*Continued*

Live Weight (lb)	Gain (lb)	Dry Matter Intake[a] (lb)	Energy					Protein			Minerals		Vitamins	
			NEM (Mcal)	NEG (Mcal)	ME (Mcal)	DE (Mcal)	TDN (lb)	UIP (lb)	DIP (lb)	CP (lb)	Ca (lb)	P (lb)	A (1,000 IU)	D
900	2.20	19.58	7.81	3.26	21.02	24.77	12.39	0.60	1.45	2.35	0.065	0.050	17.31	2.6
1,000	1.80	20.05	8.45	2.78	21.08	24.92	12.46	0.51	1.47	2.41	0.063	0.047	19.23	2.9
1,000	2.00	20.90	8.45	3.12	21.97	25.98	12.99	0.54	1.55	2.51	0.064	0.048	19.23	2.9
1,000	2.20	21.76	8.45	3.45	22.88	27.05	13.52	0.57	1.63	2.61	0.065	0.050	19.23	2.9
1,100	1.80	22.18	9.08	2.93	22.83	27.08	13.54	0.49	1.65	2.66	0.064	0.047	21.16	3.2
1,100	2.00	23.12	9.08	3.28	23.79	28.23	14.12	0.52	1.74	2.77	0.064	0.049	21.16	3.2
1,100	2.20	24.07	9.08	3.63	24.77	29.39	14.69	0.54	1.82	2.89	0.065	0.050	21.16	3.2
1,200	1.80	24.45	9.69	3.07	24.62	29.32	14.66	0.48	1.83	2.93	0.064	0.047	23.08	3.5
1,200	2.00	25.48	9.69	3.44	25.67	30.57	15.28	0.50	1.92	3.06	0.064	0.049	23.08	3.5
1,200	2.20	26.53	9.69	3.81	26.72	31.82	15.91	0.52	2.02	3.18	0.065	0.050	23.00	3.6
1,300	1.80	26.88	10.29	3.21	26.48	31.65	15.83	0.47	2.01	3.23	0.064	0.047	25.00	3.8
1,300	2.00	28.03	10.29	3.60	27.61	33.00	16.50	0.49	2.11	3.36	0.064	0.049	25.00	3.8
1,300	2.20	29.18	10.29	3.98	28.75	34.36	17.18	0.51	2.22	3.50	0.065	0.051	25.00	3.8
1,400	1.80	29.51	10.88	3.35	28.42	34.11	17.05	0.47	2.20	3.54	0.064	0.048	26.93	4.1
1,400	2.00	30.78	10.88	3.75	29.64	35.57	17.79	0.49	2.32	3.69	0.065	0.049	26.93	4.1
1,400	2.20	32.06	10.88	4.15	30.87	37.05	18.52	0.51	2.43	3.85	0.065	0.051	26.93	4.1
1,500	1.80	32.37	11.46	3.48	30.47	36.71	18.35	0.48	2.41	3.88	0.064	0.048	28.85	4.4
1,500	2.00	33.78	11.46	3.90	31.79	38.30	19.15	0.50	2.53	4.05	0.065	0.049	28.85	4.4
1,500	2.20	35.19	11.46	4.32	33.12	39.90	19.95	0.51	2.66	4.22	0.065	0.051	28.85	4.4
1,600	1.80	35.51	12.03	3.62	32.63	39.49	19.74	0.50	2.63	4.26	0.064	0.048	30.77	4.7
1,600	2.00	37.07	12.03	4.05	34.06	41.22	20.61	0.51	2.76	4.45	0.065	0.050	30.77	4.7
1,600	2.20	38.64	12.03	4.49	35.51	42.96	21.48	0.53	2.90	4.64	0.065	0.051	30.77	4.7
1,700	1.80	38.04	12.58	3.75	34.51	41.86	20.93	0.50	2.81	4.56	0.064	0.048	32.70	5.0
1,700	2.00	39.72	12.58	4.19	36.03	43.70	21.85	0.51	2.96	4.77	0.065	0.050	32.70	5.0
1,700	2.20	41.40	12.58	4.65	37.56	45.56	22.78	0.52	3.10	4.97	0.066	0.052	32.70	5.0
1,800	1.80	39.57	13.14	3.87	35.90	43.54	21.77	0.47	2.95	4.75	0.064	0.048	34.62	5.3
1,800	2.00	41.31	13.14	4.34	37.47	45.45	22.73	0.48	3.10	4.96	0.065	0.050	34.62	5.3
1,800	2.20	43.05	13.14	4.81	39.06	47.37	23.69	0.48	3.25	5.17	0.066	0.052	34.62	5.3
						Small-Breed Growing Males								
200	1.10	5.08	2.53	0.98	6.15	7.12	3.56	0.65	0.05	0.81	0.034	0.017	3.85	0.60
200	1.30	5.45	2.53	1.17	6.60	7.63	3.82	0.71	0.09	0.87	0.036	0.018	3.85	0.60
200	1.50	5.81	2.53	1.35	7.04	8.15	4.07	0.77	0.12	0.93	0.038	0.019	3.85	0.60
300	1.10	6.72	3.43	1.15	7.99	9.27	4.64	0.58	0.23	1.08	0.038	0.022	5.77	0.90
300	1.30	7.17	3.43	1.37	8.52	9.89	4.94	0.64	0.27	1.15	0.040	0.023	5.77	0.90
300	1.50	7.62	3.43	1.59	9.06	10.51	5.25	0.69	0.31	1.22	0.041	0.024	5.77	0.90
400	1.10	8.39	4.25	1.31	9.74	11.34	5.67	0.53	0.40	1.27	0.042	0.027	7.69	1.20
400	1.30	8.92	4.25	1.56	10.36	12.06	6.03	0.57	0.45	1.38	0.043	0.028	7.69	1.20
400	1.50	9.46	4.25	1.81	10.98	12.79	6.39	0.62	0.50	1.50	0.045	0.029	7.69	1.20
500	1.10	10.09	5.03	1.45	11.44	13.37	6.68	0.48	0.57	1.26	0.045	0.032	9.62	1.50
500	1.30	10.71	5.03	1.74	12.15	14.19	7.10	0.52	0.63	1.37	0.047	0.033	9.62	1.50
500	1.50	11.34	5.03	2.02	12.86	15.02	7.51	0.56	0.69	1.47	0.049	0.034	9.62	1.50
600	1.10	11.85	5.76	1.59	13.12	15.38	7.69	0.44	0.73	1.42	0.048	0.036	11.54	1.80
600	1.30	12.57	5.76	1.90	13.91	16.31	8.16	0.48	0.80	1.51	0.050	0.037	11.54	1.80
600	1.50	13.30	5.76	2.22	14.71	17.25	8.63	0.51	0.87	1.60	0.051	0.038	11.54	1.80
700	1.10	13.71	6.47	1.73	14.79	17.41	8.71	0.41	0.90	1.65	0.050	0.038	13.46	2.10
700	1.30	14.53	6.47	2.06	15.68	18.46	9.23	0.44	0.97	1.74	0.052	0.039	13.46	2.10
700	1.50	15.36	6.47	2.41	16.57	19.51	9.76	0.47	1.05	1.84	0.053	0.040	13.46	2.10
800	1.10	15.68	7.15	1.86	16.48	19.49	9.74	0.39	1.06	1.88	0.052	0.040	15.39	2.40
800	1.30	16.61	7.15	2.22	17.47	20.65	10.33	0.41	1.15	1.99	0.054	0.041	15.39	2.40
800	1.50	17.56	7.15	2.59	18.46	21.82	10.91	0.43	1.24	2.11	0.055	0.042	15.39	2.40
900	1.10	17.79	7.81	1.98	18.21	21.63	10.81	0.37	1.23	2.13	0.061	0.041	17.31	2.69
900	1.30	18.85	7.81	2.37	19.30	22.92	11.46	0.39	1.33	2.26	0.062	0.042	17.31	2.69
900	1.50	19.92	7.81	2.76	20.40	24.22	12.11	0.41	1.43	2.39	0.062	0.044	17.31	2.69
1,000	1.10	20.08	8.45	2.10	20.00	23.86	11.93	0.37	1.41	2.41	0.061	0.041	19.23	2.99
1,000	1.30	21.28	8.45	2.52	21.20	25.29	12.65	0.38	1.52	2.55	0.062	0.043	19.23	2.99
1,000	1.50	22.50	8.45	2.94	22.41	26.73	13.37	0.39	1.63	2.70	0.062	0.044	19.23	2.99
1,100	1.10	22.58	9.08	2.22	21.87	26.22	13.11	0.37	1.60	2.71	0.061	0.041	21.16	3.29

Continues

APPENDIX TABLE 2 Daily Nutrient Requirements of Growing Dairy Cattle and Mature Bulls—*Continued*

Live Weight (lb)	Gain (lb)	Dry Matter Intake[a] (lb)	Energy					Protein			Minerals		Vitamins	
			NEM (Mcal)	NEG (Mcal)	ME (Mcal)	DE (Mcal)	TDN (lb)	UIP (lb)	DIP (lb)	CP (lb)	Ca (lb)	P (lb)	A (1,000 IU)	D
1,100	1.30	23.94	9.08	2.66	23.19	27.80	13.90	0.38	1.72	2.87	0.062	0.043	21.16	3.29
1,100	1.50	25.32	9.08	3.10	24.53	29.40	14.70	0.39	1.84	3.04	0.062	0.044	21.16	3.29
1,200	1.10	25.34	9.69	2.34	23.85	28.73	14.37	0.38	1.79	3.04	0.061	0.041	23.08	3.59
1,200	1.30	26.89	9.69	2.80	25.31	30.49	15.25	0.39	1.93	3.23	0.062	0.043	23.08	3.59
1,200	1.50	28.46	9.69	3.27	26.78	32.27	16.13	0.40	2.07	3.42	0.063	0.045	23.08	3.59
1,300	1.10	28.43	10.29	2.45	25.97	31.46	15.73	0.41	2.00	3.41	0.061	0.042	25.00	3.89
1,300	1.30	30.20	10.29	2.94	27.58	33.41	16.71	0.41	2.16	3.62	0.062	0.043	25.00	3.89
1,300	1.50	31.98	10.29	3.43	29.22	35.39	17.70	0.42	2.31	3.84	0.063	0.045	25.00	3.89
						Maintenance of Mature Breeding Bulls								
1,200	—	18.55	9.69	—	16.83	20.41	10.20	0.35	1.14	1.86	0.049	0.030	23.08	3.59
1,400	—	20.82	10.88	—	18.89	22.91	11.45	0.34	1.34	2.08	0.057	0.035	26.93	4.19
1,600	—	23.01	12.03	—	20.88	25.32	12.66	0.32	1.53	2.30	0.065	0.040	30.77	4.79
1,800	—	25.14	13.14	—	22.81	27.66	13.83	0.31	1.72	2.51	0.073	0.045	34.62	5.39
2,000	—	27.21	14.22	—	24.68	29.93	14.97	0.30	1.90	2.72	0.081	0.050	38.47	5.99
2,200	—	29.22	15.27	—	26.51	32.15	16.08	0.28	2.08	2.92	0.089	0.055	42.31	6.59
2,400	—	31.19	16.30	—	28.30	34.32	17.16	0.27	2.25	3.12	0.097	0.060	46.16	7.19
2,600	—	33.12	17.31	—	30.05	36.44	18.22	0.26	2.42	3.31	0.105	0.065	50.00	7.78
2,800	—	35.01	18.30	—	31.77	38.53	19.26	0.24	2.58	3.50	0.113	0.070	53.85	8.38
3,000	—	36.87	19.27	—	33.45	40.57	20.29	0.23	2.75	3.69	0.122	0.075	57.70	8.98

NOTE: The following abbreviations were used: NEM, net energy for maintenance; NEG, net energy for gain; ME, metabolizable energy; DE, digestible energy; TDN, total digestible nutrients; UIP, undegraded intake protein; DIP, degraded intake protein; CP, crude protein.

[a]The data for DMI are not requirements per se, unlike the requirements for net energy maintenance, net energy gain, and absorbed protein. They are not intended to be estimates of voluntary intake but are consistent with the specified dietary energy concentrations. The use of diets with decreased energy concentrations will increase dry matter intake needs; metabolizable energy, digestible energy, and total digestible nutrient needs; and crude protein needs. The use of diets with increased energy concentrations will have opposite effects on these needs.

APPENDIX TABLE 3 Daily Nutrient Requirements of Lactating and Pregnant Cows

Live Weight (lb)	Energy				Total Crude Protein (lb)	Minerals		Vitamins	
	NEL (Mcal)	ME (Mcal)	DE (Mcal)	TDN (lb)		Ca (lb)	P (lb)	A (1,000 IU)	D
Maintenance of Mature Lactating Cows[a]									
700	6.02	10.10	11.61	5.80	0.613	0.028	0.020	24	10
800	6.65	11.17	12.83	6.42	0.661	0.032	0.023	28	11
900	7.27	12.20	14.01	7.01	0.708	0.036	0.026	31	12
1,000	7.86	13.20	15.17	7.58	0.755	0.041	0.029	34	14
1,100	8.45	14.18	16.29	8.15	0.801	0.045	0.031	38	15
1,200	9.02	15.13	17.39	8.70	0.846	0.049	0.034	41	16
1,300	9.57	16.07	18.47	9.23	0.892	0.053	0.037	45	18
1,400	10.12	16.99	19.52	9.76	0.932	0.057	0.040	48	19
1,500	10.66	17.89	20.56	10.28	0.973	0.061	0.043	52	20
1,600	11.19	18.78	21.58	10.79	1.011	0.065	0.046	55	22
1,700	11.71	19.65	22.58	11.29	1.049	0.069	0.049	59	23
1,800	12.22	20.51	23.57	11.79	1.087	0.073	0.051	62	24
Maintenance Plus Last 2 Months of Gestation of Mature Dry Cows[b]									
700	7.82	12.96	15.20	7.63	1.651	0.046	0.028	24	10
800	8.65	14.33	16.81	8.43	1.825	0.053	0.032	28	11
900	9.45	15.65	18.36	9.21	1.993	0.059	0.036	31	12
1,000	10.22	16.94	19.87	9.97	2.157	0.066	0.040	34	14
1,100	10.98	18.19	21.34	10.71	2.317	0.072	0.044	38	15
1,200	11.72	19.42	22.78	11.43	2.473	0.079	0.048	41	16
1,300	12.45	20.62	24.19	12.14	2.626	0.086	0.052	45	18
1,400	13.16	21.80	25.57	12.83	2.776	0.092	0.056	48	19
1,500	13.86	22.96	26.93	13.51	2.924	0.099	0.060	52	20
1,600	14.54	24.10	28.26	14.18	3.069	0.105	0.064	55	22
1,700	15.22	25.22	29.58	14.84	3.211	0.112	0.068	59	23
1,800	15.89	26.32	30.87	15.49	3.352	0.118	0.072	62	24
Milk Production—Nutrients/lb of Milk of Different Fat Percentages									
(Fat %)									
3.0	0.29	0.49	0.56	0.280	0.078	0.0027	0.0017	—	—
3.5	0.31	0.52	0.60	0.301	0.084	0.0030	0.0018	—	—
4.0	0.33	0.56	0.64	0.322	0.090	0.0032	0.0020	—	—
4.5	0.36	0.60	0.69	0.343	0.096	0.0035	0.0021	—	—
5.0	0.38	0.63	0.73	0.364	0.101	0.0037	0.0023	—	—
5.5	0.40	0.67	0.77	0.385	0.107	0.0039	0.0024	—	—
Live Weight Change During Lactation—Nutrients/lb of Weight Change[c]									
Weight loss	−2.23	−3.74	−4.33	−2.17	−0.320	—	—	—	—
Weight gain	2.32	3.88	4.52	2.26	0.320	—	—	—	—

NOTE: The following abbreviations were used: NEL, net energy for lactation; ME, metabolizable energy; DE, digestible energy; TDN, total digestible nutrients.

[a]To allow for growth of young lactating cows, increase the maintenance allowances for all nutrients except vitamins A and D by 20 percent during the first lactation and 10 percent during the second lactation.

[b]Values for calcium assume that the cow is in calcium balance at the beginning of the last 2 months of gestation. If the cow is not in balance, then the calcium requirement can be increased from 25 to 33 percent.

[c]No allowance is made for mobilized calcium and phosphorus associated with live weight loss or with live weight gain. The maximum daily nitrogen available from weight loss is assumed to be 0.066 lb or 0.515 lb of crude protein.

Nutrient Requirements of Dairy Cattle

APPENDIX TABLE 4 Daily Nutrient Requirements of Lactating Cows Using Absorbable Protein

Live Weight (lb)	Fat (%)	Milk (lb)	Live Weight Change (lb)	Dry Matter Intake (lb)	Energy			Protein		Minerals	
					NELDM (Mcal/lb)	NEL (Mcal)	TDN (lb)	UIP (lb)	DIP (lb)	Ca (lb)	P (lb)
Intake at 100% of the Requirement for Maintenance, Lactation, and Weight Gain											
900	4.5	14.0	0.495	20.79	0.64	13.39	13.07	0.98	1.50	0.085	0.056
900	4.5	29.0	0.495	27.42	0.68	18.73	18.20	1.51	2.25	0.137	0.087
900	4.5	43.0	0.495	32.76	0.72	23.71	22.94	1.92	2.95	0.185	0.117
900	4.5	58.0	0.495	37.86	0.77	29.04	28.00	2.29	3.72	0.237	0.149
900	4.5	74.0	0.495	44.54	0.78	34.73	33.45	2.81	4.52	0.292	0.183
900	5.0	14.0	0.495	21.26	0.64	13.70	13.37	1.01	1.54	0.088	0.058
900	5.0	29.0	0.495	28.13	0.69	19.36	18.80	1.55	2.34	0.144	0.092
900	5.0	43.0	0.495	33.70	0.73	24.65	23.84	1.97	3.09	0.195	0.124
900	5.0	58.0	0.495	38.98	0.78	30.31	29.19	2.34	3.90	0.251	0.158
900	5.0	74.0	0.495	46.61	0.78	36.35	35.00	2.94	4.74	0.310	0.194
900	5.5	14.0	0.495	21.73	0.64	14.01	13.66	1.05	1.59	0.092	0.060
900	5.5	29.0	0.495	28.84	0.69	20.00	19.41	1.59	2.43	0.151	0.096
900	5.5	43.0	0.495	34.62	0.74	25.59	24.73	2.01	3.23	0.206	0.130
900	5.5	58.0	0.495	40.49	0.78	31.57	30.41	2.43	4.08	0.265	0.166
900	5.5	74.0	0.495	48.68	0.78	37.96	36.56	3.08	4.97	0.328	0.205
1,100	4.0	18.0	0.605	24.62	0.64	15.86	15.47	1.11	1.86	0.102	0.067
1,100	4.0	36.0	0.605	32.01	0.68	21.87	21.25	1.71	2.70	0.160	0.103
1,100	4.0	55.0	0.605	38.77	0.73	28.21	27.29	2.23	3.60	0.221	0.140
1,100	4.0	73.0	0.605	44.45	0.77	34.22	32.98	2.65	4.46	0.279	0.176
1,100	4.5	91.0	0.605	54.13	0.78	42.22	40.65	3.39	5.58	0.359	0.225
1,100	4.5	18.0	0.605	25.23	0.64	16.25	15.86	1.16	1.91	0.107	0.070
1,100	4.5	36.0	0.605	32.89	0.69	22.65	22.00	1.76	2.81	0.169	0.108
1,100	4.5	55.0	0.605	39.95	0.74	29.41	28.43	2.29	3.77	0.234	0.149
1,100	4.5	73.0	0.605	45.92	0.78	35.81	34.49	2.72	4.69	0.297	0.187
1,100	4.5	91.0	0.605	54.13	0.78	42.22	40.65	3.39	5.58	0.359	0.225
1,100	5.0	18.0	0.605	25.74	0.65	16.65	16.24	1.19	1.97	0.111	0.072
1,100	5.0	36.0	0.605	33.76	0.69	23.44	22.75	1.81	2.92	0.177	0.113
1,100	5.0	55.0	0.605	41.11	0.74	30.61	29.57	2.35	3.95	0.248	0.157
1,100	5.0	73.0	0.605	47.97	0.78	37.41	36.02	2.85	4.92	0.314	0.198
1,100	5.0	91.0	0.605	56.68	0.78	44.20	42.56	3.55	5.86	0.381	0.239
1,300	3.0	23.0	0.715	27.80	0.64	17.91	17.47	1.21	2.16	0.115	0.076
1,300	3.0	47.0	0.715	36.40	0.68	24.87	24.17	1.94	3.13	0.181	0.116
1,300	3.0	70.0	0.715	43.53	0.72	31.55	30.53	2.51	4.07	0.244	0.155
1,300	3.0	93.0	0.715	49.90	0.77	38.22	36.85	3.01	5.02	0.306	0.194
1,300	3.0	117.0	0.715	57.94	0.78	45.19	43.52	3.67	6.00	0.372	0.234
1,300	3.5	23.0	0.715	28.58	0.64	18.41	17.96	1.27	2.23	0.121	0.079
1,300	3.5	47.0	0.715	37.55	0.69	25.90	25.15	2.00	3.27	0.192	0.123
1,300	3.5	70.0	0.715	45.05	0.73	33.08	31.98	2.59	4.29	0.261	0.165
1,300	3.5	93.0	0.715	51.70	0.78	40.25	38.77	3.09	5.32	0.329	0.208
1,300	3.5	117.0	0.715	61.21	0.78	47.74	45.97	3.88	6.36	0.400	0.251
1,300	4.0	23.0	0.715	29.25	0.65	18.91	18.45	1.31	2.30	0.127	0.083
1,300	4.0	47.0	0.715	38.68	0.70	26.92	26.13	2.07	3.42	0.204	0.130
1,300	4.0	70.0	0.715	46.53	0.74	34.60	33.43	2.67	4.52	0.277	0.176
1,300	4.0	93.0	0.715	54.22	0.78	42.28	40.72	3.24	5.61	0.351	0.221
1,300	4.0	117.0	0.715	64.49	0.78	50.29	48.43	4.09	6.72	0.428	0.269
1,500	3.0	26.0	0.825	31.23	0.64	20.12	19.63	1.32	2.48	0.132	0.087
1,500	3.0	52.0	0.825	40.51	0.68	27.66	26.88	2.10	3.53	0.203	0.130
1,500	3.0	78.0	0.825	48.58	0.73	35.21	34.07	2.75	4.60	0.274	0.174
1,500	3.0	104.0	0.825	55.76	0.77	42.76	41.22	3.31	5.67	0.345	0.218
1,500	3.0	130.0	0.825	64.50	0.78	50.30	48.44	4.03	6.73	0.416	0.262
1,500	3.5	26.0	0.825	32.11	0.64	20.69	20.18	1.39	2.56	0.138	0.091
1,500	3.5	52.0	0.825	41.79	0.69	28.80	27.97	2.18	3.69	0.215	0.138
1,500	3.5	78.0	0.825	50.27	0.73	36.91	35.69	2.84	4.84	0.292	0.186
1,500	3.5	104.0	0.825	57.77	0.78	45.02	43.36	3.40	6.01	0.370	0.233
1,500	3.5	130.0	0.825	68.14	0.78	53.14	51.17	4.26	7.13	0.447	0.281
1,500	4.0	26.0	0.825	32.83	0.65	21.25	20.73	1.43	2.64	0.144	0.094

APPENDIX TABLE 4 Daily Nutrient Requirements of Lactating Cows Using Absorbable Protein—*Continued*

Live Weight (lb)	Fat (%)	Milk (lb)	Live Weight Change (lb)	Dry Matter Intake (lb)	Energy			Protein		Minerals	
					NELDM (Mcal/lb)	NEL (Mcal)	TDN (lb)	UIP (lb)	DIP (lb)	Ca (lb)	P (lb)
1,500	4.0	52.0	0.825	43.04	0.70	29.93	29.05	2.25	3.86	0.228	0.146
1,500	4.0	78.0	0.825	51.92	0.74	38.61	37.30	2.92	5.09	0.311	0.197
1,500	4.0	104.0	0.825	60.65	0.78	47.29	45.55	3.58	6.33	0.395	0.249
1,500	4.0	130.0	0.825	71.77	0.78	55.97	53.90	4.50	7.53	0.478	0.300
1,700	3.0	29.0	0.935	34.60	0.64	22.29	21.75	1.43	2.80	0.148	0.097
1,700	3.0	57.0	0.935	44.56	0.68	30.42	29.56	2.27	3.93	0.224	0.145
1,700	3.0	86.0	0.935	53.55	0.73	38.84	37.58	2.99	5.12	0.304	0.193
1,700	3.0	114.0	0.935	61.28	0.77	46.96	45.28	3.59	6.28	0.380	0.240
1,700	3.0	143.0	0.935	71.01	0.78	55.38	53.33	4.39	7.46	0.459	0.289
1,700	3.5	29.0	0.935	35.55	0.64	22.93	22.37	1.50	2.89	0.155	0.102
1,700	3.5	57.0	0.935	45.96	0.69	31.66	30.75	2.35	4.11	0.238	0.153
1,700	3.5	86.0	0.935	55.41	0.74	40.71	39.36	3.09	5.39	0.324	0.206
1,700	3.5	114.0	0.935	63.48	0.78	49.45	47.63	3.69	6.64	0.407	0.257
1,700	3.5	143.0	0.935	75.01	0.78	58.50	56.33	4.65	7.90	0.494	0.311
1,700	4.0	29.0	0.935	36.35	0.65	23.56	22.98	1.55	2.98	0.162	0.106
1,700	4.0	57.0	0.935	47.33	0.70	32.91	31.94	2.43	4.29	0.252	0.161
1,700	4.0	86.0	0.935	57.22	0.74	42.59	41.14	3.18	5.67	0.345	0.219
1,700	4.0	114.0	0.935	66.60	0.78	51.94	50.02	3.88	7.00	0.435	0.274
1,700	4.0	143.0	0.935	79.01	0.78	61.62	59.34	4.91	8.34	0.528	0.332
				Intake at 85% of the Requirement for Maintenance and Lactation							
900	4.5	43.0	−1.516	25.31	0.76	19.18	18.49	1.47	2.32	0.185	0.117
900	4.5	58.0	−1.875	31.30	0.76	23.71	22.87	2.08	2.93	0.237	0.149
900	4.5	74.0	−2.257	37.69	0.76	28.55	27.53	2.76	3.58	0.292	0.183
900	5.0	43.0	−1.579	26.37	0.76	19.97	19.26	1.54	2.43	0.195	0.124
900	5.0	58.0	−1.960	32.72	0.76	24.79	23.91	2.20	3.08	0.251	0.158
900	5.0	74.0	−2.366	39.50	0.76	29.92	28.86	2.92	3.77	0.310	0.194
900	5.5	43.0	−1.642	27.42	0.76	20.77	20.03	1.62	2.54	0.206	0.130
900	5.5	58.0	−2.045	34.14	0.76	25.86	24.94	2.32	3.23	0.265	0.166
900	5.5	74.0	−2.474	41.31	0.76	31.29	30.18	3.08	3.96	0.328	0.205
1,100	4.0	55.0	−1.802	30.08	0.76	22.79	21.98	1.78	2.83	0.221	0.140
1,100	4.0	73.0	−2.206	36.82	0.76	27.89	26.90	2.51	3.51	0.279	0.176
1,100	4.5	91.0	−2.743	45.79	0.76	34.69	33.46	3.43	4.43	0.359	0.225
1,100	4.5	55.0	−1.882	31.43	0.76	23.81	22.96	1.90	2.97	0.234	0.149
1,100	4.5	73.0	−2.313	38.61	0.76	29.25	28.21	2.67	3.70	0.297	0.187
1,100	4.5	91.0	−2.743	45.79	0.76	34.69	33.46	3.43	4.43	0.359	0.225
1,100	5.0	55.0	−1.963	32.77	0.76	24.83	23.94	2.02	3.11	0.248	0.157
1,100	5.0	73.0	−2.420	40.40	0.76	30.60	29.52	2.82	3.88	0.314	0.198
1,100	5.0	91.0	−2.877	48.02	0.76	36.38	35.09	3.63	4.66	0.381	0.239
1,300	3.0	70.0	−2.009	33.54	0.76	25.40	24.50	2.04	3.19	0.244	0.155
1,300	3.0	93.0	−2.458	41.03	0.76	31.08	29.97	2.88	3.95	0.306	0.194
1,300	3.0	117.0	−2.926	48.84	0.76	37.00	35.68	3.75	4.74	0.372	0.234
1,300	3.5	70.0	−2.112	35.25	0.76	26.70	25.75	2.19	3.37	0.261	0.165
1,300	3.5	93.0	−2.594	43.30	0.76	32.80	31.64	3.07	4.19	0.329	0.208
1,300	3.5	117.0	−3.097	51.71	0.76	39.17	37.78	3.99	5.04	0.400	0.251
1,300	4.0	70.0	−2.214	36.96	0.76	28.00	27.01	2.34	3.55	0.277	0.176
1,300	4.0	93.0	−2.730	45.58	0.76	34.53	33.30	3.27	4.42	0.351	0.221
1,300	4.0	117.0	−3.269	54.57	0.76	41.34	39.87	4.24	5.34	0.428	0.269
1,500	3.0	78.0	−2.238	37.36	0.76	28.30	27.30	2.28	3.60	0.274	0.174
1,500	3.0	104.0	−2.745	45.83	0.76	34.71	33.48	3.23	4.46	0.345	0.218
1,500	3.0	130.0	−3.252	54.29	0.76	41.13	39.67	4.17	5.31	0.416	0.262
1,500	3.5	78.0	−2.352	39.27	0.76	29.75	28.69	2.45	3.80	0.292	0.186
1,500	3.5	104.0	−2.897	48.37	0.76	36.64	35.34	3.45	4.72	0.370	0.233
1,500	3.5	130.0	−3.443	57.48	0.76	43.54	41.99	4.45	5.64	0.447	0.281
1,500	4.0	78.0	−2.467	41.18	0.76	31.19	30.09	2.62	4.00	0.311	0.197
1,500	4.0	104.0	−3.050	50.92	0.76	38.57	37.20	3.67	4.99	0.395	0.249
1,500	4.0	130.0	−3.633	60.66	0.76	45.95	44.32	4.72	5.98	0.478	0.300

Continues

Nutrient Requirements of Dairy Cattle

APPENDIX TABLE 4 Daily Nutrient Requirements of Lactating Cows Using Absorbable Protein—*Continued*

Live Weight (lb)	Fat (%)	Milk (lb)	Live Weight Change (lb)	Dry Matter Intake (lb)	Energy			Protein		Minerals	
					NELDM (Mcal/lb)	NEL (Mcal)	TDN (lb)	UIP (lb)	DIP (lb)	Ca (lb)	P (lb)
1,700	3.0	86.0	−2.464	41.14	0.76	31.17	30.06	2.53	4.01	0.304	0.193
1,700	3.0	114.0	−3.011	50.26	0.76	38.07	36.72	3.54	4.93	0.380	0.240
1,700	3.0	143.0	−3.576	59.70	0.76	45.23	43.62	4.59	5.88	0.459	0.289
1,700	3.5	86.0	−2.590	43.25	0.76	32.76	31.60	2.71	4.23	0.324	0.206
1,700	3.5	114.0	−3.178	53.05	0.76	40.19	38.76	3.79	5.22	0.407	0.257
1,700	3.5	143.0	−3.786	63.20	0.76	47.88	46.18	4.90	6.25	0.494	0.311
1,700	4.0	86.0	−2.717	45.35	0.76	34.36	33.14	2.89	4.45	0.345	0.219
1,700	4.0	114.0	−3.345	55.84	0.76	42.30	40.80	4.03	5.51	0.435	0.274
1,700	4.0	143.0	−3.996	66.71	0.76	50.53	48.74	5.20	6.61	0.528	0.332

NOTE: The following abbreviations were used: NELDM, net energy for lactation/lb of dry matter; NEL, net energy for lactation; TDN, total digestible nutrients; UIP, undegraded intake protein; DIP, degraded intake protein.

APPENDIX TABLE 5 Recommended Nutrient Content of Diets for Dairy Cattle

Cow Wt (lb)	Fat (%)	Wt Gain (lb/d)	Lactating Cow Diets: Milk Yield (lb/d)				
900	5.0	0.50	14	29	43	58	74
1,100	4.5	0.60	18	36	55	73	91
1,300	4.0	0.72	23	47	70	93	117
1,500	3.5	0.82	26	52	78	104	130
1,700	3.5	0.94	29	57	86	114	143

	Lactating Cow Diets					Early Lactation (wks 0–3)	Dry Pregnant Cows	Calf Milk Replacer	Calf Starter Mix	Growing Heifers and Bulls[a] 3–6 Mos	6–12 Mos	>12 Mos	Mature Bulls	Maximum Tolerable Levels[b,c]
Energy														
NEL, Mcal/lb	0.65	0.69	0.73	0.78	0.78	0.76	0.57	—	—	—	—	—	—	—
NEM, Mcal/lb	—	—	—	—	—	—	—	1.09	0.86	0.77	0.72	0.63	0.52	—
NEG, Mcal/lb	—	—	—	—	—	—	—	0.70	0.54	0.49	0.44	0.37	—	—
ME, Mcal/lb	1.07	1.16	1.25	1.31	1.31	1.27	0.93	1.71	1.41	1.18	1.12	1.03	0.91	—
DE, Mcal/lb	1.26	1.35	1.44	1.50	1.50	1.46	1.12	1.90	1.60	1.37	1.31	1.22	1.10	—
TDN, % of DM	63	67	71	75	75	73	56	95	80	69	66	61	55	—
Protein equivalent														
Crude protein, %	12	15	16	17	18	19	12	22	18	16	12	12	10	—
UIP, %	4.5	5.4	5.7	6.0	6.3	7.2	—	—	—	8.2	4.3	2.1	—	—
DIP, %	7.9	8.8	9.7	10.4	10.4	9.7	—	—	—	4.6	6.4	7.2	—	—
Fiber content (min.)[d]														
Crude fiber, %	17	17	17	15	15	17	22	—	—	13	15	15	15	—
Acid detergent fiber, %	21	21	21	19	19	21	27	—	—	16	19	19	19	—
Neutral detergent fiber, %	28	28	28	25	25	28	35	—	—	23	25	25	25	—
Ether extract (min.), %	3	3	3	3	3	3	3	10	3	3	3	3	3	—
Minerals														
Calcium, %	0.43	0.53	0.60	0.65	0.66	0.77	0.39[e]	0.70	0.60	0.52	0.41	0.29	0.30	2.00
Phosphorus, %	0.28	0.34	0.38	0.42	0.41	0.49	0.24	0.60	0.40	0.31	0.30	0.23	0.19	1.00
Magnesium, %[f]	0.20	0.20	0.20	0.25	0.25	0.25	0.16	0.07	0.10	0.16	0.16	0.16	0.16	0.50
Potassium, %[g]	0.90	0.90	0.90	1.00	1.00	1.00	0.65	0.65	0.65	0.65	0.65	0.65	0.65	3.00
Sodium, %	0.18	0.18	0.18	0.18	0.18	0.18	0.10	0.10	0.10	0.10	0.10	0.10	0.10	—
Chlorine, %	0.25	0.25	0.25	0.25	0.25	0.25	0.20	0.20	0.20	0.20	0.20	0.20	0.20	—
Sulfur, %	0.20	0.20	0.20	0.20	0.20	0.25	0.16	0.29	0.20	0.16	0.16	0.16	0.16	0.40
Iron, ppm	50	50	50	50	50	50	50	100	50	50	50	50	50	1,000
Cobalt, ppm	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	10.00
Copper, ppm[h]	10	10	10	10	10	10	10	10	10	10	10	10	10	100
Manganese, ppm	40	40	40	40	40	40	40	40	40	40	40	40	40	1,000
Zinc, ppm	40	40	40	40	40	40	40	40	40	40	40	40	40	500
Iodine, ppm[i]	0.60	0.60	0.60	0.60	0.60	0.60	0.25	0.25	0.25	0.25	0.25	0.25	0.25	50.00[j]
Selenium, ppm	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	2.00
Vitamins[k]														
A, IU/lb	1,450	1,450	1,450	1,450	1,450	1,800	1,800	1,700	1,000	1,000	1,000	1,000	1,450	30,000
D, IU/lb	450	450	450	450	450	450	540	270	140	140	140	140	140	4,500
E, IU/lb	7	7	7	7	7	7	7	18	11	11	11	11	7	900

NOTE: The values presented in this table are intended as guidelines for the use of professionals in diet formulation. Because of the many factors affecting such values, they are not intended and should not be used as a legal or regulatory base.

[a]The approximate weight for growing heifers and bulls at 3–6 mos is 331 lb; at 6–12 mos, it is 559 lb; and at more than 12 mos, it is 881 lb. The approximate average daily gain is 1.543 lb/day.

[b]The maximum safe levels for many of the mineral elements are not well defined and may be substantially affected by specific feeding conditions. Additional information is available in *Mineral Tolerance of Domestic Animals* (NRC, 1980).

[c]Vitamin tolerances are discussed in detail in *Vitamin Tolerance of Animals* (NRC, 1987b).

[d]It is recommended that 75 percent of the NDF in lactating cow diets be provided as forage. If this recommendation is not followed, a depression in milk fat may occur.

[e]The value for calcium assumes that the cow is in calcium balance at the beginning of the dry period. If the cow is not in balance, then the dietary calcium requirement should be increased by 25 to 33 percent.

[f]Under conditions conducive to grass tetany (see text), magnesium should be increased to 0.25 or 0.30 percent.

[g]Under conditions of heat stress, potassium should be increased to 1.2 percent (see text).

[h]The cow's copper requirement is influenced by molybdenum and sulfur in the diet (see text).

[i]If the diet contains as much as 25 percent strongly goitrogenic feed on a dry basis, the iodine provided should be increased two times or more.

[j]Although cattle can tolerate this level of iodine, lower levels may be desirable to reduce the iodine content of milk.

[k]The following minimum quantities of B-complex vitamins are suggested per unit of milk replacer: niacin, 2.6 ppm; pantothenic acid, 13 ppm; riboflavin, 6.5 ppm; pyridoxine, 6.5 ppm; folic acid, 0.5 ppm; biotin, 0.1 ppm; vitamin B_{12}, 0.07 ppm; thiamin, 6.5 ppm; and choline, 0.26 percent. It appears that adequate amounts of these vitamins are furnished when calves have functional rumens (usually at 6 weeks of age) by a combination of rumen synthesis and natural feedstuffs.

FEEDING DAIRY CATTLE

AG 310 - D

ASSIGNMENT SHEET #1--BALANCE A DAIRY CATTLE RATION

Name_____ Score_____

(Note: A review of how to balance a ration may be necessary before completing this assignment sheet. Information can be found in unit AG 530-I--Feeding Livestock.)

Using the feeds listed, balance a ration for dry matter, protein and total digestible nutrients for a dairy cow having the nutrient requirements listed in the chart. Figure nutrient requirements on a dry matter basis and then convert them to an as-fed basis as the final step after balancing the ration. Use 12.05 lbs of corn silage on a dry matter basis.

(Note: The following ration would also need supplemental calcium, phosphorus and trace mineral salt.)

Requirements for a medium producing 1,300 - to - 1,400 lb cow
(all feeds are in lbs)

Dry Matter	Crude Protein	TDN	Calcium	Phosphorus
36-40	5.5-5.8	25.5-26.2	.20-.24	.16

Worksheet (dry matter basis--lbs)

Feeds (dry matter basis)	Dry Matter--lbs	Crude Protein--lbs	TDN--lbs
Alfalfa 17% CP, 56% TDN			
Corn silage 8% CP, 66% TDN	12.05		
Corn 10.2% CP, 91% TDN			
Protein supplement 49% CP, 86% TDN			
Totals			

Converting to as-fed basis:

Feeds	Dry Matter Content	Pounds of feed actually needed
Alfalfa	89.2	_____
Corn silage	28	_____
Corn	89	_____
Protein supplement	90	_____

FEEDING DAIRY CATTLE

AG 310 - D

ASSIGNMENT SHEET #2--DEVELOP A FEEDING PROGRAM FOR A DAIRY HERD

Name_____ Score_____

Effective feeding programs depend on production goals, herd size, type of operation, geographic location and feed availability.

Develop a feeding program for a dairy herd of an appropriate size for your area. Decide on the type of roughages and concentrates to be used. Also choose the mineral, vitamin and protein supplement needed. Choose these feeds based on cost and availability. Include in your program the ration used for the cow herd at different production levels and lactation times and also appropriate rations for replacement heifers and young calves.

Size of herd:

Roughages used:

Concentrates used:

Protein supplements used:

Mineral and vitamin supplements used:

Ration for the cow herd:

Ration for replacement heifers:

Ration for calves:

FEEDING DAIRY CATTLE

AG 310 - D

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

Feeds	Dry Matter--lbs	Crude Protein--lbs	TDN--lbs
Alfalfa	12.05	2.05	6.75
Corn silage	12.05	.96	7.95
Corn	10.1	1.03	9.19
Protein supplement	3.1	1.52	2.67
Totals	37.3	5.56	26.56

As-fed basis

Feeds	Pounds of feed actually needed
Alfalfa	13.5
Corn silage	43.0
Corn	11.3
Protein supplement	3.4

Assignment Sheet #2

Completed to the satisfaction of the instructor.

FEEDING DAIRY CATTLE

AG 310 - D

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a. Protein substance in the blood that protects against disease

_____b. Length of time a cow remains in herd

_____c. A nutritional disease occurring at calving caused by a calcium-phosphorus imbalance

_____d. Net energy value used for maintenance and milk production in lactating cows

_____e. Flavor of the feed

_____f. Total digestible nutrients

_____g. Low moisture silage made from legumes and/or grasses; 35-50% moisture content

_____h. Fat found in milk composed of short-chain fatty acids; contains vitamin A

_____i. Dry forage; 10-25% moisture content

_____j. Energy left in feeds after energy used in digestion has been subtracted

_____k. Nutrient supplying most of the energy needs for animals; usually easily digested and absorbed

_____l. Grain containing between 24-40% moisture and stored in an air-tight silo

_____m. Secreting milk

_____n. Fermented forage plants usually ensiled at 60-67% moisture content

_____o. Dairy disease caused by high milk production in which cow is forced to use body fat to supply production demands

1. Milk fever
2. Lactating
3. Ketosis
4. Milk fat
5. NE
6. Palatability
7. Protein
8. Carbohydrate
9. Pre-mix
10. Haylage
11. Lignin
12. Replacement heifers
13. Longevity
14. Antibody
15. Colostrum
16. NE_{lac}
17. Hay
18. Fiber
19. TDN
20. High moisture grain
21. Silage

_____p. First "milk" of a cow after calving, high in nutrients and antibodies

_____q. Nutrient made up of chains of amino acids which contain nitrogen; "building blocks" of muscles

_____r. Young females being raised to remain in the herd as cows

_____s. Feed purchased already combined in set amounts to provide a specified nutritional content

_____t. Non-digestible portion of fiber that provides the "bulk" necessary for dairy animals

_____u. Carbohydrate with a digestibility of less than 50%

2. List the seven nutritional areas of concern when balancing a dairy cattle ration.

a. _____ e. _____

b. _____ f. _____

c. _____ g. _____

d. _____

3. Describe four advantages of using pastures for dairy cattle feed.

a. _____

b. _____

c. _____

d. _____

4. Describe three reasons pastures are becoming less important in commercial dairy herds.

a. _____

b. _____

c. _____

5. Select advantages of good quality hay for dairy feed by placing an "X" in front of those advantages.

   _____ a. Has no effect on milk fat levels

   _____ b. Helps maintain proper digestion

   _____ c. Provides relatively inexpensive nutrients

   _____ d. Provides a good source of selenium

6. Describe four characteristics of good quality hay.

   a. _____

   b. _____

   c. _____

   d. _____

7. Describe the effects of poor quality hay on milk production and grain requirements.

   a. _____

   b. _____

   c. _____

8. Compare high quality alfalfa hay to corn silage in each of the areas listed.

   a. TDN content _____

   b. Protein content _____

   c. Feeding rate _____

9. Select the main advantages of using silage by placing an "X" in front of those advantages.

   _____a. Retains between 60 and 70% of crop feed value

   _____b. Can be harvested in relatively wet weather

   _____c. Storage facilities are much cheaper to build

   _____d. Produces a comparable amount of TDN per acre, but is quicker than other methods

   _____e. Requires less storage space per pound of TDN than hay

   _____f. Improves utilization of by-products and other feeds with low palatability

10. Distinguish between advantages of corn silage and grass silage by putting "corn" or "grass" in front of the appropriate advantage.

_____a. Produced in shorter and cooler growing seasons

_____b. More palatable

_____c. Higher in TDN

_____d. Higher in protein

_____e. Can be used for summer feeding by ensiling first cutting

_____f. Generally yields better

_____g. Easier to produce higher quality silage more consistently than the other

11. Name five types of silos.

a. _____ d. _____

b. _____ e. _____

c. _____

12. Name the most common grains fed to dairy cattle.

a. _____ c. _____

b. _____ d. _____

13. Name two of the most common protein supplement sources for dairy cattle in the western United States.

a. _____ b. _____

14. Describe four reasons for taking precautions when feeding by-products.

a. _____

b. _____

c. _____

d. _____

15. Name two ways minerals can be fed.

a. _____

b. _____

16. Select three minerals most commonly fed to dairy cattle by placing an "X" in the appropriate blanks.

_____a. Iron

_____b. Phosphorus

_____c. Potassium

_____d. Salt

_____e. Calcium

_____f. Magnesium

17. Name the vitamin most likely to be deficient in dairy cattle. _____

18. List five types of information necessary to successfully balance a ration.

a. _____

b. _____

c. _____

d. _____

e. _____

19. Name four ways to process grain.

a. _____ c. _____

b. _____ d. _____

20. Describe the effects the following methods of processing hay have on dairy cattle.

a. Fine grinding _____

b. Cubing _____

21. List the minimum requirements for a lactating cow for roughage and crude fiber.

a. Crude fiber _____ %

b. Roughage _____ pounds per 100 pounds of body weight

22. State one general rule of thumb used to determine the amount of concentrate to feed large dairy breeds.

Feed (a) _____ pounds of grain for each (b) _____

pounds of milk above a base of (c) _____ pounds of milk

23. Match the four phases of a dairy cow's feeding period to their proper descriptions. Write the number of the correct phase in the blank.

_____a.	Maximum level of feed intake reached	1.	Phase 1; first 10 weeks after calving
_____b.	Time for feeding calf and restoring body reserves	2.	Phase 2; second 10 weeks after calving
_____c.	Rapidly increasing milk production; cow must draw on body reserves to maintain production	3.	Phase 3; last half of lactation
		4.	Phase 4; dry period
_____d.	Milk production is decreasing		

24. Describe challenge feeding.

_____

_____

_____

25. Describe group feeding.

_____

_____

_____

26. Match the feedstuffs on the right to the time they should be fed by writing the correct number of the feedstuff in the blank.

_____a.	Once or twice a day; after milking	1.	Hay
_____b.	Twice a day	2.	Silage
_____c.	Always readily available	3.	Grain
_____d.	Generally free choice at all times	4.	Water

27. Describe general feeding tips for dry cows.

_____

_____

_____

_____

_____

28. Describe five advantages of properly feeding dry cows.

a. _____ d. _____

b. _____ e. _____

c. _____

29. Describe general feeding tips for feeding replacement heifers during the two stages listed.

a. Under 6 months or 400 lbs _____

_____

_____

b. Six months to breeding age _____

_____

_____

30. Match the dairy cows at different stages of production listed on the right to an appropriate sample ration by writing the correct number of the stage in the blank.

_____a.	27 lbs of alfalfa; 10 lbs of corn; Ca, P; and trace mineral salt	1. High producing cows in early lactation
_____b.	21.5 lbs of alfalfa; 16.9 lbs of corn; 4.6 lbs of 44% protein supplement; Ca, P; and trace mineral salt	2. Medium producing cows in mid-lactation
_____c.	26.3 lbs of alfalfa; 13.2 lbs of corn; Ca, P; and trace mineral salt	3. Low producing cows in late lactation
_____d.	7 lbs of alfalfa; 18 lbs grass hay; 1 lb 44% protein supplement; Ca, P; and trace mineral salt	4. Dry cows

31. Describe the timing involved in feeding colostrum and the reasons for that timing.

_____

_____

_____

_____

_____

_____

32. Match the age on the right to the ration that best fits that age in a calf feeding program. (Note: In some cases there is more than one correct answer, but pick the age that best fits the description.)

_____a.	Start to wean and increase calf starter	1.	Day 1
_____b.	Start good, leafy hay and a calf starter with 80% TDN and 21% protein	2.	Days 1 to 4
_____c.	Feed milk replacer or milk	3.	Days 5 to 30
_____d.	Allow calf to nurse	4.	Day 10
_____e.	Hand feed colostrum or allow calf to nurse	5.	Day 21
_____f.	Switch to starter ration with 75% TDN and 14% protein	6.	Months 1 to 5
_____g.	Feed calf starter and hay free choice	7.	Month 5

FEEDING DAIRY CATTLE

AG 310 - D

ANSWERS TO TEST

1.

a.	14	g.	10	m.	2	s.	9
b.	13	h.	4	n.	21	t.	11
c.	1	i.	17	o.	3	u.	18
d.	16	j.	5	p.	15		
e.	6	k.	8	q.	7		
f.	19	l.	20	r.	12		

2. Dry matter intake; Phosphorus; Crude protein; Fiber; TDN; Trace mineral salt; Calcium

3. Answer should include four of the following:

   Lowers feed costs; Lessens chance of nutritional deficiencies; Lessens disease spread; Lowers building costs; Increases flexibility; Improves reproduction; Provides outlet for manure

4. Answer should include three of the following:

   Increases land requirements; Limits expansion; Does not provide enough dry matter and therefore energy to maintain high production; Decreases feed efficiency; Increases variability in production and growth; Increases worm problems

5. b, c

6. Answer should include four of the following:

   Cut at an early maturity--1/10 bloom; Leafy; Bright green; Free from mold or dust; Pleasant aroma

7. Lowers milk production; Lowers hay consumption; Increases grain requirements

8. a. Corn silage has 11% more TDN than hay (dry matter basis)
   b. Corn silage has slightly over one-fourth the protein of hay (dry matter basis)
   c. Feed 3 lbs of silage to 1 lb of hay (as-fed basis)

9. b, e, f

10.

a.	Grass	e.	Grass
b.	Corn	f.	Corn
c.	Corn	g.	Corn
d.	Grass		

11. Tower; Horizontal; Oxygen-limiting; Temporary; Pit

12. Corn; Oats; Barley; Three-way mix (wheat, barley and oats)

13. Answer should include two of the following:

    Soybean meal; Cottonseed meal; Whole soybean, whole cottonseed; Alfalfa

14. Widely varying nutrient value; Possible low palatability; Possible pesticide contaminations; Possible presence of toxic substances

15. Free choice; Mixed with ration

16. b, d, e

17. Vitamin A

18. Feeds available; Nutrient values of feeds; Feed costs; Nutritional levels needed to meet production goals; Other requirements or limitations such as minimum fiber

19. Fine grinding; Steam rolling; Coarse grinding; Pelleting

20. a. Lowers fat content in milk; increases digestion problems
    b. May increase production and does not affect butterfat content

21. a. 17 b. 1 - 1 1/2

22. a. 1 b. 2 c. 20 to 30

23. a. 2 b. 4 c. 1 d. 3

24. Cow is challenged to produce more milk by increasing concentrates before freshening; Grain is then increased until production no longer increases; Grain amounts are then adjusted according to milk production

25. Cows are divided into groups based on production and then are fed together in feed bunks; Little or no grain is fed in the milking parlor

26. a. 2 b. 3 c. 4 d. 1

27. Roughages should be the main feed so that the digestive system can recover; Grass hay is best and silage can also be fed to keep calcium levels down during the dry period; Weight gain is desirable during this time, but the cow must not get fat; Graining should be started or increased 2 weeks prior to calving and should be limited to not more than 1% of body weight

28. Increased milk production; Healthier calves; Better conception rate; Increased herd longevity; Fewer calving problems

29. a. Feed high quality forage with very little or no high moisture forages; Supplement with 3 to 5 lbs of grain
    b. Feed adequate forages; Grain 2 weeks before breeding

30. a. 3 b. 1 c. 2 d. 4

31. Feed at least 1 quart within 2 hours and 1 gallon within 24 hours; Calves have no natural disease protection at birth and colostrum contains the antibodies necessary to provide this protection; These antibodies can only be absorbed for the first 24 hours of life

32. a. 5 d. 1 g. 6
    b. 4 e. 2
    c. 3 f. 7

DAIRY CATTLE MANAGEMENT

AG 310 - E

UNIT OBJECTIVE

After completion of this unit, students should be able to describe dairy cattle management techniques involved in housing, breeding, disease prevention, manure handling and milk production. Students should also be able to fill out and obtain information from records used in managing dairy herds. This knowledge will be demonstrated by the completion of assignment sheets and unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with dairy cattle management to their definitions.
2. Describe four factors responsible for the overall increase in milk production in the United States.
3. Describe sanitation and disease control and prevention associated with dairy cattle production.
4. Describe two tips for handling dairy bulls.
5. Select guidelines for facilities for housing dairy bulls.
6. Describe five conditions that could keep a bull from being an effective breeder.
7. Select guidelines for housing calves.
8. Distinguish between the two types of housing systems for dairy cattle.
9. Label six types of milking parlor arrangements.
10. Describe four advantages of paved lots.
11. Write the age and weight at which a heifer can be bred.
12. Describe the relationship between age of freshening and lifetime milk production.
13. Select steps to take when acquiring new stock.
14. List the primary diseases which should be vaccinated against in Idaho dairy cattle at various stages.
15. Describe why, when and how extra teats should be removed.
16. Describe six parts of a program to prevent mastitis.
17. Describe three tests for mastitis and describe how mastitis should be treated.

18. List in order the steps involved in milk letdown.
19. Describe a procedure for milking.
20. Describe how to dry off cows.
21. Match milk flavors to their cause and prevention.
22. Describe four types of manure based on moisture content.
23. Match three systems of manure handling to appropriate descriptions of those systems.
24. List six factors used to classify milk in Idaho.
25. Name five adjustments that can affect the basic milk price.
26. Name four methods of dairy cattle identification.
27. Describe the goal of production records.
28. Name the three basic types of records kept on dairy cattle.
29. Describe the four main testing programs for dairy cattle.
30. List six types of information recorded on DHIA cow herd records.
31. Describe the four adjustments necessary to compare milk production records.
32. Identify information from a DHIA monthly herd summary and an individual cow record.
33. Sketch the layout of a basic dairy cattle operation.
34. Design a manure handling system.

DAIRY CATTLE MANAGEMENT

AG 310 - E

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

A. Make transparencies and necessary copies of material.

B. Provide students with objective sheet and discuss.

C. Provide students with information and discuss.

D. Provide students with assignment sheets.

E. Obtain and display pictures and plans for different kinds of dairy facilities and equipment.

F. Obtain copies of DHIA forms for all the students, preferably forms used in the local area.

G. Obtain copies of sire summaries from local AI companies.

H. Arrange for a veterinarian to speak to the class about an overall dairy herd-health program, including local diseases to vaccinate against and precautions to take when acquiring new cattle.

I. Arrange for a state health inspector to speak on health regulations for dairies.

J. Locate and review magazine articles and other publications on manure handling systems.

(Note: The Canada Animal Manure Management Guide, Publication 1534 is available from Information Services, Agriculture Canada, Ottawa K1A OC7. The Hoard's Dairyman booklet referred to in the unit reference section also has information on this topic.)

K. Obtain and show a film on how milk is processed into cheese and other dairy products.

(Note: Select Sires has had such a film available.)

L. Arrange for a county agent or extension dairy specialist to demonstrate the computer program for balancing dairy rations.

M. Have students form a panel for discussing the effects of the advertising program of the dairy associations in the U.S.

N. Review and give test.

O. Reteach and retest if necessary.

II. Instructional materials

A. Objective sheet

B. Suggested activities

C. Information sheet

D. Transparency masters

1. TM 1--Milking Parlor Arrangements

2. TM 2--Methods for Handling Manure

E. Assignment sheets

1. AS 1--Identify Information From a DHIA Monthly Herd Summary and an Individual Cow Record

2. AS 2--Sketch the Layout of a Basic Dairy Cattle Operation

3. AS 3--Design a Manure Handling System

F. Answers to assignment sheets

G. Test

H. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

C. Ensminger, M.E., *Dairy Cattle Science*. The Interstate Printers and Publishers, Inc., Danville, Illinois, 1980.

D. Miron, A.E., *GTA Dairy Guide*. GTA Feed Division, Sioux Falls, South Dakota, 1979.

E. Mix, Lewellyn S. and Hoglund, C. Raymond, *Chore Reduction For Free Stall Dairy Systems*. Hoard's Dairyman, Fort Atkinson, Wisconsin, 1978.

DAIRY CATTLE MANAGEMENT

AG 310 - E

INFORMATION SHEET

I. Terms and definitions

A. Milk--A secretion of a cow's udder, free from colostrum, obtained by the complete milking of one or more healthy cows, which contains not less than 8 1/2% milk solids-not-fat and not less than 3 1/4% milk fat

(Note: This is the official definition used by the Idaho Department of Health.)

B. Milk substitute--Replaces milk as a feed for very young calves; usually powdered and requires mixing with water

C. Alveoli--Small bulb-shaped structures responsible for transforming nutrients from the blood into milk

(Note: There are approximately one million alveoli in each cubic inch of udder tissue.)

D. Oxytocin--Hormone that causes muscle contractions around the alveoli and therefore causes milk letdown

E. Adrenalin--Hormone that interferes with milk letdown

F. Bacteria--Microscopic organisms of which some types are involved in milk spoilage and others in the manufacture of some milk products such as cheese

G. Antibiotic--Substance which prevents or slows the growth of microorganisms, many of which cause disease

(Note: This explains why antibiotics control disease, but also can destroy those microorganisms necessary in the making of some milk products such as cheese.)

H. Vaccination--Giving an animal a mild dose of a bacteria or virus of a particular disease to protect the animal against that disease

(Note: This causes the animal to build defenses against the disease.)

I. Mastitis--A disease of the udder causing swelling and irritation of the mammary glands

J. Freshening--Coming into milk after calving

K. Intermittent milking--Milking off and on to allow a gradual drying up of the udder

L. Stanchion--Locking headgate for restraining dairy animals

M. USDA--United States Department of Agriculture

N. DHIA--Dairy Herd Improvement Association

O. DHIR--Dairy Herd Improvement Registry

P. Mature equivalent--Adjusted production of young dairy cows reflecting their probable milk production as mature cows; used in DHIA records for comparing cows of different ages

Q. Milk-feed price ratio--A comparison of the selling price of milk to the cost of the feed necessary to produce that milk

Example: The milk-feed price ratio for a particular year was 1.5 to 1. This means milk sold for 1 1/2 times the cost of the feed used to produce it

II. Factors responsible for the increased milk production in the United States

A. Better feeding and management

B. Increased use of high quality bulls through artificial insemination

(Note: Artificial insemination is currently used on well over half the dairy cows and heifers in the United States and in 90% of the dairy herds.)

C. Better selection of high producing cows

(Note: Better records have aided this trend.)

D. More rigid culling of low producing cows

III. Sanitation and disease control and prevention

A. Keep cows clean at milking time, especially flanks and udders

B. Keep yards clean and well-drained

C. Barn floor kept clean, made of concrete

D. Utensils/milking equipment made of stainless steel or tinned iron, clean, good condition

E. Milk room

1. Concrete, sloped floor

2. Screened and ventilated

3. Separated from barn

4. Hot water, wash and rinse vats

5. Tank for cooling and storing milk

IV. Handling dairy bulls

A. Use caution; always keep safety in mind

B. Use a nose ring

V. Guidelines for facilities for housing dairy bulls

A. Strongly constructed

B. Located away from other animals

C. At least a 12-foot-square stall

D. Adequate exercise area

E. Constructed so feeding and watering can be done from outside pen

VI. Conditions that could keep a bull from being an effective breeder

A. Poor semen

B. Physical defects or injuries

C. Excitement or inappropriate handling

D. Diseases

E. Lack of exercise

F. Improper feeding

G. Overworking

H. Using a young bull on too many or too large of cows

VII. Guidelines for housing calves

A. House separately until at least 1 week after discontinuing milk or milk substitute

B. House in dry, draft free areas with good ventilation

VIII. Basic types of housing systems for dairy cattle

A. Confinement stall housing

1. Each cow is tied or stanchioned in an individual stall

2. Animals are either facing out with a common center alley or facing in with a common feeding area

3. Allows for better control and display of animals

4. Higher labor requirement

5. Higher housing expense

B. Loose housing

1. Cows are either provided free stalls or housed in a common, open area

(Note: Most dairies have some kind of free stall system.)

2. Lower labor requirement

3. Lower housing expense

4. Less leg and udder injuries

5. Most popular system

IX. Milking parlor arrangement (Transparency 1)

A. Rotary tandem

B. Side opening

C. Double herringbone

D. Rotary herringbone

E. Polygon herringbone

F. Turnstyle

X. Advantages of paved lots

A. Less time and labor required

B. Less waste of feed and bedding

C. Less disease because of better sanitation

D. Higher production because of increased animal comfort

XI. Age and weight to breed dairy heifers

A. Age--14 to 15 months

B. Weight

(Note: Weight is the most important guide as reproductive maturity is much more dependent on weight than size.)

1. Holstein and Brown Swiss--700 pounds

(Note: Heifers of these large breeds should be fed to gain 1.5 to 1.75 pounds per day up to breeding age.)

2. Guernsey and Aryshire--500 pounds

3. Jersey--400 pounds

XII. Heifers freshening at a young age (22-24 months) have a higher average lifetime production than heifers freshening later

XIII. Steps to take when acquiring new stock

A. Make sure animals come from disease-free herds

B. Vaccinate against diseases as dictated by the particular situation and area

C. Isolate animals for a minimum of 3 weeks

D. Treat for external and internal parasites

E. Disinfect stalls between animals

XIV. Diseases to vaccinate against in Idaho

(Caution: Since disease presence varies from one area to the next and even from one year to the next, a veterinarian should always be consulted for developing and implementing a vaccination program.)

A. Young calves

1. Brucellosis or Bangs

2. Blackleg

3. Bovine virus diarrhea or BVD

4. Infectious bovine rhinotracheitis or IBR

B. Heifers at breeding

1. Blackleg

2. BVD

3. IBR

4. Leptospirosis

C. Cows before breeding--IBR and BVD

(Note: If a bull is used, cows should be vaccinated for vibriosis.)

XV. Removing extra teats

A. Extra teats are unsightly and may cause milker problems

B. Teats should be removed with sharp, sterilized scissors

C. Teats should be removed when heifer is 1 to 2 months of age

XVI. Preventing mastitis

A. Protect udder and teats with good bedding

B. Keep facilities and equipment clean

C. Keep machines in repair--particularly vacuum equipment

D. Maintain proper and constant milking procedures

E. Use teat dip after milking

F. Treat all cows as they go dry

XVII. Testing for and treating mastitis

A. Tests

1. Visual method--First milk is stripped into a cup and observed for clots, flakes and pus

2. Wisconsin Mastitis Test--Bulk tanks are tested for bacteria levels

3. California Mastitis Test--First milk is tested to determine bacteria levels

B. Treatment

(Caution: Treated milk should not go into the bulk tank.)

1. Exact problem should be determined by veterinarian

2. Usual treatment involves injecting antibiotics into the infected quarter of the udder through the teat canal

3. Dry cows may respond better since the udder is resting; treating when dry also eliminates problems with keeping the treated milk separate

XVIII. Milk letdown

(Note: Adrenalin, which is released when cows get excited, will interfere with milk letdown.)

A. Udder stimulation sends nerve impulse to brain

B. Brain releases oxytocin which is carried by the blood to the udder

C. Oxytocin causes muscles to contract around alveoli and milk is forced into larger cavities and ducts in udder

D. Oxytocin is destroyed quickly so milk should be removed within 5 minutes

XIX. Procedure for milking

A. Prepare and sanitize equipment

B. Move cows into milking parlor quietly and easily

C. Wash udder with warm water and dry

D. Strip some milk from each quarter

(Note: This should be done into a cup to avoid spreading diseases and to allow checking for mastitis.)

E. Attach milkers after about 45 seconds

F. Milk out completely, but don't allow milker to stay on too long

G. Dip teats after milking

XX. Procedure for drying off cows

A. Reduce feed

B. Stop milking

(Note: Feed may need to be reduced several days ahead of time if cow is producing over 40 pounds of milk per day.)

XXI. "Off" flavors in milk

Flavor	Cause	Prevention
Feed	Cows eating or smelling strong smelling feeds (such as silage) or weeds; milk absorbing feed odors directly	Shift to pasture or silage gradually and withdraw 3 hours before milking; eliminate objectionable weeds; feed silage after milking and away from milking area
Oxidized (cardboard)	Sunlight; foaming; drylot feeding; metallic contamination from copper or iron	Avoid exposing milk to sunlight; use stainless steel; feed vitamin E
Rancid (spoiled)	Breakdown of butterfat which releases strong acids--more common in cows nearing end of lactation; too much agitation; slow cooling	Test cows nearing the end of lactation; reduce sharp turns and lifts in pipelines; cool rapidly with a minimum of foaming
Foreign	Usually disinfectant or medicine	Rinse equipment thoroughly after washing; wash udders thoroughly; don't market milk from treated cows for at least 72 hours
Salty	Cows late in lactation; mastitis	Test for problems and separate cows with objectionable milk
Malty	High bacterial count	Clean equipment; cool milk rapidly
High-acid	High bacterial count	Cool milk rapidly

XXII. Types of manure based on moisture content

A. Solid--Less than 82% moisture; bedding added; can be stacked

B. Semisolid--82-88% moisture; small amount of bedding; cannot be stacked; can use piston pump

C. Slurry--88-92% moisture; as produced by animals; can use liquid manure pump

D. Liquid--Over 92% moisture; large amounts of water added; can use liquid manure pump or irrigation pump

XXIII. Systems of handling manure (Transparency 2)

A. Daily hauling

1. Bedding must be added

2. Large land area is needed to fit spreading in with cropping plans

3. Labor and energy requirements are high

4. Manure is scraped from alleys with a tractor and either pushed off a push-off lip into a spreader or loaded with a front-end loader

5. Low investment required if land is available

6. No storage needed

B. Semisolid manure handling with storage

1. Alleys are scraped with tractor or automatic scraper and removed to storage area with piston pump or conveyor

2. Large investment required

3. Liquids must be disposed of separately

4. Labor and fuel costs are reduced

5. Manure can be plowed down immediately, which greatly improves nitrogen retention

(Note: This is more practical since manure is applied much less often.)

6. Covered storage area is required

7. Spreading can be coordinated more easily with cropping plans

C. Liquid handling system

1. Add water and store manure in a pond and then apply with liquid spreaders or irrigation systems

2. Bedding is kept to a minimum

3. Milking center wastewater can be disposed of with manure

4. Water-tight pit needed for storage

5. Automation is most easily utilized

6. Soil types need to be able to handle large amounts of liquid

XXIV. Factors used to classify milk in Idaho

A. Facilities

(Note: These are evaluated mainly on how they contribute to milk cleanliness.)

B. Water supply--Hot and cold

C. Equipment

D. Bacteria count

E. Antibiotics in milk

(Note: Antibiotics are not allowed in any milk sold.)

F. Temperature of milk

XXV. Adjustments that affect basic milk price

A. Intended use

(Note: Fluid milk is Class I. Minimum processed milk such as cottage cheese is Class II. Class III is processed milk such as cheese.)

B. Quality

(Note: This is usually determined by the conditions under which it was produced. It is usually classified as Grade A or market.)

C. Amount of milk produced, especially during times when production is usually lower

D. Butterfat tests

E. Special classifications

Example: All-Jersey milk

XXVI. Methods of identification of individual dairy animals

A. Ear tags

B. Neck chains

C. Plate under skin

(Note: This method is used with detectors usually installed in the milking parlor and can be used for checking a cow's temperature and for many other management techniques such as providing extra grain to high producers.)

D. Freeze branding

XXVII. Goal of production records--Provide basis for making good management decisions and thereby maximizing profits

XXVIII. Types of records kept on dairy cattle

A. Breeding records

B. Milk and butterfat production records

C. Health records

XXIX. Testing programs for dairy cattle

A. Dairy Herd Improvement Association--Program conducted by local and state associations using the services of the cooperative extension and the USDA; cows are tested by an official tester each month; records are sent to a central place and analyzed and then returned to the dairy

B. USDA-DHIA sire summaries--Bull evaluations based on the production records of their offspring

(Note: Breed registry associations also publish sire summaries.)

C. Dairy Herd Improvement Registry--Includes DHIA tests plus tests required by individual breed associations; only registered cattle are eligible

D. Unofficial dairy herd improvement testing--Testing records the dairy manager keeps to improve production

XXX. Types of information included on DHIA cow herd records

A. Milk production

B. Butterfat content

C. Amount and cost of feed

D. Income over feed cost

E. Breeding and calving dates

F. Time of dry period

(Note: Specific records may vary some and may add additional production or even disease information.)

XXXI. Adjustment factors necessary to compare milk production records

A. Length of lactation--Adjusted to 305 days

B. Number of milkings per day--Adjusted to two times per day

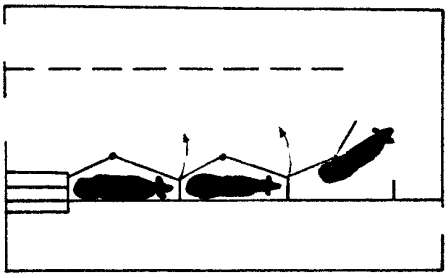
(Note: This is done by multiplying a cow's production at 3 times a day milkings by .85.)

C. Age and month of calving--Production adjusted to mature equivalent

D. Fat content of milk--Usually adjusted to 4%

(Note: Fat content may be adjusted to any percentage and is often adjusted to 3.5% for Idaho records.)

Milking Parlor Arrangements



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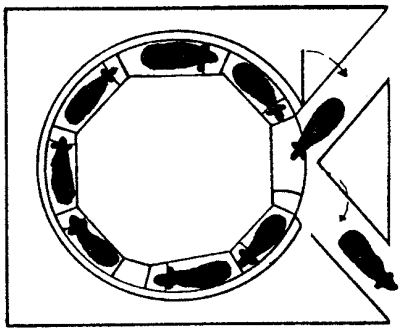

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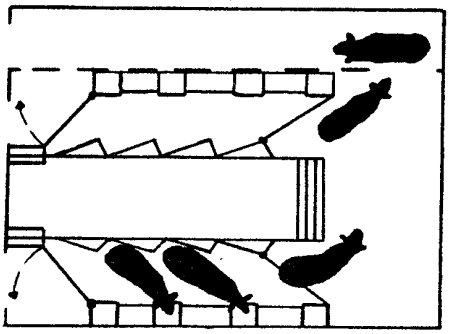

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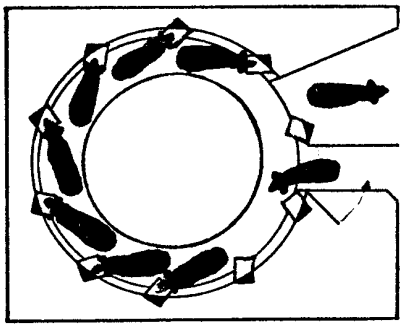

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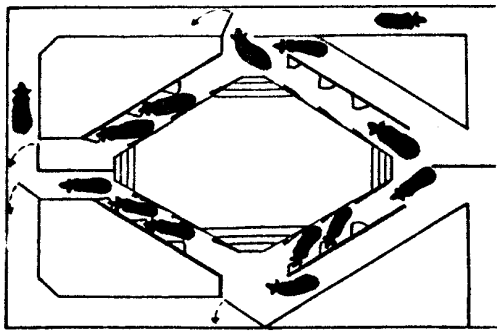
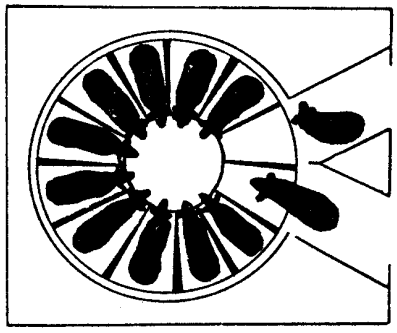


POLYGON HERRINGBONE



TURNSTYLE

TM 1

Methods For Handling Manure

	SOLID LESS THAN 82% WATER	SEMI-SOLID 82% - 88% WATER	SLURRY 88% - 92% WATER	LIQUID MORE THAN 92% WATER
COLLECTION	TRACTOR SCRAPER	TRACTOR SCRAPER ALLEY SCRAPER	TRACTOR SCRAPER ALLEY SCRAPER	FLUSH SLOTTED FLOOR
TRANSFER	TRACTOR SCRAPER CROSS CONVEYOR	TRACTOR SCRAPER SOLID OR HOLLOW PISTON PUMP CROSS CONVEYOR AUGER	GRAVITY FLOW SUMP & AGITATOR PUMP SOLID OR HOLLOW PISTON PUMP CROSS CONVEYOR AUGER	SOLID SEPARATOR SUMP & AGITATOR PUMP GRAVITY FLOW
STORAGE	COVERED STORAGE	COVERED STORAGE EARTHEN BASIN-PICKET DAM	UNDER-FLOOR ABOVE GRADE TUB EARTHEN BASIN	EARTHEN BASIN
UNLOAD	TRACTOR LOADER	TRACTOR LOADER	AGITATOR PUMP LOAD-OUT PUMP	AGITATOR PUMP IRRIGATION PUMP
APPLY	BOX OR FLAIL SPREADER	BOX OR FLAIL SPREADER WITH LIQUID CONTROL	LIQUID SPREADER INJECTION EQUIPMENT	IRRIGATION PUMP
INCORPORATE	PLOW OR DISK	PLOW OR DISK	PLOW, DISK OR INJECT	PLOW OR DISK

TAKEN FROM CHORE REDUCTION FOR FREE STALL DAIRY SYSTEMS PUBLISHED BY HOARD'S DAIRYMAN.

DAIRY CATTLE MANAGEMENT

AG 310 - E

ASSIGNMENT SHEET #1--IDENTIFY INFORMATION FROM A DHIA MONTHLY HERD SUMMARY AND AN INDIVIDUAL COW RECORD

Name_____ Score_____

Dairy herd improvement association records are becoming an essential management tool for modern dairies. There are many different forms, but all provide basically the same information. Being able to fill out the forms and read the information after it has been summarized (usually by computer) are important skills for a dairy manager.

Study the two records following the questions and then answer the questions using information found on them.

(Note: The cows are grouped according to number of lactations. The three groups are 1st lactation (1), 2nd lactation (2), and third and over lactations (3+). The following abbreviations are used on the forms: Perm--Permanent; Lact--Lactation; SNF--Solids not fat; FCM--Fat corrected milk; CMT--California Mastitis Test; N--Negative; AVG--Average; Equiv--Equivalent; ME--Mature equivalent; Yrs--Years; Mos--Months; Opt--Optimum; H.R.S.--Herd reproductive summary; Preg--Pregnant; Reg--Registration; Br--Breed; RH--Registered Holstein; Req--Required; Ext--Extrapolated; D--Days; Diag--Diagnosis; C.C.--Calf carried)

1. What is the name of the dairy?_____
2. What is the basic difference between the two records? _____

   _____
3. What is the herd identification number? _____
4. How many herds or "strings" does this dairy run?_____
5. Are the cattle on this record registered?_____
6. How many cows are in the herd?_____
7. How many cows are in their first lactation?_____
8. How many cows are in their second lactation? _____
9. Which group of cows (first lactation, second lactation, third and over lactation) has the highest 305 day actual milk production? _____

   _____
10. What is that production? _____

    _____

11. Which group of cows has the highest 305 day mature equivalent milk production? _____

_____

12. What is that production? _____

_____

13. How many days does this herd summary record cover? _____

14. How many pounds of grain should be fed to each of the second lactation cows per day?_____

_____

_____

15. How many cows in the herd are milking? _____

16. How many of the above are first lactation heifers? _____

17. What was the average age of the third lactation and over cows at last calving? _____

18. What is the herd average for the number of times a cow must be bred to conceive? (only consider the pregnant cows) _____

19. Which group of cows (1, 2, 3+) has the best conception rate?_____

20. During which month in the previous year were the most calves born? _____

21. How many calves were born in October? _____

22. During which two months of the year ahead are the fewest number of cows expected to calve?

_____

_____

23. How many cows in the herd had to be bred 4 times or more to get a conception? _____

_____

24. What is the overall herd average fat percentage for <u>this</u> testing period? _____

_____

25. What is the overall herd average fat percentage since Aug. 1? _____

26. What is the average number of days a cow is "open" in this herd? _____

27. Which group of cows has the highest average number of "open" days? _____

_____

28. How many cows died during the past month? _____

29. How many cows have entered the herd since Aug. 1?_____

30. What is the daily average milk production per cow for this last testing period? _____

_____

31. Which group of cows has the highest average daily, per cow milk production for this last testing period? _____

32. What is that average?_____

33. What is the registration or E.T. number for cow number 132? _____

34. Is cow number 132 registered? _____

35. What is the barn number for the mother of cow number 132?_____

36. Is cow number 132 milking or dry?_____

37. Is cow number 132 pregnant? _____

38. When is cow number 132 expected to calve? _____

39. When was cow 132 born? _____

40. What is cow 132's highest average daily milk production during the past year?_____

_____

41. How many days did cow 132 milk?_____

42. What is cow 132's total milk production for the year?_____

43. What is cow 132's average fat percentage for the past year?_____

44. Has cow 132 had mastitis this past year?_____

45. Is cow 132 above or below the herd average? _____

DHIA MONTHLY HERD SUMMARY

OWNER

HERD NO.	TYPE	ASSN	PERF. STRING	TESTER	OWNER OR NAME OF DAIRY	TYPE OF TEST	PREVIOUS DATE TESTED	DATE RECEIVED	CURRENT DATE TESTED	DAYS
91 11 0001	1		1	60	WSU KNOTT DAIRY CENTER	OFFICIAL DHIR	3 18 80	4 24 80	4 15 80	29

LACT NO.	COWS IN HERD	AVERAGE FOR ALL COWS: TOTAL COW MONTHS	% DAYS MILK	POUNDS MILK	% FAT	POUNDS FAT	% SNF	POUNDS SNF	POUNDS 3.5 FCM	COWS IN MILK	AVERAGE FOR MILKING COWS: COW MONTHS	DAYS IN MILK	POUNDS MILK	POUNDS FAT	% SNF	POUNDS SNF	POUNDS 3.5 FCM	PERCENT CMT: N & T	1	2 & 3	LACT NO
1	31	30.4	91	46.9	3.42	1.60	3.24	1.52	46.3	28	27.6	180	51.6	1.76	1.67	50.9	100			1
2	24	23.2	96	59.3	3.18	1.89	3.15	1.87	56.2	23	22.2	180	61.9	1.97	1.95	58.7	87	13		2
3+	40	39.3	87	51.3	3.66	1.88	3.30	1.70	52.6	33	34.2	212	58.9	2.16	1.95	60.4	91	6	3	3+
T	95	92.9	91	51.9	3.45	1.79	3.24	1.68	51.5	84	84.1	192	57.3	1.98	1.86	56.8	93	6	1	T

LACT NO	EXTRAPOLATED 305 DAY AVG: ACTUAL MILK	ACTUAL FAT	MATURE EQUIV MILK	MATURE EQUIV FAT	AVG. RELATIVE VALUE: ± MILK	± FAT	% ME FAT	COWS SINCE LAST TEST: ENTERING HERD	LEAVING HERD: DAIRY	BEEF	DIED	%	GRAIN TO FEED PER DAY: PER COW	TOTAL	AVG. AGE AT LAST CALVING: YRS	MOS	PREVIOUS DAYS DRY: AVG.	NO. OF COWS: 48 & LESS	60 OPT	72 & OVER	LACT NO
1	14796	495	18461	608	1365-	62-	92	1		1		3.2	16	482	2	3					1
2	18067	620	20488	691	967	22	104						19	458	3	3	50	10	14		2
3+	19085	686	19615	701	168	36	104			1	1	4.8	17	676	5	4	58	13	28	1	3+
T	17426	607	19459	668	33-		100	1		2	1	3.1	17	1616	3	10	55	23	42	1	T

LACT NO.	COWS CALVING DURING PREVIOUS YEAR: APR (CURRENT)	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	COWS OVER 75 DAYS SINCE LAST BRED OR PREG.: NO. OF TIMES BRED 1	2	3	4 & +	TOTAL TIMES BRED	SERVICES PER CONCEPT	H.R.S INDEX	DAYS IN MILK AT FIRST BREEDING: AVG	NO. OF COWS: 45 OPT & LESS	56 OPT 11	66 & OVER	LACT NO.
1		1		2	4	4	1	3	7	2	3	1	16	1	3		27	1.35		76		14	12	1
2				5	1	2	3	4		2	5	1	8	2		1	16	1.45		75		9	9	2
3+		2	2	4	2	4	3	2	1	3	2	5	12	3	4	5	52	2.17		87		11	21	3+
T		3	2	11	7	10	7	9	8	7	10	7	36	6	7	6	95	1.73		81		34	42	T

LACT NO	COWS EXPECTED TO CALVE: APR (CURRENT)	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	AVERAGE CALVING INTERVAL MONTHS: LAST	NEXT	COWS IN MILK, OPTION 30, DAYS NOT PREG.: NO. OF TIMES BRED 1	2	3	4 & +	TOTAL TIMES BRED	SERVICES PER COW	COWS NOT BRED TO MILK	DAYS OPEN: AVG	NO. OF COWS: 99 & LESS	120 OPT	141 & OVER	LACT NO
1													3	3			9	1.50	3	91	21	5	3	1
2	1	2	1	5	2	2	1	8	1	3	12.63		2	2	2	1	16	2.29	5	101	15	5	3	2
3+	3	2	6	5	7	5	6	3	5	8	12.73		2	2	2	1	16	2.29	2	132	11	8	15	3+
T	4	4	7	10	9	7	7	11	6	11	12.69		7	7	4	2	41	2.05	10	110	47	18	21	T

DATE	DAYS ON TEST	NO. OF RECORDS	HERD AVERAGE: COW MONTHS	% DAYS IN MILK	DAYS IN MILK	POUNDS MILK	% FAT	POUNDS FAT	% SNF	POUNDS SNF	PERCENT CMT: N & T	1	2 & 3	TOTAL NUMBER OF COWS: IN HERD	REGISTERED	ENTERING HERD	LEAVING HERD: DAIRY	BEEF	DIED	%
8 1	32	95	99.0	85	201	50.0	3.30	1.65	3.48	1.74	94	5	1	93	93	1		2		2
8 29	28	98	90.5	88	185	51.3	3.31	1.70	3.48	1.78	89	8	4	95	95	5		3		3
9 26	31	99	97.1	87	163	50.6	3.59	1.81	3.70	1.87	95	4	1	94	94	4		5		5
10 30	36	96	110.8	89	169	51.1	3.58	1.83	3.63	1.85	94	5	1	90	90	2		5	1	6
12 6	39	93	120.3	94	178	51.9	3.77	1.95	3.42	1.78	96	1	2	92	92	3			1	1
1 16	37	101	122.5	89	179	45.0	3.71	1.67	3.28	1.47	91	6	4	97	97	8		2	2	4
2 20	31	99	100.3	87	188	48.0	3.59	1.72	3.35	1.61	94	5	1	96	96	2		3		3
3 18	28	98	91.4	92	184	51.8	3.63	1.88	3.36	1.74	94	5	1	97	97	2		1		1
4 15	29	98	92.9	91	192	51.9	3.45	1.79	3.24	1.68	93	6	1	95	94	1		2	1	3
AVERAGE OR TOTAL	91		76.0	89	182	18,275	3.56	650	3.44	628	93	5	2	94	94	28		23	5	0

ASSIGNMENT SHEET # 1

CONTROL NO. 132 | ASSN. 00

HERD DESIGNATION 91-11-0001 | TYPE 1

WSU KNOTT DAIRY CENTER

INDIVIDUAL COW RECORD

ECM-W OFFICIAL DHIR 1

FORM 1010 ± $ * MILKED 3X P STRING

PHYSICAL TRAITS A B C D E F G H	I J K L M N O P	DET BY	ATTACT NO

DATE OF TEST: 03-18-80

REPORT FROM 03-05 TO 04-02

SIRE BARN NAME OR NUMBER	REG OR E.T. NO. BR
29H1869	1432733 RH

DAM BARN NAME OR NUMBER	REG OR E.T. NO. BR
21	8426162 RH

COW BARN NAME OR NUMBER	REG. OR E.T. NO BR
132	9245071 RH

TEST DAY DATA AND LACTATION TO DATE

TEST MO	TEST DAY	TEST INTERVAL STRING	CAR P T	MILK DAYS	MILK FACTOR	MILK DAILY	FAT PM %	FAT %	FAT FACTOR	FAT DAILY	PROTEIN OR SNF %	PROTEIN OR SNF FACTOR	PROTEIN OR SNF DAILY	DAILY ± $	PERSISTENCY	C M T	CONCENTRATES FED	CONCENTRATES REC
4	25			35	.94	84.0		3.9	.96	3.28	2.5	.96	2.10	9.71		N		
6	06			32	1.02	88.0		3.5	1.01	3.08	2.9		2.55	9.68	98	N		
6	27			27		89.8	47	3.0		2.69	2.8		2.51	9.25	94	N		27
8	01			32		83.8	50	3.0		2.51	3.3		2.77	8.65	93	N		26
8	29			28		78.2	48	3.4		2.66	3.4		2.66	8.08	100	N		26
9	26			31		73.5	46	3.9		2.87	3.7		2.72	8.66	102	N		26
10	30			36		63.6	46	3.8		2.42	3.8		2.42	7.49	85	N		22
12	06			39		50.7	47	4.2		2.13	3.9		1.98	6.37	85	N		19
1	16			40	.98	35.0	36	4.4	.98	1.54	3.6	.98	1.26	4.59	71	N		13
														.00				
TOTAL				300		20850		3.63		756	3.27		681	2373				

EXT. 305 DAYS MILK	FAT	± $
17550	653	2075
18950	685	2147
19750	685	2190
20410	690	2237
20690	704	2253
20990	731	2315
21180	748	2360
21230	759	2386
20850	756	2373
PRES	DRY	57

RELATIVE VALUE ± MILK	± FAT	% OF HERD M.E.
		108
1900	73	110
2180	94	115
3310	115	117
3560	151	121
4150	179	125
4070	186	125
3980	178	124
DAYS		

ASSIGNMENT SHEET # 1

AGE AT CALVING	BIRTH DATE	LACT. NO.	DAYS OPEN	CALF IDENTIFICATION	SEX
3-01	2-23-76	2	62		
	4-12-79	48	295	H132	

BREEDING RECORD DATE	DAYS*	BULL USED	T
6-12	62	7H903	
3-18	DUE	TO CALVE	

DIAG PREG OR OPEN	MANAGEMENT DATE	NOTE
1-21		PRFG
2-06-80		DRY

BODY WEIGHT OR MISC | CALVING DATE | PREV. DRY | DAYS C.C. | CALF'S SIRE | BR.

PLANNED SERVICE SIRE → 1ST | 2ND

DATE AND REASON LACTATION TERMINATED

* DAYS IN MILK AT FIRST BREEDING OR DAYS BETWEEN BREEDING

* MILKED 3X

PREVIOUS LACTATIONS

TYPE	LACT NO	BRED MO	BRED DAY	BRED YR	CAR	AGE AT CALVING YR	AGE AT CALVING MO	305 DAYS OR LESS DAYS DRY	DAYS OPEN	DAYS MILKED	POUNDS MILK	% FAT	POUNDS FAT	% SNF or P	POUNDS SNF or P	305 DAY M.E. POUNDS MILK	POUNDS FAT	RELATIVE VALUE ± POUNDS MILK	± POUNDS FAT	COMPLETE LACTATION DAYS	POUNDS MILK	POUNDS FAT	POUNDS SNF or P	± $	CALF IDENT NO.	BODY WEIGHT CALF'S SIRE OR MISC
1	11	4	24	78	0	2	02	68	305	175	4036	617	3.7	642		21750	753	2130	57	305	17540	617	642	1795		
1	21	4	12	79		3	01	48	62	300	20850	756	3.6	681		23350	839	3980	178	300	20850	756	681	2373		H132

CONTEMP GROUP NUMBER
132

NO LACTS	PROD. LIFE YEARS	MOS	AVG. LIFE PRODUCTION PER YEAR MILK	FAT	% FAT	SNF or P	% SNF or P	AVG 305 DAY M.E. MILK	FAT	AVG. REL. VAL. MILK	± FAT	LIFE TIME TOTAL DAYS	MILK	FAT	SNF or P	± $
2	1	9	21459	3.6	767	3.4	740	22550	796	3055	117	605	38390	1373	1323	4168

CONTROL NO.
132

DAIRY CATTLE MANAGEMENT

AG 310 - E

ASSIGNMENT SHEET #2--SKETCH THE LAYOUT OF A BASIC DAIRY CATTLE OPERATION

Name_____ Score_____

Choose a dairy of between 60 and 600 cows and decide on the type of housing and feeding arrangement. Then sketch the basic layout of the dairy. Be sure to include milking and milk handling areas, feeding areas, dry and milking cow lots, shelters and feed storage.

Size of dairy _____

DAIRY CATTLE MANAGEMENT

AG 310 - E

ASSIGNMENT SHEET #3--DESIGN A MANURE HANDLING SYSTEM

Name_____ Score_____

A 1400 pound dairy cow produces 115 pounds of manure per day or 21 tons per year. Two hundred cows would produce 4,200 tons per year. Obviously, an efficient system must be developed to handle this huge volume. Systems will vary depending on herd size, land and capital availability, labor, soil types, topography and weather.

Choose a dairy size appropriate for your area and design a system for handling wastes. Local dairies, soil conservationists and extension personnel, as well as agricultural magazines and the information in this unit are good resources.

Size of dairy _____

Basic type of system _____

Equipment and facilities needed:

_____

_____

_____

_____

_____

Description of system:

_____

_____

_____

_____

_____

_____

_____

_____

DAIRY CATTLE MANAGEMENT

AG 310 - E

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

(Note: The written numbers on the records show where the answers are found. These numbers match the question numbers. Some answers are found in more than one place.)

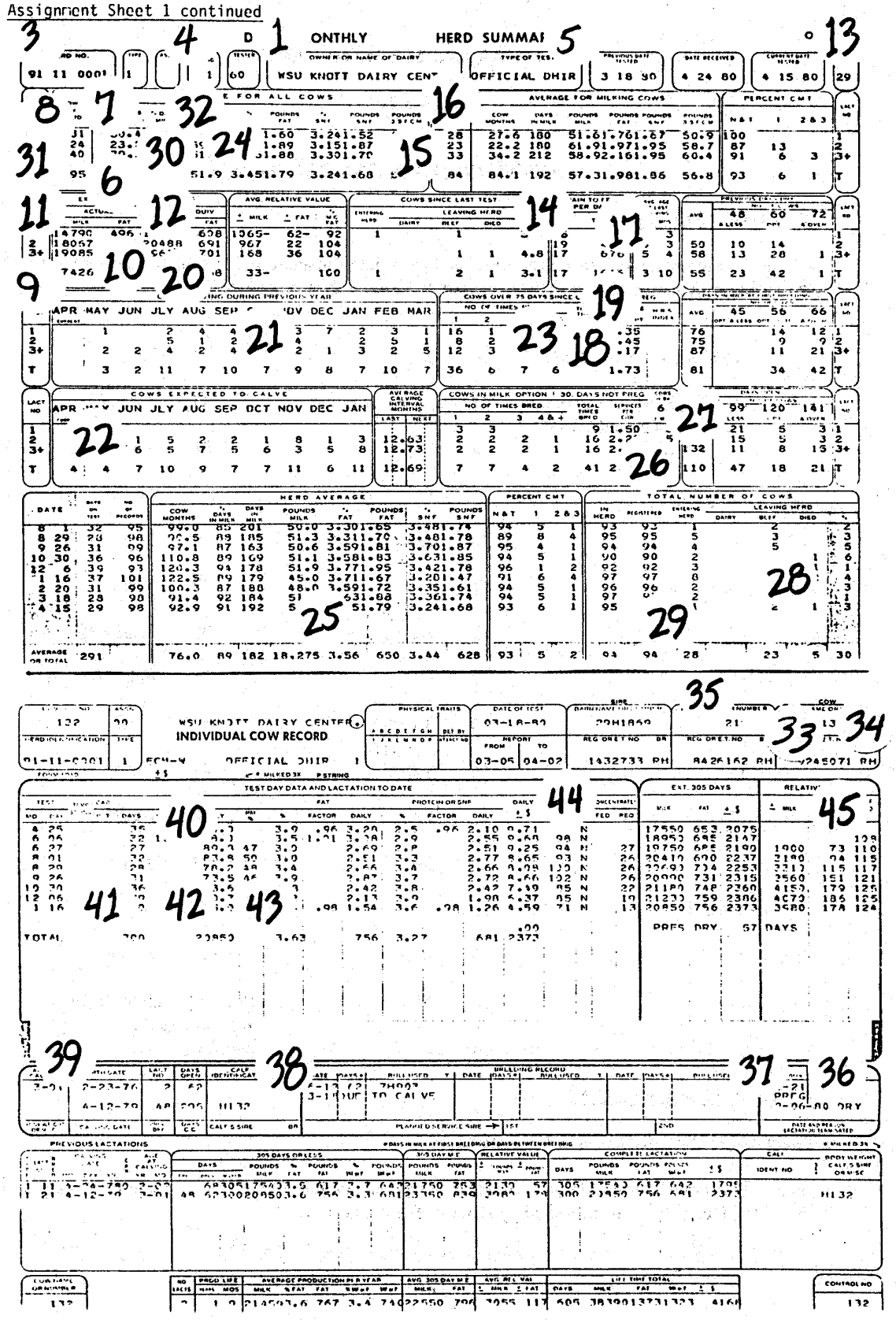
1.	WSU Knott Dairy Center	16.	28	32.	59.3
2.	One is a herd summary and the other is an individual cow record	17.	5 years 4 months	33.	9245071
		18.	1.73	34.	Yes
3.	91 11 0001	19.	1	35.	21
4.	1	20.	July	36.	Dry
5.	Yes	21.	7	37.	Yes
6.	95	22.	April, May	38.	March 18
7.	31	23.	6	39.	Feb. 23, 1976
8.	24	24.	3.45%	40.	89.8#
9.	3+	25.	3.56%	41.	300
10.	19085#	26.	110	42.	20850
11.	2	27.	3+	43.	3.63
12.	20488#	28.	1	44.	No
13.	29	29.	28	45.	Above
14.	19	30.	51.9	(See assignment Sheet #1 continued on page 26.)	
15.	84	31.	2		

Assignment Sheet #2 and #3

Evaluated to the satisfaction of the instructor.

(Note: Plans can be found in dairy magazines and publications. One source is Chore Reduction For Free Stall Dairy Systems published by Hoard's Dairyman.)

Assignment Sheet 1 continued



DAIRY CATTLE MANAGEMENT

AG 310 - E

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Microscopic organisms of which some types are involved in milk spoilage and others in the manufacture of some milk products such as cheese	1. Oxytocin
_____b.	A secretion of a cow's udder, free from colostrum, obtained by the complete milking of one or more healthy cows, which contains not less than 8 1/2% milk solids-not-fat and not less than 3 1/4% milk fat	2. Adrenalin
_____c.	Dairy Herd Improvement Association	3. Alveoli
_____d.	United States Department of Agriculture	4. Bacteria
_____e.	Giving an animal a mild dose of a bacteria or virus of a particular disease to protect the animal against that disease	5. Milk substitute
_____f.	Replaces milk as a feed for very young calves; usually powdered and requires mixing with water	6. Antibiotic
_____g.	A comparison of the selling price of milk to the cost of the feed necessary to produce that milk	7. Milk
_____h.	Coming into milk after calving	8. Stanchion
_____i.	Hormone that causes muscle contractions around the alveoli and therefore causes milk letdown	9. Intermittent milking
_____j.	Small, bulb-shaped structures responsible for transforming nutrients from the blood into milk	10. USDA
_____k.	Substance which prevents or slows the growth of microorganisms, many of which cause disease	11. Mastitis
_____l.	Hormone that interferes with milk letdown	12. DHIA
_____m.	Adjusted production of young dairy cows reflecting their probable milk production as mature cows; used in DHIA records for comparing cows of different ages	13. Vaccination
_____n.	Milking off and on to allow a gradual drying up of the udder	14. Milk-feed price ratio
_____o.	Dairy Herd Improvement Registry	15. DHIR
_____p.	Locking headgate for restraining dairy animals	16. Mature equivalent
_____q.	A disease of the udder causing swelling and irritation of the mammary glands	17. Freshening

2. Describe four factors responsible for the overall increase in milk production.

   a. _____

   b. _____

   c. _____

   d. _____

3. Describe sanitation and disease control and prevention associated with dairy cattle production.

   _____

   _____

   _____

   _____

   _____

   _____

   _____

4. Describe two tips for handling dairy bulls.

   a. _____

   b. _____

5. Select guidelines for facilities for housing dairy bulls by placing a check in front of the appropriate guidelines.

   _____a. Strongly constructed

   _____b. Located near the cows

   _____c. Eight to 11 foot square stall

   _____d. Constructed so feeding and watering can be done outside of pen

   _____e. Adequate exercise area

6. Describe five conditions that could keep a bull from being an effective breeder.

   a. _____

   b. _____

c. _____

d. _____

e. _____

7. Select guidelines for housing calves by placing a check in front of the appropriate guidelines.

_____a. House together until one week after discontinuing milk or milk substitute

_____b. House in dry, draft-free areas with good ventilation

_____c. House separately until one week after discontinuing milk or milk substitute

_____d. House in warm, slightly moist enclosed areas

8. Distinguish between the two types of housing systems for dairy cattle by placing a "CS" by the statements which indicate confinement stall housing and an "LH" by the statements which indicate loose housing.

_____a. Lower labor requirement

_____b. Less leg and udder injuries

_____c. Higher housing expense

_____d. Cows are either facing in with a common feeding center or out with a common center alley

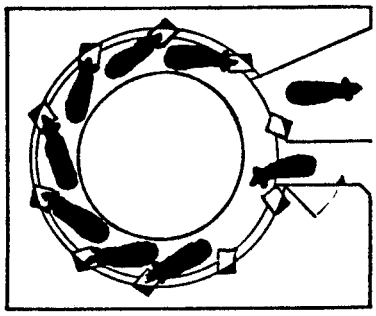
_____e. Cows usually have free stalls

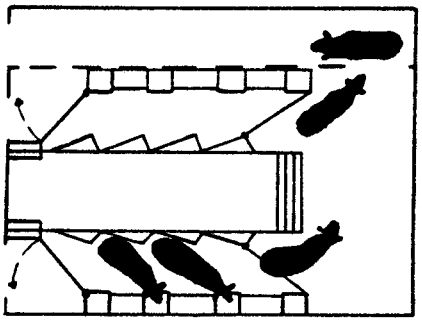
_____f. Allows better control and display of animals

_____g. Each cow is stanchioned or tied

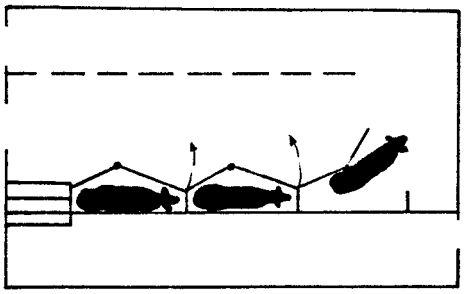
_____h. Most popular system

9. Label six types of milking parlor arrangements.

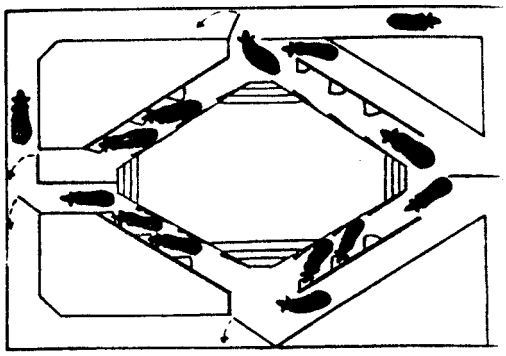




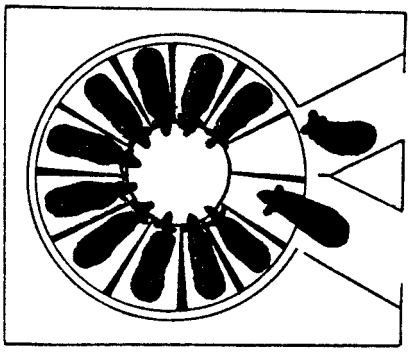
a. _____ b. _____



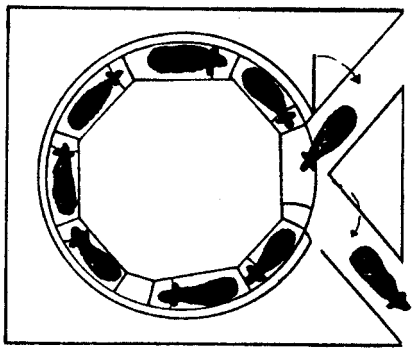
c. _____



d. _____



e. _____



f. _____

10. Describe four advantages of paved lots.

a. _____

b. _____

c. _____

d. _____

11. Write the age and weight at which a heifer can be bred.

Age: a. _____

Weight: b. Holstein and Brown Swiss _____

c. Guernsey and Aryshire _____

d. Jersey _____

12. Describe the relationship between age of freshening and lifetime milk production.

_____

_____

13. Select steps to take when acquiring new stock by placing a check in front of the correct steps.

_____a. Make sure animals come from disease-free herds

_____b. Isolate animals for 3 days

_____c. Disinfect stalls between animals

_____d. Treat for external and internal parasites

_____e. Vaccinate for diseases as dictated by the particular situation and area

14. List the primary diseases which should be vaccinated against in the following dairy cattle.

Young calves:

a. _____

b. _____

c. _____

d. _____

Heifers at breeding:

e. _____

f. _____

g. _____

h. _____

Cows before breeding:

i. _____

j. _____

15. Describe why, when and how extra teats should be removed.

a. Why _____

b. When _____

c. How _____

16. Describe six parts of a program to prevent mastitis.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

17. Describe three tests for mastitis and describe how it should be treated.

Tests:

a. _____

b. _____

c. _____

Treatment:

d. _____

_____

_____

_____

_____

_____

18. List in order the steps involved in milk letdown.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

19. Describe the procedure for milking.
(Note: This is assuming the use of automatic milkers.)

_____

_____

_____

_____

_____

_____

_____

20. Describe how to dry off cows.

_____

_____

21. Match the milk flavors on the right to their cause and/or prevention on the left.
(Note: Each flavor will be used twice. High acid and malty are not the same flavors, but they are caused by the same thing.)

_____a. Test for problems and separate cows with objectionable milk

_____b. Rinse equipment thoroughly after washing; wash udders thoroughly; don't market milk from treated cows for at least 72 hours

_____c. Cows eating or smelling strong smelling feeds (such as silage) or weeds; milk absorbing feed odors directly

_____d. Cool milk rapidly

_____e. Usually disinfectant or medicine

_____f. Cows late in lactation; mastitis

_____g. Breakdown of butterfat which releases strong acids--more common in cows nearing end of lactation; too much agitation; slow cooling

_____h. Avoid exposing milk to sunlight; use stainless steel; feed vitamin E

1. High-acid or malty
2. Rancid
3. Feed
4. Salty
5. Oxidized
6. Foreign

_____i. Sunlight; foaming; drylot feeding; metallic contamination from copper or iron

_____j. Test cows nearing the end of lactation; reduce sharp turns and lifts in pipelines; cool rapidly with a minimum of foaming

_____k. Shift to pasture or silage gradually and withdraw 3 hours before milking; eliminate objectional weeds; feed silage after milking and away from milking area

_____l. High bacterial count

22. Describe the four types of manure listed below.

a. Solid _____

_____

b. Semisolid _____

_____

c. Slurry _____

_____

d. Liquid _____

_____

23. Match the three systems of manure handling on the right to their appropriate descriptions. (Note: The systems will be used more than once.)

_____a. Alleys are scraped and moved to storage area with piston pumps

_____b. Least bedding used

_____c. Most bedding used

_____d. Automation is most easily utilized

_____e. Liquid part of manure must be handled separately

_____f. Largest land requirements

_____g. Nitrogen is easier to retain in soil

_____h. Milking center waste water can be disposed of with manure

1. Daily hauling
2. Semisolid handling with storage
3. Liquid handling

_____i. Covered storage area required

_____j. Soil types must be able to handle large amounts of liquid

_____k. Can be used in irrigation systems

_____l. Smallest investment required if land is available

_____m. No storage needed

_____n. Manure can be scraped directly into spreader

_____o. Water-tight pit needed for storage

_____p. Highest labor and energy requirements

24. List 6 factors used to classify milk in Idaho.

a. _____ d. _____

b. _____ e. _____

c. _____ f. _____

25. Name 5 adjustments that can affect the basic milk price.

a. _____ d. _____

b. _____ e. _____

c. _____

26. Name 4 methods of dairy cattle identification.

a. _____ c. _____

b. _____ d. _____

27. Describe the goal of production records.

_____

_____

28. Name the three types of records kept on dairy cattle.

a. _____

b. _____

c. _____

29. Describe the four main testing programs for dairy cattle listed below.

    a. Dairy Herd Improvement Association (cows)_____

    _____

    _____

    _____

    b. USDA-DHIA sire summaries_____

    _____

    c. Dairy Herd Improvement Registry_____

    _____

    _____

    d. Unofficial dairy herd improvement testing_____

    _____

30. List 6 types of information recorded on DHIA cow herd records.

    a. _____ d. _____

    b. _____ e. _____

    c. _____ f. _____

31. Describe four adjustments necessary to compare milk production records.

    a. Length of lactation _____

    b. Number of milkings per day_____

    c. Age and month of calving_____

    d. Fat content of milk _____

DAIRY CATTLE MANAGEMENT

AG 310 - E

ANSWERS TO TEST

1.

a.	4	f.	5	k.	6	p.	8
b.	7	g.	14	l.	2	q.	11
c.	12	h.	17	m.	16		
d.	10	i.	1	n.	9		
e.	13	j.	3	o.	15		

2. Better feeding and management; Increased use of high quality bulls through artificial insemination; Better selection of high producing cows; More rigid culling of low producing cows

3. Keep cows clean at milking time, especially flanks and udders; Keep yards clean and well-drained; Barn floor kept clean, made of concrete; Utensils/milking equipment made of stainless steel or tinned iron, clean, good condition; Milk room should have concrete, sloped floor, should be screened and ventilated, separate from barn, should have hot water, wash and rinse vats and a tank for cooling and storing milk

4. Use caution, always keep safety in mind; Use a nose ring

5. a, d, e

6. Answer should include five of the following:

   Poor semen; Physical defects or injuries; Excitement or inappropriate handling; Diseases; Lack of exercise; Improper feeding; Overworking; Using a young bull on too many or too large of cows

7. b, c

8.

a.	LH	e.	LH
b.	LH	f.	CS
c.	CS	g.	CS
d.	CS	h.	LH

9.

a.	Rotary herringbone	d.	Polygon herringbone
b.	Double herringbone	e.	Turnstyle
c.	Side-opening	f.	Rotary tandem

10. Less time and labor required; Less waste of feed and bedding; Less disease because of better sanitation; Higher production because of increased animal comfort

11.
    a. 14 to 15 months
    b. 700 pounds
    c. 500 pounds
    d. 400 pounds

12. Heifers freshening at a young age (22-24 months) have a higher average lifetime production than heifers freshening later

13. a, c, d, e

14.

a.	Brucellosis or Bangs	e.	Blackleg	i.	IBR
b.	Blackleg	f.	BVD	j.	BVD
c.	Bovine virus diarrhea or BVD	g.	IBR		
d.	Infectious bovine rhinotracheitis or IBR	h.	Leptospirosis		

15. They are unsightly and may cause milker problems; When heifer is 1 to 2 months of age; With sharp, sterilized scissors

16. Protect udders and teats with good bedding; Keep facilities and equipment clean; Keep machines in repair--particularly vacuum equipment; Maintain proper and constant milking procedures; Use teat dip after milking; Treat all cows as they go dry

17. Tests: Visual method--First milk is stripped into a cup and observed for clots, flakes and pus; Wisconsin Mastitis Test--Bulk tanks are tested for bacteria levels; California Mastitis Test--First milk is tested to determine bacteria levels

Treatment: A veterinarian should first test cows to determine exact problem; Usual treatment involves injecting antibiotics into the infected quarter through the teat canal; Dry cows often respond better since the udder is resting, and also treating dry cows eliminates the problem of keeping the treated milk separate

18.
a. Udder stimulation sends nerve impulse to brain
b. Brain releases oxytocin which is carried by the blood to the udder
c. Oxytocin causes muscles to contract around alveoli and milk is forced into larger cavities and ducts in udder
d. Oxytocin is destroyed quickly so milk should be removed within 5 minutes

19. Prepare and sanitize equipment; Move cows into milking parlor quietly and easily; Wash udder with warm water and dry; Strip some milk from each quarter; Attach milkers after about 45 seconds; Milk out completely, but don't allow milker to stay on too long; Dip teats after milking

20. Reduce feed; stop milking

21.

a.	4	d.	1	g.	2	j.	2
b.	6	e.	6	h.	5	k.	3
c.	3	f.	4	i.	5	l.	1

22.
a. Solid--Less than 82% moisture; bedding added; can be stacked
b. Semisolid--82-88% moisture; small amount of bedding; cannot be stacked; can use piston pump
c. Slurry--88-92% moisture; as produced by animals; can use liquid manure pump
d. Liquid--Over 92% moisture; large amounts of water added; can use liquid manure pump or irrigation pump

23.

a.	2	e.	2	i.	2	m.	1
b.	3	f.	1	j.	3	n.	1
c.	1	g.	2	k.	3	o.	3
d.	3	h.	3	l.	1	p.	1

24. Facilities; Bacteria count; Water supply; Antibiotics in milk; Equipment; Temperature of milk

25. Intended use; Quality; Amount of milk produced, especially during times when production is lower; Butterfat tests; Special classifications

26. (Note: There are other methods of identification than those listed here.) Ear tags; Neck chains; Plate under skin; Freeze branding

27. Provide basis for making good management decisions and thereby maximizing profits

28. Breeding records; Milk and butterfat production records; Health records

29. a. Dairy Herd Improvement Association--Program conducted by local and state associations using the services of the cooperative extension and the USDA; Cows are tested by an official tester each month; Records are sent to a central place and analyzed and then returned to the dairy
    b. USDA-DHIA sire summaries--Bull evaluations based on the production records of their offspring
    c. Dairy Herd Improvement Registry--Includes DHIA tests plus tests required by individual breed associations; Only registered cattle are eligible
    d. Unofficial dairy herd improvement testing--Testing records the dairy manager keeps to improve production

30. Milk production; Income over feed cost; Butterfat content; Breeding and calving dates; Amount and cost of feed; Time of dry period

31. a. Length of lactation--Adjusted to 305 days
    b. Number of milkings per day--Adjust to 2 times a day
    c. Age and month of calving--Production adjusted to mature equivalent
    d. Fat content of milk--Usually adjusted to 4 percent

CARE AND FEEDING OF THE SWINE BREEDING HERD

AG 310 - F

UNIT OBJECTIVE

After completion of this unit, students should be able to describe how to effectively care for sows, gilts and boars as parts of a swine breeding herd. Students should also be able to prepare breeding swine for breeding and farrowing, including proper housing and feeding. This knowledge will be demonstrated by completion of assignment sheets and a unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with care and feeding of the swine breeding herd to their correct definitions.
2. List primary feeds appropriate for the breeding herd.
3. Write the minimum percentage of protein necessary for rations for various types of breeding swine.
4. Write the desired weight gain for gilts and sows during gestation.
5. List the six procedures for introducing new boars to the breeding herd.
6. List recommended breeding loads for a young boar and a mature boar.
7. Describe proper housing for the herd boar.
8. Select steps to take when buying replacement gilts and introducing them to the breeding herd.
9. Describe four procedures for maintaining healthy breeding stock.
10. List two signs of estrus.
11. Distinguish among methods of breeding swine.
12. Describe the amount and kind of feed recommended for flushing sows and gilts prior to breeding.
13. Describe major management guidelines to follow during the gestation period.
14. List three factors that lower conception rates in swine.
15. Describe how to care for sows and gilts beginning 30 days before farrowing.
16. List in order the appropriate steps in cleaning and disinfecting a farrowing facility.
17. Select signs of approaching parturition.

18. Describe how to properly care for a sow at farrowing.

19. Describe seven steps in caring for newborn pigs.

20. List the top four causes of baby pig loss prior to weaning.

21. Describe timelines for rebreeding sows after farrowing.

22. Draw a farrowing facility for swine.

23. Develop a procedure to follow before, during and after farrowing.

CARE AND FEEDING OF THE SWINE BREEDING HERD

AG 310 - F

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

A. Make transparencies and necessary copies of materials.

B. Provide students with objectives and discuss.

C. Provide students with information and discuss.

D. Visit an area swine producer to examine swine farrowing facilities.

E. Ask a resource person to discuss purchasing and introducing replacement swine breeding stock.

F. Have a veterinarian speak on the care of gestating and lactating sows.

G. Using appropriate sanitary precautions, observe sows as they are approaching farrowing and during farrowing. Have students write down their observations.

H. Write for plans of farrowing facilities from the cooperative extension service.

I. Review and give test.

J. Reteach and retest if necessary.

II. Instructional materials

A. Objective sheet

B. Suggested activities

C. Information sheet

D. Transparency masters

1. TM 1--Sample Rations for Breeding Swine

2. TM 2--Recommended Breeding Load for Boars

3. TM 3--Signs of Estrus in Sows

4. TM 4--Steps for Cleaning a Farrowing Facility

5. TM 5--Causes of Baby Pig Losses

E. Handout

1. HO 1--Nutrient Requirements of Breeding Swine

F. Assignment sheets

1. AS 1--Draw a Farrowing Facility for Swine

2. AS 2--Develop a Procedure to Follow Before, During and After Farrowing

G. Answers to assignment sheets

H. Test

I. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Bundy, C.E. and Diggins, R.V., *Swine Production*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1970.

C. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

D. Ensminger, M.E., *Animal Science*. Interstate Printers and Publishers, Inc., Danville, Illinois, 1977.

E. Gibson, G.W., *Swine Nutrition*. Current Information Series #306, College of Agriculture, University of Idaho, Moscow, Idaho, 1980.

F. Olson, David P. and Gibson, Gene W., *Swine Herd Health Management During Gestation and Farrowing*. Current Information Series #385, College of Agriculture, University of Idaho, Moscow, Idaho, 1977.

G. *Swine Guide*. GTA Feeds, GTA Feed Division, Sioux Falls, South Dakota, 1979.

CARE AND FEEDING OF THE SWINE BREEDING HERD

AG 310 - F

INFORMATION SHEET

I. Terms and definitions

A. Gestation--Period of time when female is carrying offspring within the reproductive tract

B. Lactation--Period of time when female is providing milk to nourish offspring

C. Farrowing--Giving birth to a litter of pigs

D. Parturition--Act of giving birth

E. Flushing--Increasing amount of high energy ration to sows or gilts prior to breeding to increase conception rates

F. Passive immunity--Disease resistance passed on to offspring from the mother via the placenta or colostrum

G. Colostrum--First milk of a sow, containing high levels of antibodies and nutrients

H. Antibiotic--Substance given animals as a defense against diseases and/or bacterial infections

I. Monogastric--Animal with one stomach compartment; i.e. swine

J. Concentrate--Easily digested, high energy feedstuff; i.e. barley, corn, wheat

K. Viscous--Sticky consistency similar to gelatin

II. Primary feeds used for breeding swine (Transparency 1 and Handout 1)

A. Energy concentrates

1. Corn

2. Barley

3. Wheat

(Note: Concentrates are easily digestible and high in energy. Since swine are monogastric, the bulk of all rations should consist of concentrates.)

B. Protein supplements

1. Soybean oil meal

2. Meat meal

3. Fish meal

4. Cull peas

C. Roughages

1. Alfalfa hay

2. Pasture

3. Beet pulp

(Note: Roughages are used primarily for their laxative effect close to farrowing and as food source when weight gain should be kept to a minimum. Roughages can also supply protein, minerals and vitamins.)

III. Minimum protein requirements for breeding swine

A. Gestating sow or gilt--12%

B. Lactating sow--13%

C. Young or adult boar--12%

IV. Weight gain desired during gestation

A. Gilt--90 pounds

B. Sow--60 to 70 pounds

V. Procedure for introducing new boars to the breeding herd

A. Check health background of new boars
(Note: Diseases of particular importance are brucellosis, leptospirosis and pseudorabies.)

B. Purchase boars 50 to 60 days prior to breeding season

C. Isolate new boars for at least 30 days after arrival in clean, disinfected quarters at least several hundred feet from rest of the herd

D. After 30 days, pen boar adjacent to swine breeding herd

E. Have veterinarian evaluate semen to determine viable sperm count

F. Carefully determine appropriate breeding load

(Note: Think in terms of services per week rather than sows per boar.)

VI. Breeding load for boars (Transparency 2)

A. Young boar (8 1/2 - 12 months)

1. 1 service per day

2. 7 services per week

B. Mature boar (over 12 months)

1. 2 services per day

2. 10 services per week

(Note: A boar should not be used prior to 8 1/2 months of age.)

VII. Boar housing requirements

A. Provide clean, dry, draft-free sleeping area

B. Provide an exercise area

1. Open lot--1/4 acre/boar

2. Confinement--64 sq ft/boar

C. House boars individually to prevent fighting

D. Provide clean water and feeding facilities

VIII. Introducing replacement gilts to the breeding herd

(Note: Although gilts reach reproductive age at less than 5 months, they should not be bred until 7 1/2 to 8 months of age in order to insure they are physically able to produce large, healthy litters.)

A. Purchase only from a reputable breeder or seed stock supplier

B. Check health background of new gilts

(Note: Diseases of particular importance are brucellosis, leptospirosis and pseudorabies.)

C. Acquire purchased gilts 50 to 60 days prior to breeding season

D. Isolate new gilts for at least 30 days after arrival in clean, disinfected quarters at least several hundred feet from the rest of the herd

E. After 30 days, place healthy females with the rest of the sow herd to improve immunity prior to breeding

IX. Maintaining healthy breeding stock

A. Vaccinate boars and gilts for diseases such as leptospirosis and erysipelas prior to breeding season

B. Deworm breeding stock prior to breeding season

C. Spray for mange and lice prior to breeding season

D. Keep breeding area clean and free of debris that could cause injury

X. Signs of estrus (Transparency 3)

A. Red and swollen vulva

B. Clear, viscous vaginal discharge as standing heat approaches

C. Increased interest shown in boar

D. Standing to allow other females to mount

XI. Methods of breeding swine

A. Pen or pasture breeding

1. Most popular method

2. Less labor required

3. Greater chance of reduced conception

4. Greater chance of animal injury

5. Greater difficulty in identifying bred sows

B. Hand breeding

1. More labor required to identify sows in heat

2. Greater accuracy in identifying farrowing date

3. Each sow is mated twice--12 to 24 hours apart

(Note: Mating two times per estrus increases conception rate by 10% and litter size by 1 pig.)

4. Reduces injuries to animals

C. Artificial insemination--Still not a viable breeding alternative for commercial swine breeders due to difficulty in collecting and storing quality semen

XII. Procedure for flushing sows and gilts--Increased conception may be attained by increasing feed intake to 6-8 pounds of high energy ration per head per day during breeding season (14-21 days)

XIII. Gestation management of sows and gilts

A. Group sows with similar breeding dates to make gestation management more uniform for the stage of pregnancy sows are going through

B. Provide a draft-free, dry and well ventilated sleeping area

C. Two to three weeks after breeding, limit feed intake from flushing level--6 to 8 pounds to 3 to 5 pounds of balanced diet without antibiotics

(Note: Limiting feeding refers to an energy reduction without a reduction in nutrients such as protein, minerals and vitamins. Sows fed excess energy feeds will become overweight.)

D. Limit pregnancy weight gain to 90 pounds for gilts and 60 to 70 pounds for sows

E. Eighteen to 24 days after breeding, use a boar to settle open sows and gilts

F. Thirty to 45 days after breeding, use ultra-sonic pregnancy detector to locate open sows or sows that have absorbed or aborted their litter

G. Keep pregnant sows clean, healthy and comfortable

XIV. Factors that lower conception rates in swine

A. Reduction in boar fertility

B. Single mating per estrus

C. Warm temperatures

D. Inadequate or unbalanced ration

E. Disease and/or parasite infestation

XV. Pre-farrowing management for sows and gilts

A. 30 days before farrowing

1. Vaccinate animals according to a veterinarian's recommendations

(Note: The sow's immunity is often passed on to the baby pigs.)

2. Deworm

B. 7 to 14 days before farrowing--Begin feeding antibiotics and feed until 1 or 2 weeks after farrowing

C. 3 to 7 days before farrowing

1. Wash and treat for external parasites

2. Move animal into farrowing area

3. Add a laxative feed to make up 25% of the ration

XVI. Cleaning and disinfecting a farrowing facility (Transparency 4)

A. Remove everything movable from the building at least 3 days before introducing sows

B. Remove all manure, bedding, dust and cobwebs

C. Wash walls, ceiling, floors and equipment with high pressure, hot water and detergent solution

D. Thoroughly rinse and repeat the process if dirt or manure remain

E. Disinfect all equipment, floors, walls, etc. after cleaning

F. Close building tightly and allow to dry thoroughly

G. Place disinfectant foot baths at all entrances

H. Be sure all heaters, ventilators, fans, heat lamps, etc. are in working order

I. Isolate farrowing house from visitors, dogs, cats, etc.

XVII. Signs of approaching parturition

A. Nervousness or restlessness

B. Increased respiration rate

C. Frequent urination

D. Attempts at nest building

E. Milk expelled and dripping from teats

F. Feverish udder and underline

XVIII. Care of sow at farrowing

A. Maintain a uniform ration and provide ample, clean water

B. Keep animal and farrowing crate or pen clean, dry and draft-free

C. Provide adequate supervision to prevent farrowing loss

XIX. Care of newborn pigs

A. Wipe mucous off with dry towel

B. Place under heat lamp

C. Clip needle teeth

(Note: Small pigs have a better chance if teeth are not clipped. Do not clip too close to gums.)

D. Cut or pull navel cord apart at 1/2 to 1 inch from belly

E. Disinfect navel and gums with iodine or iodine and glycerine

F. Notch ears and disinfect

G. Make sure all pigs get colostrum within 12 hours

H. Give iron shots or feed iron at 2 to 4 days

I. Treat with erysipelas serum and antibiotics as is necessary

XX. Causes of baby pig losses prior to weaning (Transparency 5)

A. Crushing 30.9%

B. Starvation 17.6%

C. Born weak 14.7%

D. Diarrhea 12.9%

(Note: About 80% of the pigs lost prior to weaning die within two days after farrowing.)

XXI. Rebreeding sows after farrowing

A. Sows tend to exhibit standing heat 3 to 8 days after weaning if pigs are nursed 3 to 4 weeks

B. Sows may exhibit estrus during lactation if pigs are nursed beyond 5 to 6 weeks

C. Breed sows during the first estrus following weaning to maximize the number of litters produced per year

(Note: The use of prestarter rations and creep feeds for young pigs makes it easier to wean at earlier ages. Consequently, synchronization of estrus is relatively simple if a number of litters are weaned at the same time, since standing heat will likely occur 3 to 8 days after weaning.)

Sample Rations For Breeding Swine

GESTATING SOWS AND GILTS

1684 LBS CORN, 221 LBS SOYBEAN OIL MEAL, 21 LBS LIMESTONE, 33 LBS DICALCIUM PHOSPHATE, 10 LBS SALT

1731 LBS BARLEY, 105 LBS SOYBEAN OIL MEAL, 100 LBS MEAT MEAL, 18 LBS LIMESTONE, 25 LBS DICALCIUM PHOSPHATE, 10 LBS SALT

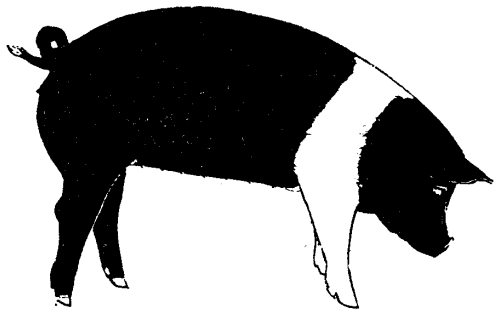
LACTATING SOW

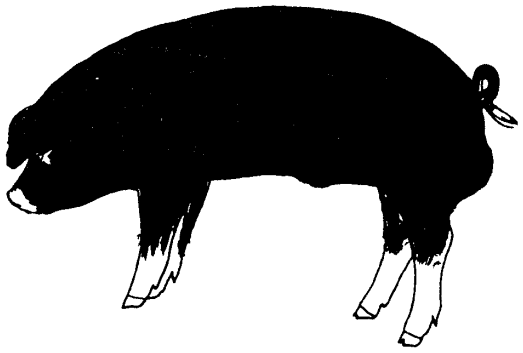
1664 LBS BARLEY, 162 LBS SOYBEAN OIL MEAL, 100 LBS MEAT MEAL, 50 LBS ANIMAL FAT, 6 LBS LIMESTONE, 10 LBS SALT

1477 LBS CORN, 442 LBS SOYBEAN OIL MEAL, 22 LBS LIMESTONE, 28 LBS DICALCIUM PHOSPHATE, 10 LBS SALT

BOAR

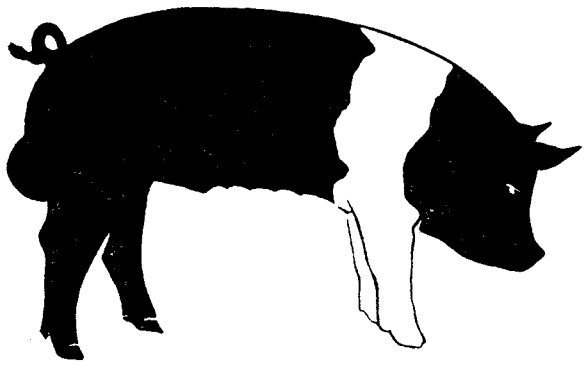
1606 LBS CORN, 320 LBS SOYBEAN OIL MEAL, 22 LBS LIMESTONE, 21 LBS DICALCIUM PHOSPHATE, 10 LBS SALT

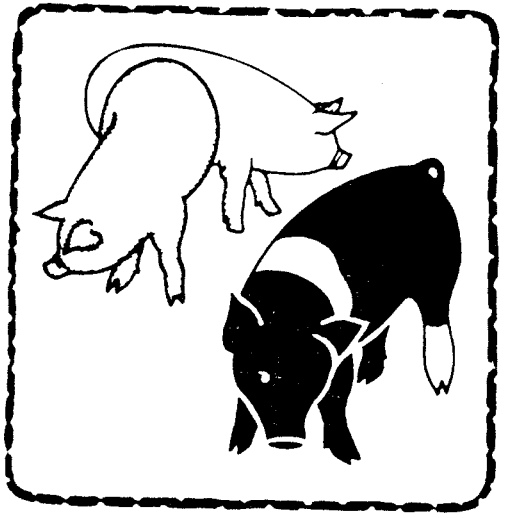




Recommended Breeding Load For Boars

BOAR	SERVICES/DAY	SERVICES/WEEK
YOUNG (8 1/2 - 12 MONTHS)	1	7
MATURE (OVER 12 MONTHS)	2	10





Signs Of Estrus In Sows

1. RED, SWOLLEN VULVA

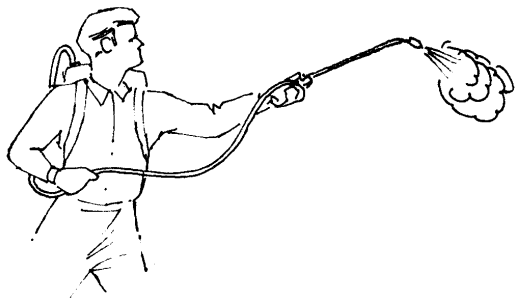
2. CLEAR, VISCOUS VAGINAL DISCHARGE

3. INCREASED INTEREST SHOWN IN BOAR

4. STANDING TO ALLOW OTHER FEMALES TO MOUNT

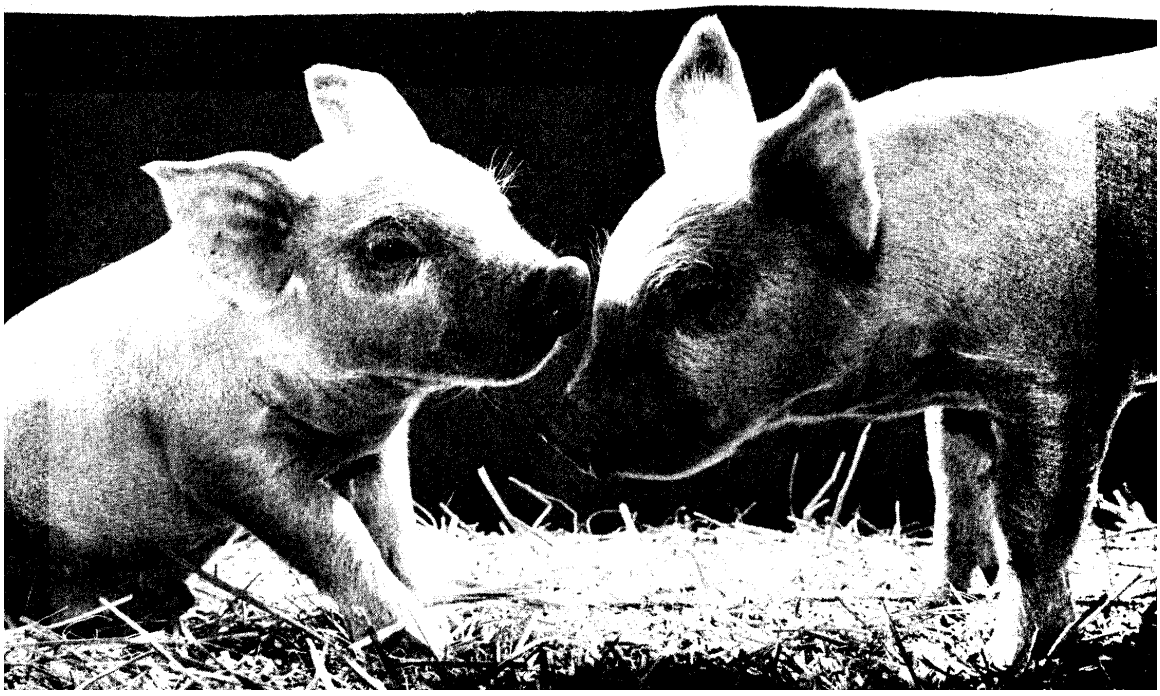
Steps For Cleaning A Farrowing Facility

1. REMOVE ALL MOVABLE EQUIPMENT FROM BUILDING
2. REMOVE ALL MANURE, BEDDING, DUST AND COBWEBS
3. WASH WALLS, CEILINGS, FLOORS AND EQUIPMENT WITH HIGH PRESSURE HOT WATER AND DETERGENT SOLUTION
4. THOROUGHLY RINSE
5. DISINFECT ALL EQUIPMENT, FLOORS, WALLS AND CEILINGS
6. CLOSE BUILDING TIGHTLY AND ALLOW TO DRY
7. PLACE DISINFECTANT FOOTBATHS AT ALL ENTRANCES
8. BE SURE HEATERS, VENTILATORS, FANS, AND HEAT LAMPS ARE IN WORKING ORDER
9. MOVE SOWS IN 5 TO 7 DAYS PRIOR TO DUE DATE
10. ISOLATE FARROWING HOUSE FROM VISITORS, DOGS, CATS, ETC.



Causes Of Baby Pig Losses

CRUSHING	30.9%
STARVATION	17.6%
BORN WEAK	14.7%
CHILLING	5.5%
TRANSMISSIBLE GASTROENTERITIS	3.9%
DIARRHEA	12.9%
PNEUMONIA	1.4%
OTHER	13.1%
TOTAL	100.0%



Nutrient Requirements of Breeding Swine
Ninth Revised Edition
1988

Nutrient Requirements of Swine

TABLE 5-3 Nutrient Requirements of Breeding Swine

Intake Levels	Bred gilts, sows, and adult boars	Lactating gilts and sows
Digestible energy (kcal/kg diet)	3,340	3,340
Metabolizable energy (kcal/kg diet)	3,210	3,210
Crude protein (%)	12	13
Requirement (% or amount/kg diet)[a]		
Nutrient		
Indispensable amino acids (%)		
Arginine	0.00	0.40
Histidine	0.15	0.25
Isoleucine	0.30	0.39
Leucine	0.30	0.48
Lysine	0.43	0.60
Methionine + cystine	0.23	0.36
Phenylalanine + tyrosine	0.45	0.70
Threonine	0.30	0.43
Tryptophan	0.09	0.12
Valine	0.32	0.60
Linoleic acid (%)	0.1	0.1
Mineral elements		
Calcium (%)	0.75	0.75
Phosphorus, total (%)	0.60	0.60
Phosphorus, available (%)	0.35	0.35
Sodium (%)	0.15	0.20
Chlorine (%)	0.12	0.16
Magnesium (%)	0.04	0.04
Potassium (%)	0.20	0.20
Copper (mg)	5.00	5.00
Iodine (mg)	0.14	0.14
Iron (mg)	80.00	80.00
Manganese (mg)	10.00	10.00
Selenium (mg)	0.15	0.15
Zinc (mg)	50.00	50.00
Vitamins		
Vitamin A (IU)	4,000	2,000
Vitamin D (IU)	200	200
Vitamin E (IU)	22	22
Vitamin K (menadione) (mg)	0.50	0.50
Biotin (mg)	0.20	0.20
Choline (g)	1.25	1.00
Folacin (mg)	0.30	0.30
Niacin, available (mg)	10.00	10.00
Pantothenic acid (mg)	12.00	12.00
Riboflavin (mg)	3.75	3.75
Thiamin (mg)	1.00	1.00
Vitamin B_6 (mg)	1.00	1.00
Vitamin B_{12} (μg)	15.00	15.00

NOTE: The requirements listed are based upon the principles and assumptions described in the text of this publication. Knowledge of nutritional constraints and limitations is important for the proper use of this table.

[a] These requirements are based upon corn-soybean meal diets, feed intakes, and performance levels listed in Tables 5-4, 5-6, and 5-7. In the corn-soybean meal diets, the corn contains 8.5 percent protein; the soybean meal contains 44 percent.

TABLE 5-4 Daily Nutrient Intakes and Requirements of Intermediate-Weight Breeding Animals

	Mean Gestation or Farrowing Weight (kg) of:	
	Bred Gilts, Sows, and Adult Boars	Lactating Gilts and Sows
Intake and Performance Levels	162.5	165.0
Daily feed intake (kg)	1.9	5.3
Digestible energy (Mcal/day)	6.3	17.7
Metabolizable energy (Mcal/day)	6.1	17.0
Crude protein (g/day)	228	689
Requirement (amount/day)		
Nutrients		
Indispensable amino acids (g)		
Arginine	0.0	21.2
Histidine	2.8	13.2
Isoleucine	5.7	20.7
Leucine	5.7	25.4
Lysine	8.2	31.8
Methionine + cystine	4.4	19.1
Phenylalanine + tyrosine	8.6	37.1
Threonine	5.7	22.8
Tryptophan	1.7	6.4
Valine	6.1	31.8
Linoleic acid (g)	1.9	5.3
Mineral elements		
Calcium (g)	14.2	39.8
Phosphorus, total (g)	11.4	31.8
Phosphorus, available (g)	6.6	18.6
Sodium (g)	2.8	10.6
Chlorine (g)	2.3	8.5
Magnesium (g)	0.8	2.1
Potassium (g)	3.8	10.6
Copper (mg)	9.5	26.5
Iodine (mg)	0.3	0.7
Iron (mg)	152	424
Manganese (mg)	19	53
Selenium (mg)	0.3	0.8
Zinc (mg)	95	265
Vitamins		
Vitamin A (IU)	7,600	10,600
Vitamin D (IU)	380	1,060
Vitamin E (IU)	42	117
Vitamin K (menadione) (mg)	1.0	2.6
Biotin (mg)	0.4	1.1
Choline (g)	2.4	5.3
Folacin (mg)	0.6	1.6
Niacin, available (mg)	19.0	53.0
Pantothenic acid (mg)	22.8	63.6
Riboflavin (mg)	7.1	19.9
Thiamin (mg)	1.9	5.3
Vitamin B_6 (mg)	1.9	5.3
Vitamin B_{12} (μg)	28.5	79.5

TABLE 5-5 Requirements for Several Nutrients of Breeding Herd Replacements Allowed Feed Ad Libitum

	Weight (kg) of:			
	Developing Gilts		Developing Boars	
Intake Levels	20–50	50–110	20–50	50–110
Energy concentration (kcal ME/kg diet)	3,255	3,260	3,240	3,255
Crude protein (%)	16	15	18	16
Nutrient[a]				
Lysine (%)	0.80	0.70	0.90	0.75
Calcium (%)	0.65	0.55	0.70	0.60
Phosphorus, total (%)	0.55	0.45	0.60	0.50
Phosphorus, available (%)	0.28	0.20	0.33	0.25

[a]Sufficient data are not available to indicate that requirements for other nutrients are different from those in Table 5-1 for animals of these weights.

TABLE 5-6 Daily Energy and Feed Requirements of Pregnant Gilts and Sows

	Weight (kg) of Bred Gilts and Sows at Mating[a]		
Intake and Performance Levels	120	140	160
Mean gestation weight (kg)[b]	142.5	162.5	182.5
Energy required (Mcal DE/day)			
Maintenance[c]	4.53	5.00	5.47
Gestation weight gain[d]	1.29	1.29	1.29
Total	5.82	6.29	6.76
Feed required/day (kg)[e]	1.8	1.9	2.0

[a]Requirements are based on a 25-kg maternal weight gain plus 20-kg increase in weight due to the products of conception; the total weight gain is 45 kg.

[b]Mean gestation weight is weight at mating + (total weight gain/2).

[c]The animal's daily maintenance requirement is 110 kcal of DE/kg$^{0.75}$ (see the energy section in Chapter 2).

[d]The gestation weight gain is 1.10 Mcal of DE/day for maternal weight gain plus 0.19 Mcal of DE/day for conceptus gain (see the Energy section in Chapter 2).

[e]The feed required/day is based on a corn-soybean meal diet containing 3.34 Mcal of DE/kg.

TABLE 5-7 Daily Energy and Feed Requirements of Lactating Gilts and Sows

	Weight (kg) of Lactating Gilts and Sows at Postfarrowing		
Intake and Performance Levels	145	165	185
Milk yield (kg)	5.0	6.25	7.5
Energy required (Mcal DE/day)			
Maintenance[a]	4.5	5.0	5.5
Milk production[b]	10.0	12.5	15.0
Total	14.5	17.5	20.5
Feed required/day (kg)[c]	4.4	5.3	6.1

[a]The animal's daily maintenance requirement is 110 kcal of DE/kg$^{0.75}$ (see the energy section in Chapter 2).

[b]Milk production requires 2.0 Mcal of DE/kg of milk (see the Energy section in Chapter 2).

[c]The feed required/day is based on a corn-soybean meal diet containing 3.34 Mcal of DE/kg.

CARE AND FEEDING OF THE SWINE BREEDING HERD

AG 310 – F

ASSIGNMENT SHEET #1 – DRAW A FARROWING FACILITY FOR SWINE

Name_____ Score_____

Design and draw a farrowing facility using sources such as livestock magazines, local farmers, books and extension publications. Feeding, watering, ventilation and heat should be taken into consideration, as well as farrowing crates or pens and facilities for handling baby pigs. You may also add additional items as is necessary for your particular operation. You will need to decide on the number of sows that will be farrowing at one time.

Size of breeding herd_____ sows

Number of sows farrowing at one time _____

(Note: Use another paper to draw your facility.)

CARE AND FEEDING OF THE SWINE BREEDING HERD

AG 310 - F

ASSIGNMENT SHEET #2--DEVELOP A PROCEDURE TO FOLLOW BEFORE, DURING AND AFTER FARROWING

Name_____ Score_____

Farrowing is a very critical time in a swine operation. Profit is directly related to the number of pigs saved and their physical condition.

Develop a procedure for dealing with this critical period. Start about 30 days before farrowing and include the first few days after farrowing. Consider factors such as feeding, vaccinations, spraying and deworming, care and supervision just before, during and after farrowing, assistance during birth and what to do with the newborn pigs. Some research into local disease problems will be necessary.

Procedure:

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CARE AND FEEDING OF THE SWINE BREEDING HERD

AG 310 - F

ANSWERS TO ASSIGNMENT SHEETS

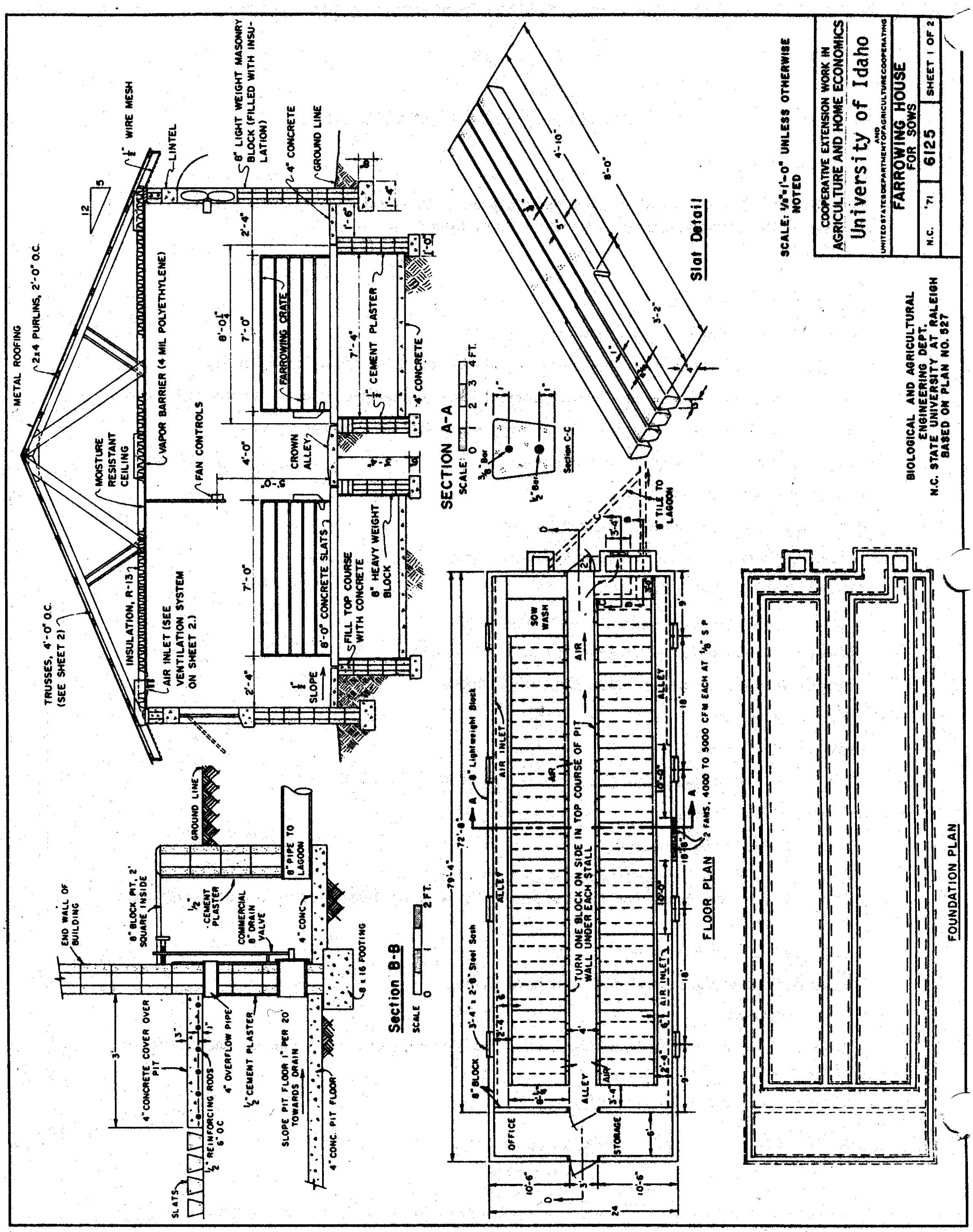
Assignment Sheet #1

The plan can either be a sketch or a detailed blueprint depending on the class, time, etc. One detailed drawing of a farrowing house can be found on the next page.

Assignment Sheet #2

Answer should be similar to the following:

- Begin vaccinating sows for diseases prevalent in the local area 30 days before farrowing
- Begin feeding antibiotics 21 days before farrowing and continue feeding until 1 week after farrowing
- Feed a bulky or laxative ration before farrowing, especially if sows are constipated
- Deworm sows 14 to 21 days prior to farrowing
- Spray for external parasites
- Thoroughly clean and disinfect farrowing facility
- Move sows into the facility 5 to 7 days before farrowing
- Watch closely for signs of parturition
- Keep sow and farrowing crate clean, dry and draft-free
- Maintain a uniform ration and provide plenty of clean water
- Provide assistance to the sow during the birth if needed
- Wipe baby pigs dry
- Clip the needle teeth
- Disinfect navels and gums with solution of 1/2 glycerine and 1/2 iodine
- Notch ears and disinfect
- Place baby pigs under heat lamp
- Adjust litter size to the number of functional teats on the sow
  (Note: This can be accomplished by transferring the baby pigs from one sow to another within the first 3 to 4 days.)
- Make sure they are all nursing
- Particularly weak pigs may need shots or hand feeding
- Destroy afterbirth
- After the first day move the heat lamps so that one is over the sow's underline and one is over the creep feeder
- Give iron shots at 2 to 4 days of age


METAL ROOFING
2x4 PURLINS, 2'-0" O.C.
TRUSSES, 4'-0" O.C. (SEE SHEET 2)
INSULATION, R-13
MOISTURE RESISTANT CEILING
VAPOR BARRIER (4 MIL POLYETHYLENE)
FAN CONTROLS
AIR INLET (SEE VENTILATION SYSTEM ON SHEET 2.)
LINTEL
WIRE MESH
8" LIGHT WEIGHT MASONRY BLOCK (FILLED WITH INSULATION)
4" CONCRETE
GROUND LINE
FARROWING CRATE
CEMENT PLASTER
CROWN ALLEY
8'-0" CONCRETE SLATS
FILL TOP COURSE WITH CONCRETE
8" HEAVY WEIGHT BLOCK
SLOPE
SECTION A-A
Section C-C
8" TILE TO LAGOON
Slat Detail
END WALL OF BUILDING
8" BLOCK PIT, 2' SQUARE INSIDE
8" PIPE TO LAGOON
COMMERCIAL 8" DRAIN VALVE
4" CONCRETE COVER OVER PIT
4" OVERFLOW PIPE
REINFORCING RODS 6" OC
SLOPE PIT FLOOR 1" PER 20' TOWARDS DRAIN
4" CONC. PIT FLOOR
8 x 16 FOOTING
SLATS
Section B-B
OFFICE
STORAGE
ALLEY
SOW WASH
AIR INLET
TURN ONE BLOCK ON SIDE IN TOP COURSE OF PIT WALL UNDER EACH STALL
2 FANS, 4000 TO 5000 CFM EACH AT 1/8" S P
FLOOR PLAN
FOUNDATION PLAN
SCALE: 1/8"=1'-0" UNLESS OTHERWISE NOTED
COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
University of Idaho
FARROWING HOUSE FOR SOWS
6125
SHEET 1 OF 2
BIOLOGICAL AND AGRICULTURAL ENGINEERING DEPT.
N.C. STATE UNIVERSITY AT RALEIGH
BASED ON PLAN NO. 527

CARE AND FEEDING OF THE SWINE BREEDING HERD

AG 310 - F

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Giving birth to a litter of pigs	1. Passive immunity
_____b.	Disease resistance passed on to offspring from the mother via the placenta or colostrum	2. Lactation
_____c.	Period of time when female is carrying offspring within the reproductive tract	3. Farrowing
_____d.	First milk of a sow, containing high levels of antibodies and nutrients	4. Viscous
_____e.	Act of giving birth	5. Monogastric
_____f.	Animal with one stomach compartment; i.e. swine	6. Flushing
_____g.	Period of time when female is providing milk to nourish offspring	7. Gestation
_____h.	Substance given animals as a defense against diseases and/or bacterial infections	8. Antibiotic
_____i.	Increasing amount of high energy ration to sows or gilts prior to breeding to increase conception rates	9. Colostrum
_____j.	Easily digested, high energy feedstuff; i.e. barley, corn, wheat	10. Parturition
_____k.	Sticky consistency similar to gelatin	11. Concentrate

2. Under each category below, list two feeds that are appropriate for breeding swine.

   Energy concentrates:

   a. _____

   b. _____

Protein supplements:

a. _____

b. _____

Roughages:

a. _____

b. _____

3. Write the minimum percentage of protein necessary for rations for the swine listed below.

   a. Gestating sow _____

   b. Lactating sow _____

   c. Boar _____

4. Write the desired weight gain for gilts and sows during gestation.

   a. Gilt _____

   b. Sow _____

5. List the procedures for introducing new boars to the breeding herd.

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

   d. _____

   _____

   e. _____

   _____

   f. _____

   _____

6. List recommended breeding loads for a young and a mature boar.

   Young boar

   a. _____services per day

   b. _____services per week

   Mature boar

   c. _____services per day

   d. _____services per week

7. Describe proper housing for the herd boar.

   _____

   _____

   _____

   _____

   _____

   _____

8. Select the steps to take when buying replacement gilts and introducing them to the breeding herd.

   _____ a. Purchase only from a reputable breeder or seed stock supplier

   _____ b. Check health background of new gilts

   _____ c. Acquire purchased gilts at least 20 days before breeding

   _____ d. Isolate gilts for at least 30 days

   _____ e. After 30 days move the gilts to their breeding pens, but do not mix with existing stock

9. Describe four procedures for maintaining healthy breeding stock.

   a. _____

      _____

   b. _____

      _____

c. _____

_____

d. _____

_____

10. List two signs of estrus.

a. _____

b. _____

11. Distinguish among the methods of breeding swine by placing a "P" for pen or pasture mating, an "H" for hand breeding or an "A" for artificial breeding in front of the appropriate statement.

(Note: Although "A" could apply to more than one, only use it for the one most appropriate statement.)

_____a. Reduces injuries to animals

_____b. Less labor required

_____c. Each sow is mated twice - 12 to 24 hours apart

_____d. Most popular method

_____e. Greater chance of animal injury

_____f. More labor required to identify sows in heat

_____g. Greater accuracy in identifying farrowing date

_____h. Greater difficulty in identifying bred sows

_____i. Greater chance of reduced conception

_____j. Not very practical due to difficulty in collecting and storing quality semen

12. Describe the amount and kind of feed recommended for flushing sows and gilts prior to breeding.

a. Amount of feed _____

b. Kind or type of feed _____

13. Describe the major management guidelines to follow during the gestation period for each of the conditions or time periods listed.

    a. To make gestation management easier and more uniform _____

    _____

    b. Housing conditions _____

    _____

    c. Feeding two to three weeks after breeding _____

    _____

    d. Weight gain _____

    _____

    e. Open gilts 18 to 24 days after breeding _____

    _____

    f. All sows and gilts 30 to 45 days after breeding _____

    _____

14. List three of the factors that could lower conception rates in swine.

    a. _____

    _____

    b. _____

    _____

    c. _____

    _____

15. Describe how to care for sows and gilts beginning 30 days before farrowing.

    a. 30 days before farrowing

    (1) _____

    (2) _____

    b. 7 to 14 days before farrowing _____

    _____

    _____

c. 3 to 7 days before farrowing

(1) _____

(2) _____

(3) _____

16. List in order the appropriate steps in cleaning and disinfecting a farrowing facility.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

e. _____

_____

f. _____

_____

g. _____

_____

h. _____

_____

i. _____

_____

17. Select the signs of approaching parturition by placing an "X" in the blank before the correct answers.

_____a.	Nervousness	_____d.	Attempts at "nest building"
_____b.	Decreased respiration rate	_____e.	Milk dripping from teats
_____c.	Ceasing of urination	_____f.	Feverish underline and udder

18. Describe how to properly care for a sow at farrowing.

_____

_____

_____

_____

_____

_____

_____

19. Describe 7 steps in caring for newborn pigs.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

g. _____

20. List the top four causes of baby pig loss prior to weaning.

a. _____

b. _____

c. _____

d. _____

21. Describe timelines for rebreeding sows after farrowing by filling in the blanks below.

Sows tend to exhibit standing heat (a) _____ days after weaning if pigs are nursed 3 to 4 weeks. Sows may exhibit estrus during lactation if pigs are nursed beyond (b) _____. Sows should be bred during the (c) _____ estrus following (d) _____.

CARE AND FEEDING OF THE SWINE BREEDING HERD

AG 310 - F

ANSWERS TO TEST

1.

a.	3 or 10	d.	9	g.	2	j.	11
b.	1	e.	10 or 3	h.	8	k.	4
c.	7	f.	5	i.	6		

2. Answer should include two from each category.

   Concentrates: corn, barley, wheat
   Protein supplements: soybean meal, meat meal, fishmeal, cull peas
   Roughages: alfalfa hay, pasture, beet pulp

3. a. 12%
   b. 13%
   c. 12%

4. a. 90 lbs
   b. 60 to 70 lbs

5. Check health background of new boars; Purchase boars 50 to 60 days prior to breeding season; Isolate new boars for at least 30 days after arrival in clean, disinfected quarters at least several hundred feet from rest of the herd; After 30 days, pen boar adjacent to swine breeding herd; Have veterinarian evaluate semen to determine viable sperm count; Carefully determine appropriate breeding load

6. a. 1
   b. 7
   c. 2
   d. 10

7. Provide clean, dry, draft-free sleeping area; Provide an exercise area (open lot - 1/4 acre/boar, confinement - 64 sq ft/boar); House boars individually to prevent fighting; Provide clean water and feeding facilities

8. a, b, d

9. Vaccinate boars and gilts for diseases such as leptospirosis and erysipelas prior to breeding season; Deworm breeding stock prior to breeding season; Spray for mange and lice prior to breeding season; Keep breeding area clean and free of debris that could cause injury

10. Answer should include 2 of the following:

    Red and swollen vulva; Clear, viscous vaginal discharge as standing heat approaches; Increased interest shown in boar; Standing to allow other females to mount

11.

a.	H	d.	P	g.	H	j.	A
b.	P	e.	P	h.	P		
c.	H	f.	H	i.	P		

12. a. 6 - 8 lbs
    b. High energy

13. a. Group sows and gilts according to similar breeding dates
    b. Provide dry, draft-free but well ventilated sleeping areas
    c. Cut feed from flushing level to 3 - 5 lbs of a balanced diet without antibiotics
    d. Limit weight gain to 90 lbs for gilts and 60 - 70 lbs for sows
    e. Use a boar to settle open sows and gilts
    f. Use ultrasonic pregnancy detector to locate sows or gilts that have aborted or absorbed their litter

14. Answer should include 3 of the following:

    Reduction in boar fertility; Single mating per estrus; Warm temperatures; Inadequate or unbalanced ration; Disease and/or parasite infestation

15. a. Vaccinate animals according to a veterinarian's recommendation; Deworm
    b. Begin feeding antibiotics and feed until 1 or 2 weeks after farrowing
    c. Wash and treat for external parasites; Move animal into farrowing area; Add a laxative feed to make up 25% of the ration

16. a. Remove everything from the building at least 3 days before introducing sows
    b. Remove all manure, bedding, dust and cobwebs
    c. Wash walls, ceiling, floors and equipment with high pressure, hot water and detergent solution
    d. Thoroughly rinse and repeat the process if dirt or manure remain
    e. Disinfect all equipment, floors, walls, etc. after cleaning
    f. Close building tightly and allow to dry thoroughly
    g. Place disinfectant foot baths at all entrances
    h. Be sure all heaters, ventilators, fans, heat lamps, etc. are in working order
    i. Isolate farrowing house from visitors, dogs, cats, etc.

    (Note: Answers "g" and "h" do not necessarily have to be in that order and "i" can be anywhere.)

17. a, d, e, f

18. Maintain a uniform ration and provide ample, clean water; Keep animal and farrowing crate or pen clean, dry and draft-free; Provide adequate supervision to prevent farrowing loss

19. Answer should include 7 of the following:

    Wipe mucous off with dry towel; Place under heat lamp; Clip needle teeth; Cut or pull navel cord apart at 1/2 to 1 inch from belly; Disinfect navel and gums with iodine or iodine and glycerine; Notch ears and disinfect; Make sure all pigs get colostrum within 12 hours; Give iron shots or feed iron at 2 to 4 days; Treat with erysipelas serum and antibiotics as is necessary

20. Crushing; Starvation; Born weak; Diarrhea

21. a. 3 to 8
    b. 5 to 6 weeks
    c. first
    d. weaning

SWINE MANAGEMENT

AG 310 - G

UNIT OBJECTIVE

After completion of this unit, students should be able to develop a breeding program for market swine. Students should also be able to describe proper record keeping procedures and demonstrate management skills necessary in managing a swine enterprise. This knowledge will be demonstrated by the completion of the assignment sheets and unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with swine management to their correct definitions.
2. List four reasons for maintaining swine records.
3. Describe items of information that might be included in breeding records, production records, feed records, labor records and complete enterprise records.
4. List four types of swine breeding programs.
5. Describe advantages of crossbreeding swine.
6. Match types of crossbreeding systems to their descriptions.
7. Distinguish between advantages of confinement production systems and advantages of pasture production systems.
8. List five pasture crops used in swine feeding programs.
9. Match weight requirements to specific stages of market swine development.
10. Describe the nutrient requirement trends for protein, calcium and phosphorus for swine in the pre-starter and finisher stages of development.
11. List three methods of improving efficiency in swine production.
12. Describe health and sanitation problems of the swine industry.
13. List four advantages of providing creep feed during pre-starter and starter periods.
14. Explain procedures used to wean pigs from the sow.
15. List five factors to consider when designing a total confinement system for swine.
16. Describe three kinds of swine markets.
17. List seven key techniques for shipping swine to market.

18. Distinguish among the times of year when swine prices are traditionally the highest and the lowest.

19. Describe factors to consider when planning housing facilities, feeding and watering equipment, and handling facilities and equipment for swine.

20. Describe a management program for specific stages of growth for market swine.

21. Ear notch swine for identification.

22. Design a total confinement swine system.

SWINE MANAGEMENT

AG 310 - G

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

A. Make transparencies and necessary copies of materials.

B. Provide students with objectives.

C. Provide students with information and discuss.

D. Provide students with assignment sheets.

E. Arrange a field trip to a commercial hog operation.

F. Allow students to perform actual management skills on newborn pigs and weaning pigs.

G. Arrange a field trip to an interior market (packing plant), livestock auction or terminal market. Discuss marketing with an actual hog buyer.

H. Have students build scale models of swine finishing systems.

I. Obtain swine feed labels and discuss nutrient content in relation to swine nutrient requirements.

J. Collect market information and prices for swine on a daily or weekly basis. Have students construct price graphs and discuss market trends.

K. Review and give test.

L. Reteach and retest if necessary.

II. Instructional materials

A. Objective sheet

B. Suggested activities

C. Information sheets

D. Transparency masters

1. TM 1--Advantages of Crossbreeding

2. TM 2--Crossbreeding - Two Breed Cross

3. TM 3--Crossbreeding - Three Breed Cross

4. TM 4--Crisscrossing

5. TM 5--Developmental Stages of Market Swine

6. TM 6--Ear Notching of Swine

7. TM 7--Shipping Market Hogs

E. Handout

1. HO 1--Daily Nutrient Requirements of Growing-Finishing Swine

F. Assignment sheets

1. AS 1--Describe a Management Program for Specific Stages of Growth for Market Swine

2. AS 2--Ear Notch Swine for Identification

3. AS 3--Design a Total Confinement Swine System

G. Answers to assignment sheets

H. Test

I. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Bundy, C.E. and Diggins, R.V., *Swine Production.* Prentice Hall Publishers, Englewood Cliffs, New Jersey, 1970.

C. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

D. Ensminger, M.E., *Animal Science.* The Interstate Printers and Publishers, Inc., Danville, Illinois, 1977.

E. Gilbert, Fred, *The Baby Pig*. Current Information Series #148, University of Idaho, Moscow, Idaho, 1971.

F. *Swine Feeding and Management Manual.* GTA Feeds, Sioux Falls, South Dakota, 1979.

SWINE MANAGEMENT

AG 310 - G

INFORMATION SHEET

I. Terms and definitions

A. Barrow--Castrated male hog used for producing meat

B. Boar--Uncastrated male hog used in swine breeding programs

C. Gilt--Female swine that has not produced a litter

D. Sow--Female swine that has produced a litter

E. Creep feeding--Providing starter pigs with a supplementary, highly palatable feed to increase early weight gain

F. CWT--Hundred weight or 100 pounds

(Note: This abbreviation was developed by combining the Roman Numeral "C" for 100 with the abbreviation "wt" for weight.)

G. Litter--A brood of pigs born at one time to a sow

H. Enterprise--A specific project of similar animals raised for a specific purpose; i.e. swine enterprise

I. Upgrading--Mating a purebred boar with a grade sow of the same breed

J. Purebreeding--Mating a purebred boar with a purebred sow of the same breed

K. Crossbreeding--Mating a purebred or inbred boar of one breed with a purebred or grade sow of another breed

(Note: About 90 percent of commercial hog producers are crossbreeding their hogs.)

L. Linebreeding--Mating of purebred boars of one line or family with sows of the same line, but not so closely related as those used in inbreeding

M. Inbreeding--Mating of boars with sows of the same breed which are closely related

N. Heterosis--Hybrid vigor or the increased performance obtained by mating animals of two different breeds

O. Average daily gain--Average amount of weight produced per day, calculated by dividing total gain by the number of days in the feeding period

P. Feed efficiency--A measure of the amount of feed needed to produce one pound of gain in a market animal

Q. Legume--Plant having the ability to utilize nitrogen from the air; high in protein

R. Pasture mixture--Mixture of plants usually containing grasses and legumes

II. Reasons for maintaining swine records

A. To analyze management decisions

B. To determine profitability of enterprise

C. To identify superior breeding stock

D. As a basis for future decision making

III. Kinds of swine records

(Note: Records which should be maintained will vary with production programs, but usually include the following.)

A. Breeding records

1. Date gilt or sow is bred

2. Name or number of boar used

3. Identification of sow or gilt--Ear notch number, ear tag number or other identifying characteristics

4. Number of re-breeding attempts, if necessary

B. Production records

1. Size of litter at birth

2. Size of litter at weaning

3. Litter weight at birth

4. Litter weight at weaning

5. Ear notching or marking of litter

6. Average daily gain

7. Feed efficiency--Pounds of feed fed to gain one pound of meat

(Note: A superior market swine will gain one pound of weight on 3.5 pounds of feed or less.)

8. Carcass traits--Backfat, length, loin eye area, etc.

(Note: For purebred breeding stock, littermates are raised in the same test environment and slaughtered at the appropriate weight. Carcass data from the littermates is used to estimate carcass traits in breeding animals.)

C. Feed records

1. Kind of ration or rations fed

2. Amount of ration fed

3. Cost of feed purchased

(Note: Feed raised on the farm and marketed through the swine enterprise should be valued at current market price.)

D. Labor records

1. Hours of self-labor

2. Date and hours of paid labor

3. Rate per hour of paid labor

E. Complete enterprise records

1. Cash income

2. Expenses

3. Beginning and closing inventory

4. Overhead costs--Building rental, vet bills, medicines, etc.

5. Death losses

IV. Swine breeding programs

A. Purebred breeding

B. Crisscrossing

C. Crossbreeding

(Note: About 90 percent of commercial swine production involves crossbreeding and crisscrossing.)

D. Upgrading

E. Inbreeding

F. Linebreeding

V. Advantages of crossbreeding (Transparency 1)

(Note: These advantages are the result of heterosis or hybrid vigor. Heterosis generally increases as breeds that are increasingly different are mated. Usually purebred boars are mated with crossbreed gilts.)

A. Increase in live litter size at birth and weaning

B. Increase in litter weights at birth and weaning

C. Improved mothering ability in sow

D. Increase in feed efficiency

E. Increase in average daily gain from weaning to market

F. Better performance and constitution

G. Greater resistance to stress and diseases

VI. Types of crossbreeding systems (Transparencies 2, 3, 4)

A. Two-breed cross--A purebred or inbred boar of one breed is mated to grade sows of another breed (Transparency 2)

B. Three-breed cross--Sows of one breed are bred to a boar of another breed; gilts from the first cross are bred to a third breed of boar; gilts from this cross are bred to a boar of the original sow breed (Transparency 3)

C. Crisscrossing--A purebred or inbred boar of one breed is mated to a grade sow of another; gilts from this cross are mated to a boar from the same breed as the original sow (Transparency 4)

D. Rotation breeding--Boars of three or four breeds are used in rotation in an effort to maintain the hybrid vigor in the offspring

VII. Advantages associated with swine production systems

A. Confinement system

1. More rapid gains

2. Useable during more months per year

3. Less labor in feed handling

4. Less difficulty in providing quality water

5. Better control of animals

6. Better utilization of land

7. Frees up expensive land for cultivation

B. Pasture system

1. Less feed needed

2. Less protein needed (legume pasture)

3. Healthier pigs

4. Lower cost for buildings and equipment

5. Less manure handling problems

6. Less management skill needed

VIII. Pasture crops used in swine feeding programs

A. Alfalfa

B. Ladino clover

C. Red clover

D. Sweet clover

E. Bluegrass

(Note: Grass-legume mixtures make quality pasture for swine. Check with your county extension agent for a pasture mixture appropriate for your area.)

IX. Stages of development in market hogs (Transparency 5)

A. Pre-starter period--0 - 12 lbs in weight

B. Starter period--12 - 40 lbs in weight

C. Developer period--40 - 75 lbs in weight

D. Grower period--75 - 125 lbs in weight

E. Finisher period--125 lbs to market weight

X. Nutrient requirement trends of swine at specific developmental stages

		Requirements		
Stage of Development	Weight (lb)	Protein (%)	Calcium (%)	Phosphorus (%)
Pre-starter	0 - 12	24	0.70	0.60
Starter	12 - 40	20	0.70	0.60
Developer	40 - 75	16	0.65	0.55
Grower	75 - 125	14	0.60	0.50
Finisher	125 - market	12	0.60	0.50

XI. Methods of improving efficiency in swine production

A. Crossbreeding

B. Selection

C. Improved management practices

(Note: Although crossbreeding and selection of quality breeding stock is important, improvement of management techniques generally has a greater immediate and overall impact on improving efficiency in swine production.)

XII. Health and sanitation problems of swine industry

A. Swine diseases and parasites are responsible for losses amounting to millions of dollars annually

B. Only about one third of the farrowed pigs grow out as healthy pigs

1. One third die before weaning

2. One third are stunted or unprofitable because of disease or parasites

C. Sanitation is most important factor in controlling diseases and parasites

1. Disease and parasite free breeding stock

2. Rotated legume pastures

3. Clean and disinfected houses

4. Balanced rations fortified with vitamins and antibiotics

D. Some diseases and parasites must be controlled by vaccination and medication

XIII. Management skills to be performed at specific developmental stages of swine (Assignment Sheet #1)

A. Management skills for pre-starter period

1. Provide supplementary heat of 90^{o} to 95^{o}F

(Note: Supplemental heat maintains body temperature, dries newborn pigs rapidly and draws pigs away from sow while sow is adjusting to them.)

2. Be sure pigs nurse within a few hours of birth

3. Equalize litters among sows farrowing at the same time

4. Clip needle teeth

5. Dock tails to 1/2 inch

(Note: This is especially important if pigs will be raised in confinement.)

6. Ear notch pigs for litter identification

7. Spray ears, navel and docked tail with iodine to prevent infections

8. Give iron injections by 4th day

9. Give recommended vaccinations

10. Provide creep feed with a pre-starter ration

11. Maintain sanitary environment

B. Management skills for starter period

1. Castrate male hogs to be used as market animals

2. Wean pigs at 4 to 5 weeks of age

3. De-worm two weeks after weaning

4. Vaccinate for major diseases 2 to 3 weeks after weaning

5. Maintain sanitary environment

C. Management skills for developer, grower and finisher periods

1. Group pigs into pens of 20-30 animals of similar size--do not overcrowd

2. Maintain de-worming program

3. Spray for external parasites

4. Provide adequate feeder space and waterers

5. Maintain a sanitary environment

XIV. Advantages of creep feeding during pre-starter and starter period

A. Supplements sow's milk just prior to weaning

B. More pigs saved per litter at weaning

C. Healthier pigs at weaning

D. Greater litter weight at weaning

E. Provides a balanced, fortified pre-weaning ration

XV. Procedure used in weaning pigs

A. Preparation of facilities

1. Thoroughly clean nursery at least 7 days before weaning

2. Disinfect all surfaces and let dry

3. Eliminate floor-level drafts by enclosing area with plywood, sheet metal, etc.

4. Place heat source over sleeping area

5. Maintain floor-level temperature at 80-85^{o}F

6. Provide one feeder hole for every 4 or 5 pigs weaned

7. Provide 1 waterer for every 20-25 pigs

8. Provide 2 to 3 square feet of room per pig

B. At weaning

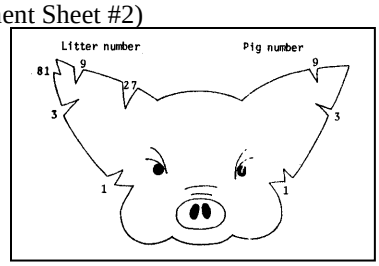
1. Pen by size or litter, but not over 25 pigs per pen

2. Do not mix older "tail-enders" from last batch with new pigs

3. Limit feed consumption during first 48 to 72 hours

4. Include antibiotic supplements in feeds

XVI. Ear notching swine (Transparency 6, Assignment Sheet #2)



A. Left ear--Pig number

B. Right ear--Litter number

C. Numbering system--

XVII. Factors associated with a swine total confinement system (Assignment Sheet #3)

A. Feed handling system

B. Manure disposal system

C. Slotted floors

D. Insulation

E. Ventilation

F. Heating equipment

G. Cooling equipment

H. Watering system

XVIII. Types of swine markets

A. Terminal markets--Public stockyards; commission firms purchase hogs; sell to meat packing plants; centrally located and accessible to large number of swine producers, usually in more than one state

B. Interior packing plants--Meat packing plants purchasing market swine directly from producers; located in smaller towns; accessible to a smaller number of swine producers

C. Sales auction--Public auction providing open bidding on swine by meat processors and other swine producers; sells breeding stock and feeder pigs as well as other livestock species

XIX. Handling techniques for shipping swine to market (Transparency 7)

A. Do not feed hogs heavily before shipping

B. Allow 3 1/2 square feet per 200 pound animal

C. Clean truck before loading

D. Use sand for bedding in hot weather; straw in cold weather

E. Separate heavy from light hogs before shipping

F. Wet or sprinkle hogs during hot weather

G. Remove all protruding bolts and nails from loading chute

H. Have sturdy, well-constructed loading facilities

I. Handle hogs quietly and with care

J. Do not bruise swine while loading

K. Do not ship swine with other kinds of livestock

L. Eliminate drafts during shipping

M. Avoid sudden stops during shipping

XX. Time of year when swine market prices are highest and lowest

A. Months when prices are traditionally highest

1. February

2. July

3. August

B. Months when prices are traditionally lowest

1. November

2. April

3. May

XXI. Factors to consider when planning facilities for swine

A. Housing facilities

1. Space requirements

a. Too few pigs

(1) Increases per-pig overhead costs

(2) Reduces profits

b. Too many pigs

(1) Tail-biting

(2) Cannibalism

(3) Reduce gain

(4) Increased feed requirements

(5) Gastric ulcers

(6) Stress

2. Ventilation requirements

a. Winter--Remove moist air before dampness condenses on cold surfaces

b. Summer--Remove heat generated by animals

c. All seasons--Minimize odor

3. Waste disposal

a. Storage

b. Removal

c. Disposal

(Note: A 100 lb hog excretes 1 gallon waste per day.)

B. Feeding and watering equipment

1. Keep feed levels low in self-feeders

2. Floor feeding close to sleeping area encourages cleanliness

3. Liquid feeding minimizes dust and waste

4. Water systems

a. One waterer for each 20 pigs

b. At least 2 gallons of water a day per pig

C. Handling facilities and equipment

1. Loading pens and chutes

2. Handling gates and hurdles

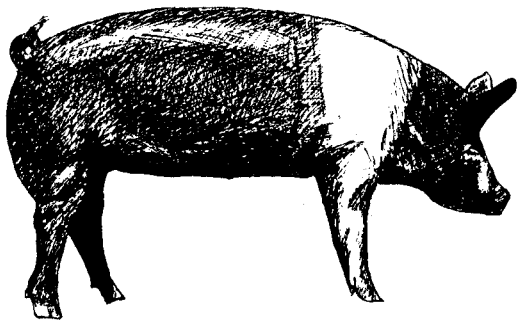
3. Holding facilities

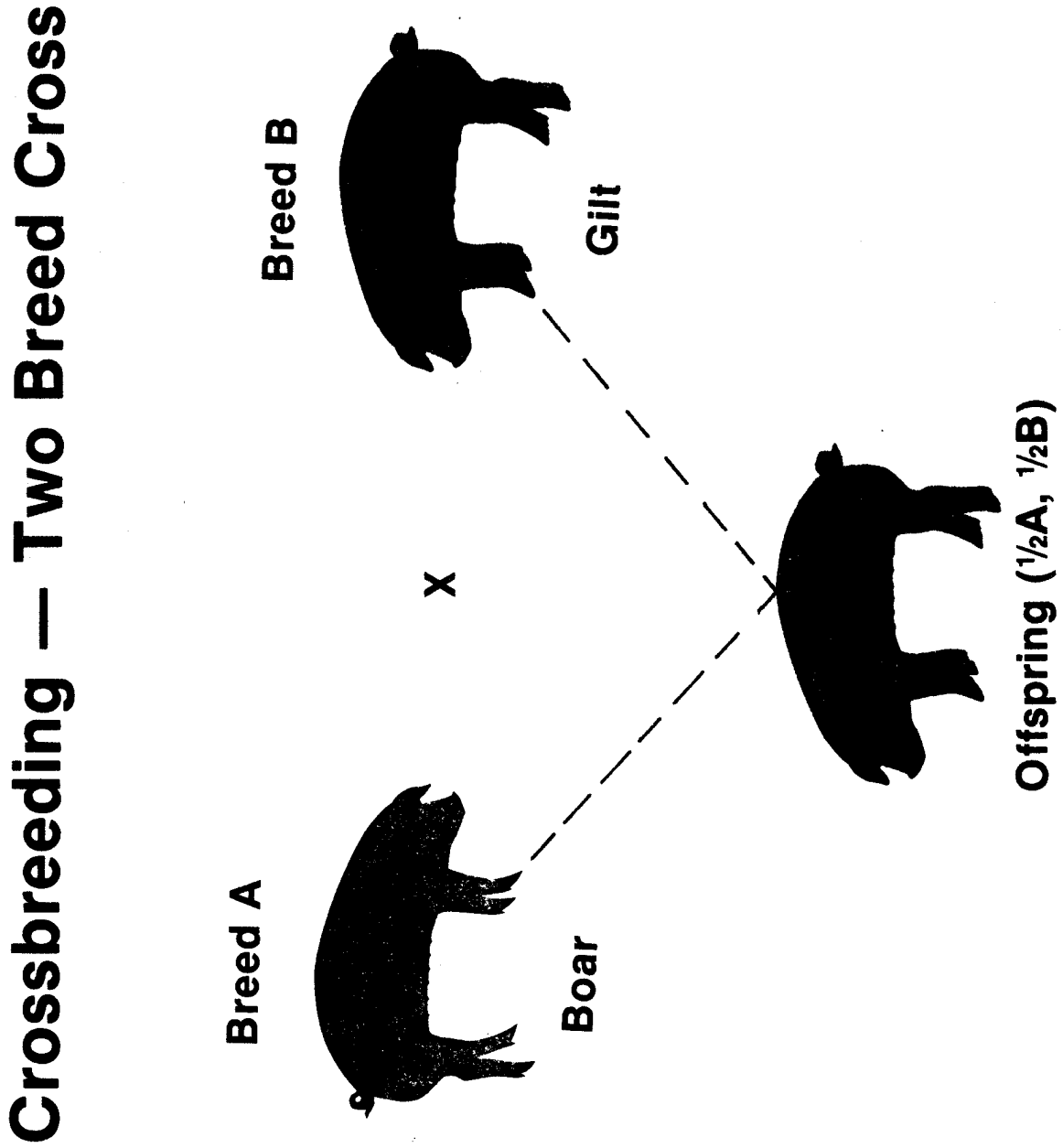
4. Breeding facilities (if needed)

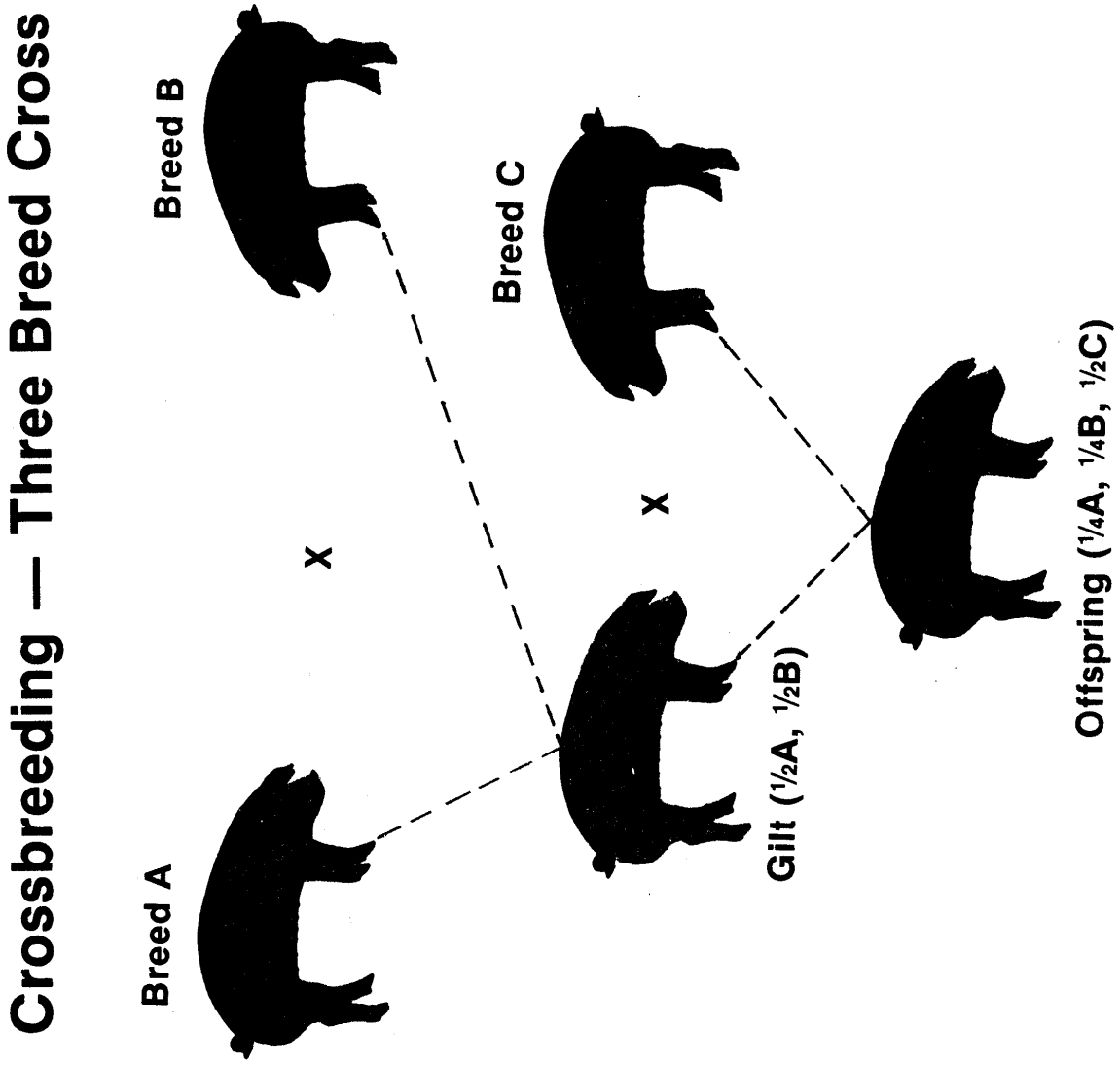
5. Gates--Wood or metal

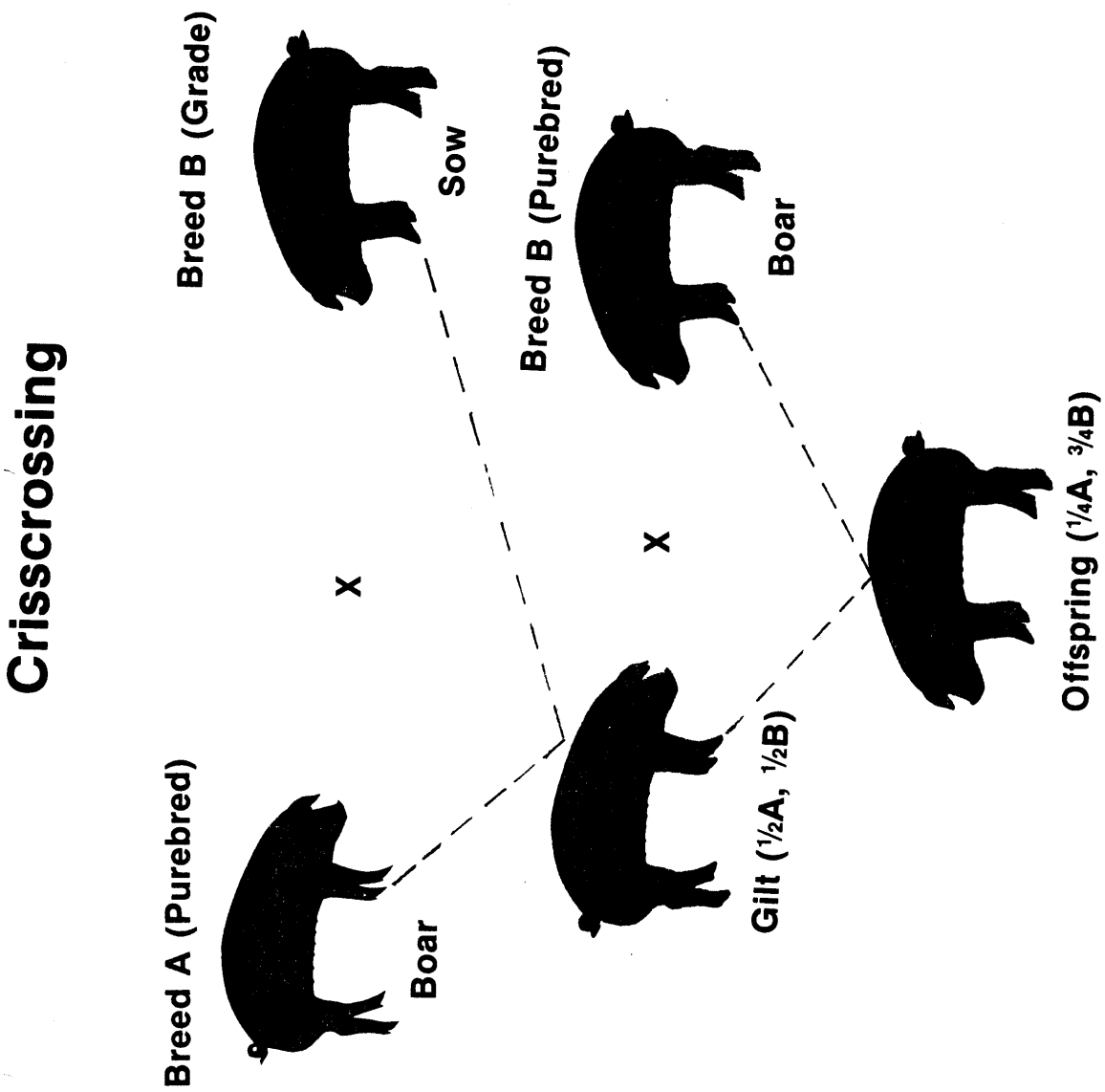
Advantages Of Crossbreeding

INCREASED	LITTER SIZE AT BIRTH
INCREASED	LITTER SIZE AT WEANING
INCREASED	LITTER WEIGHT AT BIRTH
INCREASED	LITTER WEIGHT AT WEANING
INCREASED	MOTHERING ABILITY IN SOW
INCREASED	FEED EFFICIENCY
INCREASED	DAILY GAIN
INCREASED	PERFORMANCE
INCREASED	DISEASE RESISTANCE



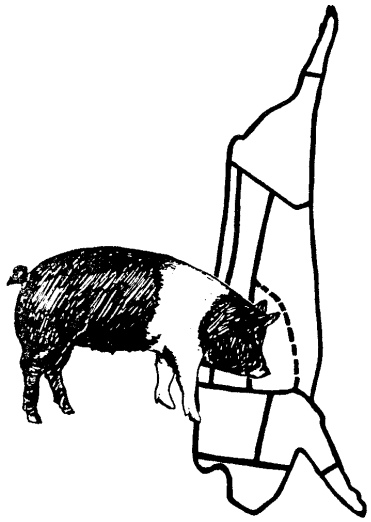

Crossbreeding — Two Breed Cross
Breed A
Boar
X
Breed B
Gilt
Offspring (½A, ½B)

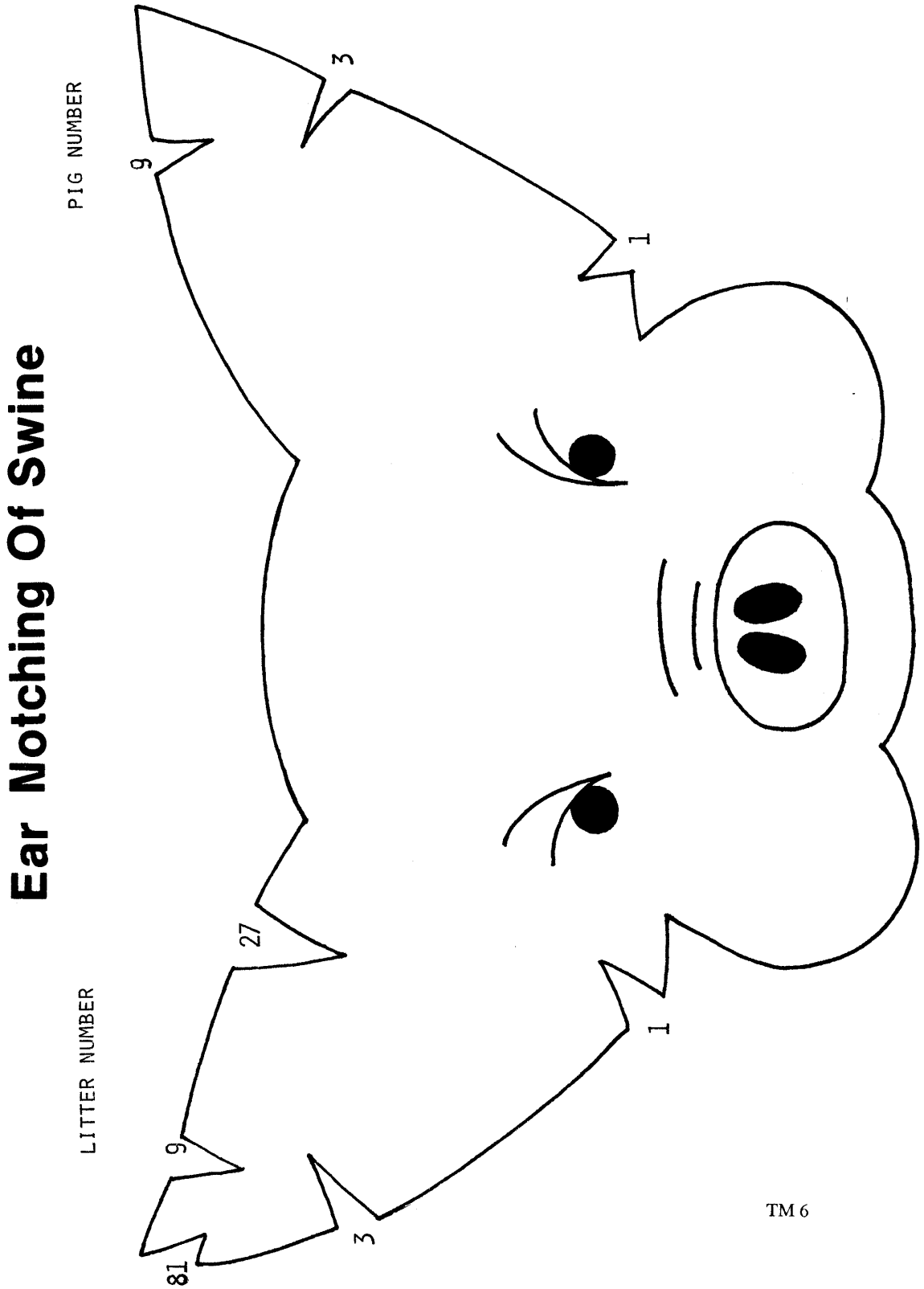

Crossbreeding — Three Breed Cross
Breed A
Breed B
Breed C
X
X
Gilt (½A, ½B)
Offspring (¼A, ¼B, ½C)


Crisscrossing
Breed A (Purebred)
Boar
X
Breed B (Grade)
Sow
Gilt (½A, ½B)
X
Breed B (Purebred)
Boar
Offspring (¼A, ¾B)

Developmental Stages Of Market Swine

STAGE	WEIGHT
PRE-STARTER	0 TO 12 POUNDS
STARTER	12 TO 40 POUNDS
DEVELOPER	40 TO 75 POUNDS
GROWER	75 TO 125 POUNDS
FINISHER	125 POUNDS TO MARKET



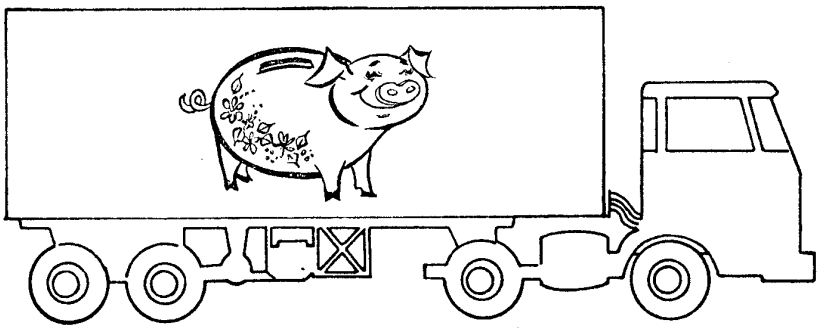


TM 6

TM 6

Shipping Market Hogs

- DO NOT FEED HOGS HEAVILY BEFORE SHIPPING
- ALLOW 3½ SQUARE FEET PER 200-POUND ANIMAL
- CLEAN TRUCK BEFORE LOADING
- USE SAND FOR BEDDING IN HOT WEATHER; STRAW IN COLD WEATHER
- SEPARATE HEAVY FROM LIGHT HOGS BEFORE SHIPPING
- WET OR SPRINKLE HOGS DURING HOT WEATHER
- REMOVE ALL PROTRUDING BOLTS AND NAILS FROM LOADING CHUTE
- HAVE STURDY, WELL-CONSTRUCTED LOADING FACILITIES
- HANDLE HOGS QUIETLY AND WITH CARE
- DO NOT BRUISE SWINE WHILE LOADING
- DO NOT SHIP SWINE WITH OTHER KINDS OF LIVESTOCK
- ELIMINATE DRAFTS DURING SHIPPING
- AVOID SUDDEN STOPS DURING SHIPPING



Nutrient Requirements of Growing and Finishing Swine
Ninth Revised Edition
1988

Nutrient Requirements of Swine

TABLE 5-1 Nutrient Requirements of Swine Allowed Feed Ad Libitum (90 percent dry matter)

	Swine Liveweight (kg)				
Intake and Performance Levels	1–5	5–10	10–20	20–50	50–110
Expected weight gain (g/day)	200	250	450	700	820
Expected feed intake (g/day)	250	460	950	1,900	3,110
Expected efficiency (gain/feed)	0.800	0.543	0.474	0.368	0.264
Expected efficiency (feed/gain)	1.25	1.84	2.11	2.71	3.79
Digestible energy intake (kcal/day)	850	1,560	3,230	6,460	10,570
Metabolizable energy intake (kcal/day)	805	1,490	3,090	6,200	10,185
Energy concentration (kcal ME/kg diet)	3,220	3,240	3,250	3,260	3,275
Protein (%)	24	20	18	15	13
	Requirement (% or amount/kg diet)[a]				
Nutrient					
Indispensable amino acids (%)					
Arginine	0.60	0.50	0.40	0.25	0.10
Histidine	0.36	0.31	0.25	0.22	0.18
Isoleucine	0.76	0.65	0.53	0.46	0.38
Leucine	1.00	0.85	0.70	0.60	0.50
Lysine	1.40	1.15	0.95	0.75	0.60
Methionine + cystine	0.68	0.58	0.48	0.41	0.34
Phenylalanine + tyrosine	1.10	0.94	0.77	0.66	0.55
Threonine	0.80	0.68	0.56	0.48	0.40
Tryptophan	0.20	0.17	0.14	0.12	0.10
Valine	0.80	0.68	0.56	0.48	0.40
Linoleic acid (%)	0.1	0.1	0.1	0.1	0.1
Mineral elements					
Calcium (%)	0.90	0.80	0.70	0.60	0.50
Phosphorus, total (%)	0.70	0.65	0.60	0.50	0.40
Phosphorus, available (%)	0.55	0.40	0.32	0.23	0.15
Sodium (%)	0.10	0.10	0.10	0.10	0.10
Chlorine (%)	0.08	0.08	0.08	0.08	0.08
Magnesium (%)	0.04	0.04	0.04	0.04	0.04
Potassium (%)	0.30	0.28	0.26	0.23	0.17
Copper (mg)	6.0	6.0	5.0	4.0	3.0
Iodine (mg)	0.14	0.14	0.14	0.14	0.14
Iron (mg)	100	100	80	60	40
Manganese (mg)	4.0	4.0	3.0	2.0	2.0
Selenium (mg)	0.30	0.30	0.25	0.15	0.10
Zinc (mg)	100	100	80	60	50
Vitamins					
Vitamin A (IU)	2,200	2,200	1,750	1,300	1,300
Vitamin D (IU)	220	220	200	150	150
Vitamin E (IU)	16	16	11	11	11
Vitamin K (menadione) (mg)	0.5	0.5	0.5	0.5	0.5
Biotin (mg)	0.08	0.05	0.05	0.05	0.05
Choline (g)	0.6	0.5	0.4	0.3	0.3
Folacin (mg)	0.3	0.3	0.3	0.3	0.3
Niacin, available (mg)	20.0	15.0	12.5	10.0	7.0
Pantothenic acid (mg)	12.0	10.0	9.0	8.0	7.0
Riboflavin (mg)	4.0	3.5	3.0	2.5	2.0
Thiamin (mg)	1.5	1.0	1.0	1.0	1.0
Vitamin B_6 (mg)	2.0	1.5	1.5	1.0	1.0
Vitamin B_{12} (μg)	20.0	17.5	15.0	10.0	5.0

NOTE: The requirements listed are based upon the principles and assumptions described in the text of this publication. Knowledge of nutritional constraints and limitations is important for the proper use of this table.

[a] These requirements are based upon the following types of pigs and diets: 1- to 5-kg pigs, a diet that includes 25 to 75 percent milk products; 5- to 10-kg pigs, a corn-soybean meal diet that includes 5 to 25 percent milk products; 10- to 110-kg pigs, a corn-soybean meal diet. In the corn-soybean meal diets, the corn contains 8.5 percent protein; the soybean meal contains 44 percent.

TABLE 5-2 Daily Nutrient Intakes and Requirements of Swine Allowed Feed Ad Libitum

	Swine Liveweight (kg)				
Intake and Performance Levels	1–5	5–10	10–20	20–50	50–110
Expected weight gain (g/day)	200	250	450	700	820
Expected feed intake (g/day)	250	460	950	1,900	3,110
Expected efficiency (gain/feed)	0.800	0.543	0.474	0.368	0.264
Expected efficiency (feed/gain)	1.25	1.84	2.11	2.71	3.79
Digestible energy intake (kcal/day)	850	1,560	3,230	6,460	10,570
Metabolizable energy intake (kcal/day)	805	1,490	3,090	6,200	10,185
Energy concentration (kcal ME/kg diet)	3,220	3,240	3,250	3,260	3,275
Protein (g/day)	60	92	171	285	404
	Requirement (amount/day)				
Nutrient					
Indispensable amino acids (g)					
Arginine	1.5	2.3	3.8	4.8	3.1
Histidine	0.9	1.4	2.4	4.2	5.6
Isoleucine	1.9	3.0	5.0	8.7	11.8
Leucine	2.5	3.9	6.6	11.4	15.6
Lysine	3.5	5.3	9.0	14.3	18.7
Methionine + cystine	1.7	2.7	4.6	7.8	10.6
Phenylalanine + tyrosine	2.8	4.3	7.3	12.5	17.1
Threonine	2.0	3.1	5.3	9.1	12.4
Tryptophan	0.5	0.8	1.3	2.3	3.1
Valine	2.0	3.1	5.3	9.1	12.4
Linoleic acid (g)	0.3	0.5	1.0	1.9	3.1
Mineral elements					
Calcium (g)	2.2	3.7	6.6	11.4	15.6
Phosphorus, total (g)	1.8	3.0	5.7	9.5	12.4
Phosphorus, available (g)	1.4	1.8	3.0	4.4	4.7
Sodium (g)	0.2	0.5	1.0	1.9	3.1
Chlorine (g)	0.2	0.4	0.8	1.5	2.5
Magnesium (g)	0.1	0.2	0.4	0.8	1.2
Potassium (g)	0.8	1.3	2.5	4.4	5.3
Copper (mg)	1.50	2.76	4.75	7.60	9.33
Iodine (mg)	0.04	0.06	0.13	0.27	0.44
Iron (mg)	25	46	76	114	124
Manganese (mg)	1.00	1.84	2.85	3.80	6.22
Selenium (mg)	0.08	0.14	0.24	0.28	0.31
Zinc (mg)	25	46	76	114	155
Vitamins					
Vitamin A (IU)	550	1,012	1,662	2,470	4,043
Vitamin D (IU)	55	101	190	285	466
Vitamin E (IU)	4	7	10	21	34
Vitamin K (menadione) (mg)	0.02	0.02	0.05	0.10	0.16
Biotin (mg)	0.02	0.02	0.05	0.10	0.16
Choline (g)	0.15	0.23	0.38	0.57	0.93
Folacin (mg)	0.08	0.14	0.28	0.57	0.93
Niacin, available (mg)	5.00	6.90	11.88	19.00	21.77
Pantothenic acid (mg)	3.00	4.60	8.55	15.20	21.77
Riboflavin (mg)	1.00	1.61	2.85	4.75	6.22
Thiamin (mg)	0.38	0.46	0.95	1.90	3.11
Vitamin B_6 (mg)	0.50	0.69	1.42	1.90	3.11
Vitamin B_{12} (μg)	5.00	8.05	14.25	19.00	15.55

SWINE MANAGEMENT

AG 310 - G

ASSIGNMENT SHEET #1--DESCRIBE A MANAGEMENT PROGRAM FOR SPECIFIC STAGES OF GROWTH FOR MARKET SWINE

Name_____ Score_____

The greatest improvement in efficiency of a swine operation comes with improved management practices. Use the following pages to describe the management practices that should be followed at each stage of growth for a market swine. Be complete.

You may wish to visit with a swine producer, your vocational agriculture instructor, an extension agent, or complete some additional reading prior to completing this assignment.

Management Skills In Swine Production

Stage of Growth	Management Program
Pre-starter (0-12 pounds)	
Starter (12-40 pounds)	

Management Skills In Swine Production

Stage of Growth	Management Program
Developer (40-75 pounds)	
Grower (75-125 pounds)	
Finisher (125 pounds to market)	

SWINE MANAGEMENT

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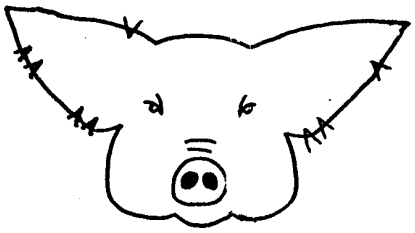
ASSIGNMENT SHEET #2--EAR NOTCH SWINE FOR IDENTIFICATION

Name_____ Score_____

Part I

Identify the litter number and pig number for each of the swine pictured below using the standard ear notching system.

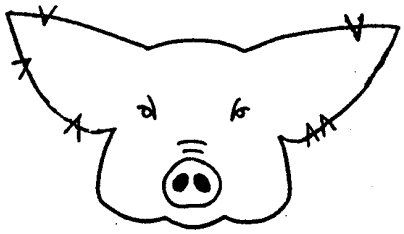
1.



Pig number_____

Litter number_____

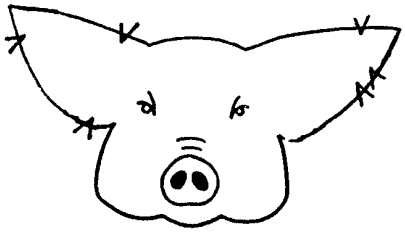
2.



Pig number_____

Litter number_____

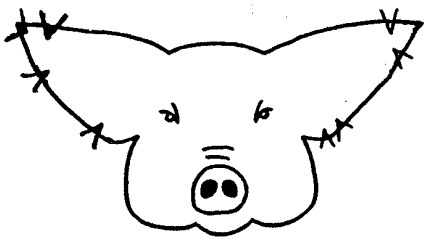
3.



Pig number_____

Litter number_____

4.



Pig number_____

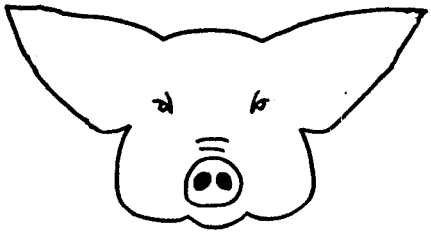
Litter number_____

Part II

Using the standard ear notching system, draw notches on the ears of the following pigs so they are properly identified.

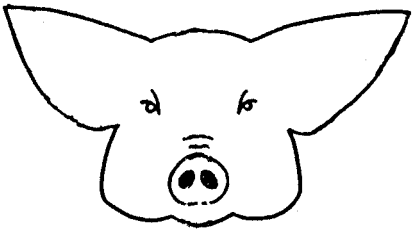
5. **Pig number** 11

Litter number 21



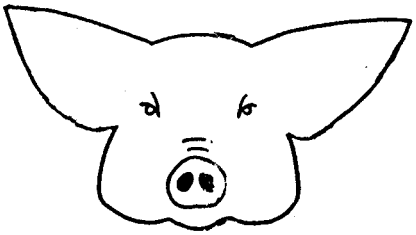
6. **Pig number** 4

Litter number 52



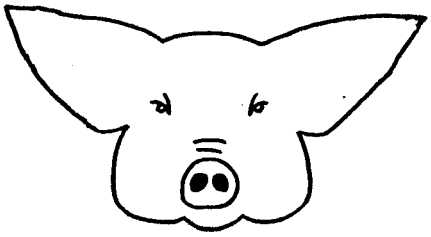
7. **Pig number** 7

Litter number 31



8. **Pig number** 16

Litter number 13



SWINE MANAGEMENT

AG 310 - G

ASSIGNMENT SHEET #3--DESIGN A TOTAL CONFINEMENT SWINE SYSTEM

Name_____ Score_____

Materials needed: Graph paper, ruler/straight edge, paper and pencil

Using the graph paper provided, design a total confinement swine system and draw the floor plan to scale. Include as much detail on the floor plan as possible in describing location of accessories such as feeders, waterers, holding pens, offices, etc.

Complete your project by describing your confinement facilities in a written report. Use the assignment sheet to discuss capacity, feeding system, manure handling system, ventilation, cooling, heating, watering systems, insulation, loading facilities and any other factors you wish to consider.

Hand in your scale drawing and the completed assignment sheet together.

Please describe the following features as they relate to your total confinement swine system.

Capacity:

Feed Handling:

Manure Disposal:

Ventilation:

Cooling:

Heating:

Watering System:

Insulation:

Loading Facilities:

Other:

SWINE MANAGEMENT

AG 310 - G

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

Evaluated to the satisfaction of the instructor

Assignment Sheet #2

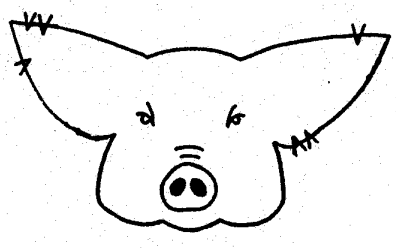
1. Pig number 5
   Litter number 35

2. Pig number 11
   Litter number 13

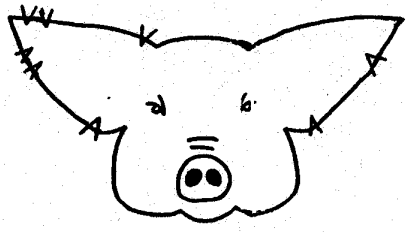
3. Pig number 15
   Litter number 31

4. Pig number 14
   Litter number 94

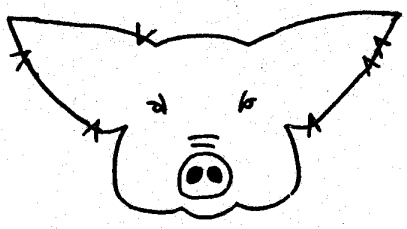
5.



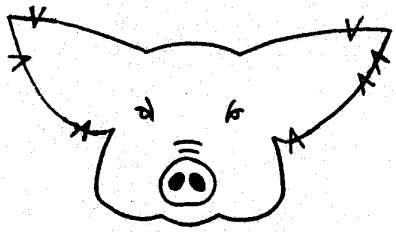
6.



7.



8.



Assignment Sheet # 3

Evaluated to the satisfaction of the instructor

SWINE MANAGEMENT

AG 310 - G

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Hundred weight or 100 pounds	1. CWT
_____b.	A brood of pigs born at one time to a sow	2. Heterosis
_____c.	Mating a purebred boar with a grade sow of the same breed	3. Linebreeding
_____d.	Female swine that has not produced a litter	4. Purebreeding
_____e.	A specific project of similar animals raised for a specific purpose	5. Litter
_____f.	Castrated male hog used for producing meat	6. Pasture mixture
_____g.	Providing starter pigs with a supplementary, highly palatable feed to increase early weight gain	7. Gilt
_____h.	Uncastrated male hog used in swine breeding programs	8. Legume
_____i.	Mating a purebred boar with a purebred sow of the same breed	9. Upgrading
_____j.	Female swine that has produced a litter	10. Inbreeding
_____k.	Mixture of plants usually containing grasses and legumes	11. Sow
_____l.	A measure of the amount of feed needed to produce one pound of gain in a market animal	12. Average daily gain
_____m.	Mating of purebred boars of one line or family with sows of the same line, but not so closely related as those used in inbreeding	13. Crossbreeding
_____n.	Hybrid vigor or the increased performance obtained by mating animals of two different breeds	14. Creep feeding
		15. Feed efficiency
		16. Barrow
		17. Enterprise
		18. Boar

_____o. Plant having the ability to utilize nitrogen from the air; high in protein

_____p. Mating a purebred or inbred boar of one breed with a purebred or grade sow of another breed

_____q. Mating of boars with sows of the same breed which are closely related

_____r. Average amount of weight produced per day, calculated by dividing total gain by the number of days in the feeding period

2. List four reasons for maintaining swine records.

a. _____

b. _____

c. _____

d. _____

3. Describe three items of information that might be included in each kind of record listed below.

Breeding records

a. _____

b. _____

c. _____

Production records

a. _____

b. _____

c. _____

Feed records

a. _____

b. _____

c. _____

Labor records

a. _____

b. _____

c. _____

Complete enterprise records

a. _____

b. _____

c. _____

4. List four types of swine breeding programs.

a. _____

b. _____

c. _____

d. _____

5. Describe advantages associated with crossbreeding swine.

_____

_____

_____

_____

_____

6. Match types of crossbreeding systems on the left to their descriptions by placing the number of the correct description in the blank.

_____a.	Crisscrossing	1.	Sows of one breed are bred to a boar of another breed; gilts from the first cross are bred to a third breed of boar; gilts from this cross are bred to a boar of the original sow breed
_____b.	Two-breed cross	2.	A purebred or inbred boar of one breed is mated to a grade sow of another; gilts from this cross are mated to a boar from the same breed as the original sow

_____c. Rotation breeding

3. Boars of three or four breeds are used in rotation in an effort to maintain the hybrid vigor in the offspring

_____d. Three-breed cross

4. A purebred or inbred boar of one breed is mated to grade sows of another breed

7. Distinguish between advantages for using a confinement system and advantages for using a pasture system for producing swine. Place a "C" in front of those statements that describe an advantage for using a swine confinement system and a "P" in front of those statements that describe advantages for using a pasture system.

_____a. Less labor in feed handling

_____b. Less manure handling problems

_____c. Better control of animals

_____d. Less protein needed

_____e. More rapid gains

_____f. Frees up expensive land for cultivation

_____g. Less feed needed

_____h. Less management skill needed

_____i. Better utilization of land

_____j. Lower cost for buildings and equipment

_____k. Healthier pigs

_____l. Useable during more months per year

_____m. Less difficulty in providing quality water

8. List five pasture crops which could be used in a swine feeding program.

a. _____

b. _____

c. _____

d. _____

e. _____

9. Match the appropriate weight at the right with the specific stage of swine development at the left by writing the correct number in the blank.

_____a.	Developer period	1.	12 - 40 lbs
_____b.	Starter period	2.	75 - 125 lbs
_____c.	Finisher period	3.	125 lbs to market weight
_____d.	Pre-starter period	4.	40 - 75 lbs
_____e.	Grower period	5.	0 - 12 lbs

10. Complete the following chart regarding nutrient requirements of swine by filling in each blank with the correct number.

	Requirements		
Stage of Development	% Protein	% Calcium	% Phosphorus
Pre-starter	(a) _____	(b) _____	(c) _____
Finisher	(d) _____	(e) _____	(f) _____

11. Three methods of improving efficiency in hogs are:

a. _____

b. _____

c. _____

12. Describe health and sanitation problems of the swine industry.

_____

_____

_____

_____

_____

_____

_____

_____

13. List four advantages of providing creep feed during pre-starter and starter periods.

a. _____

b. _____

c. _____

d. _____

14. Explain the recommended procedure for weaning pigs from the sow.

Preparation of facilities

_____

_____

_____

_____

_____

At weaning

_____

_____

_____

_____

_____

15. List five factors to consider when designing a total confinement system for swine.

a. _____

b. _____

c. _____

d. _____

e. _____

16. Describe important characteristics associated with the following types of swine markets.

a. Sales auction: _____

_____

_____

_____

b. Terminal markets:_____

_____

_____

_____

_____

c. Interior packing plants:_____

_____

_____

_____

_____

17. List seven key handling techniques for shipping swine to market.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

g. _____

18. Place an "H" before months where swine market prices are traditionally higher and an "L" before months when swine market prices are traditionally lower.

_____ a. February

_____ b. April

_____ c. May

_____ d. July

_____ e. August

_____ f. November

19. Describe factors to consider when planning facilities for swine.

a. Housing facilities: _____

_____

_____

_____

_____

_____

_____

_____

b. Feeding and watering equipment:_____

_____

_____

_____

_____

c. Handling facilities and equipment:_____

_____

_____

_____

_____

SWINE MANAGEMENT

AG 310 - G

ANSWERS TO TEST

1.

a.	1	g.	14	m.	3
b.	5	h.	18	n.	2
c.	9	i.	4	o.	8
d.	7	j.	11	p.	13
e.	17	k.	6	q.	10
f.	16	l.	15	r.	12

2. To analyze management decisions; To determine profitability of enterprise; To identify superior breeding stock; As a basis for future decision making

3. Answer should include any three from the following in <u>each</u> category:

   <u>Breeding records:</u> Date gilt or sow is bred; Name or number of boar used; Identification of sow or gilt; Number of re-breeding attempts, if necessary
   <u>Production records:</u> Size of litter at birth; Size of litter at weaning; Litter weight at birth; Litter weight at weaning; Ear notching or marking of litter; Average daily gain; Feed efficiency; Carcass traits
   <u>Feed records:</u> Kind of ration or rations fed; Amount of ration fed; Cost of feed purchased
   <u>Labor records:</u> Hours of self-labor; Date and hours of paid labor; Rate per hour of paid labor
   <u>Complete enterprise records:</u> Cash income; Expenses; Beginning and closing inventory; Overhead costs; Death losses

4. Answer should include four of the following: Purebred breeding; Crisscrossing; Crossbreeding; Upgrading; Inbreeding; Linebreeding

5. Description should include:

   Increase in litter size at birth and weaning; Increase in litter weights at birth and weaning; Improved mothering ability; Increased feed efficiency; Increased average daily gain; Better performance and constitution; Greater resistance to stress and disease

6. a. 2 b. 4 c. 3 d. 1

7.

a.	C	f.	C	j.	P
b.	P	g.	P	k.	P
c.	C	h.	P	l.	C
d.	P	i.	C	m.	C
e.	C				

8. Alfalfa; Sweet clover; Ladino clover; Bluegrass; Red clover

9.

a.	4	d.	5
b.	1	e.	2
c.	3		

10.

a.	24	b.	.70	c.	.60
d.	12	e.	.60	f.	.50

11. Crossbreeding; Selection; Improved management practices

12. Swine diseases and parasites are responsible for losses amounting to millions of dollars annually; Only about one third of the farrowed pigs grow out as healthy pigs (One third die before weaning; One third are stunted or unprofitable because of disease or parasites); Sanitation is most important factor in controlling diseases and parasites; Disease and parasite free breeding stock; Rotated legume pastures; Clean and disinfected houses; Balanced rations fortified with vitamins and antibiotics; Some diseases and parasites must be controlled by vaccination and medication

13. Answer should include four of the following:

    Supplements sow's milk just prior to weaning; More pigs saved per litter at weaning; Healthier pigs at weaning; Greater litter weight at weaning; Provides a balanced, fortified pre-weaning ration

14. Explanation should include the following:

    Preparation of facilities: Thoroughly clean nursery at least 7 days before weaning; Disinfect all surfaces and let dry; Eliminate floor-level drafts by enclosing area with plywood, sheet metal, etc.; Place heat source over sleeping area; Maintain floor-level temperature at 80-85^{o}F; Provide 1 feeder hole for every 4 or 5 pigs weaned; Provide 1 waterer for every 20-25 pigs; Provide 2 to 3 square feet of room per pig
    At weaning: Pen by size or litter, but not over 25 pigs per pen; Do not mix older "tail-enders" from last batch with new pigs; Limit feed consumption during first 48 to 72 hours; Include antibiotics supplements in feeds

15. Answer should include five of the following: Feed handling system; Manure disposal system; Slotted floors; Insulation; Ventilation; Heating equipment; Cooling equipment; Watering system

16. Descriptions should include key points from the following:

    Sales Auctions: Public auction providing open bidding on swine by meat processors and other swine producers; Sells breeding stock and feeder pigs as well as other livestock species
    Terminal markets: Public stockyards; Commission firms purchase hogs; Sell to meat packing plants; Centrally located and accessible to large number of swine producers, usually in more than one state
    Interior packing plants: Meat packing plants purchasing market swine directly from producers; Located in smaller towns; Accessible to a smaller number of swine producers

17. Answer should include seven of the following:

    Do not feed hogs heavily before shipping; Allow 3 1/2 square feet per 200 pound animal; Clean truck before loading; Use sand for bedding in hot weather, straw in cold weather; Separate heavy from light hogs before shipping; Wet or sprinkle hogs during hot weather; Remove all protruding bolts and nails from loading chute; Have sturdy, well-constructed loading facilities; Handle hogs quietly and with care; Do not bruise swine while loading; Do not ship swine with other kinds of livestock; Eliminate drafts during shipping; Avoid sudden stops during shipping

18.

a.	H	d.	H
b.	L	e.	H
c.	L	f.	L

19. Answer should include information from the following:

Housing facilities--Space requirements: Too few pigs increases per-pig overhead costs and reduces profits; Too many pigs: Tail-biting; Cannibalism; Reduce gain; Increased feed requirements; Gastric ulcers; Stress; Ventilation requirements: Winter--Remove moist air before dampness condenses on cold surfaces; Summer--Remove heat generated by animals; All seasons--Minimize odor; Waste disposal: Storage; Removal; Disposal
Feeding and watering equipment--Keep feed levels low in self-feeders; Floor feeding close to sleeping area encourages cleanliness; Liquid feeding minimizes dust and waste; Water systems--One waterer for each 20 pigs; At least 2 gallons of water a day per pig
Handling facilities and equipment--Loading pens and chutes; Handling gates and hurdles; Holding facilities; Breeding facilities (if needed); Gates--Wood or metal

CARE OF THE SHEEP BREEDING FLOCK

AG 310 - H

UNIT OBJECTIVE

After completion of this unit, students should be able to describe appropriate management practices for caring for the breeding flock. Students should also be able to recognize problems associated with the flock and should be able to describe how to pregnancy test a ewe. This knowledge will be demonstrated by completion of an assignment sheet, laboratory exercise and unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with care of the sheep breeding flock to their correct definitions.
2. Select good management practices when caring for the ram.
3. Describe three ways to keep rams from fighting.
4. Describe the relay method for breeding ewes.
5. Describe five good management practices when caring for the ewe.
6. Describe the difference in estrus between sheep and other farm animals.
7. Select the factors that help estrus begin in ewes.
8. List two ways to prepare ewes for breeding.
9. List two advantages of flushing.
10. Describe two advantages and two disadvantages of breeding ewe lambs.
11. Select the effects hormones can have on reproduction.
12. Describe the effect clovers and alfalfa can have on ovulation.
13. List two methods of marking ewes which have been serviced by the ram.
14. List two advantages of pregnancy testing.
15. Describe the advantages of shearing a ewe before lambing.
16. List four indications a ewe is about to lamb.
17. Select the time lengths for various occurrences in a normal delivery.
18. List in order the four steps to take immediately after lambing.

19. Describe what to do for a chilled lamb.

20. List three reasons a lamb needs colostrum soon after birth.

21. Describe the procedure to get a ewe to accept her own lamb.

22. Describe four procedures for grafting an orphan lamb to a ewe.

23. Distinguish between cow's milk and ewe's milk.

24. Describe two methods of feeding a lamb too weak to suck.

25. Write the best time to dock and castrate lambs.

26. Describe the amount and kind of feed recommended for the sheep breeding flock.

27. Describe the procedures for maintaining healthy breeding stock.

28. Make explanations for various problem situations connected with the sheep breeding flock.

29. Demonstrate how to test a ewe for pregnancy.

CARE OF THE SHEEP BREEDING FLOCK

AG 310 - H

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

- A. Make necessary copies of materials.
- B. Provide students with objectives and discuss.
- C. Provide students with information and discuss.
- D. Provide students with assignment sheet and laboratory exercise.
- E. Arrange a field trip to a sheep operation during breeding or lambing time.
- F. Have a veterinarian give a demonstration on pregnancy testing.
- G. Arrange for a tour of the U.S. Sheep Experiment Station at Dubois, Idaho or of the sheep farm at the University of Idaho.
- H. Arrange a demonstration on clipping a ewe for breeding.
- I. Arrange a demonstration on docking and castrating.
- J. Bring in different age sheep and let the students determine their ages by their teeth.
- K. Review and give test.
- L. Reteach and retest if necessary.

II. Instructional materials

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Assignment sheet
  1. AS 1--Make Explanations for Various Problem Situations Connected With the Sheep Breeding Flock
- E. Answers to assignment sheet
- F. Laboratory exercise
  1. LE 1--Test a Ewe for Pregnancy

G. Test

H. Answers to test

III. Unit references

A. Blakely, James and Bade, David H., *The Science of Animal Husbandry*. Reston Publishing Company, Reston, Virginia, 1976.

B. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

C. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

D. Dahmen, J.J. and Duren, Ed., *Ram Maintenance and Breeding*. University of Idaho Extension Publication, Current Information Series #345, August, 1976.

E. Ensminger, M.E., *Animal Science*. The Interstate Printers and Publishers, Inc., Danville, Illinois, 1977.

F. Hulet, C.V., Dahmen, J.J., Shupe, W.L. and Duren, Ed., *How to Graft Lambs*. University of Idaho Extension Publication, Current Information Series #469, March, 1979.

G. Scott, George E., *The Sheepman's Production Handbook*. Abegg Printing Company and The Sheep Industry Development Program, Denver, Colorado, 1977.

H. Simmons, Paula, *Raising Sheep the Modern Way*. Garden Way Publishing, Charlotte, Vermont, 1976.

CARE OF THE SHEEP BREEDING FLOCK

AG 310 - H

INFORMATION SHEET

I. Terms and definitions

A. Estrus--Standing heat or time when female will receive the male

B. Anestrus--The condition of not exhibiting estrus at regular intervals; reproductively inactive

C. Embryo--Organism in early stages of development

D. Dock--To remove a lamb's tail or the stub left over after the tail has been cut off

E. Flushing--Feeding a ewe well just before breeding to cause an increase in weight

F. Ovulation--Release of an egg or eggs by the ovary

G. Ewe lamb--A ewe under twelve months of age

H. Hormone--Substance that affects reproduction and other bodily functions

I. Puberty--The age at which reproductive organs become operative

J. Estrogen--Hormone that helps regulate the female reproductive cycle

K. Culling--Disposing of nonproductive or less desirable animals

L. Vulva--Opening to the reproductive tract in the ewe

M. Prolapse--Condition in which the vagina, uterus or rectum comes out of the body while still remaining attached

N. Colostrum--First "milk" from a mother after giving birth

O. Dextrose--Type of sugar

P. Cryptorchidism--Condition in which the testicles are pushed up into the body

Q. Palpating--Examining by feel

II. Caring for the ram

A. Buy ram well before start of breeding season

B. Shear ram before breeding season to keep cool

C. Condition ram starting 2 to 3 weeks before breeding season with one pound of grain per day

(Note: This probably is not necessary if pastures are good and ram is already in good condition.)

D. Provide shade during breeding season

(Note: Semen starts losing its potency at 80^{o}F.)

E. Feed 1 to 2 pounds of grain and at least 2 pounds of good quality hay daily during breeding season

F. For pasture mating, use one mature ram for 25 to 50 ewes

G. Mature ram lambs can be used on 15 to 30 ewes

III. Ways to keep rams from fighting

(Note: Rams fight by running at each other and butting with their heads.)

A. Put them together in a small pen for a few days to let them get used to each other

B. Tie a foreleg and a hindleg together with a leather strap

C. Tie a piece of wood to a foreleg with a leather strap

IV. Relay method--Half the rams are placed with the ewes the first two weeks and then are taken out while the second half are placed with the ewes

(Note: This increases the lamb crop by giving the rams a rest.)

V. Caring for the ewe

A. Flushing--Increase feeding 2 weeks before rams are turned in

B. Tagging--Remove wool from around dock

C. Eyeing--Clip wool around eyes

D. Provide plenty of exercise

E. Trim feet

F. Provide shade when hot

G. Keep separate from other livestock

VI. Estrus in sheep normally only occurs in the fall, usually between September and November, instead of year-round as in other farm animals

VII. Factors favoring the onset of estrus in ewes

A. Shorter days

B. Cooler temperature

(Note: Cooler temperatures increase the likelihood of embryo survival.)

C. Presence of a ram during the transition between anestrus and estrus

(Note: This effect on the ewes is not evident when the ram is with the ewes all year.)

VIII. Preparing ewes for breeding

A. Clip wool around dock area

B. Flush

(Note: This can be accomplished by feeding supplemental grain or moving to a better pasture 3 to 4 weeks before breeding.)

IX. Advantages of flushing

A. Increases number of lambs born by increasing ovulation

B. Helps bring ewes into heat about the same time

(Note: Flushing will have the greatest effect on ewes needing more condition. Ewes that are too fat need exercise rather than supplemental grain. Yearling ewes evidently do not respond to flushing.)

X. Breeding ewe lambs

A. Advantages

1. Greater lifetime production than ewes first bred to lamb as two-year-olds

2. Lower production cost per lamb produced

B. Disadvantages

1. Lighter lambs at birth

2. Increased lambing problems

3. Shorter breeding season

4. More intensive management needed

XI. Effects of hormones on reproduction

(Note: These effects can only be attained if proper management and selection are also used.)

A. Cause ewes to ovulate at the same time

B. Increase ovulation rate

C. Enable mating to occur during the anestrus period

D. Cause early puberty

XII. Clover, alfalfa and trefoil may have a high estrogen content which may hamper ovulation

(Note: Estrogen content is the highest in young plants and plants grown in high humidity.)

XIII. Methods of marking ewes which have been serviced by the ram

A. Ram marking harness with crayons

(Note: Every 16 days the color should be changed to allow detection of ewes that are returning to heat. Colors should progress from light to dark.)

B. Smearing a colored paste on the ram's breast

(Caution: This should be made with lubricating or vegetable oil. Paint or tar should not be used.)

XIV. Advantages of pregnancy testing

A. Can be used in the selection of ewe lambs

(Note: Ewes which become pregnant as lambs are more productive than their counterparts.)

B. Allows culling of non-pregnant lambs

XV. Advantages of shearing a ewe before lambing

A. Cleanliness

B. Easier for lamb to find teats

C. Easier to tell if ewe is about to lamb

D. Easier to assist in lambing and to spot a possible prolapse

E. Ewe is more likely to seek shelter for herself and lamb during bad weather

F. Ewes require less space

G. Ewes are less likely to lay on lambs

XVI. Description of a ewe about to lamb

A. Nervous

B. Sunken sides in front of hips

C. Full udder

D. Pinkish vulva

(Caution: A red, protruding vulva indicates a possible prolapse.)

XVII. Normal labor

(Note: Ewe should be checked to determine if she needs assistance if she is not progressing normally.)

A. Takes about 5 hours--4 hours for dilation of the cervix and 1 hour for delivery

B. After hard labor starts (the water bag breaks) the front feet and nose should appear in 5 to 15 minutes

C. Lamb should be delivered one half hour after hard labor begins

XVIII. Steps to take immediately after lambing

A. Wipe mucus off lamb's nose

B. Dip navel in iodine

C. Strip teats and help lamb to start nursing

D. Place lamb and ewe in a lambing pen

XIX. Procedure for a chilled lamb

A. Place in lukewarm water

B. Add hot water

(Note: This lessens the chance of shock over simply putting the lamb directly in hot water.)

C. Remove lamb when warm and then dry off

XX. Importance of colostrum soon after birth

A. Colostrum contains antibodies to protect newborn from disease

B. Lamb can only absorb colostrum for a limited time

C. Serves as a laxative

XXI. Getting a ewe to accept her own lamb

A. Place ewe and lamb in lambing pen

B. Roll ewe on her side to allow lamb to get colostrum

C. File the lamb's teeth if they are too sharp

D. Rub the ewe's milk, vanilla or a commercial product on ewe's nose and rump of lamb

E. Restrain ewe if necessary

XXII. Grafting an orphan lamb to a ewe

A. Immediately after lambing, dunk orphan lamb into warm water and rub together with the ewe's own lamb

B. Dunk orphan lamb and the ewe's own lamb into water with molasses and salt; let ewe lick it off

C. Tie dead lamb's skin to orphan lamb

(Note: The ewe can also be blindfolded in any of these procedures if she still will not accept the lamb.)

D. Use a fostering pen with a stanchion to force ewe to accept lamb until she will accept it naturally

(Note: This usually takes 4 to 5 days.)

XXIII. Ewe's milk contains 67% more fat, 57% more protein and 75% more calcium than cow's milk

(Note: This is why calf milk replacer should not be used for lambs.)

XXIV. Feeding a lamb too weak to suck

A. Inject dextrose solution under the skin

(Note: Ten cc of 50% dextrose in saline or 50 cc of 5% dextrose in saline can be used. Injections should be divided into 4 parts and injected under the loose skin at the "armpits.")

B. Feed milk with a baby lamb probe

(Caution: Care should be taken to avoid putting milk into the lungs.)

XXV. Docking and castrating

A. Docking should be done before 2 weeks of age

B. Castrating should be done before 6 weeks of age

XXVI. Feeding the sheep breeding flock

A. Breeding time

1. Flushing--Put ewes on better quality pasture or feed corn or oats (or a mixture of both) at 1/2 - 3/4 pounds

B. Early gestation

1. Roughage is the basic ration (high quality hay or haylage)

2. Some grain and protein supplementation if feeding poor quality roughage

C. Late gestation (last 4-6 weeks)--Feed some concentrate mixture (corn, grain, oats, etc.)

D. Lactation

1. Nutrient requirements higher

2. 2 - 2.5 lbs high quality legume hay

3. 2 - 3.75 lbs concentrate

XXVII. Maintaining healthy breeding stock

A. 15 essential mineral elements

1. Major minerals--Sodium, chlorine, calcium, phosphorus, magnesium, potassium and sulfur

2. Trace minerals--Iodine, iron, copper, molybdenum, cobalt, manganese, zinc, selenium

B. Vitamins--A, D, E, B complex

C. Clean, fresh water

D. Antibiotics--Daily for 80 days beginning six weeks before lambing

CARE OF THE SHEEP BREEDING FLOCK

AG 310 - H

ASSIGNMENT SHEET #1--MAKE EXPLANATIONS FOR VARIOUS PROBLEM SITUATIONS CONNECTED WITH THE SHEEP BREEDING FLOCK

Name_____ Score_____

Caring for the breeding herd involves close observation and recognition of problems before they get out of hand. Using your knowledge of the sheep breeding herd, make explanations for the situations described below and also include the most probable action to take, if one is needed.

1. After 16 days from the beginning of the breeding season, you change the color of the paste used on the breast of the ram. You notice that a large number of ewes are being marked with the new color. It has been fairly cool.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

2. Same situation as above, except only a few ewes are being marked with the new color.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

3. You just bought 2 new rams and put them in the flock. The next day you notice one of them has a bloody head.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

4. You figure that the ewes should all be coming into heat, but estrus seems to be very irregular among the flock. You have recently moved them onto some fresh clover for grazing.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

5. You notice two of your ewes look nervous and look like their sides are sunken.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

6. The water bag on one of your ewes about to lamb has been broken for at least 1 hour.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

7. One of your newborn lambs is unable to get up or suck.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

8. One of your lambs is shivering violently.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

9. A twin lamb is standing in the corner of the pen while the other one is nursing.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

10. A ewe starts to reject her lamb, but only after it begins nursing.

   a. Explanation _____

   _____

   b. Probable action_____

   _____

CARE OF THE SHEEP BREEDING FLOCK

AG 310 - H

ANSWERS TO ASSIGNMENT SHEETS

1. a. The ram is infertile.
   b. Replace the ram.

2. a. The ram is fertile, but a few of the ewes did not breed the first time.
   b. Watch the ewes that did not breed to make sure they eventually get bred. Cull if they do not breed.

3. a. They have been fighting and butting one another.
   b. Put them in a small pen until they get used to one another, tie one foreleg to a hindleg or tie a piece of wood to a foreleg of the ram.

4. a. The estrogen in the clover is hampering ovulation.
   b. Remove the animals from the fresh clover pasture.

5. a. They are about to lamb.
   b. Move them to the lambing area and observe closely for any lambing problems.

6. a. The lamb is wedged or in an abnormal position.
   b. Perform an internal examination of the ewe and provide the necessary assistance.

7. a. It is too weak.
   b. Give a dextrose injection or feed it with a baby lamb probe.

8. a. It is chilled.
   b. Place it into lukewarm water and gradually add hot water. Remove from water after lamb is warmed up and dry thoroughly.

9. a. The ewe has rejected the lamb not nursing.
   b. Rub ewe's milk, vanilla or a commercial product on lamb's rump and ewe's nose. Make sure lamb's teeth are not too sharp. Restrain ewe if she will not accept the second lamb.

10. a. The lamb's teeth are too sharp.
    b. File the teeth off.

CARE OF THE SHEEP BREEDING FLOCK

AG 310 - H

LABORATORY EXERCISE #1--TEST A EWE FOR PREGNANCY

I. Tools and equipment

A. Soapy solution of mild dish soap in warm water

B. Drenching gun

C. Holding cradle

D. Palpation rod--Hollow plastic rod 5/8 inch outside diameter x 21 inches long with a bullet-shaped tip

E. Disinfectant

F. Pregnant ewes

II. Procedure

(Caution: Procedure should be done from 60 to 115 days after breeding. Examinations done after 115 days may cause pregnancy toxemia.)

A. Best done between 70 and 110 days

B. Place ewe on back in cradle

C. Hold hind legs so that stomach muscles are relaxed

D. Hold hind legs securely

E. Inject 6 to 8 ounces of soapy solution into rectum

F. Lubricate rod and insert into rectum. Use a back and forth motion while gently pushing rod. Point rod slightly towards the backbone. Insert rod 14 to 16 inches

G. Gently push rod so that the end inside the sheep moves toward the belly

H. Place hand on the belly and palpate for the relatively solid fetus

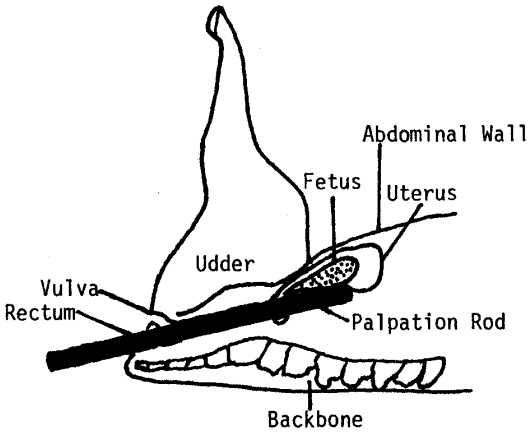
I. If fetus is not felt move rod back down and over and back up several times until the entire abdominal cavity has been palpated

J. Take care not to get rod to one side of the fetus and then not get under it to lift it up

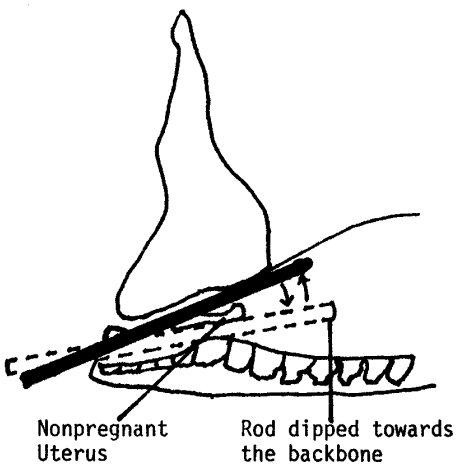
K. Rod can be easily felt through the abdominal wall if ewe is <u>not</u> pregnant

L. Disinfect rod between ewes

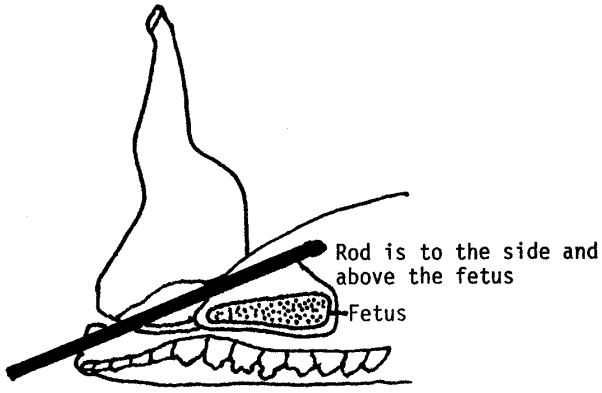
Rod Palpating Pregnant Ewe



Rod Palpating Nonpregnant Ewe



Most Common Mistake Made When Using
Palpating Rod



CARE OF THE SHEEP BREEDING FLOCK

AG 310 - H

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Opening to the reproductive tract in the ewe	1. Prolapse
_____b.	Hormone that helps regulate the female reproductive cycle	2. Vulva
_____c.	A ewe under twelve months of age	3. Estrogen
_____d.	The condition of not exhibiting estrus at regular intervals; reproductively inactive	4. Dock
_____e.	Standing heat or time when female will receive the male	5. Estrus
_____f.	Examining by feel	6. Dextrose
_____g.	The age at which reproductive organs become operative	7. Palpating
_____h.	Disposing of nonproductive or less desirable animals	8. Puberty
_____i.	Organism in early stages of development	9. Cryptorchidism
_____j.	To remove a lamb's tail or the stub left over after the tail has been cut off	10. Anestrus
_____k.	Feeding a ewe well just before breeding to cause an increase in weight	11. Hormone
_____l.	First "milk" from a mother after giving birth	12. Embryo
_____m.	Condition in which the vagina, uterus or rectum comes out of the body while still remaining attached	13. Flushing
_____n.	Release of an egg or eggs by the ovary	14. Ewe lamb
_____o.	Condition in which the testicles are pushed up into the body	15. Ovulation
_____p.	Type of sugar	16. Culling
_____q.	Substance that affects reproduction and other bodily functions	17. Colostrum

2. Select good management practices when caring for the ram by placing a check in front of the appropriate practices in the list below.

_____a. Buy ram immediately before breeding season to lower chance of disease

_____b. Feed ram one pound of grain per day before breeding season to get him into shape

_____c. Provide shade during breeding season

_____d. Use one mature ram for 40 to 75 ewes

_____e. Avoid grain during the breeding season

_____f. Use a mature ram lamb on 15 to 30 ewes

_____g. Shear ram before breeding season

_____h. Feed 2 pounds of good quality hay and 1 to 2 lbs of grain per day during breeding season

3. Describe 3 ways to keep rams from fighting.

a. _____

_____

b. _____

_____

c. _____

_____

4. Describe the relay method for breeding ewes.

_____

_____

_____

_____

5. Describe five good management practices when caring for the ewe.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

6. Describe the difference in estrus between sheep and other farm animals.

   _____

   _____

7. Select the factors that help estrus begin in ewes by placing a check in front of them in the following list.

   _____a. Shorter days

   _____b. Warmer temperatures

   _____c. Introducing the ram during transition between anestrus and estrus

   _____d. Longer days

   _____e. Cooler temperatures

   _____f. Keeping the ram with the ewes year-round

8. List two ways to prepare ewes for breeding.

   a. _____

   b. _____

9. List two advantages of flushing.

   a. _____

   b. _____

10. Describe two advantages and two disadvantages of breeding ewe lambs.

    Advantages:

    a. _____

    b. _____

Disadvantages:

c. _____

d. _____

11. Select the effects hormones can have on reproduction by placing a check in front of them in the list below.

_____a. Cause ewes to ovulate at the same time

_____b. Increase ovulation rate

_____c. Cause late puberty

_____d. Enable mating to occur during the anestrus period

12. Describe the effect clovers and alfalfa can have on ovulation.

_____

_____

13. List two methods of marking ewes which have been serviced by the ram.

a. _____

b. _____

14. List two advantages of pregnancy testing.

a. _____

b. _____

15. Describe four advantages of shearing a ewe before lambing.

a. _____

b. _____

c. _____

d. _____

16. List four indications a ewe is about to lamb.

a. _____

b. _____

c. _____

d. _____

17. Select the time lengths for various occurrences in a normal delivery from the list below.

_____a. Total time for a normal delivery is about 10 hours

_____b. After the cervix is dilated, delivery lasts about 1 hour

_____c. Hard labor lasts about one half hour

_____d. The front feet and head should appear 30 to 35 minutes after hard labor starts

18. List in order the four steps to take after lambing.

a. _____

b. _____

c. _____

d. _____

19. Describe what to do for a chilled lamb.

_____

_____

20. List three reasons a lamb needs colostrum soon after birth.

a. _____

b. _____

c. _____

21. Describe the procedure to get a ewe to accept her own lamb.

_____

_____

_____

_____

_____

_____

_____

22. Describe four procedures for grafting an orphan lamb to a ewe.

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

23. Distinguish between a cow's milk and a ewe's milk by writing cow or ewe in front of the correct description.

_____a. Contains more fat

_____b. Contains more protein

_____c. Contains more calcium

24. Describe two methods of feeding a lamb too weak to suck.

a. _____

b. _____

25. Write the best time to dock and castrate lambs.

a. Docking _____

b. Castrating _____

26. Select the amount and kind of feed recommended for the sheep breeding flock by placing an "X" in the correct blanks.

_____a. Feed 2 - 2.5 lbs high quality legume hay and 2 - 3.75 lbs concentrate at breeding time

_____b. Feed only roughages during late gestation

_____c. Feed corn or oats at 1/2 to 3/4 lbs during breeding time

_____d. Feed some concentrate mixture during late gestation

_____e. Feed 2 - 2.5 lbs high quality legume hay during lactation

_____f. Feed grain and protein supplementation as the basic ration during early gestation

27. Describe the procedures for maintaining healthy breeding stock.

_____

_____

_____

_____

_____

_____

CARE OF THE SHEEP BREEDING FLOCK

AG 310 - H

ANSWERS TO TEST

1.

a.	2	f.	7	k.	13	p.	6
b.	3	g.	8	l.	17	q.	11
c.	14	h.	16	m.	1		
d.	10	i.	12	n.	15		
e.	5	j.	4	o.	9		

2. b, c, f, g, h

3. Put them together in a small pen for a few days to let them get used to each other; Tie a foreleg and a hindleg together with a leather strap; Tie a piece of wood to a foreleg with a leather strap

4. Half the rams are placed with the ewes the first two weeks and then are taken out while the second half are placed with the ewes

5. Answer should include five of the following:

   Flushing--Increase feeding 2 weeks before rams are turned in; Tagging--Remove wool from around dock; Eyeing--Clip wool around eyes; Provide plenty of exercise; Trim feet; Provide shade when hot; Keep separate from other livestock

6. Estrus in sheep normally only occurs in the fall, usually between September and November, instead of year-round as in other farm animals

7. a, c, e

8. Clip wool around dock area; Flush

9. Increases number of lambs born by increasing ovulation; Helps bring ewes into heat about the same time

10. Advantages: Greater lifetime production than ewes first bred to lamb as two-year-olds; Lower production cost per lamb produced

    Disadvantages: (Answer should include 2 of the following.) Lighter lambs at birth; Increased lambing problems; Shorter breeding season; More intensive management needed

11. a, b, d

12. Clover, alfalfa and trefoil may have a high estrogen content which may hamper ovulation

13. Ram marking harness with crayons; Smearing a colored paste on the ram's breast

14. Can be used in the selection of ewe lambs; Allows culling of non-pregnant ewes

15. Answer should include 4 of the following:

    Cleanliness; Easier for lamb to find teats; Easier to tell if ewe is about to lamb; Easier to assist in lambing and to spot a possible prolapse; Ewe is more likely to seek shelter for herself and lamb during bad weather; Ewes require less space; Ewes are less likely to lay on lambs

16. Nervous; Sunken sides in front of hips; Full udder; Pinkish vulva

17. b, c

18. a. Wipe mucus off lamb's nose
    b. Dip navel in iodine
    c. Strip teats and help lamb start nursing
    d. Place lamb and ewe in a lambing pen
    (Note: "c" and "d" could be switched and still be correct.)

19. Place in lukewarm water and then add hot water; After lamb is warm, remove from the water and dry off

20. Colostrum contains antibodies to protect newborn from disease; Lamb can only absorb colostrum for a limited time; Serves as a laxative

21. Answer should include the following information:

    Place the ewe and lamb in a lambing pen; Roll the ewe on her side to allow lamb to get colostrum; Rub the ewe's milk, vanilla or a commercial product on the ewe's nose and the lamb's rump; File the lamb's teeth if they are too sharp; Restrain the ewe if necessary

22. a. Immediately after lambing, dunk orphan lamb into warm water and rub together with the ewe's own lamb
    b. Dunk orphan lamb and the ewe's own lamb into water with molasses and salt; let ewe lick it off
    c. Tie dead lamb's skin to orphan lamb
    d. Use a fostering pen with a stanchion to force ewe to accept lamb until she will accept it naturally

23. a. ewe b. ewe c. ewe

24. Inject dextrose solution under the skin; Feed milk with a baby lamb probe

25. a. Before two weeks of age
    b. Before six weeks of age

26. c, d, e

27. 15 essential mineral elements: Major minerals--Sodium, chlorine, calcium, phosphorus, magnesium, potassium and sulfur; Trace minerals--Iodine, iron, copper, molybdenum, cobalt, manganese, zinc, selenium; Vitamins--A, D, E, B complex; Clean, fresh water; Antibiotics--Daily for 80 days beginning six weeks before lambing

FEEDING SHEEP

AG 310 - I

UNIT OBJECTIVE

After completion of this unit, students should be able to describe the general nutrient requirements of sheep and determine the rations to meet those requirements. Students should also be able to identify management techniques for feeding sheep. This knowledge will be demonstrated by completion of assignment sheets and a unit test with a minimum of 85% accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with feeding of the sheep flock to their correct definitions.
2. Match the general nutrients required by sheep to an important fact to remember about that nutrient.
3. Name the primary feed for sheep.
4. List the five most common supplemental feeds fed to sheep.
5. Distinguish between the desirability of feeding energy (grain) or protein supplements when some forage is available.
6. Select guidelines for watering sheep.
7. Select the nutritionally critical time periods for ewes.
8. Describe tips on the location and timing of feedings.
9. Distinguish between rations for ewes before and after lambing.
10. Describe a newborn lamb milk formula.
11. Select requirements for a good lamb milk replacer.
12. Describe four situations that favor creep feeding.
13. Write the minimum amount of protein necessary for a creep feed ration.
14. Write the approximate number of sheep a good and a poor pasture can maintain.
15. Describe five ways to increase forage utilization.
16. List three advantages of pasture rotation.
17. Write the ideal height of grass for sheep.
18. Match three categories of pasture plants to their descriptions.

19. List four effects improved nutrition can have on wool.

20. Balance a creep feed ration for protein using Pearson's Square.

21. Balance a ration using the trial-and-error method.

FEEDING SHEEP

AG 310 - I

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

A. Make transparencies and necessary copies of materials.

B. Provide students with objectives and discuss.

C. Provide students with information and discuss.

D. Provide students with assignment sheets.

(Note: A review of the unit AG 530-I--Feeding Livestock may be necessary before students can complete these assignment sheets. The assignment sheets should also be evaluated as to their appropriateness for the level of students in the class.)

E. Develop additional assignments appropriate for the students.

F. Obtain information on the feeds used in the local area. Information should include availability, price and nutrient content.

G. Obtain samples of feeds used locally.

H. Run a moisture test on local forages to demonstrate how much an animal must eat to get the necessary dry matter.

I. Obtain samples of various types of pasture plants found locally.

J. Obtain drawings or pictures of creep feeders used for lambs.

K. Review and give test.

L. Reteach and retest if necessary.

II. Instructional materials

A. Objective sheet

B. Suggested activities

C. Information sheet

D. Transparency master

1. TM 1--Pearson's Square

(Note: This transparency master is for use with the assignment sheet.)

E. Handout

1. HO 1--Nutrient Requirements of Sheep

(Note: This handout gives the nutrient requirements on an as-fed basis. The other handouts on nutrient requirements are on a dry-matter basis. To convert the figures to a dry-matter basis multiply by 90%.)

F. Assignment sheets

1. AS 1--Balance a Creep Feed Ration for Protein Using Pearson's Square

2. AS 2--Balance a Ration Using the Trial-and-Error Method

G. Answers to assignment sheets

H. Test

I. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

C. Ensminger, M.E., *Animal Science*. The Interstate Printers and Publishers, Inc., Danville, Illinois, 1977.

D. Scott, George E., *The Sheepman's Production Handbook*. Sheep Industry Development Program and Abegg Printing Co., Denver, Colorado, 1977.

E. Simmons, Paula, *Raising Sheep the Modern Way*. Garden Way Publishing, Charlotte, Vermont, 1976.

FEEDING SHEEP

AG 310 - I

INFORMATION SHEET

I. Terms and definitions

- A. Gestation--Period when the lamb is developing inside of the ewe; from conception to birth
- B. Lactation--Giving milk
- C. Colostrum--First "milk" from a mother after giving birth
- D. Glucose--Form of sugar
- E. Creep feeding--Feeding lambs extra feed by placing them in a structure the more mature animals cannot get into
- F. Weaning--Removing offspring from their mothers or from milk
- G. Drought--Very dry period
- H. Feeder lambs--Weaned lambs that need supplemental feeding before slaughter
- I. Lush--Tender and juicy
- J. Cellulose--Major carbohydrate or energy part of plants
- K. Staple--Fibers of wool

II. General nutrients required by sheep

- A. Water--Water must be kept clean
- B. Energy--Dry, poor quality roughages are the primary cause of energy deficiencies
- C. Protein--Quantity is more important than quality since the sheep's rumen manufactures the specific amino acids it needs
- D. Salt--Loose salt is better since sheep tend to bite block salt and injure their teeth
- E. Calcium--Most forages have sufficient calcium while grains may be deficient
- F. Phosphorus--Mature forages are low in phosphorus while grains are relatively high
- G. Vitamins--Vitamin A is the one most likely to be deficient

III. Roughages supply 89% of the feed for the sheep in the United States

IV. Common supplement feeds

(Note: Range ewes will almost always respond to supplementation, but whether it is economical to do so depends on the condition of the animals and the range.)

A. Alfalfa hay

B. Silage

C. Grains

(Note: Barley, corn and oats are the primary grains used in Idaho.)

D. Soybean and cottonseed meal

E. Molasses

(Note: This is fed in limited amounts as a source of energy.)

V. Protein supplements are better than energy (grain) supplements while forage is still available

A. Grain supplements reduce the digestibility of the forages

B. Protein supplements increase the digestibility of the forages while also providing the necessary protein and some additional energy

VI. Guidelines for watering sheep

A. Sheep must have clean water

(Note: Sheep on high moisture grasses may not need very much water.)

B. Mature sheep need an average of 1 gallon per day or 1 gallon per 4 lbs of dry feed

(Note: In tests, this has varied from .7 gallons in the winter to 2.2 gallons when the temperatures were warm and sheep were eating dry forages.)

C. Factors that increase a sheep's need for water

1. Increased dry matter intake

2. Increased nitrogen intake

3. Increased mineral intake, especially salt

4. Increased environmental temperature

5. Late gestation

6. Lactation

VII. Nutritionally critical time periods for ewes

A. Three weeks before and up to breeding

B. Last four to six weeks of gestation

C. First six weeks of lactation

VIII. Tips on location and timing of feedings

A. Sheep should be fed before dark

B. Regular feeding times for grain cut down on digestive difficulties

C. Ewes need at least 14 inches of bunk space for eating

D. Hay should be fed in bunks if possible

(Note: Feeding hay on the ground will result in as much as a 30% loss in nutrient value.)

IX. Sample ewe rations (130 lb ewe)

(Note: Each number represents a ration.)

A. Last 6 weeks of gestation

1. Shelled corn--.5 lb; alfalfa-grass hay--4.2 lbs

2. Ground ear corn--2 lbs; alfalfa-grass hay--2.2 lbs

B. First 8 weeks of lactation

1. Shelled corn--1 lb; alfalfa hay--5 lbs

2. Ground ear corn--3 lbs; alfalfa hay--2.6 lbs

(Note: Ewes with twins need another 1/2 lb of feed per day.)

X. Newborn lamb milk formula

(Caution: Colostrum should always be used unless circumstances absolutely prevent it.)

A. 26 ounces milk--1/2 canned milk and 1/2 water

B. 1 tablespoon castor oil or cod liver oil

C. 1 tablespoon glucose or sugar

D. 1 beaten egg yolk

(Note: Feed 1 1/2 to 2 ounces every 2 hours the first day and increase to 3 to 4 ounces the second day.)

XI. Requirements for a lamb milk replacer

A. 30% fat

B. 25% protein

C. Not over 25% lactose

D. Vitamins A, D and E

E. Necessary minerals

XII. Situations favoring creep feeding

A. Weaning lambs before 3 months

B. Fall and winter lambing

C. Purebred and registered lambs

D. Twin lambs or late lambs

E. Drought conditions on the range

F. Marketing slaughter lambs instead of feeders

XIII. Creep feed rations should have a minimum of 15% protein

XIV. Number of sheep a pasture can maintain

A. Good pasture--5 to 10 sheep per acre

B. Poor pasture--1 to 2 sheep per acre

XV. Ways to increase forage utilization

A. Rotate pastures

B. Restrict grazing time to a few hours each day or every other day on lush pastures

(Note: Ewes will eat more than needed if left on lush pastures continually. This is especially true of non-lactating ewes.)

C. Develop water sources in dry areas

D. Graze cattle and sheep or sheep, cattle and goats together

E. Fence sheep to force utilization of poor forage

XVI. Advantages of pasture rotation

A. Plants have more time to recover

B. Sheep eat better when moved to "fresh" grass

C. Internal parasites are more easily controlled

XVII. The ideal height for pasture grass is 4 to 6 inches

XVIII. Categories of pasture plants

A. Grass plants

1. Lowest in protein and phosphorus

2. Highest in cellulose or energy

B. Browse plants

1. Highest in protein

2. Lowest in cellulose

3. Phosphorus content increases slightly with maturity

C. Forbs

1. In between grasses and browse plants

2. Protein decreases slightly with maturity

3. Phosphorus decreases rapidly with maturity

XIX. Effects of improved nutrition on wool

A. Increase in fiber diameter

B. Increase in staple length

C. Increase in fiber strength

D. Increase in amount of wool

Pearson's Square

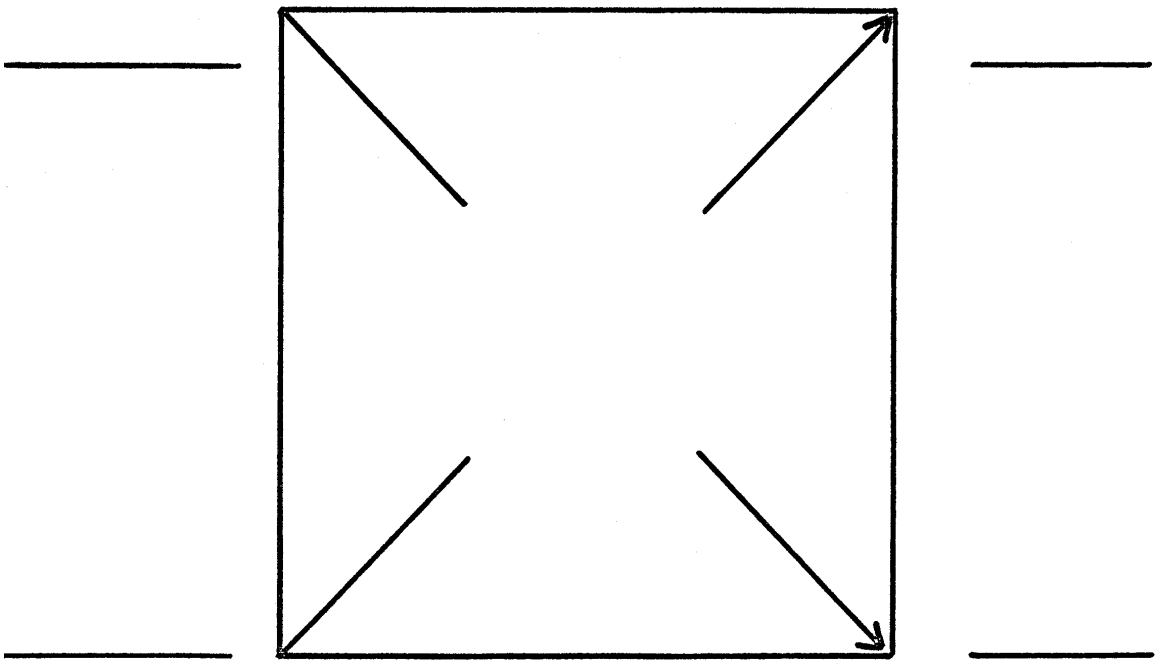


TABLE 1 Daily Nutrient Requirements of Sheep

Body Weight		Weight Change/Day		Dry Matter per Animal[a]			Nutrients per Animal									
							Energy[b]								Vitamin A Activity	Vitamin E Activity
							TDN		DE	ME	Crude protein		Ca	P		
(kg)	(lb)	(g)	(lb)	(kg)	(lb)	(% body weight)	(kg)	(lb)	(Mcal)	(Mcal)	(g)	(lb)	(g)	(g)	(IU)	(IU)
Ewes[c]																
Maintenance																
50	110	10	0.02	1.0	2.2	2.0	0.55	1.2	2.4	2.0	95	0.21	2.0	1.8	2,350	15
60	132	10	0.02	1.1	2.4	1.8	0.61	1.3	2.7	2.2	104	0.23	2.3	2.1	2,820	16
70	154	10	0.02	1.2	2.6	1.7	0.66	1.5	2.9	2.4	113	0.25	2.5	2.4	3,290	18
80	176	10	0.02	1.3	2.9	1.6	0.72	1.6	3.2	2.6	122	0.27	2.7	2.8	3,760	20
90	198	10	0.02	1.4	3.1	1.5	0.78	1.7	3.4	2.8	131	0.29	2.9	3.1	4,230	21
Flushing—2 Weeks prebreeding and first 3 weeks of breeding																
50	110	100	0.22	1.6	3.5	3.2	0.94	2.1	4.1	3.4	150	0.33	5.3	2.6	2,350	24
60	132	100	0.22	1.7	3.7	2.8	1.00	2.2	4.4	3.6	157	0.34	5.5	2.9	2,820	26
70	154	100	0.22	1.8	4.0	2.6	1.06	2.3	4.7	3.8	164	0.36	5.7	3.2	3,290	27
80	176	100	0.22	1.9	4.2	2.4	1.12	2.5	4.9	4.0	171	0.38	5.9	3.6	3,760	28
90	198	100	0.22	2.0	4.4	2.2	1.18	2.6	5.1	4.2	177	0.39	6.1	3.9	4,230	30
Nonlactating—First 15 weeks gestation																
50	110	30	0.07	1.2	2.6	2.4	0.67	1.5	3.0	2.4	112	0.25	2.9	2.1	2,350	18
60	132	30	0.07	1.3	2.9	2.2	0.72	1.6	3.2	2.6	121	0.27	3.2	2.5	2,820	20
70	154	30	0.07	1.4	3.1	2.0	0.77	1.7	3.4	2.8	130	0.29	3.5	2.9	3,290	21
80	176	30	0.07	1.5	3.3	1.9	0.82	1.8	3.6	3.0	139	0.31	3.8	3.3	3,760	22
90	198	30	0.07	1.6	3.5	1.8	0.87	1.9	3.8	3.2	148	0.33	4.1	3.6	4,230	24
Last 4 weeks gestation (130-150% lambing rate expected) or last 4-6 weeks lactation suckling singles[d]																
50	110	180 (45)	0.40 (0.10)	1.6	3.5	3.2	0.94	2.1	4.1	3.4	175	0.38	5.9	4.8	4,250	24
60	132	180 (45)	0.40 (0.10)	1.7	3.7	2.8	1.00	2.2	4.4	3.6	184	0.40	6.0	5.2	5,100	26
70	154	180 (45)	0.40 (0.10)	1.8	4.0	2.6	1.06	2.3	4.7	3.8	193	0.42	6.2	5.6	5,950	27
80	176	180 (45)	0.40 (0.10)	1.9	4.2	2.4	1.12	2.4	4.9	4.0	202	0.44	6.3	6.1	6,800	28
90	198	180 (45)	0.40 (0.10)	2.0	4.4	2.2	1.18	2.5	5.1	4.2	212	0.47	6.4	6.5	7,650	30
Last 4 weeks gestation (180-225% lambing rate expected)																
50	110	225	0.50	1.7	3.7	3.4	1.10	2.4	4.8	4.0	196	0.43	6.2	3.4	4,250	26
60	132	225	0.50	1.8	4.0	3.0	1.17	2.6	5.1	4.2	205	0.45	6.9	4.0	5,100	27
70	154	225	0.50	1.9	4.2	2.7	1.24	2.8	5.4	4.4	214	0.47	7.6	4.5	5,950	28
80	176	225	0.50	2.0	4.4	2.5	1.30	2.9	5.7	4.7	223	0.49	8.3	5.1	6,800	30
90	198	225	0.50	2.1	4.6	2.3	1.37	3.0	6.0	5.0	232	0.51	8.9	5.7	7,650	32
First 6-8 weeks lactation suckling singles or last 4-6 weeks lactation suckling twins[d]																
50	110	−25 (90)	−0.06 (0.20)	2.1	4.6	4.2	1.36	3.0	6.0	4.9	304	0.67	8.9	6.1	4,250	32
60	132	−25 (90)	−0.06 (0.20)	2.3	5.1	3.8	1.50	3.3	6.6	5.4	319	0.70	9.1	6.6	5,100	34
70	154	−25 (90)	−0.06 (0.20)	2.5	5.5	3.6	1.63	3.6	7.2	5.9	334	0.73	9.3	7.0	5,950	38
80	176	−25 (90)	−0.06 (0.20)	2.6	5.7	3.2	1.69	3.7	7.4	6.1	344	0.76	9.5	7.4	6,800	39
90	198	−25 (90)	−0.06 (0.20)	2.7	5.9	3.0	1.75	3.8	7.6	6.3	353	0.78	9.6	7.8	7,650	40

TABLE 1 Daily Nutrient Requirements of Sheep—*Continued*

Body Weight		Weight Change/Day		Dry Matter per Animal[a]			Nutrients per Animal									
							Energy[b]									
							TDN		DE	ME	Crude protein		Ca	P	Vitamin A Activity	Vitamin E Activity
(kg)	(lb)	(g)	(lb)	(kg)	(lb)	(% body weight)	(kg)	(lb)	(Mcal)	(Mcal)	(g)	(lb)	(g)	(g)	(IU)	(IU)
First 6-8 weeks lactation suckling twins																
50	110	−60	−0.13	2.4	5.3	4.8	1.56	3.4	6.9	5.6	389	0.86	10.5	7.3	5,000	36
60	132	−60	−0.13	2.6	5.7	4.3	1.69	3.7	7.4	6.1	405	0.89	10.7	7.7	6,000	39
70	154	−60	−0.13	2.8	6.2	4.0	1.82	4.0	8.0	6.6	420	0.92	11.0	8.1	7,000	42
80	176	−60	−0.13	3.0	6.6	3.8	1.95	4.3	8.6	7.0	435	0.96	11.2	8.6	8,000	45
90	198	−60	−0.13	3.2	7.0	3.6	2.08	4.6	9.2	7.5	450	0.99	11.4	9.0	9,000	48
Ewe lambs																
Nonlactating—First 15 weeks gestation																
40	88	160	0.35	1.4	3.1	3.5	0.83	1.8	3.6	3.0	156	0.34	5.5	3.0	1,880	21
50	110	135	0.30	1.5	3.3	3.0	0.88	1.9	3.9	3.2	159	0.35	5.2	3.1	2,350	22
60	132	135	0.30	1.6	3.5	2.7	0.94	2.0	4.1	3.4	161	0.35	5.5	3.4	2,820	24
70	154	125	0.28	1.7	3.7	2.4	1.00	2.2	4.4	3.6	164	0.36	5.5	3.7	3,290	26
Last 4 weeks gestation (100-120% lambing rate expected)																
40	88	180	0.40	1.5	3.3	3.8	0.94	2.1	4.1	3.4	187	0.41	6.4	3.1	3,400	22
50	110	160	0.35	1.6	3.5	3.2	1.00	2.2	4.4	3.6	189	0.42	6.3	3.4	4,250	24
60	132	160	0.35	1.7	3.7	2.8	1.07	2.4	4.7	3.9	192	0.42	6.6	3.8	5,100	26
70	154	150	0.33	1.8	4.0	2.6	1.14	2.5	5.0	4.1	194	0.43	6.8	4.2	5,950	27
Last 4 weeks gestation (130-175% lambing rate expected)																
40	88	225	0.50	1.5	3.3	3.8	0.99	2.2	4.4	3.6	202	0.44	7.4	3.5	3,400	22
50	110	225	0.50	1.6	3.5	3.2	1.06	2.3	4.7	3.8	204	0.45	7.8	3.9	4,250	24
60	132	225	0.50	1.7	3.7	2.8	1.12	2.5	4.9	4.0	207	0.46	8.1	4.3	5,100	26
70	154	215	0.47	1.8	4.0	2.6	1.14	2.5	5.0	4.1	210	0.46	8.2	4.7	5,950	27
First 6-8 weeks lactation suckling singles (wean by 8 weeks)																
40	88	−50	−0.11	1.7	3.7	4.2	1.12	2.5	4.9	4.0	257	0.56	6.0	4.3	3,400	26
50	110	−50	−0.11	2.1	4.6	4.2	1.39	3.1	6.1	5.0	282	0.62	6.5	4.7	4,250	32
60	132	−50	−0.11	2.3	5.1	3.8	1.52	3.4	6.7	5.5	295	0.65	6.8	5.1	5,100	34
70	154	−50	−0.11	2.5	5.5	3.6	1.65	3.6	7.3	6.0	301	0.68	7.1	5.6	5,450	38
First 6-8 weeks lactation suckling twins (wean by 8 weeks)																
40	88	−100	−0.22	2.1	4.6	5.2	1.45	3.2	6.4	5.2	306	0.67	8.4	5.6	4,000	32
50	110	−100	−0.22	2.3	5.1	4.6	1.59	3.5	7.0	5.7	321	0.71	8.7	6.0	5,000	34
60	132	−100	−0.22	2.5	5.5	4.2	1.72	3.8	7.6	6.2	336	0.74	9.0	6.4	6,000	38
70	154	−100	−0.22	2.7	6.0	3.9	1.85	4.1	8.1	6.6	351	0.77	9.3	6.9	7,000	40

TABLE 1 Daily Nutrient Requirements of Sheep

Body Weight		Weight Change/Day		Dry Matter per Animal[a]			Nutrients per Animal									
							Energy[b]									
							TDN		DE	ME	Crude protein		Ca	P	Vitamin A Activity	Vitamin E Activity
(kg)	(lb)	(g)	(lb)	(kg)	(lb)	(% body weight)	(kg)	(lb)	(Mcal)	(Mcal)	(g)	(lb)	(g)	(g)	(IU)	(IU)
Replacement ewe lambs[e]																
30	66	227	0.50	1.2	2.6	4.0	0.78	1.7	3.4	2.8	185	0.41	6.4	2.6	1,410	18
40	88	182	0.40	1.4	3.1	3.5	0.91	2.0	4.0	3.3	176	0.39	5.9	2.6	1,880	21
50	110	120	0.26	1.5	3.3	3.0	0.88	1.9	3.9	3.2	136	0.30	4.8	2.4	2,350	22
60	132	100	0.22	1.5	3.3	2.5	0.88	1.9	3.9	3.2	134	0.30	4.5	2.5	2,820	22
70	154	100	0.22	1.5	3.3	2.1	0.88	1.9	3.9	3.2	132	0.29	4.6	2.8	3,290	22
Replacement ram lambs[e]																
40	88	330	0.73	1.8	4.0	4.5	1.1	2.5	5.0	4.1	243	0.54	7.8	3.7	1,880	24
60	132	320	0.70	2.4	5.3	4.0	1.5	3.4	6.7	5.5	263	0.58	8.4	4.2	2,820	26
80	176	290	0.64	2.8	6.2	3.5	1.8	3.9	7.8	6.4	268	0.59	8.5	4.6	3,760	28
100	220	250	0.55	3.0	6.6	3.0	1.9	4.2	8.4	6.9	264	0.58	8.2	4.8	4,700	30
Lambs finishing—4 to 7 months old[f]																
30	66	295	0.65	1.3	2.9	4.3	0.94	2.1	4.1	3.4	191	0.42	6.6	3.2	1,410	20
40	88	275	0.60	1.6	3.5	4.0	1.22	2.7	5.4	4.4	185	0.41	6.6	3.3	1,880	24
50	110	205	0.45	1.6	3.5	3.2	1.23	2.7	5.4	4.4	160	0.35	5.6	3.0	2,350	24
Early weaned lambs—Moderate growth potential[f]																
10	22	200	0.44	0.5	1.1	5.0	0.40	0.9	1.8	1.4	127	0.38	4.0	1.9	470	10
20	44	250	0.55	1.0	2.2	5.0	0.80	1.8	3.5	2.9	167	0.37	5.4	2.5	940	20
30	66	300	0.66	1.3	2.9	4.3	1.00	2.2	4.4	3.6	191	0.42	6.7	3.2	1,410	20
40	88	345	0.76	1.5	3.3	3.8	1.16	2.6	5.1	4.2	202	0.44	7.7	3.9	1,880	22
50	110	300	0.66	1.5	3.3	3.0	1.16	2.6	5.1	4.2	181	0.40	7.0	3.8	2,350	22
Early weaned lambs—Rapid growth potential[f]																
10	22	250	0.55	0.6	1.3	6.0	0.48	1.1	2.1	1.7	157	0.35	4.9	2.2	470	12
20	44	300	0.66	1.2	2.6	6.0	0.92	2.0	4.0	3.3	205	0.45	6.5	2.9	940	24
30	66	325	0.72	1.4	3.1	4.7	1.10	2.4	4.8	4.0	216	0.48	7.2	3.4	1,410	21
40	88	400	0.88	1.5	3.3	3.8	1.14	2.5	5.0	4.1	234	0.51	8.6	4.3	1,880	22
50	110	425	0.94	1.7	3.7	3.4	1.29	2.8	5.7	4.7	240	0.53	9.4	4.8	2,350	25
60	132	350	0.77	1.7	3.7	2.8	1.29	2.8	5.7	4.7	240	0.53	8.2	4.5	2,820	25

[a]To convert dry matter to an as-fed basis, divide dry matter values by the percentage of dry matter in the particular feed.

[b]One kilogram TDN (total digestible nutrients) = 4.4 Mcal DE (digestible energy); ME (metabolizable energy) = 82% of DE. Because of rounding errors, values in Table 1 and Table 2 may differ.

[c]Values are applicable for ewes in moderate condition. Fat ewes should be fed according to the next lower weight category and thin ewes at the next higher weight category. Once desired or moderate weight condition is attained, use that weight category through all production stages.

[d]Values in parentheses are for ewes suckling lambs the last 4-6 weeks of lactation.

[e]Lambs intended for breeding; thus, maximum weight gains and finish are of secondary importance.

[f]Maximum weight gains expected.

Nutrient Requirements of Sheep

TABLE 2 Nutrient Concentration in Diets for Sheep (expressed on 100 Percent Dry Matter Basis[a])

Body Weight		Weight Change/Day		Energy[b]			Example Diet Proportions		Crude Protein	Cal-cium	Phos-phorus	Vitamin A Activity	Vitamin E Activity
(kg)	(lb)	(g)	(lb)	TDN[c] (%)	DE (Mcal/kg)	ME (Mcal/kg)	Concentrate %	Forage %	(%)	(%)	(%)	(IU/kg)	(IU/kg)
Ewes[d]													
Maintenance													
70	154	10	0.02	55	2.4	2.0	0	100	9.4	0.20	0.20	2,742	15
Flushing—2 weeks prebreeding and first 3 weeks of breeding													
70	154	100	0.22	59	2.6	2.1	15	85	9.1	0.32	0.18	1,828	15
Nonlactating—First 15 weeks gestation													
70	154	30	0.07	55	2.4	2.0	0	100	9.3	0.25	0.20	2,350	15
Last 4 weeks gestation (130-150% lambing rate expected) or last 4-6 weeks lactation suckling singles[e]													
70	154	180 (0.45)	0.40 (0.10)	59	2.6	2.1	15	85	10.7	0.35	0.23	3,306	15
Last 4 weeks gestation (180-225% lambing rate expected)													
70	154	225	0.50	65	2.9	2.3	35	65	11.3	0.40	0.24	3,132	15
First 6-8 weeks lactation suckling singles or last 4-6 weeks lactation suckling twins[e]													
70	154	−25(90)	−0.06 (0.20)	65	2.9	2.4	35	65	13.4	0.32	0.26	2,380	15
First 6-8 weeks lactation suckling twins													
70	154	−60	0.13	65	2.9	2.4	35	65	15.0	0.39	0.29	2,530	15
Ewe Lambs													
Nonlactating—First 15 weeks gestation													
55	121	135	0.30	59	2.6	2.1	15	85	10.6	0.35	0.22	1,668	15
Last 4 weeks gestation (100-120% lambing rate expected)													
55	121	160	0.35	63	2.8	2.3	30	70	11.8	0.39	0.22	2,833	15
Last 4 weeks gestation (130-175% lambing rate expected)													
55	121	225	0.50	66	2.9	2.4	40	60	12.8	0.48	0.25	2,833	15
First 6-8 weeks lactation suckling singles (wean by 8 weeks)													
55	121	−50	0.22	66	2.9	2.4	40	60	13.1	0.30	0.22	2,125	15
First 6-8 weeks lactation suckling twins (wean by 8 weeks)													
55	121	−100	−0.22	69	3.0	2.5	50	50	13.7	0.37	0.26	2,292	15
Replacement Ewe Lambs[f]													
30	66	227	0.50	65	2.9	2.4	35	65	12.8	0.53	0.22	1,175	15
40	88	182	0.40	65	2.9	2.4	35	65	10.2	0.42	0.18	1,343	15
50-70	110-154	115	0.25	59	2.6	2.1	15	85	9.1	0.31	0.17	1,567	15
Replacement Ram Lambs[f]													
40	88	330	0.73	63	2.8	2.3	30	70	13.5	0.43	0.21	1,175	15
60	132	320	0.70	63	2.8	2.3	30	70	11.0	0.35	0.18	1,659	15
80-100	176-220	270	0.60	63	2.8	2.3	30	70	9.6	0.30	0.16	1,979	15
Lambs Finishing—4 to 7 months old[g]													
30	66	295	0.65	72	3.2	2.5	60	40	14.7	0.51	0.24	1,085	15
40	88	275	0.60	76	3.3	2.7	75	25	11.6	0.42	0.21	1,175	15
50	110	205	0.45	77	3.4	2.8	80	20	10.0	0.35	0.19	1,469	15
Early Weaned Lambs—Moderate and rapid growth potential[g]													
10	22	250	0.55	80	3.5	2.9	90	10	26.2	0.82	0.38	940	20
20	44	300	0.66	78	3.4	2.8	85	15	16.9	0.54	0.24	940	20
30	66	325	0.72	78	3.3	2.7	85	15	15.1	0.51	0.24	1,085	15
40-60	88-132	400	0.88	78	3.3	2.7	85	15	14.5	0.55	0.28	1,253	15

[a]Values in Table 2 are calculated from daily requirements in Table 1 divided by DM intake. The exception, vitamin E daily requirements /head, are calculated from vitamin E/kg diet × DM intake.

[b]One kilogram TDN = 4.4 Mcal DE (digestible energy); ME (metabolizable energy) = 82% of DE. Because of rounding errors, values in Table 1 and Table 2 may differ.

[c]TDN calculated on following basis: hay DM, 55% TDN and on as-fed basis 50% TDN; grain DM, 83% TDN and on as-fed basis 75% TDN.

[d]Values are for ewes in moderate condition. Fat ewes should be fed according to the next lower weight category and thin ewes at the next higher weight category. Once desired or moderate weight condition is attained, use that weight category through all production stages.

[e]Values in parentheses are for ewes suckling lambs the last 4-6 weeks of lactation.

[f]Lambs intended for breeding; thus, maximum weight gains and finish are of secondary importance.

[g]Maximum weight gains expected.

FEEDING SHEEP

AG 310 - I

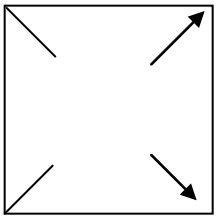
ASSIGNMENT SHEET #1--BALANCE A CREEP FEED RATION FOR PROTEIN USING PEARSON'S SQUARE

Name_____ Score_____

(Note: A review of AG 530-I--Feeding Livestock may be helpful for completing this assignment sheet.)

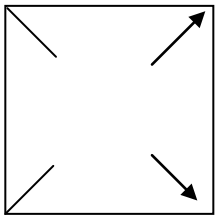
A creep feed ration for lambs should contain at least 15% protein. Using the feeds indicated, balance each of the feed combinations so that each ration will contain 15% protein. Calculate the parts of feed needed and the percentage of the ration they would make up.

1. Corn--10% protein; Soybean oil meal--48% protein



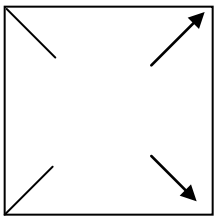
	Parts	Percentage
Corn	_____	_____
Soybean meal	_____	_____
Totals	_____	_____

2. 90% corn, 10% oats grain mixture--10% protein; Cottonseed meal--44% protein



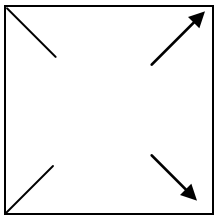
	Parts	Percentage
Grain	_____	_____
Cottonseed meal	_____	_____
Totals	_____	_____

3. 50% corn, 25% wheat, 25% oats grain mixture--12% protein; Soybean meal--48% protein



	Parts	Percentage
Grain	_____	_____
Soybean meal	_____	_____
Totals	_____	_____

4. 50% corn, 50% barley grain mixture--11.5% protein; Alfalfa hay pellets--18.4% protein



	Parts	Percentage
Grain	_____	_____
Alfalfa pellets	_____	_____
Totals	_____	_____

FEEDING SHEEP

AG 310 - I

ASSIGNMENT SHEET #2--BALANCE A RATION
USING THE TRIAL-AND-ERROR METHOD

Name_____ Score_____

(Note: A review of AG 530-I--Feeding Livestock may be helpful for completing this assignment sheet.)

Ewes during the last part of gestation may need supplemental nutrients for the developing fetus. Balance the following ration for pounds of dry matter, protein and total digestible nutrients for the ewe described using the feeds listed. Convert the values to an as-fed basis after making the calculations. Assume the ewe is on forage, but needs some supplementation. Limit the grain to 1/2 lb.

160 lb Ewe in the Last 6 weeks of Gestation

Dry Matter Basis

Dry Matter	TDN	Protein	Calcium	Phosphorus
4.3 lbs	2.25 lbs	.33 lb	.0095 lb	.007 lb

Worksheet (dry matter basis)

Feed (dry matter basis)	Dry Matter--lbs	TDN--lbs	Protein--lbs
Forage 31% TDN, 3% protein, .29% Ca, .1% P			
Alfalfa-grass hay 53% TDN, 14% protein, .67% Ca, .11% P			
Barley 83% TDN, 13% protein, .09% Ca, .47% P			
Totals			

Converting to as-fed basis:

Example:	Feed needed on a dry matter basis	2	lbs
	Dry matter content of feed	÷ 80%	
	Feed needed on an as-fed basis	2.5	lbs

Feeds	Dry Matter Content	Pounds of Feed Actually Needed
Forage	89%	_____
Alfalfa-grass hay	90%	_____
Barley	89%	_____

Extra credit: Figure out how much 18% Phosphorus supplement is needed in the ration.

_____

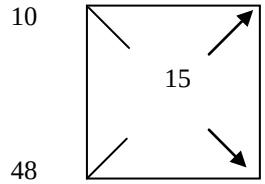
FEEDING SHEEP

AG 310 - I

ANSWERS TO ASSIGNMENT SHEETS

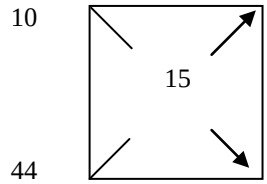
Assignment Sheet #1

1.



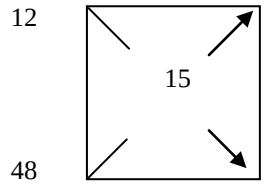
	Parts	Percentages
Corn	33	87%
Soybean meal	5	13%
Totals	38	100%

2.



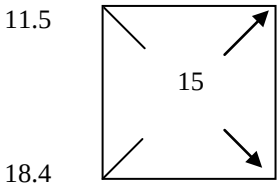
	Parts	Percentages
Grain	29	85%
Cottonseed meal	5	15%
Totals	34	100%

3.



	Parts	Percentages
Grain	33	92%
Soybean meal	3	8%
Totals	36	100%

4.



	Parts	Percentages
Grain	3.4	49%
Alfalfa pellets	3.5	51%
Totals	6.9	100%

Assignment Sheet #2--Answer should be similar to the following:

	Dry Matter--lbs	TDN--lbs	Protein--lbs
Forage	.7	.22	.02
Alfalfa-grass hay	3.1	1.64	.43
Barley	.5	.4	.07
Totals	4.3	2.26	.52

As-fed basis	Pounds of feed actually needed
Forage	.79
Alfalfa-grass hay	3.44
Barley	.56

Extra credit: 18% P = .004 lb

FEEDING SHEEP

AG 310 - I

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Tender and juicy	1. Creep feeding
_____b.	Very dry period	2. Glucose
_____c.	Major carbohydrate or energy part of plants	3. Feeder lambs
_____d.	Period when the lamb is developing inside of the ewe; from conception to birth	4. Weaning
_____e.	Fibers of wool	5. Cellulose
_____f.	Weaned lambs that need supplemental feeding before slaughter	6. Lactation
_____g.	Removing offspring from their mothers or from milk	7. Staple
_____h.	Feeding lambs extra feed by placing them in a structure the more mature animals cannot get into	8. Drought
_____i.	First "milk" from a mother after giving birth	9. Lush
_____j.	Form of sugar	10. Gestation
_____k.	Giving milk	11. Colostrum

2. Match each nutrient on the right to the most appropriate fact listed on the left.

_____a.	Must be kept clean	1. Vitamins
_____b.	"A" is the one most likely to be deficient	2. Phosphorus
_____c.	This is better fed in loose form	3. Calcium
_____d.	Quantity is more important than quality	4. Salt
_____e.	Mature forages are low in this while grains are high	5. Protein
_____f.	Dry, poor quality roughages are the primary cause of a deficiency in this nutrient	6. Energy
_____g.	Most forages have sufficient amount of this nutrient while grains are deficient	7. Water

3. Name the primary feed for sheep.

_____

4. List the most common supplemental feeds fed to sheep.

a. _____

b. _____

c. _____

d. _____

e. _____

5. Distinguish between the desirability of feeding energy (grain) or protein supplements when some forage is available by writing energy or protein in front of the statement that describes that type of supplement.

_____ a. Reduces digestibility of forages

_____ b. Increases digestibility of forages

6. Select guidelines for watering sheep from the list below. Check those that apply.

_____ a. Clean water is not a critical factor in sheep production

_____ b. Sheep on high moisture grasses require little water

_____ c. Sheep need an average of 3 gallons of water per day

_____ d. Water needs increase as dry matter intake increases

_____ e. Increased nitrogen intake lowers the need for water

_____ f. Water requirements are lower during lactation than at other times during the year

_____ g. A sheep needs approximately 1 gallon of water per 4 lbs of dry feed

_____ h. Increased mineral intake increases the need for water

7. Select the time periods which are nutritionally critical times for a ewe.

_____ a. Three weeks before and up to breeding

_____ b. First six weeks of lactation

_____ c. First part of pregnancy

_____ d. Last four to six weeks of gestation

_____ e. Dry period right after weaning

8. Describe tips on location and timing of feedings by filling in the blanks with the correct word or number.

   Sheep should be fed before (a) _____. These feedings need to be on a (b) _____ basis as this will reduce (c) _____ difficulties. Ewes need at least (d) _____ inches of bunk space for eating. Hay should always be fed in (e) _____ if possible.

9. Distinguish between the following ewe rations as being before lambing rations (BL) or after lambing rations (AL) by placing a "BL" or an "AL" in front of the appropriate rations.

   _____a. Shelled corn--1 lb; alfalfa hay--5 lbs

   _____b. Ground ear corn--3 lbs; alfalfa hay--2.6 lbs

   _____c. Shelled corn--.5 lb; alfalfa-grass hay--4.2 lbs

   _____d. Ground ear corn--2 lbs; alfalfa-grass hay--2.2 lbs

10. Describe a newborn lamb milk formula.

    _____

    _____

    _____

    _____

11. Select requirements for a good lamb milk replacer by checking the appropriate requirements.

    _____a. 15% protein

    _____b. Vitamins A, D and E

    _____c. 30% fat

    _____d. Not over 25% lactose

    _____e. Contain necessary minerals

12. Describe four situations that would favor creep feeding.

    a. _____

    b. _____

    c. _____

    d. _____

13. Write the minimum amount of protein necessary for a creep feed ration.

_____

14. Write the approximate number of sheep a good pasture and a poor pasture can maintain.

a. Good pasture_____

b. Poor pasture _____

15. Describe five ways to increase forage utilization.

a. _____

b. _____

c. _____

d. _____

e. _____

16. List three advantages of pasture rotation.

a. _____

b. _____

c. _____

17. Write the ideal height of grass for sheep.

_____

18. Match the three categories of pasture plants listed on the right to their descriptions.

_____a.	Highest in protein; lowest in cellulose; phosphorus content increases slightly with maturity	1. Grass plants
_____b.	Lowest in protein and phosphorus; highest in cellulose or energy	2. Browse plants
_____c.	Protein decreases slightly with maturity; Phosphorus decreases rapidly with maturity	3. Forbs

19. List four effects improved nutrition can have on wool.

a. _____

b. _____

c. _____

d. _____

FEEDING SHEEP

AG 310 - I

ANSWERS TO TEST

1.

a.	9	d.	10	g.	4	j.	2
b.	8	e.	7	h.	1	k.	6
c.	5	f.	3	i.	11		

2.

a.	7	d.	5	g.	3
b.	1	e.	2		
c.	4	f.	6		

3. Roughages

4. Alfalfa hay; Silage; Grains; Soybean and cottonseed meal; Molasses

5. a. Energy
   b. Protein

6. b, d, g, h

7. a, b, d

8. a. dark
   b. regular
   c. digestive
   d. 14
   e. bunks

9.

a.	AL	c.	BL
b.	AL	d.	BL

10. 26 ounces milk--1/2 canned milk and 1/2 water; 1 tablespoon castor oil or cod liver oil; 1 tablespoon glucose or sugar; 1 beaten egg yolk

11. b, c, d, e

12. Answer should include four of the following:

    Weaning lambs before 3 months; Fall and winter lambing; Purebred and registered lambs; Twin lambs or late lambs; Drought conditions on the range; Marketing slaughter lambs instead of feeders

13. 15%

14. a. 5 to 10 sheep per acre
    b. 1 to 2 sheep per acre

15. Rotate pastures; Restrict grazing time to a few hours each day or every other day on lush pastures; Develop water sources in dry areas; Graze cattle and sheep or sheep, cattle and goats together; Fence sheep to force utilization of poor forage

16. Plants have more time to recover; Sheep eat better when moved to "fresh" grass; Internal parasites are more easily controlled

17. 4 to 6 inches

18. a. 2
    b. 1
    c. 3

19. Increase in fiber diameter; Increase in staple length; Increase in fiber strength; Increase in amount of wool

SHEEP MANAGEMENT

AG 310 - J

UNIT OBJECTIVE

After completion of this unit, students should be able to describe the management systems of sheep production in the United States. Students should also be able to identify management techniques involved in record keeping, wool and meat production, selection and crossbreeding. This knowledge will be demonstrated by completion of assignment sheets and unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with sheep management to their appropriate definitions.
2. Match the four methods of sheep production to their characteristics.
3. Match the market groups of sheep to their correct descriptions.
4. List five causes of disease in sheep.
5. List three vaccinations for ewes and one for lambs in a western range operation.
6. Distinguish between the two methods of improving genetic potential in sheep.
7. Match the best methods of improvement to the four traits of reproduction, growth rate, carcass quality and wool quality.
8. Describe four factors which affect the amount of improvement which can be made from selection.
9. Describe the difficulty in selecting for fleece characteristics and growth characteristics at the same time.
10. Describe the "A, B and C Flock" selection system for range flocks.
11. Match types of crossbreeding to their appropriate descriptions.
12. List four factors that determine the best lambing time.
13. Describe the five systems of accelerated lambing.
14. Describe the necessary characteristics of a successful accelerated lambing program.
15. List the three breeds with the best potential for out-of-season breeding that are adapted to Idaho conditions.
16. Describe four advantages of out-of-season lambing.
17. Distinguish between advantages of early and late lambing.

18. Describe four advantages of early weaning.

19. Name the best way to identify sheep.

20. List six pieces of information that should be recorded for sheep.

21. Distinguish between the two types of wool grading systems.

22. Describe the wool incentive program.

23. Distinguish between the two types of fabric made from wool.

24. Match the four types of wool to their correct description.

25. Describe three advantages of sheep manure over cow manure.

26. Distinguish between the two primary marketing methods.

27. Identify the three methods of price negotiation.

28. List four factors to consider when planning facilities for sheep.

29. Develop a commercial crossbreeding system for a sheep operation.

30. Diagram and describe the layout for a sheep operation.

SHEEP MANAGEMENT

AG 310 - J

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

- A. Make transparencies and necessary copies of materials.
- B. Provide students with objectives and discuss.
- C. Provide students with information and discuss.
- D. Provide students with assignment sheets.
- E. Develop additional assignments appropriate for developing sheep management competencies especially geared to the local area.
- F. Obtain information and record forms for keeping sheep production records from cooperative extension at the University of Idaho.
- G. Obtain information on the primary marketing methods of sheep in the local area.
- H. Obtain several fleeces to demonstrate different grades and quality.
- I. Develop a marketing exercise by assigning roles of buyer, producer, middle man, etc., to different students. Have them decide on methods of marketing and go through the processes involved.
- J. Review and give test.
- K. Reteach and retest if necessary.

II. Instructional materials

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Transparency master
  1. TM 1--Wool Grading Systems
- E. Assignment sheets
  1. AS 1--Develop a Commercial Crossbreeding System for a Sheep Operation
  2. AS 2--Diagram and Describe the Layout for a Sheep Operation

F. Test

G. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

C. Ensminger, M.E., *Animal Science*. The Interstate Printers and Publishers, Inc., Danville, Illinois, 1977.

D. Scott, George E., *The Sheepman's Productive Handbook*. Abegg Printing Company and The Sheep Industry Development Program, Denver, Colorado, 1977.

E. Simmons, Paula, *Raising Sheep the Modern Way*. Garden Way Publishing, Charlotte, Vermont, 1976.

SHEEP MANAGEMENT

AG 310 - J

INFORMATION SHEET

I. Terms and definitions

A. Diversified--Having several different farming enterprises

B. Yearling--Between 1 and 2 years old

C. Finishing--Final period of feeding in which the lamb is prepared for slaughter

D. Heritability--Percentage of differences in a trait that can be explained by inheritance as opposed to environment

E. Heterosis--Hybrid vigor or the increased energy obtained by mating animals of two different breeds

F. Reproduction traits--Characteristics dealing with the ability of an animal to produce offspring

G. Growth traits--Characteristics dealing with the ability of an animal to convert feed into meat

H. Carcass traits--Characteristics indicating the ability of an animal to produce a high quantity of desirable meat cuts

I. Fleece traits--Characteristics indicating the ability of a sheep to produce large amounts of high quality wool

J. Noxious--Harmful

K. Interval--Period of time in between

L. Estrus--Standing heat or time when female will receive the male for breeding

M. Maintenance level--Feed level at which nutrients are meeting an animal's basic needs, but do not provide any energy for production or weight gain

N. Staple--Wool fibers

O. Tariff--Tax placed on imported goods

II. Major methods of sheep production

A. Farm flock method

1. Common to southern, central and eastern United States

2. Flocks from 2 or 3 to several hundred sheep are raised as part of a diversified farming program

3. Market lambs are the primary product

B. Purebred flock method

1. Found primarily in farm flock areas

2. Flocks are small

3. Primary products are rams for commercial herds and ewes and rams for other purebred herds

C. Range-band method

1. Used with 70% of the sheep in the United States

2. Sheep graze on open or fenced range under a shepherd's care

3. Lambs are weaned as they are marketed

D. Lamb feeding--Intensive program for raising feeder lambs

III. Market groups of sheep

A. Slaughter sheep--Yearlings or older ready for immediate slaughter

B. Feeder sheep--Yearlings or older best suited for further finishing

C. Breeding sheep--Mature ewes suitable for the breeding herd

D. Slaughter lambs--Animals under 1 year ready for slaughter

E. Feeder lambs--Animals under 1 year that would profit from additional finishing

F. Shearer lambs--Animals under 1 year that will be sheared and then finished before slaughter

G. Spring lambs--Lambs born in late fall or early winter and marketed before July 1; usually 3 to 7 months old and 70 to 90 pounds

H. Hothouse lambs--Very young lambs under 3 months marketed at 30 to 60 pounds, usually between Christmas and Easter

IV. Causes of disease in sheep

A. Poor environmental conditions

B. Lack of exercise

C. Unsanitary conditions

D. Transmission from insects

E. Transmission from other sick sheep

F. Infections from injuries or while lambing

G. Improper diet

H. Poisonous plants

I. Moldy or spoiled feed

J. Parasites

V. Vaccinations for western range operations

A. Ewes

1. Vibriosis

2. Type C and D Enterotoxemia

3. Bluetongue

(Note: This vaccination should be done at least 3 weeks before breeding.)

B. Lambs--Soremouth

VI. Methods of improving economically valuable traits in sheep by improving genetic potential

A. Crossbreeding--Creates "hybrid vigor" or the tendency of the offspring to be better than either of the parents

(Note: This effect increases as breeds that are increasingly different are mated.)

B. Selection--Choosing high quality breeding animals improves those traits that are "heritable" or likely to be passed on to the offspring

VII. Best methods of improvement for reproduction, growth rate, carcass quality and wool quality

Type of Trait	Heritability of Trait	Heterosis of Trait	Best Method Improvement
Reproduction	Low	High	Crossbreeding
Growth	Moderate	Moderate	Crossbreeding and Selection
Carcass	Moderate	Low	Selection
Wool	High	Very Low	Selection

(Note: Although reproduction cannot be improved very effectively by selecting rams and ewes that have proven reproductive efficiency, unproven ewes and rams which have characteristics that raise doubt about their ability to reproduce should always be selected against.)

VIII. Factors which affect improvement from selection

A. Accuracy in measuring and recording a trait

B. Selection pressure applied--Whether just the very top animals are saved or whether less desirable animals need to be kept to maintain proper herd size

C. Amount of variation between top individuals and herd average

(Note: If there is not much difference, then improvement by selection will be very slow.)

D. Heritability of the trait or the amount of superiority that will be passed on to the offspring

IX. Problems in selecting for fleece and growth characteristics at the same time--Individuals that excel in one trait are generally below average in the other

X. "A, B and C Flock" selection system for range flocks

A. Ewes are divided into three flocks with A being the best and C the worst

B. Replacement ewes for the A flock and part of the B flock come from the A flock

C. Replacement ewes for the rest of the B flock and all of the C flock come from the B flock

D. C flock ewes are culled as soon as better replacements are available

E. All C flock ewes are bred for producing market lambs only

F. A few top ewes are chosen from the A flock for production of sire rams

G. The best rams are used on the A flock

XI. Types of crossbreeding

A. Grading up--Repeatedly using rams from one breed on a flock of ewes and saving the replacement ewes from those matings

(Note: This method will replace 96% of the original genetic make-up of the flock with the genetic make-up of the ram breed used after 5 generations.)

B. Crossbreeding for commercial production--Crossbreeding to obtain hybrid vigor in replacement ewes and market lambs; breeds of rams are alternated to increase this vigor

C. Corrective breeding--Choosing a breed to strengthen a particular weakness in the flock

D. New breed formation--Combining superior characteristics of 2 or more breeds by "pooling" the genes into a single new breed

XII. Factors that determine the best lambing time

A. Natural reproductive patterns in sheep

B. Environmental conditions for lambing

C. Forage conditions during lactation when feed requirements are the highest

D. Market value at different times of the year

E. Labor and equipment utilization

F. Noxious weeds that may slow lamb growth

(Note: Lambs may need to be born early enough to be marketed before these weeds become a problem.)

XIII. Accelerated lambing systems

A. Continuous lambing--Rams are with the ewes all the time

B. Interval lambing--Rams are placed with ewe at frequent intervals

C. Lamb every 8 months

1. Ewes are bred at 8 month intervals

2. 3 lamb crops are produced in two years

D. Lamb 1/2 the flock every 4 months

1. Ewes are bred at 8 month intervals

2. Flock is divided to make better use of facilities

E. Lamb on a 7-7-10 month basis

1. Ewes produce 3 lamb crops every 2 years

2. Ewes get 1 rest period every 2 years

XIV. Characteristics of an accelerated lambing program

A. Ewes are selected from breeds that will breed out-of-season

B. Additional feed for ewes and lambs is necessary to supplement pasture

C. Hormones may be needed to induce estrus

D. Shearing should be done twice a year

E. Weaning should be done between 30 and 90 days

F. Only high producing animals should be selected

XV. Breeds with the best potential for out-of-season breeding

(Note: Breeds that have developed primarily in semitropical climates have much higher capabilities for out-of-season breeding than do breeds that have developed in harsher climates. There are many exotic breeds with good out-of-season breeding capabilities, but the following are adapted to Idaho conditions.)

A. Polypay

B. Dorset

C. Rambouillet

XVI. Advantages of out-of-season lambing

A. Creates a constant supply of lamb to maintain customer demand

B. Produces market lambs for high spring prices

C. Lambs can be marketed before noxious weeds depress lamb growth

D. Better labor and equipment utilization

XVII. Advantages of early and late lambing

A. Early lambing (January-February)

1. Fewer parasites on early pastures
2. More likely to get ewes to breed as lambs
3. Can sell Easter lambs
4. Better utilization of spring grass
5. Fewer fly problems at docking and castrating

B. Late lambing (April-May)

1. Easier to get ewes sheared before lambing
2. Better weather conditions
3. Fewer chilled lambs
4. Ewes can lamb on pasture
5. Less grain is required
6. Less labor required

XVIII. Advantages of early weaning

(Note: These advantages would not necessarily apply to a range operation where ewes and lambs utilize relatively cheap forages.)

A. More than one lamb crop per year

B. Young lambs gain more per unit of feed than older animals

C. Ewes can be cut back to a maintenance level ration

D. Fewer parasite problems

XIX. Best way to identify sheep--Ear tags

XX. Information needed on sheep records

A. Ear tag number

B. Sire and dam number

C. Age of dam at lambing

D. Birth date of lamb

E. Birth weight

F. Sex of lamb

G. Type of birth (single, twin)

H. Type of rearing (single, twin)

I. Date weighed

J. Lamb weight corrected to 90, 120 or 140 days

Example: 90 day weight = $\frac{\text{Actual weight}}{\text{Actual days old}} \times 90 \text{ days}$

(Note: Additional information that can be useful is conformation score, grease fleece weight, staple length and whether lamb was creep fed.)

XXI. Types of wool grading systems (Transparency 1)

A. "Blood" system

(Note: This system is becoming less common.)

1. Originally was the amount of Merino blood the sheep had

2. Currently used in the United States to designate fiber fineness

3. Grades are fine (best wool), 1/2 blood, 3/8 blood, 1/4 blood, low 1/4 blood and common and braid

B. Count system

1. Theoretically based on the number of hanks (560 yards) of yarn one pound of wool will spin

(Note: In practice, a wool will rarely spin the maximum amount of yards.)

2. Numbers are divided into 14 categories and range from the 80's (fine wool) to the 36's

XXII. Wool incentive program

A. The government offers subsidies to wool producers if the average price per pound of wool goes below a set amount

B. The subsidy is a percentage of wool sales

C. The subsidy is paid from a tariff placed on imported lamb and mutton

XXIII. Major fabrics made from wool

A. Worsted fabrics

1. Made from long fibers (2 inches or more)

2. Fibers are combed and woven parallel to one another creating a tighter, smoother fabric

B. Woolen fabrics

1. Made from shorter fibers

2. Fibers are not combed and are crisscrossed, creating a soft, fuzzy yarn

XXIV. Types of wool

A. Combing wool--Over 2 inches and used to make worsted fabrics

B. Clothing wool--Short fibers used to make woolens and felt

C. French combing wool--Intermediate length fibers that can be used to make worsted fabrics using a special process

D. Carpet wool--Coarse, elastic wool used in carpets

XXV. Advantages of sheep manure over cow manure

A. Higher in nitrogen, phosphorus and potash

B. Sulfurs that create the most objectionable odors have been removed for use in the wool

C. Pelleted form makes it better for pastures as it does not smother grass and is more easily incorporated into the soil

XXVI. Marketing methods

A. Spot or cash sales

1. Price is determined quickly

2. Title is quickly transferred

3. Marketing costs are paid soon after transaction

4. Producer gets money quickly

B. Contract sales

1. Price and supply are more firmly established

2. Credit may be obtained more readily

3. Market is assured

XXVII. Methods of price negotiation

A. Private treaty--Price is set by direct negotiations between producer (or representative) and buyer

B. Auction--Price is established by competitive bidding among buyers

C. Offer and acceptance--Sellers make offers to buyers to supply a certain product for a specified price; sellers are essentially bidding against one another

XXVIII. Factors to consider when planning facilities for sheep

A. Sufficient housing for protection during severe weather conditions (sheep do not need extensive or expensive housing and equipment)

B. Adequate ventilation in housing

C. Feeding facilities--Hay feeders, grain feeders and watering equipment

(Note: Sheep should not be fed on the ground, as this increases parasite problems.)

D. Lambing pens

E. Portable sheep fences

F. Trimming table

G. Footbaths

H. Sheep panels

Wool Grading Systems

Blood System	Count System	Example Sheep Breeds
FINE	64s, 70s, 80s	MERINO
		RAMBOUILLET
1/2 BLOOD	60s - 62s	TARGHEE
		POLYPAY
3/8 BLOOD	56s - 58s	CORRIEDALE
		PANAMA
		COLUMBIA
		SUFFOLK
		SOUTHDOWN
1/4 BLOOD	50s - 54s	OXFORD
		DORSET
		ROMNEY
LOW 1/4 BLOOD	46s - 48s	ROMNEY
COMMON AND BRAID	36s - 40s - 44s	LEICESTER
		LINCOLN
		COTSWOLD

SHEEP MANAGEMENT

AG 310 - J

ASSIGNMENT SHEET #1--DEVELOP A COMMERCIAL CROSSBREEDING SYSTEM FOR A SHEEP OPERATION

Name_____ Score_____

Crossbreeding is used in the vast majority of commercial operations. A ewe breed is usually chosen and then ram breeds for replacement ewes and for production of market lambs are chosen. Breeds are selected for their suitability for the conditions under which they will be raised and for special characteristics such as wool production or out-of-season lambing potential.

Select a type and size of sheep operation. Choose the ewe breed best suited for your hypothetical operation and then select the ram breed or breeds to be used for production of replacement ewes and for production of market lambs. Explain why you made the choice you did.

Type and size of operation _____

Ewe breed _____

Ram breed or breeds for replacement ewe production _____

_____

Ram breed or breeds for market lamb production _____

_____

Explanation of choice _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

SHEEP MANAGEMENT

AG 310 - J

ASSIGNMENT SHEET #2--DIAGRAM AND DESCRIBE THE LAYOUT FOR A SHEEP OPERATION

Name_____ Score_____

Choose a sheep operation and create a plan for the management of housing and equipment. Diagram the basic layout of the operation and write a description of it. Be sure to include proper handling facilities, shelters, housing, feed equipment and systems, and watering equipment and systems. Agricultural extension agents, local sheep producers and magazines and textbooks covering sheep management would be excellent resources.

SHEEP MANAGEMENT

AG 310 - J

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Tax placed on imported goods	1. Growth traits
_____b.	Period of time in between	2. Noxious
_____c.	Between 1 and 2 years old	3. Diversified
_____d.	Characteristics indicating the ability of an animal to produce a high quantity of desirable meat cuts	4. Carcass traits
_____e.	Standing heat or time when female will receive male for breeding	5. Heritability
_____f.	Characteristics indicating the ability of a sheep to produce large amounts of high quality wool	6. Yearling
_____g.	Hybrid vigor or the increased energy obtained by mating animals of two different breeds	7. Fleece traits
_____h.	Characteristics dealing with the ability of an animal to produce offspring	8. Tariff
_____i.	Wool fibers	9. Reproduction traits
_____j.	Having several different farming enterprises	10. Heterosis
_____k.	Harmful	11. Maintenance level
_____l.	Percentage of differences in a trait that can be explained by inheritance as opposed to environment	12. Estrus
_____m.	Feed level at which nutrients are meeting an animal's basic needs, but do not provide any energy for production or weight gain	13. Finishing
_____n.	Final feeding period in which the lamb is prepared for slaughter	14. Staple
_____o.	Characteristics dealing with the ability of an animal to convert feed into meat	15. Interval

2. Match the four methods of sheep production on the right to their characteristics. (Note: The methods may be used more than once.)

_____a.	Flocks from 2 or 3 to several hundred sheep are raised as part of a diversified farming program	1. Range-band method 2. Farm flock method
_____b.	Lambs are weaned as they are marketed	3. Lamb feeding
_____c.	Common to southern, central and eastern United States	4. Purebred flock method
_____d.	Flocks are generally the smallest of all	
_____e.	Used with 70% of the sheep in the United States	
_____f.	Primary products are rams for commercial herds	
_____g.	Sheep graze on open or fenced range under a shepherd's care	
_____h.	Most intensive of all methods of sheep production	

3. Match the market groups of sheep on the right to their correct description.

_____a.	Mature ewes suitable for the breeding herd	1. Hothouse lambs
_____b.	Lambs born in late fall or early winter and marketed before July 1; usually 3 to 7 months old and 70 to 90 pounds	2. Spring lambs 3. Breeding sheep
_____c.	Yearlings or older ready for immediate slaughter	4. Feeder lambs
_____d.	Animals under 1 year ready for slaughter	5. Feeder sheep
_____e.	Animals under 1 year that will be sheared and then finished before slaughter	6. Shearer lambs 7. Slaughter lambs
_____f.	Animals under 1 year that would profit from additional finishing	8. Slaughter sheep
_____g.	Yearlings or older best suited for further finishing	
_____h.	Very young lambs under 3 months marketed at 30 to 60 pounds, usually between Christmas and Easter	

4. List five causes of disease in sheep.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

5. List three vaccinations for ewes and one for lambs in a western range operation.

   Ewes

   a. _____

   b. _____

   c. _____

   Lambs

   d. _____

6. Distinguish between the two methods of improving genetic potential in sheep by writing "crossbreeding" or "selection" in front of the appropriate description.

   _____ a. Creates "hybrid vigor" or the tendency of the offspring to be better than either of the parents

   _____ b. Improvement comes from highly "heritable" traits that are likely to be passed on to the offspring

7. Match the best methods of improvement on the right to the traits on the left.
   (Note: The methods may be used more than once.)

_____a.	Wool	1.	Selection
_____b.	Growth	2.	Crossbreeding
_____c.	Carcass	3.	Crossbreeding and selection
_____d.	Reproduction		

8. Describe four factors which affect the amount of improvement which can be made from selection.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

9. Describe the difficulty in selecting for fleece characteristics and growth characteristics at the same time.

_____

_____

_____

10. Describe the "A, B and C Flock" selection system for range flocks.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

11. Match the types of crossbreeding on the right to their descriptions.

_____a.	Used to combine superior characteristics of 2 or more breeds by "pooling" the genes	1. New breed formation
_____b.	Used to strengthen a particular weakness in a flock	2. Corrective breeding
		3. Grading up
_____c.	Used to obtain hybrid vigor in replacement ewes and market lambs; breeds of rams are usually alternated	4. For commercial production
_____d.	Used to improve a flock by breeding consistently to rams of a particular breed	

12. List four factors that determine the best lambing time.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

13. Describe the five systems of accelerated lambing listed below.

a. Continuous lambing_____

_____

b. Interval lambing _____

_____

c. Lamb every 8 months _____

_____

d. Lamb 1/2 the flock every 4 months_____

_____

e. Lamb on a 7-7-10 month basis _____

_____

14. Describe the characteristics of an accelerated lambing program by filling in the blanks below. (Note: More than one word is often necessary to fill in the blanks.)

In an accelerated lambing program, ewes are selected from breeds (a) _____

_____. (b) _____

is necessary for the ewes and lambs to supplement pasture. (c) _____

may be needed to induce estrus. Shearing should be done (d) _____

_____. Weaning should be done between (e) _____

and (f) _____ days. Only high producing animals should be selected.

15. List the three breeds with the best potential for out-of-season lambing that are adapted to Idaho conditions.

a. _____

b. _____

c. _____

16. Describe four advantages of out-of-season lambing.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

17. Distinguish between the advantages of early and late lambing by writing an "E" for early or an "L" for late in front of the appropriate advantage.

_____a. Easier to get ewes sheared before lambing

_____b. Better weather conditions

_____c. Less labor required

_____d. More likely to get ewes to breed as lambs

_____e. Fewer chilled lambs

_____f. Better utilization of spring grass

_____g. Fewer fly problems at docking and castrating

_____h. Less grain is required

_____i. Ewes can lamb on pasture

_____j. Can sell Easter lambs

_____k. Fewer parasites on early pastures

18. Describe four advantages of early weaning.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

19. Name the best way to identify sheep.

_____

20. List six pieces of information that should be recorded for sheep.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

21. Distinguish between the two types of wool grading systems by writing "Blood" or "Count" in front of the appropriate statements.

_____a. Originally based on how much Merino blood the sheep had

_____b. Theoretically based on the number of hanks of yarn one pound of wool will spin

_____c. Grades in this system are divided into 14 categories from the 80's to the 36's

_____d. Currently used in the United States, but is becoming less common

_____e. Fine is the best grade, with braid being the worst

22. Describe the wool incentive program.

_____

_____

_____

_____

_____

_____

_____

23. Distinguish between the two types of fabric made from wool by writing "Worsted" or "Woolen" in front of the appropriate description.

_____a. Fibers are not combed and are crisscrossed, creating a soft, fuzzy yarn

_____b. Fibers are combed and woven parallel to one another creating a tighter, smoother fabric

_____c. Made from shorter fibers

_____d. Made from long fibers (2 inches or more)

24. Match the four types of wool on the right to their correct descriptions.

_____a.	Coarse, elastic wool	1. Carpet wool
_____b.	Intermediate length fibers that can be used to make worsted fabrics using a special process	2. Combing wool
_____c.	Over 2 inches and used to make worsted fabrics	3. Clothing wool
_____d.	Short fibers used to make woolens and felt	4. French combing wool

25. Describe three advantages of sheep manure over cow manure.

a. _____

_____

b. _____

_____

c. _____

_____

26. Distinguish between the two primary marketing methods by writing "Cash" in front of the _____ statements describing a cash or spot sale and "Contract" in front of the statements describing a _ contract sale.

_____a. Credit may be obtained more readily

_____b. Price and supply are more firmly established

_____c. Price is determined quickly

_____d. Market is assured

_____e. Marketing costs are paid soon after transaction

_____f. Producer gets money quickly

_____g. Title is quickly transferred

27. Identify the three methods of price negotiation listed below. The three methods are private treaty, auction, and offer and acceptance.

a. Sellers make offers to buyers to supply a certain product for a specified price; sellers are _ essentially bidding against one another.

_____

b. Price is set by direct negotiations between producer (or representative) and buyer.

_____

c. Price is established by competitive bidding among buyers.

_____

28. List four factors to consider when planning facilities for sheep.

a. _____

b. _____

c. _____

d. _____

SHEEP MANAGEMENT

AG 310 - J

ANSWERS TO TEST

1.

a.	8	e.	12	i.	14	m.	11
b.	15	f.	7	j.	3	n.	13
c.	6	g.	10	k.	2	o.	1
d.	4	h.	9	l.	5		

2.

a.	2	d.	4	g.	1
b.	1	e.	1	h.	3
c.	2 or 4	f.	4		

3.

a.	3	d.	7	g.	5
b.	2	e.	6	h.	1
c.	8	f.	4		

4. Answers should include five of the following:

   Poor environmental conditions; Lack of exercise; Unsanitary conditions; Transmission from insects; Transmission from other sick sheep; Infections from injuries or while lambing; Improper diet; Poisonous plants; Moldy or spoiled feed; Parasites

5. Ewes: Vibriosis; Type C and D Enterotoxemia; Bluetongue
   Lambs: Soremouth

6. a. Crossbreeding
   b. Selection

7.

a.	1	c.	1
b.	3	d.	2

8. Accuracy in measuring and recording a trait; Selection pressure applied--Whether just the very top animals are saved or whether less desirable animals need to be kept to maintain proper herd size; Amount of variation between top individuals and herd average; Heritability of the trait or the amount of superiority that will be passed on to the offspring

9. Individuals that excel in one trait are generally below average in the other

10. Ewes are divided into three flocks with A being the best and C the worst; Replacement ewes for the A flock and part of the B flock come from the A flock; Replacement ewes for the rest of the B flock and all of the C flock come from the B flock; C flock ewes are culled as soon as better replacements are available; All C flock ewes are bred for producing market lambs only; A few top ewes are chosen from the A flock for production of sire rams; The best rams are used on the A flock

11.

a.	1	c.	4
b.	2	d.	3

12. Answer should include four of the following:

    Natural reproductive patterns in sheep; Environmental conditions for lambing; Forage conditions during lactation when feed requirements are the highest; Market value at different times of the year; Labor and equipment utilization; Noxious weeds that may slow lamb growth

13. a. Rams are with the ewes all the time
    b. Rams are placed with ewes at frequent intervals
    c. Ewes are bred at 8 month intervals; 3 lamb crops are produced in two years
    d. Ewes are bred at 8 month intervals; flock is divided to make better use of facilities
    e. Ewes produce 3 lamb crops every 2 years; ewes get 1 rest period every 2 years

14. a. that will breed out of season
    b. Additional feed
    c. Hormones
    d. Twice a year
    e. 30
    f. 90

15. Polypay; Dorset; Rambouillet

16. Creates a constant supply of lamb to maintain customer demand; Produces market lambs for high spring prices; Lambs can be marketed before noxious weeds depress lamb growth; Better labor and equipment utilization

17.

a.	L	d.	E	g.	E	j.	E
b.	L	e.	L	h.	L	k.	E
c.	L	f.	E	i.	L		

18. More than one lamb crop per year; Young lambs gain more per unit of feed than older animals; Ewes can be cut back to a maintenance level ration; Fewer parasite problems

19. Ear tags

20. Answer should include six of the following:

    Ear tag number; Sire and dam number; Age of dam at lambing; Birth date of lamb; Birth weight; Sex of lamb; Type of birth; Type of rearing; Date weighed; Lamb weight corrected to 90, 120 or 140 days; Conformation score; Grease fleece weight; Staple length; Creep feeding information

21.

a.	Blood	d.	Blood
b.	Count	e.	Blood
c.	Count		

22. The government offers subsidies to wool producers if the average price per pound of wool goes below a set amount; The subsidy is a percentage of wool sales; The subsidy is paid from a tariff placed on imported lamb and mutton

23. a. Woolen
    b. Worsted
    c. Woolen
    d. Worsted

24. a. 1 c. 2
b. 4 d. 3

25. Higher in nitrogen, phosphorus and potash; Sulfurs that create the most objectionable odors have been removed for use in the wool; Pelleted form makes it better for pastures as it does not smother grass and is more easily incorporated into the soil

26. a. Contract e. Cash
b. Contract f. Cash
c. Cash g. Cash
d. Contract

27. a. Offer and acceptance
b. Private treaty
c. Auction

28. Answer should include four of the following:

Sufficient housing for protection during severe weather conditions; Adequate ventilation in housing; Feeding facilities--Hay feeders, grain feeders and watering equipment; Lambing pens; Portable sheep fences; Trimming table; Footbaths; Sheep panels

HORSE MANAGEMENT

AG 310 - K

UNIT OBJECTIVE

After completion of this unit, students should be able to describe the management techniques involved in purchasing and caring for a horse. Students should be aware of considerations in implementing a horse health program as well as sound feeding and breeding practices. This knowledge will be demonstrated by completion of assignment sheets and a unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with horse management to their correct definitions.
2. List four factors to consider in buying a horse.
3. List four practices important for maintaining healthy horses.
4. List five characteristics of a healthy horse.
5. Select components essential for maintaining an effective health care program for horses.
6. List four means by which diseases are passed from one horse to another.
7. List four infectious diseases.
8. List four noninfectious diseases.
9. Name the vital signs of a horse and their normal ranges.
10. List five general symptoms of parasitic infection.
11. List six management practices used in prevention of parasitism.
12. Select critical factors in the care of a horse's foot.
13. Select the most common causes of lameness.
14. Select items to be recorded in a case history.
15. Select factors which contribute to correct feeding practices.
16. Identify parts of the digestive system.
17. Match parts of the digestive system to their correct description and function.
18. Complete a chart on suggested daily rations for a two-year-old that will mature at 1,100 pounds.

19. List and describe four fundamental breeding practices.
20. Name three ways to detect pregnancy.
21. Describe normal breeding characteristics of mares.
22. Name four important items relating to care of a mare during gestation.
23. List four indications of approaching parturition.
24. Describe five actions to take in the foaling process.
25. Select foaling conditions requiring veterinarian's assistance.
26. Select steps to take when caring for a newborn foal.
27. Select steps to take when caring for a postpartum mare.
28. List three types of bedding used for horses.
29. Select precautions to take before transporting a horse.
30. Discuss factors to consider while driving and transporting a horse.
31. List three factors to consider when planning facilities for horses.
32. Evaluate factors that affect susceptibility of horses to parasites.
33. Complete forms on horse health.
34. Explain actions to take in certain medical situations.
35. Balance a ration for a horse.
36. Draw plans for a horse facility.

HORSE MANAGEMENT

AG 310 - K

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

- A. Make transparencies and necessary copies of materials.
- B. Provide students with objectives and discuss.
- C. Provide students with information and discuss.
- D. Provide students with assignment sheets and discuss.
- E. Invite a veterinarian to speak on health care of horses.
- F. Identify horse enthusiasts in the community and invite them to speak to the class.
- G. Visit a ranch where horses are raised as a business.
- H. Have students develop a budget on the costs of raising horses.
- I. Have students do a community survey on uses of horses.
- J. Review and give test.
- K. Reteach and retest if necessary.

II. Instructional materials

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Transparency masters
  1. TM 1--Locations of Injuries and Diseases
  2. TM 2--Immunization Table
  3. TM 3--Deworming Schedules
  4. TM 4--Compounds Effective Against Internal Parasites
  5. TM 5--Insecticides Effective Against Flies
  6. TM 6--External Parts of the Foot (Side View)

7. TM 7--External Parts of the Foot (Bottom View)
8. TM 8--Internal Parts of the Foot
9. TM 9--Signs of Estrus in Mares
10. TM 10--Signs of Estrus in Mares (continued)
11. TM 11--Bedding Material: Approximate Water Absorbing Capacity
12. TM 12--Storage Space Requirements for Feed and Bedding
13. TM 13--Storage Space Requirements for Feed and Bedding (continued)
14. TM 14--Space Requirements for Horses in Buildings
15. TM 15--Recommended Widths and Heights for Passages

E. Assignment sheets

1. AS 1--Evaluate Factors That Affect Susceptibility of Horses to Parasites
2. AS 2--Complete Forms on Horse Health
3. AS 3--Explain Actions to Take in Certain Medical Situations
4. AS 4--Balance Ration for a Horse
5. AS 5--Draw Plans for a Horse Facility

F. Answers to assignment sheets

G. Test

H. Answers to test

III. Unit references

A. Barrick, Kirby R. and Harman, Hobart L., *Animal Production and Management*, McGraw-Hill Book Company, New York, 1988.

B. Cooper, Elmer L., *Agriscience Fundamentals and Applications*, Delmar Publishers, Inc., Albany, New York, 1990.

C. Rudolph, James A., *Equine Management and Production*. Curriculum and Instructional Materials Center, Oklahoma State Board of Vocational Technical Education, Stillwater, Oklahoma, 1980.

HORSE MANAGEMENT

AG 310 - K

INFORMATION SHEET

I. Terms and definitions

A. VEE--Venezuelan Equine Encephalitis or sleeping sickness

B. Paddock--Small fenced exercise area

C. Immunization--Act of injecting substance in horse's system which causes resistance to disease

D. Sheath--Housing for male penis

E. Lymph nodes--Produce lymphocytes which become a part of the blood and are involved in natural disease defense

F. Lesion--An injury of an organ or body tissue

G. Coggins exam--Test for equine infectious anemia; issued by veterinarian

H. Edema--Swelling caused by an accumulation of fluids

I. Analgesic--Pain killer

J. Antihistamine--Relieves allergic reactions

K. Placenta--Membrane which attaches fetus to uterus

L. Encephalomyelitis--Inflammation of the brain and spinal cord

M. Colic--Painful digestive disturbance

N. Anthelmintics--Chemical materials used for deworming

O. Vermifuge--Another term for anthelmintic

P. Case history--Record of disorders, medications, immunizations and other pertinent information about the horse

Q. Farrier--Horseshoer

R. Chyme--Thick, semifluid mass resulting from gastric digestion of food

S. Estrus--Period of time in which mare is receptive to stallion; usually lasts 5-7 days and occurs in 21 day cycles

T. Foal--Young horse under one year of age; also, the process of giving birth

U. Enema--Liquid injected into the rectum to clean out the feces

V. Parturition--Act of giving birth

W. Winking--Lips of vulva contracting and relaxing

II. Factors to consider when buying a horse

A. Use of horse

B. Cost

C. Characteristics of horse

Example: Size, weight, age

D. Places to purchase horses

Example: Individuals, horse sales, riding stables, advertisements in magazines and newspapers, agents

E. Experience of individual purchaser

F. Examination by veterinarian

G. Availability of equipment and facilities

III. Practices important for maintaining healthy horses

A. Avoid public feeding and watering places

B. Administer proper vaccinations

Example: Tetanus, VEE, influenza

C. Keep stalls clean of manure and urine

D. Maintain pastures and paddocks to eliminate manure accumulation

E. Remove hazardous obstacles from pastures and barn area

F. Maintain parasite control

IV. Characteristics of healthy horse (Transparency 1)

(Note: Without a balanced ration the following signs would not be valid.)

A. Contentment

B. Bright eyes and alert ears

C. Good appetite

D. Pliable skin and shiny coat

E. Mucous membranes of eyes and lips pink colored and moist

F. Normal temperature, pulse and respiration

G. No visible wounds

H. Normal feces and urine

V. Components essential for maintaining effective health care program

A. Checking daily for injuries or disease

B. Keeping accurate records

C. Organizing immunization program

D. Avoiding high risk situations

Example: Barbed wire; mixing mares, stallions and geldings in same pasture or paddock

E. Being aware of equine diseases and latest research

F. Maintaining good nutrition

G. Controlling parasites

H. Keeping teeth in good condition

I. Grooming daily

J. Administering hoof care

K. Maintaining clean sheaths and udders

VI. Means by which infectious diseases are passed from one horse to another

A. Feeder containers

B. Water containers

C. Hypodermic needles

D. Close contact

VII. Infectious diseases (Transparency 2)

(Note: Most infectious diseases are caused by some type of virus or bacteria.)

Disease	Primary Characteristics	Prevention	Treatment
Influenza	Fever of 101-105°F (38-40°C); watery nasal discharge	Vaccination; isolation of new animals	Good nursing care
Strangles	Enlarged lymph nodes; nasal discharge watery at first, then thick mucus; fever of 102-105°F (39-40°C)	Isolation of new animals; vaccinate all animals with killed vaccine	Antibiotics
Pneumonia	Fever of 102-105°F (39-40°C); chest pains, lung congestion, difficulty in breathing	Good management; avoid chills and stress; provide proper ventilation	Antibiotics when cause is bacterial
Rhinopneumonitis	Fever of 102-106°F (39-41°C); coughing; clear nasal discharge; abortion primarily in last third of gestation	Modified live virus vaccine	No treatment
Viral arteritis	Fever of 102-106°F (39-41°C); abortion	No vaccine available	Good nursing care
Equine encephalomyelitis (sleeping sickness)	Brain lesions, drowsiness, fever; lower lip drops; difficulty in walking	Vaccination	Good nursing care
Equine infectious anemia (swamp fever)	Fever of 104-108°F (40-42°C); weakness, jaundice, edema of ventral abdomen	Use of Coggins test to detect carriers	No treatment
Tetanus (lockjaw)	Muscular rigidity; prolapse of third eyelid	Tetanus toxoid or antitoxin	Very little; mortality rate high
Anthrax	High fever; edema about throat, lower neck, and chest; lasts approximately 48-96 hours	Use vaccines only in an epidemic area	Antibiotics, antianthrax serum

VIII. Noninfectious diseases

Condition	Cause	Primary Characteristics	Prevention	Treatment
Colic	Parasites; overfeeding; moldy feed; twisted intestines	Abdominal pain; kicking at belly; rolling; sawhorse posture	Parasite control; proper feeding methods	Walking; laxatives; analgesics; surgery in some cases
Pulmonary emphysema	Not well defined--perhaps allergic response	Coughing; heave line	Prevent and treat respiratory infections; control stable dust	Control dust; provide fresh air; give antihistamine drugs
Roaring	Damage to recurrent laryngeal nerve	Noise during inspiration	Prevent and treat respiratory infections	Surgery
Azoturia (Monday morning sickness)	Unknown, but condition occurs when animal is exercised heavily, fed a heavy ration, and then rested a few days while still being fed a heavy ration	Stiff gait; reluctance to move; dark-colored urine	Reduce feed intake when animal is not working	Injections of thiamin, vitamin E, and selenium are frequently used
Laminitis (founder)	Overeating; retained placenta; allowing to drink water while hot	Lameness; heat in hoof; drop of coffin bone	Maintain a sound feeding program; do not keep horses too fat	Acute: obtain immediate veterinary attention. Chronic: perform corrective trimming and shoeing

IX. Vital signs and their normal ranges

A. Pulse--Normal, 28-40 beats per minute

(Note: Pulse may be higher for younger, smaller and more nervous animals. Excitement, digestion and higher environmental temperature may also cause increases.)

B. Temperature--Normal, 99.5 - 101.5^{o}F (37.5-38.5^{o}C); average, 100.5^{o}F (38^{o}C)

(Note: Temperature varies according to age, environmental temperature, exercise and ration. If temperature is above 102^{o}F (39^{o}C), it indicates disease problems and a veterinarian should be consulted.)

C. Respiration--Normal, 8-16 breaths per minute

(Note: Rapid breathing due to recent exercise, excitement, hot weather or poor ventilation should not be confused with disease.)

X. General symptoms of parasitic infection

A. Weak

B. Unhealthy appearance

C. Tucked up flanks

D. Potbelly

E. Rough coat

F. Paleness of membranes around eyes and mouth

G. Frequent colic and diarrhea in some cases

H. Stunted growth and development in young animals

XI. Management practices used in the prevention of parasitism (Transparencies 3, 4, 5)

A. Feed hay and grain in trough and/or manger, not on the ground

B. Supply fresh, clean water

C. Clean manure daily from stalls and small paddocks

D. Store manure in a tightly constructed pit for at least two weeks prior to spreading

(Note: Spread on crop land and/or pasture not currently being used for horses.)

E. Mow and rake pastures frequently

F. Rotate pasture, alternately graze cattle and horses, and let pasture rest three months of year

G. Treat infected animals prior to turning out to a clean area

H. Deworm at a minimum of three-month intervals

I. Treat with effective insecticide during late spring, summer and early fall

J. Provide good sanitary conditions and a high level of nutrition

XII. Critical factors in the care of the foot (Transparencies 6, 7, 8)

A. Trimming

B. Shoeing

C. Cleaning the hoof

D. Correct moisture content

E. Hoof wear

F. Daily inspection

G. Conformation

XIII. Most common causes of lameness

A. Poor hoof care

B. Poor conformation

C. Injury

D. Poor shoeing

E. Foreign object in hoof

F. Disease of the foot

G. Lack of moisture

XIV. Items to be recorded in case history

(Note: Each horse is to have a separate record. A good case history is helpful and sometimes essential in diagnosis of disease.)

A. Age, breed, color and sex

(Note: Be specific on sex. State whether or not male is gelded.)

B. Immunization history

C. Past illnesses, injuries and allergies

D. Past medications

E. Deworming dates and anthelmintics

F. Dental records

G. Ration

H. Use

I. Past ownerships

J. Farrier records

XV. Factors which contribute to correct feeding practices

A. Feed must vary with individual horse and depends upon use, size, age and weight of horse

B. Horse should consume approximately 2.0-2.5% of body weight

C. Grain should be increased and hay decreased as amount of work increases

D. Feed should not be made available to the horse within the hour immediately before or after strenuous activity

E. Changes in diet should be gradual, allowing digestive system to adapt accordingly

F. Ration should be balanced

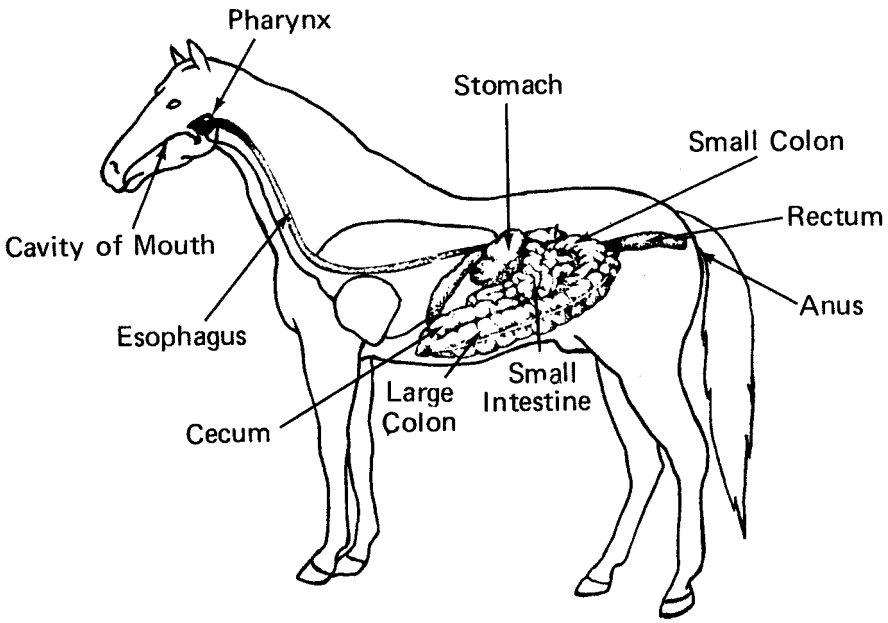
G. Water should be fresh and easily accessible

H. Times of feeding should be consistent

(Note: Twice a day at 12-hour intervals is acceptable.)

I. Horse should not be permitted to drink heavily when hot or immediately before heavy activity

XVI. Parts of digestive system



XVII. Descriptions and functions of the digestive system

A. Mouth--Chewing mechanism; secretes saliva to act as a digestive juice and to lubricate food for swallowing

B. Pharynx--Muscular passage which separates mouth from esophagus

C. Esophagus--Tube providing passage of food from pharynx to stomach

D. Stomach--J shaped, muscular sac between esophagus and small intestine that secretes gastric juices by which proteins and fats are broken down

E. Small intestine--Provides further breakdown of proteins, fats and sugars which have escaped breakdown by gastric juices

F. Cecum--Contains mostly fluids; results in breaking down chyme, which forms fatty acids and some vitamins

(Note: The cecum, large colon, small colon and rectum form the large intestine.)

G. Large colon--Contains semifluid for digestion, mostly by bacterial fermentation and absorption

H. Small colon--Contains relatively solid materials which are formed into balls of dung

I. Rectum--Holds waste material until passed out of horse's body through anal opening

XVIII. Suggested daily ration for horse that will mature at 1,100 pounds

Description	% Digestible Protein	Weight	Lbs Grain	Lbs Hay	Total Lbs Feed
Weanling	17	525	7.0	5	12.9
Yearling	14	725	7.5	7	14.5
Two-year-old	11	990	8.0	9	17
Pregnant mare	10	1100	6.0	12	18
Lactating mare	12	1100	16.5	17	33.5
Mature horse (idle)	8	1100	None	17	17
Mature horse (light work)	10	1100	4.5	16	20.5
Mature horse (medium work)	10	1100	9.0	14	23.0
Mature horse (heavy work)	10	1100	15.0	11	25.0
Breeding stallion	12	1100	12.0	12	23.0

XIX. Fundamental breeding practices

A. Estrus cycle of the mare--Length of cycle is usually an average of 21 days, consisting of 5 days in heat and 16 days out of heat

B. Selection of appropriate stallion--Decision should be made by January of each year

C. Age to breed mares--Mares should not foal before three years of age, preferably four; many mares will continue to produce past 20 years of age

D. Time of year to breed--Spring foals are most popular due to registration guidelines and weather conditions

E. Gestation length--Eleven months or 336 days

F. Care of pregnant mare--Proper nutrition, good health practices and sufficient exercise are major concerns

G. Signs of approaching parturition--Udder shows signs of waxing and dripping milk; mare exhibits restlessness

(Note: The foaling process under normal conditions is rapid compared to other large farm animals.)

H. Foaling the mare--Location should be in clean meadow or sanitary foaling stall

(Note: Distraction should be avoided and stall should be a minimum of 16 ft by 16 ft.)

I. Care of mare after foaling--Examination should be done by competent individual for abnormalities and shedding of the placenta

J. Care of foal--Navel cord treated with antiseptic; enema given as precautionary measure; be certain foal has nursed for colostrum

XX. Ways to detect pregnancy

A. Cessation of heat period

B. Rectal palpation

C. Laboratory tests

Example: Biological tests, immunological tests, chemical tests

D. Movement of live fetus

E. Enlargement of mare's stomach and flank area

XXI. Normal breeding characteristics of mares (Transparencies 9, 10)

A. Age of puberty--15 - 18 months

B. Age to breed mares--Not earlier than 3 years of age

C. Estrus (heat)--Occurs at approximately 21 day intervals, but may vary 10 to 37 days; lasts 4-6 days; time of receptivity of stallion

D. Ovulation--Rupture of follicle and release of egg from the ovary; usually one day before or one day after mare goes out of estrus

E. Gestation period--Time from conception until parturition; average is approximately 336 days, but may range from 310-370 days

F. Foal heat--Mares usually show signs of estrus 9-11 days after foaling; may vary 3-13 days

XXII. Important items relating to care of mare during gestation

A. Nutrition

B. Exercise

C. Vaccinations

D. Housing quarters

XXIII. Indications of approaching parturition

A. Enlargement of udder ("makes a bag")

(Note: Stabled mares bag up more than pastured mares.)

B. Hip and abdomen muscles begin to sag and stretch in preparation for passage of foal

C. Waxing of teats

D. Vulva enlargement; may discharge mucus

E. Muscles and ligaments in and around pelvic area relax and become loose and flabby

F. Restlessness

G. Milk dripping from teats

H. Irritable behavior

I. Frequent passing of urine

J. Vigorously switching tail

K. Sweat around flanks and neck

L. Pawing ground

M. Halfheartedly biting and kicking at abdomen

N. Lying down and getting up

(Caution: There are times when all signs fail and a foal may be dropped when least expected.)

XXIV. Actions to take in the foaling process

A. Prepare sanitary and safe surroundings

(Note: If stall is prepared for foaling, it should be well bedded and at least 16 ft by 16 ft.)

B. Keep distractions to a minimum

C. Observe for signs of foaling

(Note: The immediate indications that a mare is about to foal are extreme nervousness and uneasiness, lying down and getting up, biting of sides and flanks, switching of tail, sweating in flanks and frequent urination.)

D. Wrap tail and wash genital region of mare upon first signs of foaling

(Note: The first actual sign of foaling is the rupture of the outer fetal membrane, followed by the escape of a large amount of fluid.)

E. Give mare adequate time to foal

(Note: With normal presentation, a mare foals rapidly, not usually more than 15 to 30 minutes.)

XXV. Foaling conditions requiring veterinarian's assistance

A. Hard labor with no results

(Note: Wait no longer than 20 minutes before contacting veterinarian.)

B. Slow and difficult labor or delivery

(Note: Anything exceeding 30 minutes from rupture of fetal membrane is considered slow and difficult.)

C. Mare and/or foal fail to get up within an hour

D. Foal fails to nurse within two hours

E. Mare refuses to accept foal

F. Hemorrhaging of mare from vulva or foal from navel stump

G. Placenta retained for more than two hours

H. Weakness of mare and/or foal

I. Failure of foal to have bowel movement within six hours after birth

J. Placenta passed and not intact

(Note: Placenta should be laid out and examined to insure that all of placenta has been expelled. The picture below shows a placenta that is intact.)

XXVI. Caring for a newborn foal

A. Check to make sure foal is breathing and respiratory tract is free of excess fluids and congestion

B. Allow foal to rest 10-15 minutes after delivery

C. Let foal remain attached to placenta until navel cord is broken by mare or foal

(Caution: Premature breakage of the cord will result in a loss of one to two pints of blood.)

D. Treat stump of navel, after cord breaks, by soaking in a small container of iodine

E. Allow mare to lick foal

F. Make certain foal nurses within 6 hours

(Note: Colostrum is readily available and absorbed during this period of time.)

G. Give injection of penicillin-streptomycin for precautionary measure

H. Give tetanus injection

(Note: Exclude tetanus injection if mare was given tetanus toxin injection one month prior to foaling and foal received colostrum.)

I. Give enema

J. Observe foal closely for first few days to detect any complications that might require immediate attention

XXVII. Caring for a postpartum mare

A. Check for lacerations and tears caused during foaling process

B. Examine udder for milk

C. Make available lukewarm water to drink

(Caution: Do not allow mare to drink excessively.)

D. Observe for shedding of placenta

E. Give tetanus injection

(Note: The mare should receive a tetanus antitoxin injection, unless on a regular immunization program. Vaginal lacerations, no matter how small, can become infected.)

F. Wash udder with warm water

G. Feed laxative feeds for first few days following foaling

(Note: Length of time will depend upon amount of soreness exhibited by mare)

XXVIII. Types of bedding (Transparencies 11, 12, 13, 14, 15)

A. Straw

B. Shavings

C. Sawdust

D. Sand

E. Tan bark

F. Ground cobs

G. Peat moss

(Note: Other types of bedding are used in localities where readily available.)

XXIX. Precautions to take before transporting horse

A. Provide good footing

B. Provide proper ventilation

C. Prepare horse by wrapping legs and tail

D. Blanket horse if weather requires

E. Feed lightly and give fresh, clean water to drink

F. Possess proper health papers and statement of ownership

G. Control flies and other insects

XXX. Factors to consider while driving and transporting the horse

A. Drive at a moderate, constant and safe speed

B. Avoid quick starts and stops

C. Use a light application of brakes first and then apply firm, steady pressure

D. Avoid taking sharp curves too fast

E. Allow horse to rest every 3-4 hours and unload and walk every 8-10 hours on long trips

F. Take into consideration state laws, signs, amount and speed of traffic, and weather conditions

XXXI. Factors to consider when planning facilities for horses

A. Shelter from cold, storms, wind, sun

B. Good ventilation without drafts in shelter

C. Well-drained site

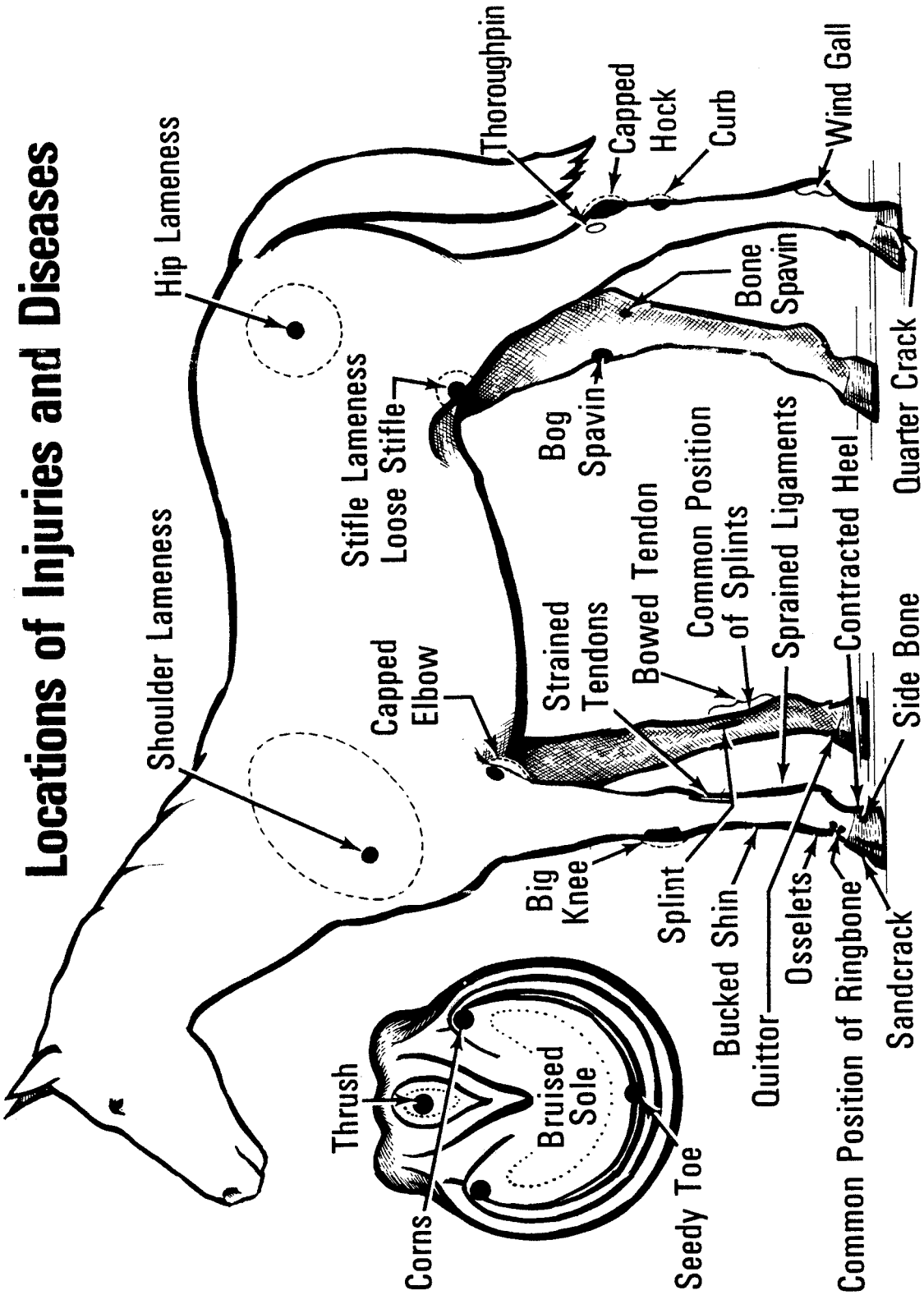
D. Floor

1. Clay or wood

2. Bedding with straw or wood shavings

3. Avoid concrete floors

E. Wood fences best (boards on inside of posts)


Locations of Injuries and Diseases
Hip Lameness
Shoulder Lameness
Stifle Lameness
Loose Stifle
Capped
Elbow
Thoroughpin
Capped
Hock
Curb
Wind Gall
Bone
Spavin
Bog
Spavin
Strained
Tendons
Bowed Tendon
Common Position
of Splints
Sprained Ligaments
Contracted Heel
Quarter Crack
Side Bone
Big
Knee
Splint
Bucked Shin
Quittor
Osselets
Common Position of Ringbone
Sandcrack
Thrush
Bruised
Sole
Corns
Seedy Toe

Immunization Table

DISEASE	PRODUCT	INITIAL IMMUNIZATION	ANNUAL BOOSTER
Strangles	Bacterin	1st dose; 2nd dose in 7 days; 3rd dose in 7 days	Single dose annually
Tetanus	Bacterial toxoid	1st dose; 2nd dose in 4-8 weeks	Single dose annually
Influenza	Killed virus vaccine	1st dose; 2nd dose in 6-12 weeks	Single dose annually
Encephalomyelitis (eastern & western)	Killed virus vaccine	1st dose; 2nd dose in 7-10 days	Repeat series annually
Rhinopneumonitis	Intramuscular type live virus	(a) Pregnant mares: 1st dose after 2nd month of pregnancy & again at the 5th-7th month. (b) All other horses: 1st dose; 2nd dose in 4 weeks	Single dose annually

Data derived from proceedings of Horse Production Short Course, Texas A&M University, January 1974.

Deworming Schedules

DATE	FOALS*	YEARLINGS AND OTHER NON-PREGNANT ANIMALS	PREGNANT MARES
Feb. 1	Mebendazole (Paste or Powder) or Cambendazole (Paste)	Trichlorfon + Pyrantel	Thiabendazole
April 1	Pyrantel	Pyrantel	Pyrantel
June 1	Cambendazole or Mebendazole or Thiabendazole	Mebendazole Thiabendazole + Piperazine Cambendazole Fenbendazole	Mebendazole
August 1	Piperazine and Phenothiazine with Carbon Disulfide	Pyrantel	Pyrantel
October 1	Thiabendazole	Cambendazole Fenbendazole Thiabendazole + Piperazine	Thiabendazole
December 1	Dichlorvos	Piperazine and Phenothiazine and Carbon Disulfide Pyrantel + Trichlorfon Phenothiazine + Piperazine + Trichlorfon	Cambendazole
	*Start worming foals at 60 days of age and continue to worm every 8 weeks if possible		

Compounds Effective Against Internal Parasites

Anthelmintics — % of Major Parasites Removed from Host

	Ascarids	Strongylus Vulgaris	Strongylus Edentatus	Strongylus Equinus	Small Strongyles	Bots	Pinworms [adults]	Pinworms [larvae]
Cambendazole	94-99	98	98	98	94	--	--	--
Dichlorvos	99	99	85	--	90	90	99	99
Mebendazole	95-99	98-99	92	100	85-98	--	98-100	99
Phenothiazine/ Piperazine/ Carbon Disulfide	99	90	85	--	90	80	75	45
Piperazine	94	50	--	--	70	--	75	15
Piperazine/ Carbon Disulfide	99	50	--	--	90	80	75	15
Pyrantel	96-99	90-95	75-80	85-100	90	--	60-90	75
Thiabendazole	25-90	90	90	--	90	--	90	30
Thiabendazole/ Piperazine	90	90	90	--	90	--	90	30
Thiabendazole/ Trichlorfon	99	98	97	--	99	98	99	--
Trichlorfon*	90	40-90	15-40	--	80-90	90-99	90	5
Trichlorfon/ Phenothiazine/ Piperazine	95-99	40-95	15	--	60-90	90	90	--

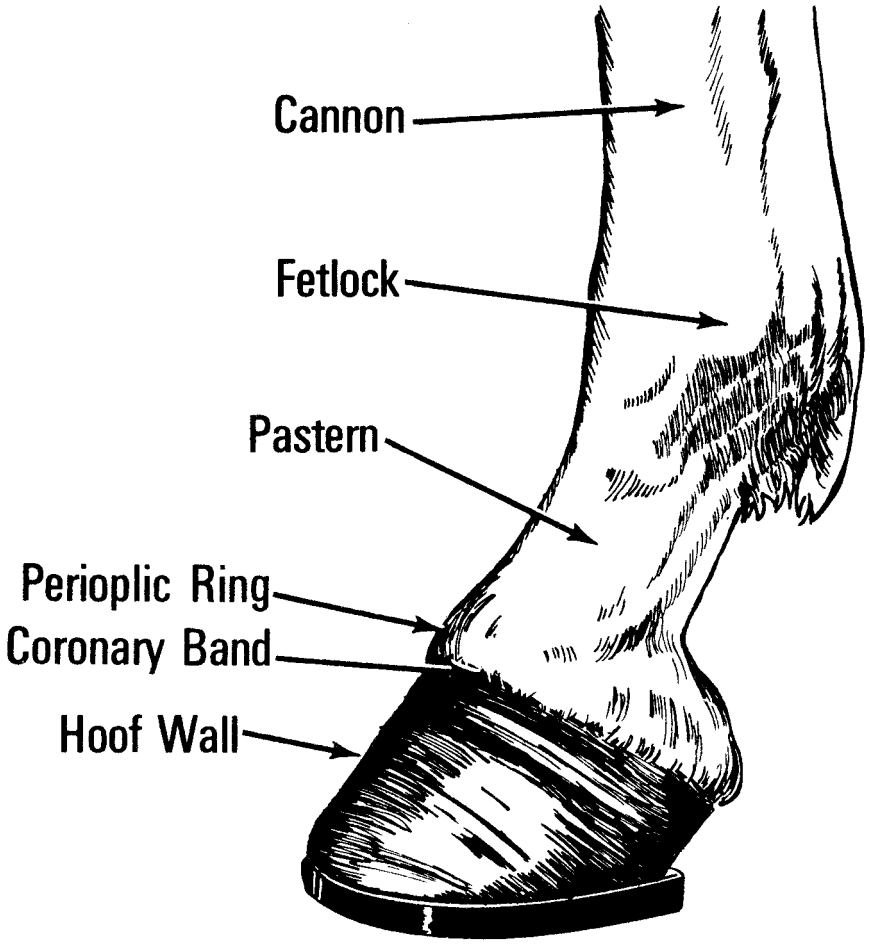
*Trichlorfon and carbon disulfide are contraindicated in pregnant mares. Check labels for other precautions involving pregnant mares, foals, and sick debilitated animals. Dichlorvos and trichlorfon are cholinesterase inhibitors.

Insecticides Effective Against Flies

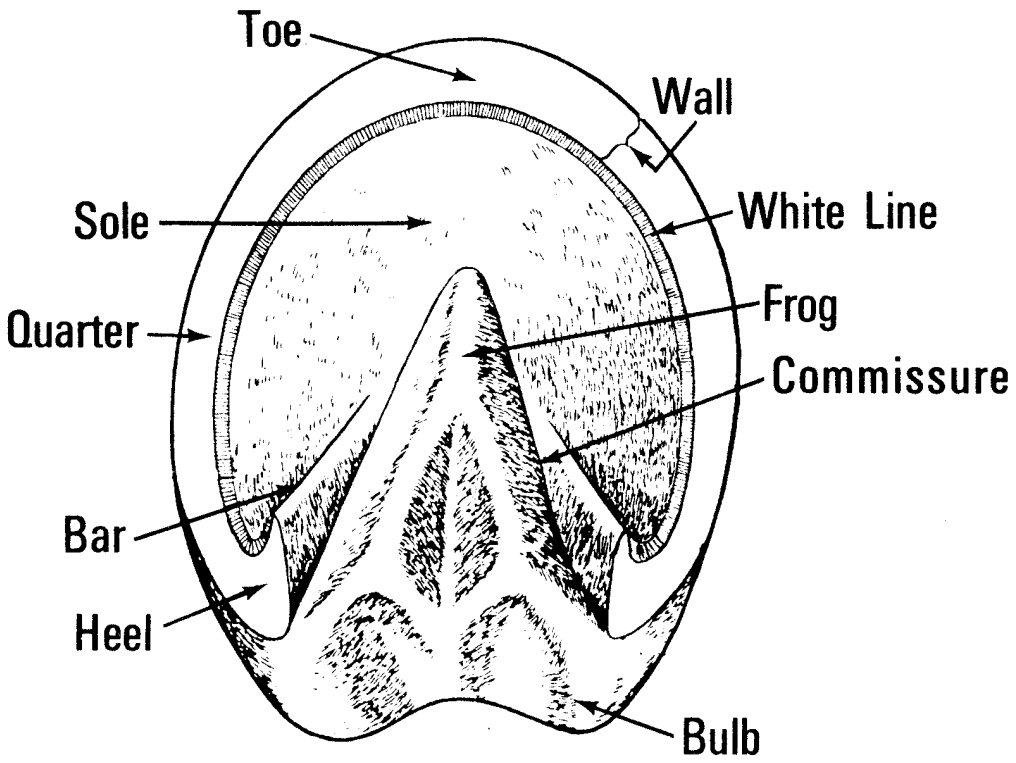
Insecticide	Form	% Concentration Necessary for Control					
		CATTLE GRUB	HOUSEFLY	STABLE FLY	BLOWFLY	HORNFLY	FACE FLY
Carbaryl	Spray	--	0.5	0.5	--	0.5	--
Ciodrin	Spray	--	0.15-1	--	0.3	0.3	0.3
	Spray	--	2	2	--	--	--
Coumaphos	Spray	--	0.125	0.125	0.25	0.6	--
Dioxathian	Spray	--	0.15-0.6	0.15-0.6	--	0.15	--
Dichlorvos[1]	Spray	--	1	1	--	--	0.5
Malathion[2]	Spray	0.5	0.5	--	0.5	--	--
	Dust	--	--	--	4-5	--	--
Methoxychlor	Spray	--	0.5	0.5	--	0.5	--
Ronnel	Spray	--	0.25	0.25	--	0.5	--
Toxaphene	Spray	--	0.5	0.5	--	--	--
Pyrethrins[3]	Spray	--	0.05-0.1	0.05-0.1	--	0.05-0.1	--
Rotenone	Dust	1.5	--	--	--	--	--
Lindane	Spray	--	--	--	--	0.03-0.06	--

[1]Dichlorvos also used as space spray for house and stable flies at 0.5-1%
[2]Malathion also used as bait for house and stable flies at 0.5-2%
[3]Pyrethrins also used as space spray for house and stable flies at 0.1-0.25%

External Parts of the Foot (Side View)

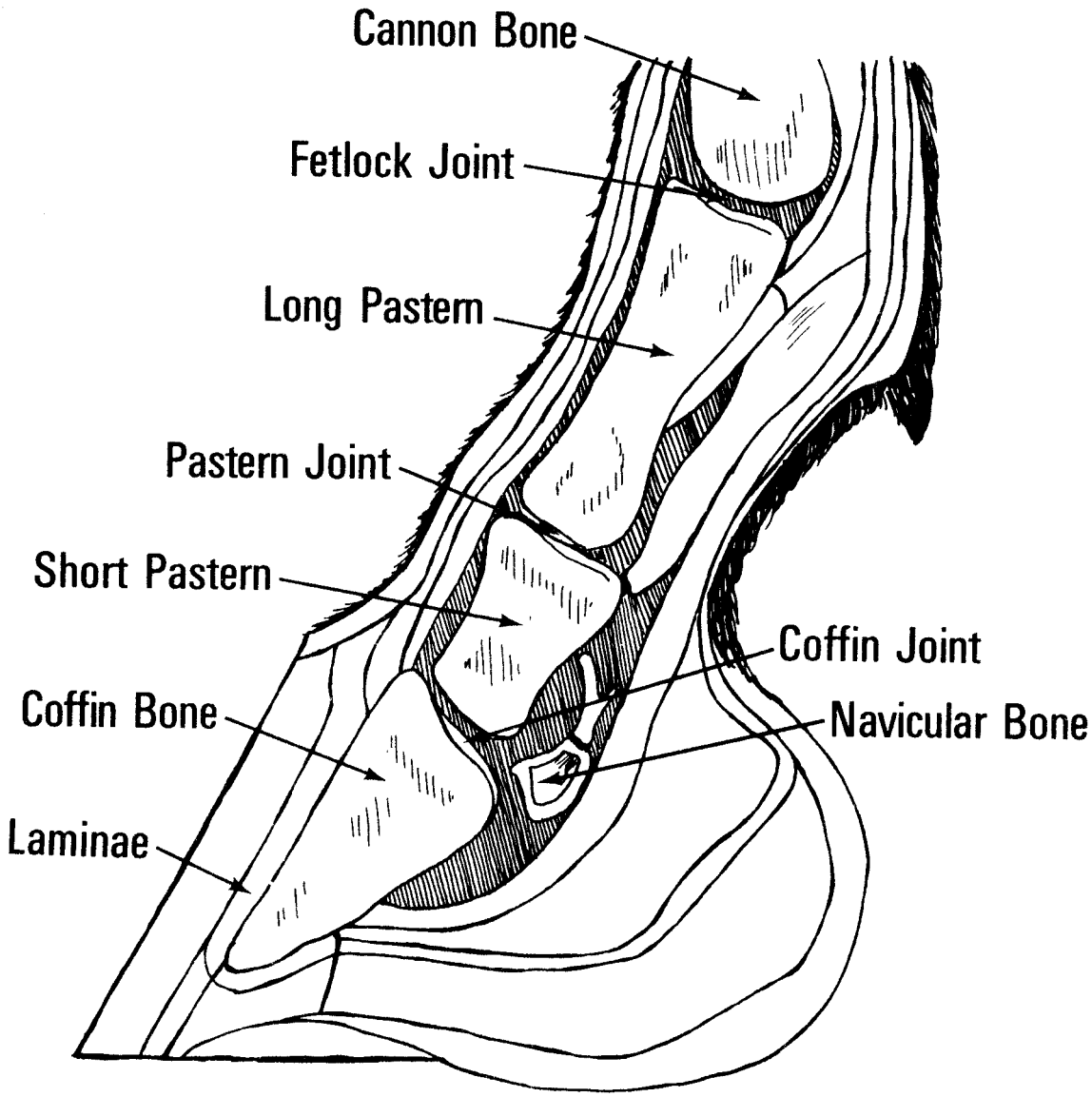


External Parts of the Foot (Bottom View)



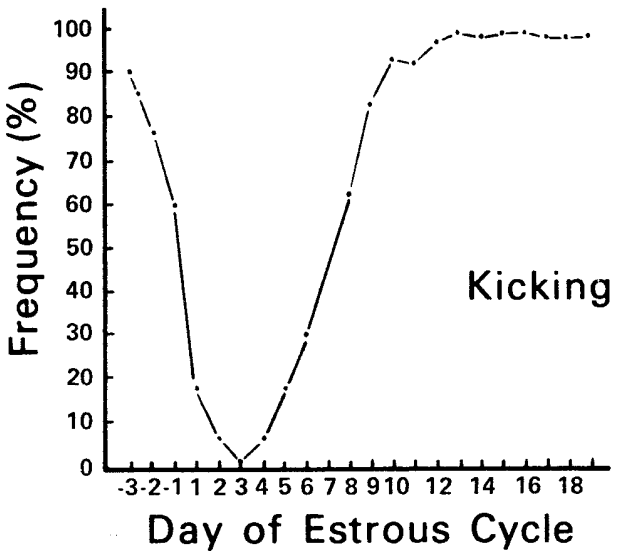
 TM 7

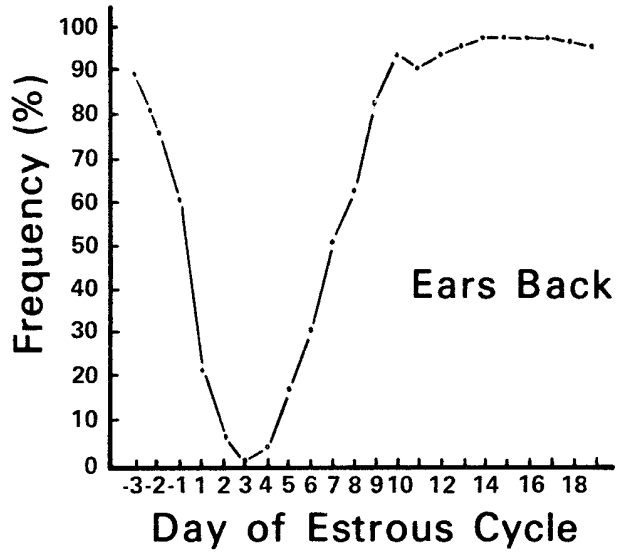
Internal Parts of the Foot



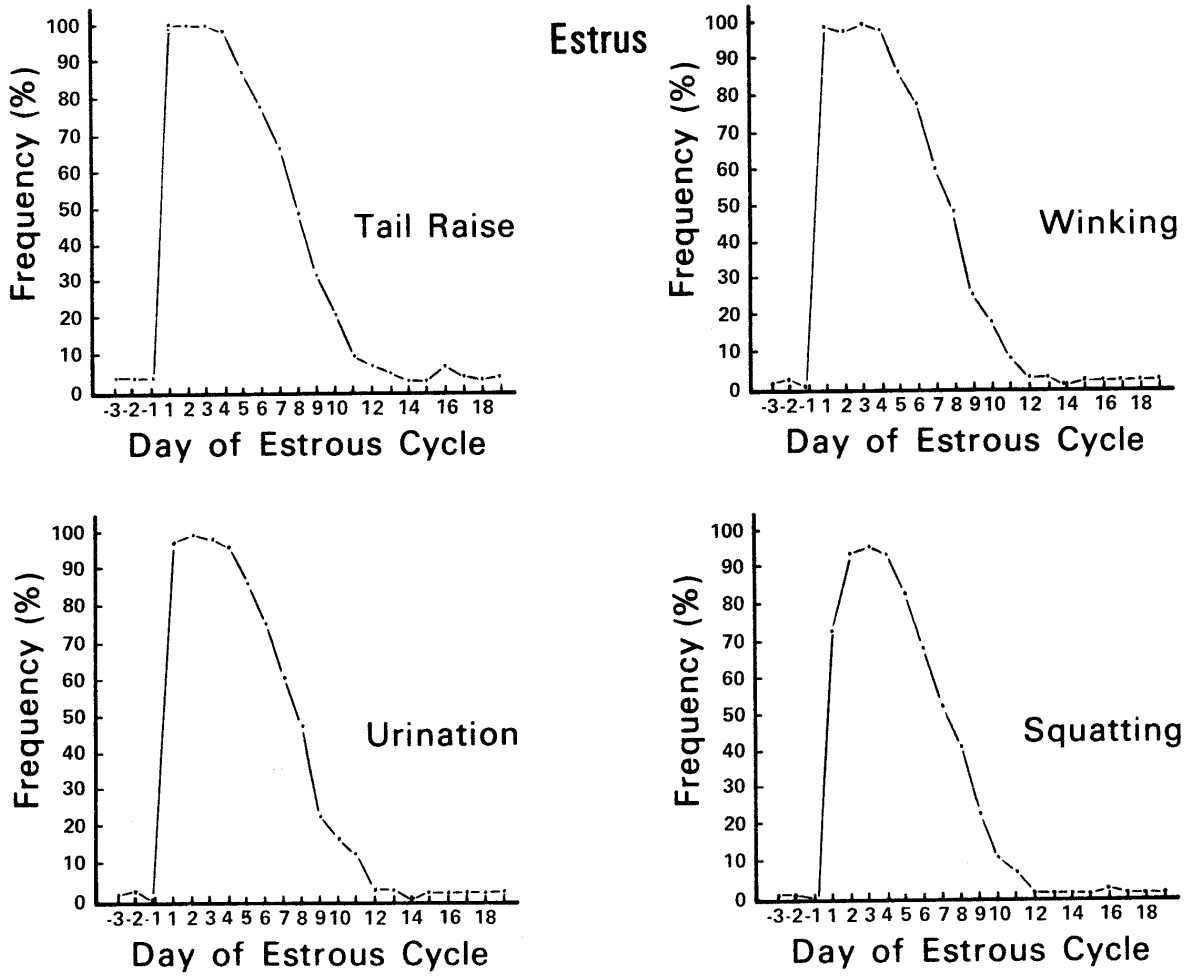
Signs of Estrus in Mares

Non-Estrus





Signs of Estrus in Mares
(Continued)



Bedding Material: Approximate Water Absorbing Capacity

lbs of water/lb of bedding	
4.0	Tan bark
3.0	Pine chips
2.5	sawdust
2.0	shavings
1.0	needles
1.5	Hardwood chips, shavings or sawdust
2.5	Shredded stover
2.1	Ground cobs
2.8	Oats, threshed
2.5	combined
2.4	chopped
3.0	HAY, chopped mature
.25	Sand
10.0	Peat Moss
2.5	Wheat Straw

Storage Space Requirements for Feed and Bedding

Kind of Feed or Bedding	Pounds per Cubic Foot	Cubic Feet per Ton	Pounds per Bushel of Grain
Hay-Straw:			
1. Loose			
Alfalfa	4.4-4.0	450-500	
Nonlegume	4.4-3.3	450-600	
Straw	3.0-2.0	670-1000	
2. Baled			
Alfalfa	10.0-6.0	200-330	
Nonlegume	8.0-6.0	250-330	
Straw	5.0-4.0	400-500	
3. Chopped			
Alfalfa	7.0-5.5	285-360	
Nonlegume	6.7-5.0	300-400	
Straw	8.0-5.7	250-350	

Storage Space Requirements for Feed and Bedding
(Continued)

Kind of Feed or Bedding	Pounds per Cubic Foot	Cubic Feet per Ton	Pounds per Bushel of Grain
Corn:			
15½% moisture			
Shelled	44.8		56
Ear	28.0		70
Shelled, ground	38.0		48
Ear, ground	36.0		45
30% moisture			
Shelled	54.0		67.5
Ear, ground	35.8		89.6
Barley, 15%	38.4		48.0
ground	28.0		37.0
Flax, 11%	44.8		56.0
Oats, 16%	25.6		32.0
ground	18.0		23.0
Rye, 16%	44.8		56.0
ground	38.0		48.0
Sorghum, grain 15%	44.8		56.0
Soybeans, 14%	48.0		60.0
Wheat, 14%	48.0		60.0
ground	43.0		50.0

Space Requirements for Horses in Buildings

Dimensions of Stalls including Manger Box Stall Size	
Mature Animal (Mare or Gelding)	10' x 10' . . . . . .small . . . . . . 10' x 12' . . . . . .medium . . . . . . 12' x 12' . . . . . .large . . . . .
Brood Mare	12' x 12' . . . . . .or larger . . . . .
Foal to 2-year old	10' x 10' . . . . . .average . . . . . 12' x 12' . . . . . .large . . . . .
Stallion*	14' x 14' . . . . . .or larger . . . . .
Pony	9' x 9' . . . . . .average . . . . .

*Work stallions daily or provide a 2-4 acre paddock for exercise.

Recommended Widths and Heights for Passages

Alleys	
Feed	4′ x 8′
Horse, Never Mounted	9–12′ x 8′
Horse, Mounted	9–12′ x 12′
Driveways	10–12′ x 12′
Drive-Through Doors and Gates	10′ x 12′

HORSE MANAGEMENT

AG 310 - K

ASSIGNMENT SHEET #1--EVALUATE FACTORS THAT AFFECT SUSCEPTIBILITY OF HORSES TO PARASITES

Name_____ Score_____

Check the following conditions which make a horse <u>less</u> susceptible to parasites.

1.	( )	kept in stable	or	( )	on pasture
2.	( )	yearling	or	( )	five-year-old horse
3.	( )	fed in trough	or	( )	fed on ground
4.	( )	rotated pasture	or	( )	same pasture year around
5.	( )	stall cleaned daily	or	( )	stall cleaned weekly
6.	( )	manure spread directly from stall	or	( )	manure spread after two weeks of compacted storage
7.	( )	deworm spring and fall	or	( )	deworm every two months
8.	( )	one acre per animal unit	or	( )	five acres per animal unit
9.	( )	pond	or	( )	water tank
10.	( )	deworming all of herd at same time	or	( )	deworming individuals on rotational basis

HORSE MANAGEMENT

AG 310 - K

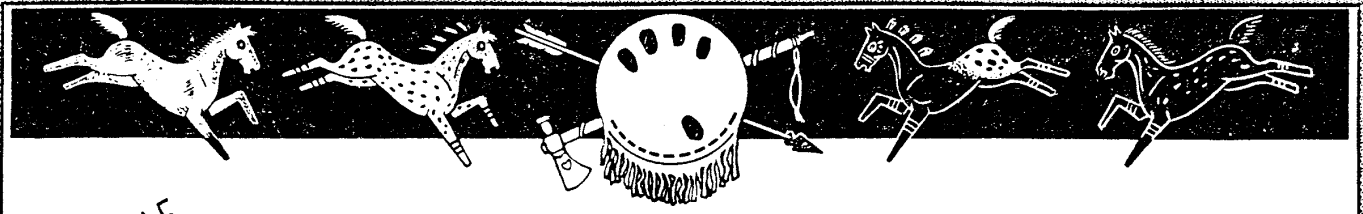
ASSIGNMENT SHEET #2--COMPLETE FORMS ON HORSE HEALTH

Name_____ Score_____

Using the registration papers and Coggins exam that follow and the information below, complete the health record forms provided. Two sets of health record forms have been provided. One set is for recording information from the previous year, if necessary. The second set is for recording current year's information.

Use today's date as the date you begin recording information. The horse was bought 15 days ago for a purchase price of $1,250.00. The horse arrived at the farm/ranch five days ago. The transportation cost was $20.00. The horse is 15 1/2 hands high and has O negative blood. As the owner, you place the horse in pasture #7 at night and in stall #12 in the daytime. The horse's collar number is 161. The Coggins exam was issued 30 days ago. The horse's immunization record is as follows:

Venezuelan and Eastern/Western Encephalomyelitis	March 6
Tetanus antitoxin	March 6
Strangles	October 12
Influenza	October 12
Rhinopneumonitis	April 5, Sept. 8
Farrier (cost each visit, $7.00)	Jan. 5, Mar. 3, May 2 July 2, Sept. 8, Oct. 5
Attacks of colic	Oct. 23, Nov. 9
Deworming	Mar. 6, May 2, Aug. 6
Administered 15 cc of penicillin for cough	Sept. 2, 6, 8



SAMPLE

CERTIFICATE OF REGISTRATION

APPALOOSA HORSE CLUB

Incorporated Under the Laws of the State of Oregon

This certificate is written evidence of the breeding of the below named animal. This acceptance is based upon an application duly certified by the breeder or owner. This certificate is subject to correction and cancellation under the By-Laws of the Appaloosa Horse Club, Inc. The Appaloosa Horse Club, Inc., will not be liable under this certificate for any mistakes therein, based upon an error or misrepresentation in the application thereof, and in case of such error or misrepresentation the Appaloosa Horse Club, Inc., reserves the right to cancel or correct this certificate of registration.

NAME	DOUBLE PATCH	NUMBER	#38306	STATE FOALED	IDAHO
COLOR	CHESTNUT	SEX	STALLION	DATE FOALED	5/20/62
OWNER	GEORGE B. HATLEY	CITY	MOSCOW	STATE	IDAHO
BREEDER	GEORGE B. HATLEY	CITY	MOSCOW	STATE	IDAHO

DESCRIPTION WHITE OVER LOIN AND HIPS, STAR AND STRIP, STOCKING LEFT REAR.

SIRE DOUBLE REIGH (JOCKEY CLUB #512882) — DOUBLE JAY / REIGH ORPHAN

DAM KATHY #F-895 — PATCHY #F-416 / ROCKSEY #F-636

IN WITNESS WHEREOF, WE HAVE HEREUNTO AFFIXED THE SEAL OF THIS SOCIETY AT MOSCOW, IDAHO THIS DATE January 14, 1964

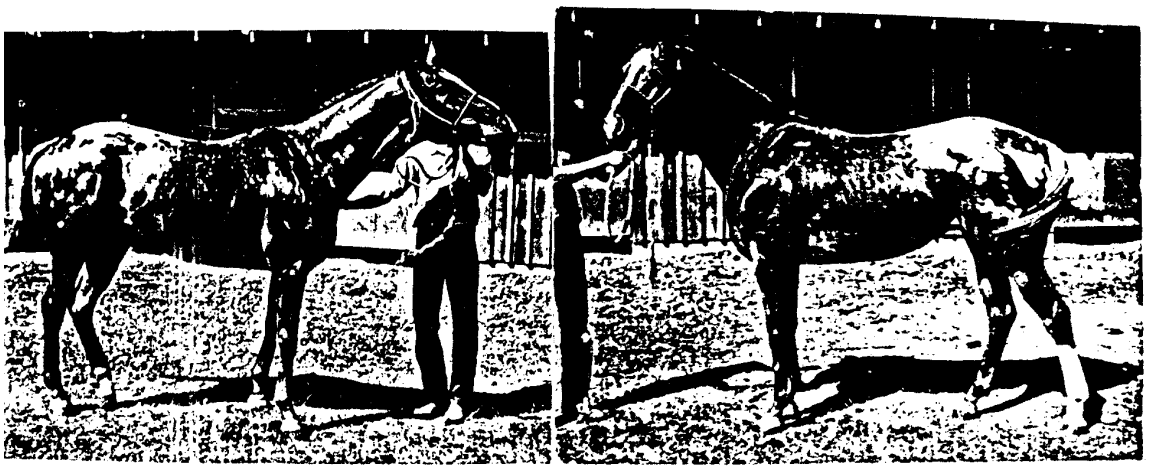
Earl Steinert
President

Charles Ruben
Secretary

Please do not write on certificate. Send this certificate of registration, transfer application and transfer fee to APPALOOSA HORSE CLUB, INC., Box 8403, Moscow, Idaho 83843.

TRANSFER RECORD No record valid without signature of Secretary

DATE	TO	ADDRESS



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LABORATORY USE

PRIN ACC. NO./DATE

SPEC. ACC. NO.

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services

EQUINE INFECTIOUS ANEMIA LABORATORY TEST REPORT

TESTING VETERINARIAN: Submit to laboratory with blood samples. Direct inquiries to reporting laboratory and refer to Accession No.

LABORATORY: Distribute all copies after testing.

1. DATE

2. PAGE 1 OF 1

3. NAME & ADDRESS OF OWNER *(Include Zip Code)*
George B. Hatley

Moscow, Idaho

4 VETERINARIAN'S NAME & ADDRESS *(Include Zip Code)* - TYPE OR PRINT LEGIBLY BELOW & BETWEEN DOTS.

SEX F - Female S - Stallion G - Gelding

TEST RESULTS POS - Positive NEG - Negative

TUBE NO.	IDENTIFICATION *(Name, ID No., Brand, etc.)*	AGE	BREED	SEX	COLOR	TEST RESULT	REACTOR ID NO.	REMARKS
1	1. Double Patch		Appaloosa	S	Chtnut	NEG		
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							

SAMPLE

5. HORSES STABLED AT *(Address)*

COUNTY | TOWN

I hereby certify that this is a correct record of blood samples taken by me.

6. TOTAL NO. BLOOD SAMPLES TAKEN →

7. SIGNATURE *(Accredited Veterinarian)* | 8. DATE

FOR LABORATORY USE ONLY

DATE RECEIVED	DATE READ	ANTIGEN USED	NAME OF TEST	OTHER *(Specify)*
			COGGINS ☐	

ADDITIONAL DATA

TEST SUMMARY	
No. Negative	
No. Positive	
TOTAL	

NAME OF LABORATORY | BY | DATE

VS FORM 10 - 11
JULY 1973

OFFICE

EQUI•RECORD ©

MONTH/DAY/YEAR ARRIVED — HORSE'S NAME/OWNER'S NAME/ I.D. NUMBER — MONTH/DAY/YEAR DEPARTED

* EXPENSES * OBSERVATIONS * TREATMENTS *

DATE	DESCRIPTION	COST	DATE	DESCRIPTION	COST
	TOTAL			EQUI • RECORD NO. ____ TOTAL	

EQUINE © 1978

FORM NO. 2050 Rev. 12/78

IDENTIFICATION NUMBER

PASTURE NUMBER | STALL NUMBER | COLLAR NUMBER

HORSE INFORMATION

NAME | REGISTERED NUMBER

BRANDS # TATOO NUMBER

☐ BLACK ☐ BAY ☐ SORREL ☐ CHESTNUT
☐ PALOMINO ☐ DUN ☐ GRAY ☐ BUCKSKIN

MARKINGS | HEIGHT | YEAR BORN

LAST COGGINS TEST DATE | BLOOD TYPE | SEX | PURCHASE PRICE/SELLING PRICE

SIRE | DAM

OWNER INFORMATION

NAME

ADDRESS

CITY | STATE | ZIP CODE

BUSINESS TELEPHONE | HOME TELEPHONE

PEDIGREE

SIRE'S SIRE

SIRE'S DAM

DAM'S SIRE

DAM'S DAM

COMMENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JAN																															
FEB																															
MAR																															
APR																															
MAY																															
JUN																															
JUL																															
AUG																															
SEP																															
OCT																															
NOV																															
DEC																															

← SYMBOLS HERE	DESCRIPTION HERE				

MEDICATION

N	= Novin
IL	= Iron & Liver
P	= Penicillin
L	= Lasix
B	= Phenylbutazone
Q	= Arquel
J	= Injacome 100
ES	= eSE
Z	= Acepromazine
AS	= Anabolic Steriod
AC	= Aureomycin Crumbles
D	= Demerol
TW	= Talwin

VACCINATIONS

R	= E. Rhinopheomonitis
TA	= Tetanus Antitoxin
TT	= Tetanus Toxoid
EW	= E/W Encephomyelitis
VE	= Venezuelen "
S	= Strangles
I	= E. Influenza

Example N/4 = 4 cc's Novin
S/B = Strangles Booster

C	= Colic
ST	= Bowed Tendon
SP	= Splint
BS	= Bog Spavin
BL	= Blister
FI	= Fired
WM	= Wormed
FR	= Farrier
WK	= Walker
R	= Ridden
TO	= Turned Out
GW	= Gate Work
TK	= Track Work
DA	= Date Arrived
DD	= Date Departed

EQUI•RECORD ©

MONTH/DAY/YEAR ARRIVED

HORSE'S NAME/OWNER'S NAME/ I.D. NUMBER

MONTH/DAY/YEAR DEPARTED

★ EXPENSES ★ OBSERVATIONS ★ TREATMENTS ★

DATE	DESCRIPTION	COST	DATE	DESCRIPTION	COST

TOTAL

EQUI • RECORD NO. ____

TOTAL

EQUINE [illegible] © 1978

FORM NO. 2050 Rev. 12/78

IDENTIFICATION NUMBER

PASTURE NUMBER | STALL NUMBER | COLLAR NUMBER

HORSE INFORMATION

NAME | REGISTERED NUMBER

BRANDS & TATOO NUMBER

☐ BLACK ☐ BAY ☐ SORREL ☐ CHESTNUT
☐ PALOMINO ☐ DUN ☐ GRAY ☐ BUCKSKIN

MARKINGS | HEIGHT | YEAR BORN

LAST COGGINS TEST DATE | BLOOD TYPE | SEX | PURCHASE PRICE/SELLING PRICE

SIRE | DAM

OWNER INFORMATION

NAME

ADDRESS

CITY | STATE | ZIP CODE

BUSINESS TELEPHONE | HOME TELEPHONE

PEDIGREE

SIRE'S SIRE

SIRE'S DAM

DAM'S SIRE

DAM'S DAM

COMMENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JAN																															
FEB																															
MAR																															
APR																															
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D	= Demerol
TW	= Talwin

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WK	= Walker
R	= Ridden
TO	= Turned Out
GW	= Gate Work
TK	= Track Work
DA	= Date Arrived
DD	= Date Departed

HORSE MANAGEMENT

AG 310 - K

ASSIGNMENT SHEET #3--EXPLAIN ACTIONS TO TAKE IN CERTAIN MEDICAL SITUATIONS

Name_____ Score_____

If you are around horses for any length of time, you may be confronted with any or all of the following situations. Explain what action is to be taken under each condition. If a veterinarian is to be called, explain what to do until the veterinarian arrives. You will need to do some additional research before completing this assignment sheet.

1. Horse is spurting blood from cannon area on right front leg.

_____

_____

_____

_____

2. Horse is biting and/or kicking at stomach, trying to lay down and roll, and exhibiting signs of pain.

_____

_____

_____

_____

3. Horse is stiff and reluctant to move.

_____

_____

_____

_____

4. Horse has laceration on left forearm which is not deep enough for suturing.

_____

_____

_____

5. Horse is lame in rear foot.

_____

_____

_____

_____

6. Horse did not eat feed from last feeding.

_____

_____

_____

_____

7. Mare is foaling, and water broke 20 minutes ago.

_____

_____

_____

_____

8. Horse has a temperature of 104^{o}F (40^{o}C).

_____

_____

_____

_____

HORSE MANAGEMENT

AG 310 - K

ASSIGNMENT SHEET #4--BALANCE RATION FOR A HORSE

Name_____ Score_____

Balance a ration for a mature horse at hard work weighing 1,000 lbs. Use oats, soybean meal and prairie hay. Use the following composition of feeds and the value of the nutrients.

Composition of Feeds

Feed	Digestible Protein %	TDN %	Calcium grams per lb	Phosphorus grams per lb	Vitamin A International Units per lb of feed
Oats	11.0	75	0.41	1.95	0
Soybean Meal	42.0	78	1.27	2.77	0
Prairie Hay	3.7	43.1	2.80	0.56	5600

Daily Nutrient Requirements
(Based on air-dry feed containing 90 percent dry matter)

Size and Use of horse	Lbs Fed	Digestible Protein lbs	TDN lbs	Calcium grams	Phosphorus grams	Vitamin A I. U.
Mature (hard work)	23.0	1.2-1.4	14-17	24.0	21.0	18,000

Feed	Lbs Fed	Digestible Protein lbs	TDN lbs	Calcium grams	Phosphorus grams	Vitamin A I. U.
Oats						
Soybean Meal						
Prairie Hay	10					
Total						

(Note: Limit hay to 10 pounds.)

HORSE MANAGEMENT

AG 310 - K

ASSIGNMENT SHEET #5--DRAW PLANS FOR A HORSE FACILITY

Name_____ Score_____

The horse facility will house eight show horses, two stallions, twenty brood mares, six yearlings and eight weaning offspring. Draw plans of the barn or barns and include stall areas, pastures, paddocks, manure storage and road area. Show the areas for feed, bedding and tack storage. Take into consideration all the topics described in this unit.

HORSE MANAGEMENT

AG 310 - K

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

1. On pasture
2. Five-year-old horse
3. Fed in trough
4. Rotated pasture
5. Stall cleaned daily
6. Manure spread after two weeks of compacted storage
7. Dewormed every two months
8. Five acres per animal unit
9. Water tank
10. Deworming all of herd at same time

Assignment Sheet #2

Answered to the satisfaction of the instructor.

Assignment Sheet #3

1. Apply gauze or cotton over spurting area and cover with reasonably tight ace bandage wrapping well above and below the wound.
2. Keep horse up, outside and walking slowly while someone else calls the veterinarian. Monitor vital signs and record to inform veterinarian.
3. Allow horse to stand quietly; do not force to move. Check for hot coronary bands or throbbing arteries in the fetlock. Apply pressure to loin muscles to detect cramps. Provide fresh water to drink in small one-gallon quantities. Check vital signs and call veterinarian.
4. Clean thoroughly with mild soap and warm water; dry and apply scarlet oil or other nondrying healing aid.
5. Pick up foot and clean thoroughly using hoof pick and hoof knife. Examine for nails, rocks or any foreign object. If shod, pull shoe and examine nails for signs of blood. Check for wounds, sore places and heat at coronary band. Check vital signs. If all the above signs are negative call veterinarian. If signs are positive, remove foreign object and treat wound accordingly.

6. Check vital signs, examine remainder of feed, and determine amount not eaten. If all normal, remove feed (not water) for 12-hour period and furnish with fresh feed. If significant change in vital signs or horse does not eat within 12 hours, call veterinarian.

7. If no part of foal had been presented at this point, call veterinarian. While waiting for veterinarian, keep mare up and walking to prevent straining until veterinarian arrives.

8. Examine horse for nasal discharge and eye discharge. Check vital signs. Call veterinarian and, while waiting for his/her arrival, provide cooler surroundings for the horse during the summer by spraying with water hose to help drop temperature.

   (Caution: Do not spray with water if there is nasal discharge or eye discharge.)

Assignment Sheet #4

Quantity of Nutrients in Feeds Being Used

Feed	Lbs Fed	Digestible Protein lbs	TDN lbs	Calcium grams	Phosphorus grams	Vitamin A I. U.
Oats	12.6	1.39	9.45	5.17	24.57	0
Soybean Meal	.4	.17	.31	.51	1.11	0
Prairie Hay	10.0	.37	4.31	28.00	5.60	56,000
Total	23.0	1.93	14.07	33.68	31.28	56,000

Assignment Sheet #5

Answered to the satisfaction of the instructor.

HORSE MANAGEMENT

AG 310 - K

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Relieves allergic reactions	1. Anthelmintics
_____b.	Period of time in which mare is receptive to stallion; usually lasts 5-7 days and occurs in 21-day cycles	2. Analgesic
_____c.	Chemical materials used for deworming	3. Chyme
_____d.	Act of giving birth	4. Vermifuge
_____e.	Record of disorders, medications, immunizations and other pertinent information about the horse	5. Enema
_____f.	Painful digestive disturbance	6. Antihistamine
_____g.	Thick, semifluid mass resulting from gastric digestion of food	7. Lymph nodes
_____h.	Membrane which attaches fetus to uterus	8. Parturition
_____i.	Lips of vulva contracting and relaxing	9. Case history
_____j.	Inflammation of the brain and spinal cord	10. VEE
_____k.	Pain killer	11. Colic
_____l.	Young horse under one year of age; also, the process of giving birth	12. Immunization
_____m.	An injury of an organ or body tissue	13. Coggins exam
_____n.	Liquid injected into the rectum to clean out the feces	14. Lesion
_____o.	Produce lymphocytes which become a part of the blood and are involved in natural disease defense	15. Placenta
_____p.	Test for equine infectious anemia; issued by veterinarian	16. Foal
_____q.	Horseshoer	17. Paddock
		18. Farrier
		19. Estrus
		20. Sheath
		21. Edema

_____r. Act of injecting substance in horse's system which causes resistance to disease

_____s. Small fenced exercise area

_____t. Swelling caused by an accumulation of fluids

_____u. Housing for male penis

_____v. Sleeping sickness

_____w. Another term for anthelmintic

22. Encephalomyelitis

23. Winking

2. List four factors to consider in buying a horse.

a. _____

b. _____

c. _____

d. _____

3. List four practices important for maintaining healthy horses.

a. _____

b. _____

c. _____

d. _____

4. List five characteristics of a healthy horse.

a. _____

b. _____

c. _____

d. _____

e. _____

5. Select from the list below components essential for maintaining an effective health care program. Place an "X" in the appropriate blanks.

_____a. Heating barns during winter months

_____b. Controlling parasites

_____c. Organizing immunization program

_____d. Grooming twice a week

_____e. Checking twice a week for injuries or disease

_____f. Administering hoof care

_____g. Keeping accurate records

_____h. Giving 10 cc of penicillin weekly as a preventive measure

_____i. Administering diuretic weekly to flush kidneys

_____j. Avoiding high risk situations

_____k. Being aware of equine disease and latest research

_____l. Maintaining good nutrition

_____m. Keeping teeth in good condition

6. List four means by which diseases are passed from one horse to another.

a. _____

b. _____

c. _____

d. _____

7. List four infectious diseases.

a. _____

b. _____

c. _____

d. _____

8. List four noninfectious diseases.

a. _____

b. _____

c. _____

d. _____

9. Name the vital signs of a horse and their normal ranges.

Vital signs	Normal ranges
a. _____	_____
b. _____	_____
c. _____	_____

10. List five general symptoms of parasitic infection.

a. _____

b. _____

c. _____

d. _____

e. _____

11. List six management practices used in prevention of parasitism.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

12. Select from the list below the critical factors in the care of the horse's foot. Place an "X" in the appropriate blanks.

_____a. Daily inspection

_____b. Correct moisture content

_____c. Whether horse is mare or gelding

_____d. Conformation

_____e. Shoeing

_____f. Trimming

_____g. Length of time ridden

_____h. Hoof wear

_____i. Whether animal is shown

13. Select from the list below the most common causes of lameness. Place an "X" by the appropriate answers.

_____a. Lack of moisture

_____b. Black hooves

_____c. Disease of the foot

_____d. Injury

_____e. Riding too hard

_____f. Foreign object in hoof

_____g. Poor shoeing

_____h. Poor conformation

_____i. Poor hoof care

_____j. Old age

14. Select from the list below items to be recorded in case history by placing an "X" in the appropriate blanks.

_____a. Length of gestation

_____b. Farrier records

_____c. Ration

_____d. Past ownerships

_____e. Birthplace

_____f. Past illnesses, injuries and allergies

_____g. Age, breed, color and sex

_____h. Deworming dates and anthelmintics

_____i. Past medications

_____j. Sire's race record

_____k. Show record

_____l. Use

_____m. Dental records

_____n. Immunization history

15. Select from the following list factors which contribute to correct feeding practices. Place an "X" by the correct answers.

_____a. Horse should consume approximately 5% of body weight

_____b. Water should be fresh and easily accessible

_____c. Horse should not be permitted to drink heavily when hot or immediately before heavy activity

_____d. Changes in diet are not important

_____e. Grain should be increased and hay decreased as amount of work increases

_____f. Feed must vary with individual horse and depends upon use, size, age and weight of horse

_____g. Ration should be balanced

_____h. Times of feeding can vary

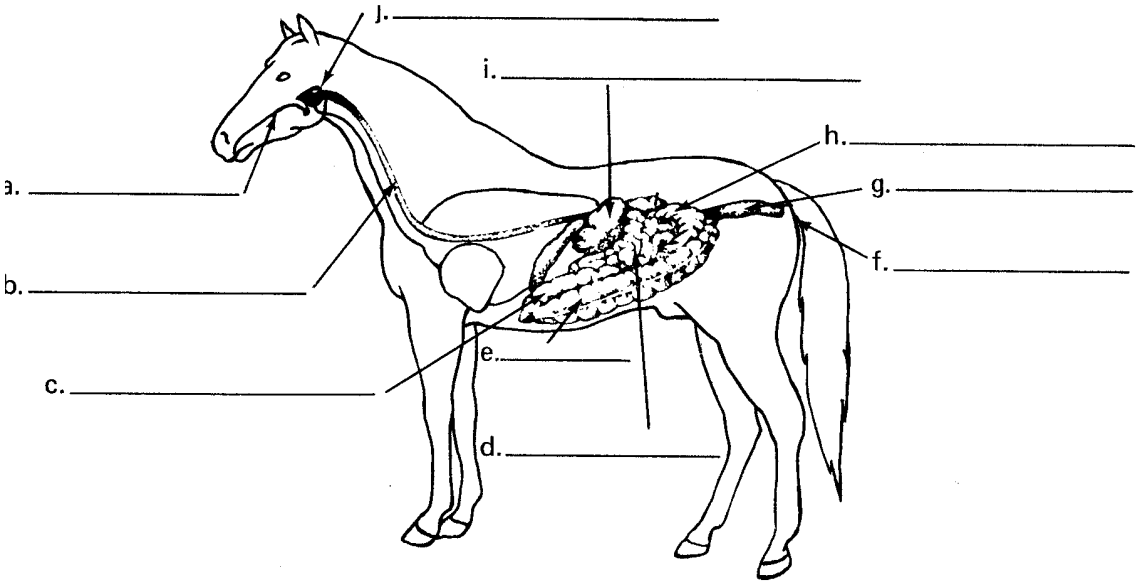
_____i. Feed should not be made available to the horse within the hour immediately before or after strenuous activity

_____j. Times of feeding should be consistent

_____k. Horse should consume approximately 2.0-2.5% of body weight

_____l. Changes in diet should be gradual, allowing digestive system to adapt accordingly

16. Identify the parts of the digestive system shown in the illustration below. Write the correct names in the blanks provided.



17. Match the parts of the digestive system on the right to the correct descriptions and functions by placing the appropriate numbers in the blanks provided.

_____a. Contains mostly fluids; results in breaking down chyme, which forms fatty acids and some vitamins

_____b. Tube providing passage of food from pharynx to stomach

_____c. Chewing mechanism; secretes saliva to act as a digestive juice and to lubricate food for swallowing

_____d. Holds waste material until passed out of horse's body through anal opening

_____e. Controls semifluid for digestion, mostly by bacterial fermentation and absorption

_____f. J-shaped muscular sac between esophagus and small intestine that secretes gastric juices by which proteins and fats are broken down

_____g. Muscular passage which separates mouth from esophagus

_____h. Provides further breakdown of proteins, fats and sugars which have escaped breakdown by gastric juices

_____i. Contains relatively solid materials which are formed into balls of dung

1. Mouth
2. Pharynx
3. Esophagus
4. Stomach
5. Small intestine
6. Cecum
7. Large colon
8. Small colon
9. Rectum

18. Complete the following chart on the suggested daily ration for a two-year-old that will mature at 1,100 pounds.

% Digestible Protein	Weight lbs	Lbs Grain	Lbs Hay	Total Lbs Feed
(a)_____	990	(b)_____	(c)_____	17

19. List and describe four fundamental breeding practices.

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

20. Name three ways to detect pregnancy.

a. _____

b. _____

c. _____

21. Describe normal breeding characteristics of mares.

a. Age of puberty _____

b. Age to breed mares _____

c. Estrus (heat) _____

_____

d. Ovulation _____

_____

e. Gestation period _____

_____

f. Foal heat _____

_____

22. Name four important items relating to care of mare during gestation.

a. _____

b. _____

c. _____

d. _____

23. List four indications of approaching parturition.

a. _____

b. _____

c. _____

d. _____

24. Describe actions to take in the foaling process.

a. _____

b. _____

c. _____

d. _____

e. _____

25. Select from the list below foaling conditions requiring veterinarian's assistance. Place an "X" in the appropriate blanks.

_____a. Weakness of mare and/or foal

_____b. Mare refuses to accept foal

_____c. Mare and/or foal failing to get up immediately

_____d. Foal fails to nurse within 30 minutes

_____e. Hemorrhaging of mare from vulva or foal from navel stump

_____f. Slow and difficult labor or delivery

_____g. Hard labor with no results

_____h. Placenta retained for more than 30 minutes

_____i. Failure of foal to have bowel movement within 30 minutes

_____j. Placenta passed and not intact

26. Select from the list below steps to take when caring for a newborn foal. Place an "X" in the appropriate blanks.

_____a. Dry foal with a rag before mare licks it

_____b. Give enema

_____c. Allow foal to rest five minutes after delivery

_____d. Give injection of penicillin-streptomycin

_____e. Check to make sure foal is breathing and respiratory tract is free of excess fluids and congestion

_____f. Break navel cord immediately to prevent infection

_____g. Make certain foal nurses within 6 hours

_____h. Observe foal closely for first few days

_____i. Give tetanus injection if mare was given tetanus toxin injection one month prior to foaling and foal received colostrum

27. Select from the list below steps to take when caring for a postpartum mare. Place an "X" in the appropriate blanks.

_____a. Provide fresh, cold water to drink

_____b. Feed laxative feeds for the first few days following foaling

_____c. Check for lacerations and tears caused during the foaling process

_____d. Encourage mare to drink large amount of water

_____e. Observe for shedding of placenta

_____f. Examine udder for milk

_____g. Wash udder with hot, soapy water

_____h. Give tetanus injection

28. List three types of bedding used for horses.

a. _____

b. _____

c. _____

29. Select from the list below precautions to take before transporting a horse. Mark each correct answer with an "X".

_____a. Tranquilize horse before loading

_____b. Provide good footing

_____c. Possess proper health papers and statement of ownership

_____d. Withhold all water and feed until reaching destination

_____e. Prepare horse by wrapping legs and tail

_____f. Feed lightly and give fresh, clean water to drink

30. Discuss factors to consider while driving and transporting the horse.

_____

_____

_____

_____

_____

_____

_____

_____

31. List three factors to consider when planning facilities for horses.

a. _____

b. _____

c. _____

HORSE MANAGEMENT

AG 310 - K

ANSWERS TO TEST

1.

a.	6	g.	3	m.	14	s.	17
b.	19	h.	15	n.	5	t.	21
c.	1 or 4	i.	23	o.	7	u.	20
d.	8 or 16	j.	22	p.	13	v.	10
e.	9	k.	2	q.	18	w.	4
f.	11	l.	16	r.	12		

2. Answer should include four of the following:

   Use of horse; Cost; Characteristics of horse; Places to purchase horses; Experience of individual purchaser; Examination by veterinarian; Availability of equipment and facilities

3. Answer should include four of the following:

   Avoid public feeding and watering places; Administer proper vaccinations; Keep stalls clean of manure and urine; Maintain pastures and paddocks to eliminate manure accumulation; Remove hazardous obstacles from pastures and barn area; Maintain parasite control

4. Answer should include five of the following:

   Contentment; Bright eyes and alert ears; Good appetite; Pliable skin and shiny coat; Mucous membranes of eyes and lips pink colored and moist; Normal temperature, pulse and respiration; No visible wounds; Normal feces and urine

5. b, c, f, g, j, k, l, m

6. Feed containers; Water containers; Hypodermic needles; Close contact

7. Answer should include four of the following:

   Influenza; Strangles; Pneumonia; Rhinopneumonitis; Viral arteritis; Equine encephalomyelitis (sleeping sickness); Equine infectious anemia (swamp fever); Tetanus (lock jaw); Anthrax

8. Answer should include four of the following:

   Colic; Pulmonary emphysema; Roaring; Azoturia (Monday morning sickness); Laminitis (founder)

9. a. Pulse--28-40 beats per minute
   b. Temperature--99.5 - 101.5^{o}F (37.5 - 38.5^{o}C)
   c. Respiration--8-16 breaths per minute

10. Answer should include five of the following:

    Weak; Unhealthy appearance; Tucked up flanks; Potbelly; Rough coat; Paleness of membranes around eyes and mouth; Frequent colic and diarrhea in some cases; Stunted growth and development in young animals

11. Answer should include six of the following:

    Feed hay and grain in trough and/or manger, not on the ground; Supply fresh, clean water; Clean manure daily from stalls and small paddocks; Store manure in a tightly constructed pit for at least two weeks prior to spreading; Mow and rake pastures frequently; Rotate pasture, alternately graze cattle and horses, and let pasture rest three months of year; Treat infected animals prior to turning out to a clean area; Deworm at a minimum of three-month intervals; Treat with effective insecticide during late spring, summer and early fall; Provide good sanitary conditions and a high level of nutrition

12. a, b, d, e, f, h

13. a, c, d, f, g, h, i

14. b, c, d, f, g, h, i, l, m, n

15. b, c, e, f, g, i, j, k, l

16.

a.	Cavity of mouth	f.	Anus
b.	Esophagus	g.	Rectum
c.	Cecum	h.	Small colon
d.	Small intestine	i.	Stomach
e.	Large colon	j.	Pharynx

17.

a.	6	d.	9	g.	2
b.	3	e.	7	h.	5
c.	1	f.	4	i.	8

18.

a.	11	b.	8	c.	9

19. Answer should include four of the following:

    Estrus cycle of the mare--Length of cycle is usually an average of 21 days, consisting of 5 days in heat and 16 days out of heat
    Selection of appropriate stallion--Decision should be made by January of each year
    Age to breed mares--Mares should not foal before three years of age, preferably four; Many mares will continue to produce past 20 years of age
    Time of year to breed--Spring foals are most popular due to registration guidelines and weather conditions
    Gestation length--Eleven months or 336 days
    Care of pregnant mare--Proper nutrition, good healthy practices and sufficient exercise are major concerns
    Signs of approaching parturition--Udder shows signs of waxing and dripping milk; Mare exhibits restlessness
    Foaling the mare--Location should be in clean meadow or sanitary foaling stall
    Care of mare after foaling--Examination should be done by competent individual for abnormalities and shedding of the placenta
    Care of foal--Navel cord treated with antiseptic; enema given as precautionary measure; be certain foal has nursed for colostrum

20. Answer should include three of the following:

    Cessation of heat period; Rectal palpation; Laboratory tests; Movement of live fetus; Enlargement of mare's stomach and flank area

21. a. Age of puberty--15 - 18 months
    b. Age to breed mares--Not earlier than 3 years of age
    c. Estrus (heat)--Occurs at approximately 21 day intervals, but may vary 10 to 37 days; Lasts 4-6 days; Time of receptivity of stallion
    d. Ovulation--Rupture of follicle and release of egg from the ovary; Usually one day before or one day after mare goes out of estrus
    e. Gestation period--Time from conception until parturition; Average is approximately 336 days, but may range from 310-370 days
    f. Foal heat--Mares usually show signs of estrus 9-11 days after foaling; May vary 3-13 days

22. Nutrition; Exercise; Vaccinations; Housing quarters

23. Answer should include four of the following:

    Enlargement of udder; Hip and abdomen muscles begin to sag and stretch in preparation for passage of foal; Waxing of teats; Vulva enlargement; May discharge mucus; Muscles and ligaments in and around pelvic area relax and become loose and flabby; Restlessness; Milk dripping from teats; Irritable behavior; Frequent passing of urine; Vigorously switching tail; Sweat around flanks and neck; Pawing ground; Halfheartedly biting and kicking at abdomen; Lying down and getting up

24. Prepare sanitary and safe surroundings; Keep distractions to a minimum; Observe for signs of foaling; Wrap tail and wash genital region of mare upon first signs of foaling; Give mare adequate time to foal

25. a, b, e, f, g, j

26. b, d, e, g, h

27. b, c, e, f

28. Answer should include three of the following:

    Straw; Shavings; Sawdust; Sand; Tan bark; Ground cobs; Peat moss

29. b, c, e, f

30. Drive at a moderate, constant and safe speed; Avoid quick starts and stops; Use light application of brakes first and then apply firm, steady pressure; Avoid taking sharp curves too fast; Allow horse to rest every 3-4 hours and unload and walk every 8-10 hours on long trips; Take into consideration state laws, signs, amount and speed of traffic, and weather conditions

31. Answer should include three of the following:

    Shelter from cold, storms, wind, sun; Good ventilation without drafts in shelter; Well-drained site; Floor: Clay or wood; Bedding with straw or wood shavings; Avoid concrete floors; Wood fences best (boards on inside of posts)

SPECIALTY ANIMAL PRODUCTION

AG 310 - L

UNIT OBJECTIVE

After completion of this unit, students should be able to select pullets and broilers and identify the egg grades. Students should be able to describe the different breeds of dairy goats and outline health management for poultry and goats. Students should also be able to list fish species cultured in Idaho, describe rainbow trout industry management operations and label the parts of the external anatomy of a bony fish. This knowledge will be demonstrated by the completion of a unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. Match terms associated with poultry, goat and fish management to their correct definitions.
2. Describe six factors in selecting pullets for egg production.
3. Select factors in selecting broilers after slaughter.
4. List the four USDA egg grades.
5. List three feed systems for hens.
6. Select poultry management practices.
7. Describe five disease management practices for poultry.
8. List the five goat classifications.
9. Match the major goat breeds in the United States to their characteristics.
10. List five goat products.
11. Identify the parts of a dairy goat doe when given a description of how each part should be evaluated.
12. Identify the parts of a dairy goat buck when given a description of how each part should be evaluated.
13. Describe five factors in dairy goat health management.
14. Outline a good goat herd health program.
15. Label the parts of a dairy goat.
16. List six fish species cultured in Idaho.
17. Select correct statements describing the Idaho aquaculture industry.

18. Describe rainbow trout industry management operations.

19. Describe farm pond operations.

20. List the five steps involved in fish processing.

21. List six careers in aquaculture.

22. Label the parts of the external anatomy of a bony fish.

SPECIALTY ANIMAL PRODUCTION

AG 310 - L

SUGGESTED ACTIVITIES

I. Suggested activities for the instructor

A. Make transparencies and necessary copies of materials.

B. Provide students with objective sheet.

C. Provide students with information sheets.

D. Discuss unit and specific objectives.

E. Discuss information sheets.

F. Arrange for field trip to poultry farm.

G. Arrange for field trip to fish hatchery or farm.

H. Review and give test.

I. Reteach and retest if necessary.

II. Instructional materials

A. Objective sheet

B. Suggested activities

C. Information sheet

D. Transparency masters

1. TM--1 Poultry Management Practices
2. TM--2 Goat Classifications
3. TM--3 Major Goat Breeds in the U.S.
4. TM--4 Goat Products
5. TM--5 Dairy Goat Scorecard for Does
6. TM--6 Dairy Goat Scorecard for Bucks
7. TM--7 Parts of a Dairy Goat
8. TM--8 Fish Species Cultured in Idaho
9. TM--9 The Hagerman Valley

10. TM--10 Careers in Aquaculture

11. TM--11 External Anatomy of a Bony Fish

E. Test

F. Answers to test

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SPECIALTY ANIMAL PRODUCTION

AG 310 - L

INFORMATION SHEET

I. Terms and definitions

A. Sexed chicks--Chicks sorted into pullets or cockerels for buying or selling

B. Straight-run chicks--Chicks that are not sorted for buying or selling; usually are one-half pullets and one-half cockerels

C. Culling--Removing of undesirable animals from the herd or flock

D. Pullets--Young female chickens

E. Cockerels--Young male chickens

F. Layers--Female chickens used for egg production

G. Broilers--Young chickens, about seven to eight weeks of age, which have been raised for meat production

H. Capon--Castrated male chicken

I. Caponizing--Process of castrating cockerels

J. Poult--Newborn turkey of either sex

K. Kid--Newborn dairy goat of either sex

L. Wether--Castrated male goat

M. Doe--Female goat

N. Buck--Male goat

O. Disbudding--Removing horn buds from kid goats

P. Broadfish--Sexually mature fish used primarily for reproductive purposes

Q. Fingerlings--Small fish; raised and used mostly for stockgrowers

R. Stocker production--Production of fish between fingerling and food size; least common type of fish production

S. Hatching trough--A raceway utilized to hatch the eggs of fish

T. Fry--A newly-hatched fish

U. Alevins--Yolk sac larvae from hatched fish eggs

V. Aquaculture--Raising aquatic animals under controlled conditions. Also, the management of the aquatic environment for production of plants and animals

W. Spawn--Egg-laying process of fish

X. Seining--The removal of fish with nets

II. Factors in selecting pullets for egg production

A. Head--fairly long, strong with flattened skull

B. Face--clean, smooth

C. Comb--large, bright red

D. Eyes--large, bright, prominent, richly-colored iris

E. Body form--deep, broad, angular

F. Heart girth--large capacity

G. Back--broad, flat

H. Keel--long

I. Shanks--bright yellow

J. Feet and toes--well-balanced

III. Factors in selecting broilers (after slaughter)

A. Wide, meaty breast; wide, straight back; bulging thighs and meaty legs

B. High percentage of meat on bone

C. Light, cream-colored fat distributed evenly over body

D. Absence of wasty fat

E. No protruding pinfeathers; very few nonprotruding pinfeathers

F. Absence of common defects (crooked breastbone, torn skin, callouses, blisters, skin damaged by parasites, etc.)

G. Absence of bruises or skin discolorations

H. Absence of broken bones; few disjointed bones

IV. USDA grades for eggs

- A. Grade AA
- B. Grade A
- C. Grade B
- D. Grade C

V. Feed systems for laying and breeding hens

- A. All mash
  - 1. Commercially prepared complete feeds
    - a. 15 percent protein
    - b. No additional grain
  - 2. Achieves uniformity of interior and exterior egg quality
  - 3. Calcium supplement may be offered free choice
  - 4. Vitamins and minerals
- B. Mash and concentrate
  - 1. Flocks of 50 - 2,000 hens
  - 2. 15 percent protein ration
    - a. Mash--20 percent protein
    - b. Grain
  - 3. Vitamins and minerals
- C. Free choice
  - 1. Hens balance own ration
    - a. High protein mash (25 percent or more)
    - b. Whole grains
    - c. Calcium supplement
    - d. Vitamins and minerals

VI. Poultry management practices (Transparency 1)

A. Debeaking

1. Removal of part of upper and lower beak, or only part of upper
2. Day old chicks (again at 16 weeks for layers)
3. Prevents cannibalism

B. Dubbing

1. Removal of part or all of the chicken's comb
2. Day old chicks
3. Snip off with manicure scissors
4. Eliminates interference of large combs with eating and drinking; reduces injury to comb; reduces fighting

C. Desnooding

1. Removal of poult's snood
2. Snip off with manicure scissors, close to skull
3. Day old poults
4. Disease prevention

D. Wing clipping

1. Removal of last joint of wing
2. Two to twenty days old
3. One wing
4. Prevents flight

E. Wing notching

1. Alternative to wing clipping
2. Five to six weeks old
3. Wing bent back at last joint with cauterizing blade or debeaker

F. Toeclipping turkeys--Prevents scratched and torn backs

G. Vaccinating

1. Helps control diseases

2. Check with veterinarian for diseases that are a threat

3. Administering

a. Intranasal--Injection into nose opening

b. Intraocular--Vaccine placed in eye

c. Wing web--Injection into underside of wing at elbow joint

H. Caponizing

1. Castration

a. Small incision between last 2 ribs on sides

b. Remove testicle through incision

c. Must have entire testicle from each side

2. Three to five week males

3. Rapid weight gain; don't develop male characteristics (tough skin and flesh, etc.); docile

VII. Disease management practices for poultry

A. Purchase high quality stock

B. Purchase only from reputable, disease-free hatcheries

C. Clean and disinfect equipment and buildings between production cycles

D. Keep waterers and feeders clean

E. Disinfect and fumigate facilities regularly

F. Control spread from other poultry farms by controlling visitors

G. Isolate diseased birds (kill and either bury or burn)

H. Regularly and rigidly cull the flock

I. Control litter dampness

J. Eliminate disease carrying insects, rodents and wild birds

K. Keep informed of disease symptoms

L. Quarantine show birds one month before returning to the rest of the flock

M. Develop and follow a sound vaccination program

VIII. Goat classifications (Transparency 2)

A. Purebred--Both parents registered of same breed

B. American--7/8 purebred by grading up

C. Recorded grade

1. Does only

2. One registered purebred parent

D. Crossbred--Registered parents of different breeds

E. Unrecorded grade--Unknown or unrecorded parents

IX. Major goat breeds in the United States (Transparency 3)

A. French Alpines

1. Large, rangy, deerlike

2. Good milk production--3.5% butterfat content in milk

3. Any color or color pattern possible

B. American La Manchas

1. Short, fine, glossy hair

2. No external ears

3. 4% butterfat content in milk

4. Any color or color combination

C. Toggenburgs

1. Medium size, sturdy, vigorous

2. Markings

a. Light fawn to dark

b. White ears with dark spots in middle

c. Two white stripes on face from above eye to muzzle

d. White on rump and legs

3. 3.8% butterfat content in milk

D. Saanens

1. Vigorous, rugged-boned, medium to large in size
2. Pure white or cream colored
3. 3.5% butterfat content in milk

E. Nubians

1. Large
2. Wide, drooping, large ears
3. Convex roman nose
4. All colors or color combinations
5. 5% butterfat content in milk

F. Angora

1. Raised for fleece and meat
2. Medium size
3. Long, thin, drooping ears
4. White or gray
5. Usually have horns

X. Goat products (Transparency 4)

A. Milk/butterfat

B. Meat

C. Wool

D. Hair

E. Leather

XI. Characteristics in evaluating dairy goat does (Transparency 5)

A. General appearance

1. Attractive individuality revealing vigor; femininity with a harmonious blending and correlation of parts; impressive style and attractive carriage; graceful walk
2. Breed characteristics--Appropriate for the breed

3. Head--Medium in length, clean-cut; broad muzzle with large, open nostrils; lean, strong jaw; full, bright eyes; forehead broad between the eyes; ears medium size, alertly carried (except Nubians)

4. Shoulder blades--Set smoothly against the chest wall and withers, forming neat junction with the body

5. Back--Strong and appearing straight with vertebrae well defined

6. Loin--Broad, strong and nearly level

7. Rump--Long, wide and nearly level

    a. Hips--Wide, level with back

    b. Thurls--Wide apart

    c. Pin bones--Wide apart, lower than hips, well defined

    d. Tail head--Slightly above and neatly set between pin bones

    e. Tail--Symmetrical with body

8. Legs--Wide apart, squarely set, clean-cut and strong with forelegs straight

    a. Hind legs--Nearly perpendicular from hock to pastern; when viewed from behind, legs wide apart and nearly straight; bone flat and flinty; tendons well defined; pasterns of medium length, strong and springy; hocks cleanly molded

9. Feet--Short and straight, with deep heel and level sole

B. Dairy character

1. Animation, angularity, general openness and freedom from excess tissue, giving due regard to period of lactation

2. Neck--Long and lean, blending smoothly into shoulders and brisket, clean-cut throat

3. Withers--Well defined and wedge-shaped with the dorsal process of the vertebrae rising slightly above the shoulder blades

4. Ribs--Wide apart; rib bone wide, flat and long

5. Flank--Deep, arched and refined

6. Thighs--Incurving to flat from the side; apart when viewed from the rear, providing sufficient room for the udder and its attachments

7. Skin--Fine textured, loose and pliable; hair fine

C. Body capacity

1. Relatively large in proportion to the size of the animal, providing ample digestive capacity, strength and vigor

2. Barrel--Deep, strongly supported; ribs wide apart and well sprung; depth and width tending to increase toward rear of barrel

3. Heart girth--Large, resulting from long, well-sprung foreribs; wide chest floor between the front legs and fullness at the point of elbow

D. Mammary system

1. A capacious, strongly attached, well-carried udder of good quality, indicating heavy production and a long period of usefulness

2. Udder - Capacity and shape--Long, wide and capacious; extended well forward; strongly attached

a. Rear attachment--High and wide; halves evenly balanced and symmetrical

b. Fore attachment--Carried well forward, tightly attached without pocket, blending smoothly into body

c. Texture--Soft, pliable and elastic; free of scar tissue; well collapsed after milking

3. Teats--Uniform, of convenient length and size, cylindrical in shape, free from obstructions, well apart, squarely and properly placed, easy to milk

XII. Characteristics in evaluating dairy goat bucks (Transparency 6)

A. General appearance

1. Attractive individuality revealing vigor; masculinity with a harmonious blending and correlation of parts; impressive style and majestic carriage; graceful and powerful walk

2. Breed characteristics--Appropriate for the breed

3. Head--Medium in length, clean-cut; broad muzzle with large, open nostrils; lean, strong jaw; full, bright eyes; forehead broad between the eyes; ears medium size, alertly carried (except Nubian and La Manchas)

4. Color--Appropriate for breed

5. Shoulder blades--Set smoothly against the chest wall and withers, forming neat junction with the body

6. Back--Strong and appearing straight with vertebrae well defined

7. Loin--Broad, strong and nearly level

8. Rump--Long, wide and nearly level

    a. Hips--Wide, level with back

    b. Thurls--Wide apart

    c. Pin bones--Wide apart, lower than hips, well defined

    d. Tail head--Slightly above and neatly set between pin bones

    e. Tail--Symmetrical with body

9. Legs--Wide apart, squarely set, clean-cut and strong with forelegs straight

    a. Hind legs--Nearly perpendicular from hock to pastern; when viewed from behind, legs wide apart and nearly straight; bone strong, flat and flinty; tendons well defined; pasterns of medium length, strong and springy; hocks cleanly molded

10. Feet--Short and straight, with deep heel and level sole

B. Dairy character

1. Animation, angularity, general openness and freedom from excess tissue

2. Neck--Medium length, strong and blending smoothly into shoulders and brisket

3. Withers--Well defined and wedge-shaped with the dorsal process of the vertebrae rising slightly above the shoulder blades

4. Ribs--Wide apart; rib bone wide, flat and long

5. Flank--Deep, arched and refined

6. Thighs--Incurving to flat from the side; apart when viewed from the rear

7. Skin--Fine textured, loose and pliable; hair fine

C. Body capacity

1. Relatively large in proportion to the size of the animal, providing ample digestive capacity, strength and vigor

2. Barrel--Deep, strongly supported; ribs wide apart and well sprung; depth and width tending to increase toward rear of barrel

3. Heart girth--Large, resulting from long, well-sprung foreribs; wide chest floor between the front legs and fullness at the point of the elbow

XIII. Dairy goat health management

A. Milking practices

1. Milk every 12 hours

2. Wash udder and teats before milking

3. After milking, dip teats in dairy teat dip solution

B. Disbudding--4-7 days old

1. Caustic paste

2. Electric iron

C. Castrating

1. 1 - 3 weeks old

a. Cutting

b. Emasculation (crushing)

c. Elastration (rubber ring)

2. Feed out for butchering

D. Hoof trimming

1. Check hooves once a month

2. Pruning shears

3. Farrier's knife

E. Tattooing

1. Ear

2. Side of tail

F. Vaccination and deworming

1. Vaccination

a. Tetanus

b. Soremouth

c. Vibriosis

d. Leptospirosis

2. Deworming

a. 6 weeks after mating

b. 3 weeks after kidding

G. Weaning--8 - 12 weeks old

XIV. Goat herd health program

A. Vaccinate regularly

B. Fecal exams and parasite control

C. Trim hooves regularly

D. Trim hair regularly around udder and flanks to keep milk clean

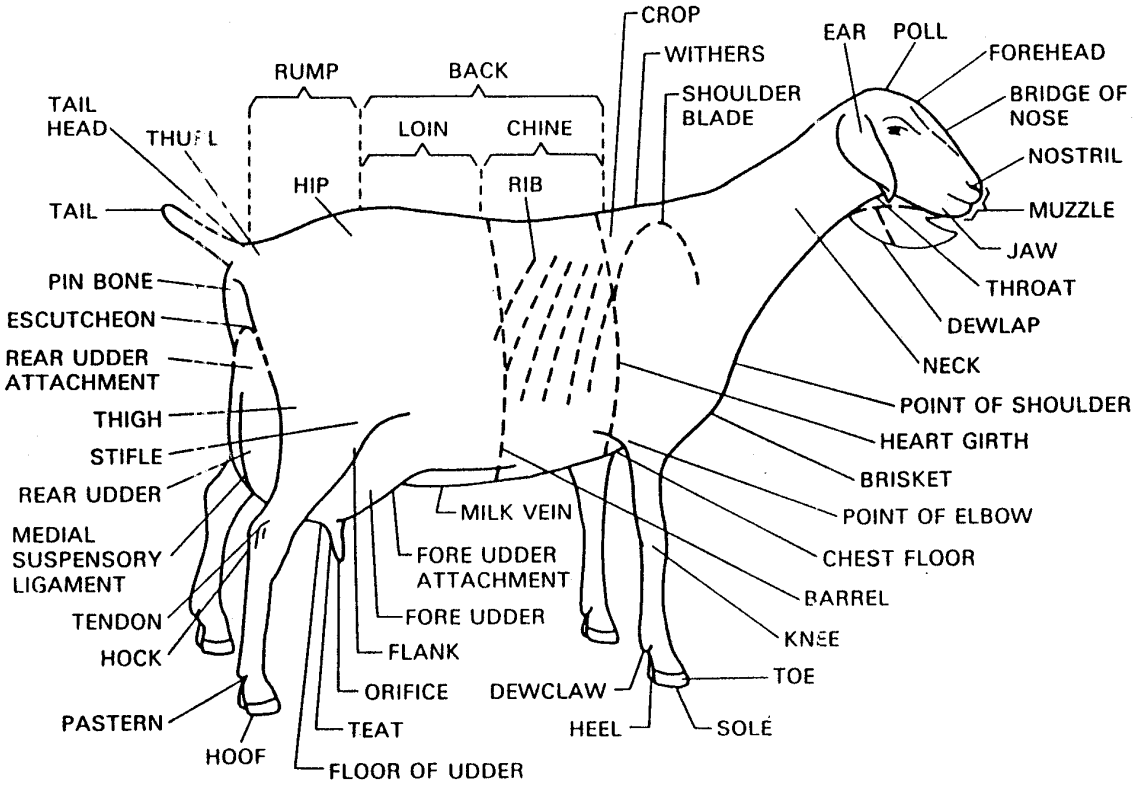
E. Disbud and castrate

F. Clean feeders and waterers regularly

G. Get regular bacteria counts of milk

H. Get yearly blood tests for tuberculosis and brucellosis

XV. Parts of a dairy goat (Transparency 7)



XVI. Fish species cultured in Idaho (Transparency 8)

A. Rainbow trout

B. Cutthroat trout

C. Coho salmon

D. Channel catfish

E. Blue catfish

F. Tilapias

XVII. Idaho aquaculture industry (Transparency 9)

A. Majority located in Hagerman Valley

B. Provides 80% of the trout grown in the United States

C. Owned by Idaho residents

D. Ranks third in Idaho animal agriculture production

E. Three largest farm operations

1. Blue Lakes Trout Farm

2. Clear Lakes Trout Farm

3. Clear Springs Trout Company

F. 40 million pounds fish produced in 1988

XVIII. Rainbow trout industry management operations

A. Broodstock or egg-producing facility

1. Raised to sexual maturity (3 years old)

2. Manually spawned for 3-4 years

a. Control of light cycle used to induce spawning during any season

b. Individuals can spawn twice a year

c. Females can produce 2,000 - 8,000 eggs per spawning

3. Sold for processing or fee-fishing stock

B. Incubation

1. Deep cylindrical incubators containing several thousand eggs

2. Upwelling velocities used to roll eggs for oxygen distribution

3. After eggs hatch, the alevins are carried by the flow from the incubator to receiving troughs

C. Receiving troughs

1. Alevins absorb their yolk

2. Remain through the fry stage

a. Fed 9% of body weight per day

b. Remain until weigh 1 - 2 grams

D. Larger containers or ponds

1. Fed 4 - 5% of body weight per day

2. Remain until 6 grams

E. Standard raceways

1. Stockers

2. Feeding rate falls to 1 - 3% of body weight per day as they grow larger

F. Harvested when they reach pan size (380 grams)

XIX. Farm pond operations

A. Landowners with water resources on their property build ponds to raise stockers

B. Method

1. Lease facilities to large farms; or

2. Raise stockers themselves to sell to processors

C. Production

1. Transfer fingerlings to farm pond

2. Harvest a few months later

3. Tank truck the live fish to a processing plant

XX. Processing the fish

A. Transferred by tank trucks to the processing plant

B. Killed by dewatering or cold shock

C. Placed in processing line (mostly automatic)

D. Super-cooled

E. Packaged or further processed

XXI. Careers in aquaculture (Transparency 10)

A. Chemist of water and plants

B. Geneticist of aquatic plants and animals

C. Veterinarian

D. Biochemist and physiologist of aquatic plant and animal nutrition

E. Feed formulator and aquaculture supplier

F. Engineer of aquatic confinement systems, transportation and protection

G. Aquatic pathologist and epidemiologist of fish diseases

H. Foreman or manager of fish farm

XXII. External anatomy of a bony fish (Transparency 11)

A. Nostrils

B. Pectoral fin

C. Dorsal fin (spinous)

D. Dorsal fin (soft)

E. Lateral line

F. Caudal fin

G. Anal fin

H. Anus

I. Pelvic fin

J. Operculum

POULTRY MANAGEMENT PRACTICES

Debeaking

Dubbing

Desnooding

Wing clipping

Wing notching

Toeclipping (Turkeys)

Vaccinating

Caponizing

GOAT CLASSIFICATIONS

Purebred

American

Recorded Grade

Crossbred

Unrecorded Grade

MAJOR GOAT BREEDS IN THE U.S.

French Alpines

American La Manchas

Toggenburgs

Saanens

Nubians

Angora

GOAT PRODUCTS

Milk/Butterfat

Meat

Wool

Hair

Leather

DAIRY GOAT SCORECARD FOR DOES

(Note: Ideals of type and breed characteristics must be considered in using this card.)

Based on order of observation

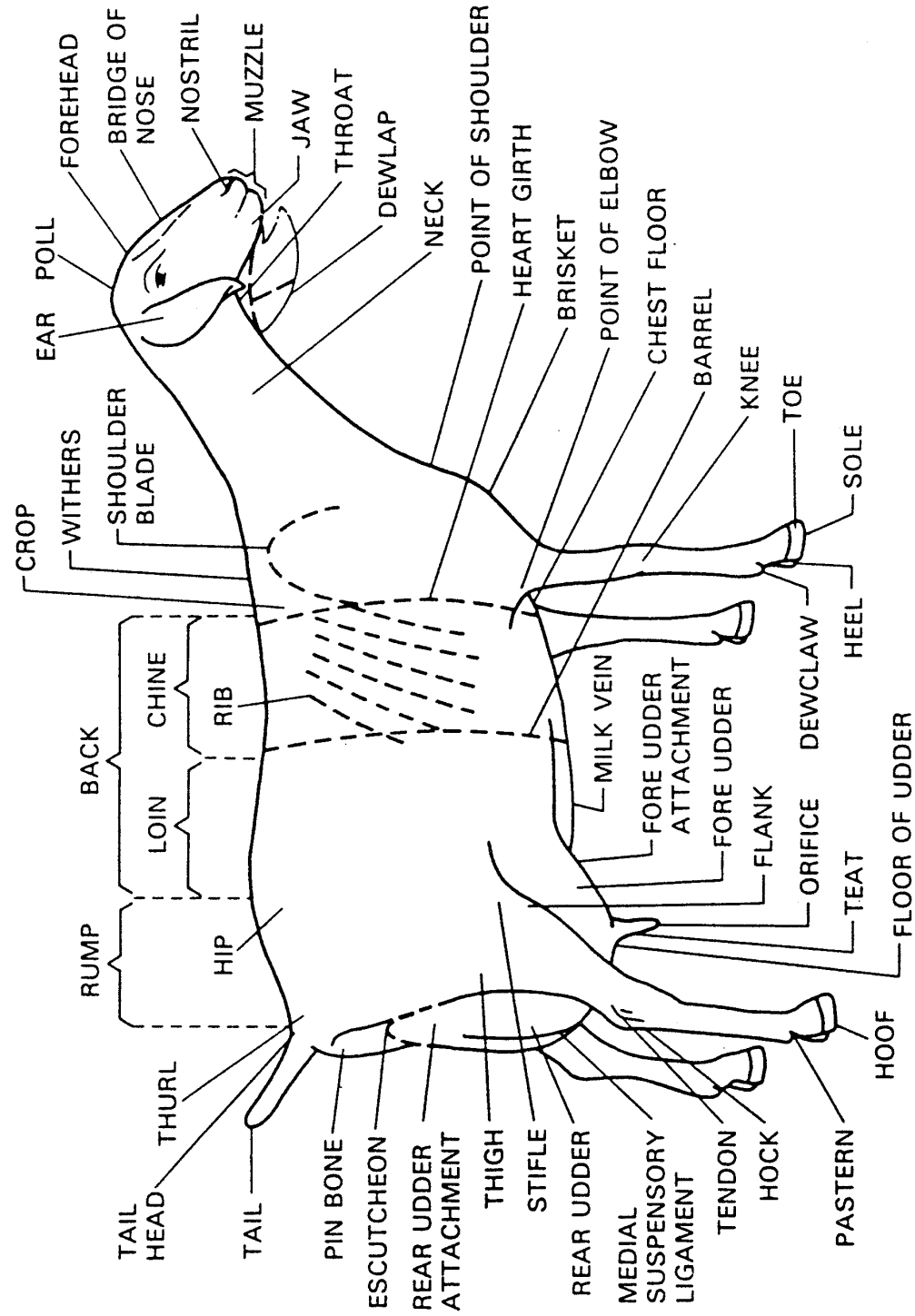
1.	GENERAL APPEARANCE		30
	Attractive individuality revealing vigor; femininity with a harmonious blending and correlation of parts; impressive style and attractive carriage; graceful walk		
	Breed characteristics--Appropriate for the breed	10	
	Head--Medium in length, clean-cut; broad muzzle with large, open nostrils; lean, strong jaw; full, bright eyes; forehead broad between the eyes; ears medium size, alertly carried (except Nubians)		
	Shoulder blades--Set smoothly against the chest wall and withers, forming neat junction with the body		
	Back--Strong and appearing straight with vertebrae well defined		
	Loin--Broad, strong and nearly level		
	Rump--Long, wide and nearly level	8	
	Hips--Wide, level with back		
	Thurls--Wide apart		
	Pin bones--Wide apart, lower than hips, well defined		
	Tail head--Slightly above and neatly set between pin bones		
	Tail--Symmetrical with body		
	Legs--Wide apart, squarely set, clean-cut and strong with forelegs straight		
	Hind legs--Nearly perpendicular from hock to pastern. When viewed from behind, legs wide apart and nearly straight. Bone flat and flinty; tendons well defined. Pasterns of medium length, strong and springy. Hocks cleanly molded	12	
	Feet--Short and straight, with deep heel and level sole		
2.	DAIRY CHARACTER		20
	Animation, angularity, general openness and freedom from excess tissue, giving due regard to period of lactation		
	Neck--Long and lean, blending smoothly into shoulders and brisket, clean-cut throat		
	Withers--Well defined and wedge-shaped with the dorsal process of the vertebrae rising slightly above the shoulder blades	20	
	Ribs--Wide apart; rib bone wide, flat and long		
	Flank--Deep, arched and refined		
	Thighs--Incurving to flat from the side; apart when viewed from the rear, providing sufficient room for the udder and its attachments		
	Skin--Fine textured, loose and pliable. Hair fine		
3.	BODY CAPACITY		20
	Relatively large in proportion to the size of the animal, providing ample digestive capacity, strength and vigor	12	
	Barrel--Deep, strongly supported; ribs wide apart and well sprung; depth and width tending to increase toward rear of barrel		
	Heart girth--Large, resulting from long, well-sprung foreribs; wide chest floor between the front legs and fullness at the point of elbow	8	
4.	MAMMARY SYSTEM		30
	A capacious, strongly attached, well-carried udder of good quality, indicating heavy production and a long period of usefulness		
	Udder - Capacity and shape--Long, wide and capacious; extended well forward; strongly attached	10	
	Rear attachment--High and wide. Halves evenly balanced and symmetrical	5	
	Fore attachment--Carried well forward, tightly attached without pocket, blending smoothly into body	6	
	Texture--Soft, pliable and elastic; free of scar tissue; well collapsed after milking	5	
	Teats--Uniform, of convenient length and size, cylindrical in shape, free from obstructions, well apart, squarely and properly placed, easy to milk	4	
	TOTAL		100

TM 5

DAIRY GOAT SCORECARD FOR BUCKS

1.	**GENERAL APPEARANCE**		45
	Attractive individuality revealing vigor; masculinity with a harmonious blending and correlation of parts; impressive style and majestic carriage; graceful and powerful walk		
	Breed characteristics--Appropriate for the breed	10	
	Head--Medium in length, clean-cut; broad muzzle with large, open nostrils; lean, strong jaw; full, bright eyes; forehead broad between the eyes; ears medium size, alertly carried (except Nubian and La Manchas)	5	
	Color--Appropriate for breed		
	Shoulder blades--Set smoothly against the chest wall and withers, forming neat junction with the body		
	Back--Strong and appearing straight with vertebrae well defined		
	Loin--Broad, strong and nearly level		
	Rump--Long, wide and nearly level	12	
	Hips--Wide, level with back		
	Thurls--Wide apart		
	Pin bones--Wide apart, lower than hips, well defined		
	Tail head--Slightly above and neatly set between pin bones		
	Tail--Symmetrical with body		
	Legs--Wide apart, squarely set, clean-cut and strong with forelegs straight		
	Hind legs--Nearly perpendicular from hock to pastern. When viewed from behind, legs wide apart and nearly straight. Bone strong, flat and flinty; tendons well defined. Pasterns of medium length, strong and springy. Hocks cleanly molded	18	
	Feet--Short and straight, with deep heel and level sole		
2.	**DAIRY CHARACTER**		30
	Animation, angularity, general openness and freedom from excess tissue		
	Neck--Medium length, strong and blending smoothly into shoulders and brisket		
	Withers--Well defined and wedge-shaped with the dorsal process of the vertebrae rising slightly above the shoulder blades		
	Ribs--Wide apart; rib bone wide, flat and long		
	Flank--Deep, arched and refined		
	Thighs--Incurving to flat from the side; apart when viewed from the rear		
	Skin--Fine textured, loose and pliable. Hair fine		
3.	**BODY CAPACITY**		25
	Relatively large in proportion to the size of the animal, providing ample digestive capacity, strength and vigor		
	Barrel--Deep, strongly supported; ribs wide apart and well sprung; depth and width tending to increase toward rear of barrel	13	
	Heart girth--Large, resulting from long, well-sprung foreribs; wide chest floor between the front legs and fullness at the point of the elbow	12	
	TOTAL		100

Parts of a Dairy Goat



FISH SPECIES CULTURED IN IDAHO

Rainbow Trout

Cutthroat Trout

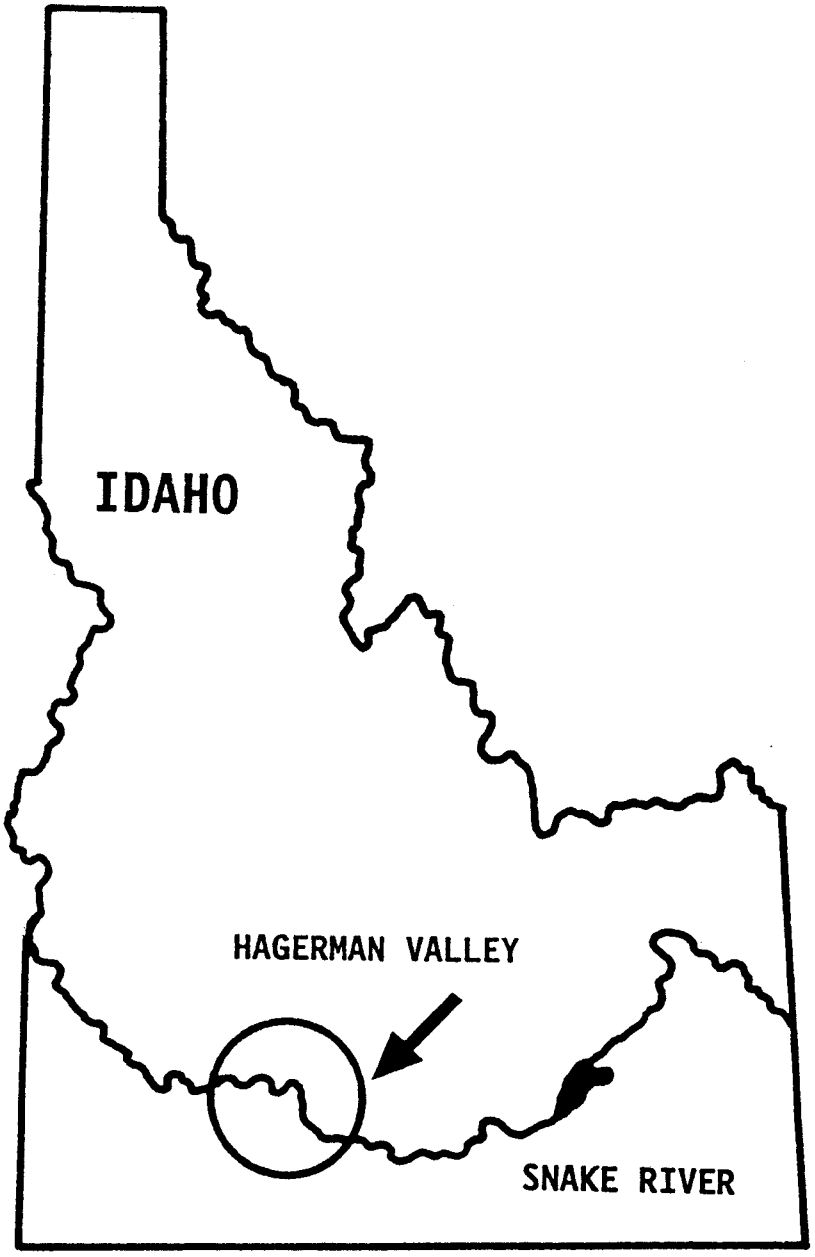
Coho Salmon

Channel Catfish

Blue Catfish

Tilapias

The Hagerman Valley



CAREERS IN AQUACULTURE

Chemist

Geneticist

Veterinarian

Biochemist

Physiologist

Feed Formulator

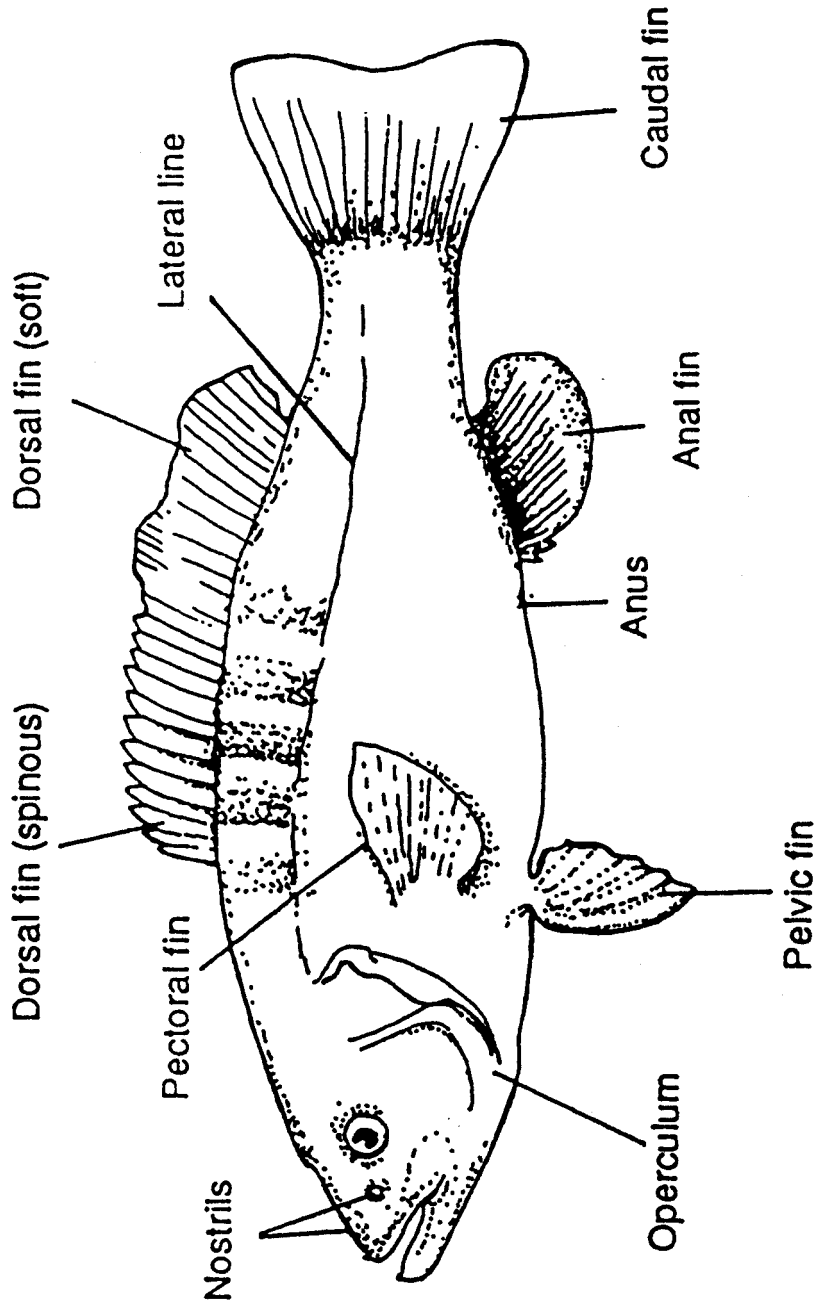
Aquaculture Supplier

Engineer

Aquatic Pathologist and Epidemiologist

Fish Farm Foreman or Manager

External Anatomy of a Bony Fish



SPECIALTY ANIMAL PRODUCTION

AG 310 - L

UNIT TEST

Name_____ Score_____

1. Match the terms on the right to their correct definitions.

_____a.	Raising aquatic animals under controlled conditions. The management of the aquatic environment for production of plants and animals	1. Sexed chicks
_____b.	Young chickens, about seven to eight weeks of age, which have been raised for meat production	2. Straight-run chicks
_____c.	Small fish; raised and used mostly for stockgrowers	3. Culling
_____d.	The removal of fish with nets	4. Pullets
_____e.	Chicks that are not sorted for buying or selling; usually are one-half pullets and one-half cockerels	5. Cockerels
_____f.	Male goat	6. Layers
_____g.	Newborn turkey of either sex	7. Broilers
_____h.	Female goat	8. Capon
_____i.	Chicks sorted into pullets or cockerels for buying or selling	9. Caponizing
_____j.	Production of fish between fingerling and food size; least common type of fish production	10. Poult
_____k.	Young male chickens	11. Kid
_____l.	Removing horn buds from kid goats	12. Wether
_____m.	Process of castrating cockerels	13. Doe
_____n.	Yolk sac larvae from hatched fish eggs	14. Buck
_____o.	Female chickens used for egg production	15. Disbudding
_____p.	Egg-laying process of fish	16. Broadfish
_____q.	Sexually mature fish used primarily for reproductive purposes	17. Fingerlings
_____r.	Young female chickens	18. Seining
		19. Stocker production
		20. Hatching trough
		21. Fry
		22. Alevins

_____s. A newly-hatched fish

_____t. Removing of undesirable animals from the herd or flock

_____u. Castrated male goat

_____v. Castrated male chicken

_____w. Newborn dairy goat of either sex

_____x. A raceway utilized to hatch the eggs of fish

23. Aquaculture

24. Spawn

2. Describe six factors in selecting pullets for egg production.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

3. Select factors in selecting broilers after slaughter. Place an "X" in the correct blanks.

_____a. High percentage of bone

_____b. Very few protruding pinfeathers

_____c. Few broken bones

_____d. Absence of skin discoloration

_____e. Dark colored fat

_____f. No more than three bruises

_____g. Light, cream-colored fat

_____h. Very few nonprotruding pinfeathers

_____i. Absence of broken bones

4. List the four USDA egg grades.

   a. _____

   b. _____

   c. _____

   d. _____

5. List three feed systems for hens.

   a. _____

   b. _____

   c. _____

6. Select poultry management practices. Place an "X" in the correct blank.

   _____a. Tail-clipping

   _____b. Debeaking

   _____c. Wing notching

   _____d. Toeclipping chickens

   _____e. Dubbing

   _____f. Demouthing

   _____g. Caponizing

   _____h. Vaccinating

7. Describe five disease management practices for poultry.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

8. List the five goat classifications.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

9. Match the major goat breeds in the United States to their characteristics. Write the correct numbers in the blanks.

   _____a. Medium size; sturdy; vigorous; light fawn to dark; white ears with dark spots in middle; two white stripes on face from above eye to muzzle; white on rump and legs; 3.8% butterfat

   _____b. Short, fine glossy hair; no external ears; any color or color combination; 4% butterfat

   _____c. Large; wide, drooping, large ears; convex roman nose; all colors or color combinations; 5% butter fat

   _____d. Large; rangy, deerlike; any color or color pattern possible; good milk production; 3.5% butterfat

   _____e. Raised for fleece and meat; medium size; long, thin, drooping ears; white or gray; usually have horns

   _____f. Vigorous; rugged-boned; medium to large in size; pure white or cream colored; 3.5% butterfat

   1. French Alpines
   2. American La Manchas
   3. Toggenburgs
   4. Saanens
   5. Nubians
   6. Angora

10. List five goat products

    a. _____

    b. _____

    c. _____

    d. _____

    e. _____

11. Identify the parts of a dairy goat doe when given a description of how each part should be evaluated.

a. _____ Medium in length, clean-cut; broad muzzle with large, open nostrils; lean, strong jaw; full, bright eyes; forehead broad between the eyes; ears medium size, alertly carried (except Nubians)

b. _____ Strong and appearing straight with vertebrae well defined

c. _____ Wide apart, squarely set, clean-cut and strong with forelegs straight

d. _____ Short and straight, with deep heel and level sole

e. _____ Deep, arched and refined

f. _____ Incurving to flat from the side; apart when viewed from the rear, providing sufficient room for the udder and its attachments

g. _____ Deep, strongly supported; ribs wide apart and well sprung; depth and width tending to increase toward rear

h. _____ Large, resulting from long, well-sprung foreribs; wide chest floor between the front legs, and fullness at the point of elbow

i. _____ Long, wide and capacious; extended well forward; strongly attached

12. Identify the parts of a dairy goat buck when given a description of how each part should be evaluated.

a. _____ Medium in length, clean-cut; broad muzzle with large, open nostrils; lean, strong jaw; full, bright eyes; forehead broad between the eyes; ears medium size, alertly carried (except Nubians and La Manchas)

b. _____ Set smoothly against the chest wall and withers, forming neat junction with the body

c. _____ Short and straight, with deep heel and level sole

d. _____ Medium length, strong and blending smoothly into shoulders and brisket

e. _____ Well defined and wedge-shaped with the dorsal process of the vertebrae raising slightly above the shoulder blades

f. _____ Deep, arched and refined

g. _____ Deep, strongly supported; ribs wide apart and well sprung; depth and width tending to increase toward rear

h. _____ Large, resulting from long, well-sprung foreribs; wide chest floor between the front legs, and fullness at the point of elbow

13. Describe five factors in dairy goat health management.

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

e. _____

_____

_____

14. Outline a good goat herd health program.

a. _____

b. _____

c. _____

d. _____

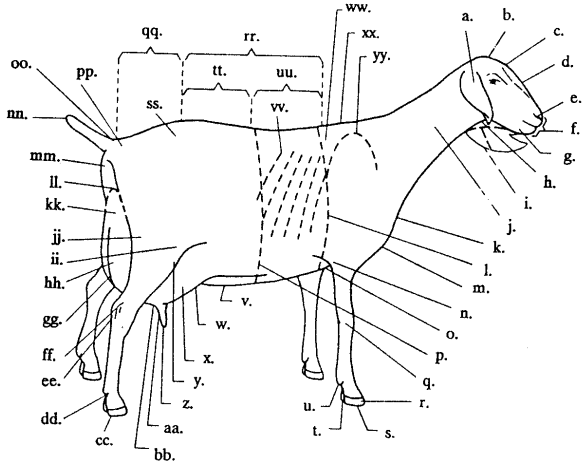
e. _____

f. _____

g. _____

h. _____

15. Label the parts of a dairy goat.



a. _____ aa. _____

b. _____ bb. _____

c. _____ cc. _____

d. _____ dd. _____

e. _____ ee. _____

f. _____ ff. _____

g. _____ gg. _____

h. _____ hh. _____

i. _____ ii. _____

j. _____ jj. _____

k. _____ kk. _____

l. _____ ll. _____

m. _____ mm. _____

n. _____ nn. _____

o. _____ oo. _____

p. _____ pp. _____

q. _____ qq. _____

r. _____ rr. _____

s. _____ ss. _____

t. _____ tt. _____

u. _____ uu. _____

v. _____ vv. _____

w. _____ ww. _____

x. _____ xx. _____

y. _____ yy. _____

z. _____

16. List six fish species cultured in Idaho.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

17. Select the correct statements describing the Idaho aquaculture industry. Write an "X" in the blank next to the correct statements.

_____a. Provides 90% of the trout grown in the United States

_____b. Majority located in Treasure Valley

_____c. Ranks third in Idaho animal agriculture production

_____d. 400,000 pounds fish produced in 1988

_____e. Majority located in Hagerman Valley

_____f. Ranks first in Idaho animal agriculture production

_____g. Provides 80% of the trout grown in the United States

_____h. 40 million pounds fish produced in 1988

18. Describe rainbow trout industry management operations of the following categories.

a. Broodstock or egg-producing facility _____

_____

_____

_____

_____

b. Incubation _____

_____

_____

_____

_____

c. Receiving troughs _____

_____

_____

_____

_____

19. Describe farm pond operations.

a. _____

_____

b. _____

_____

c. _____

_____

20. List the five steps involved in fish processing.

a. _____

b. _____

c. _____

d. _____

e. _____

21. List six careers in aquaculture.

a. _____

b. _____

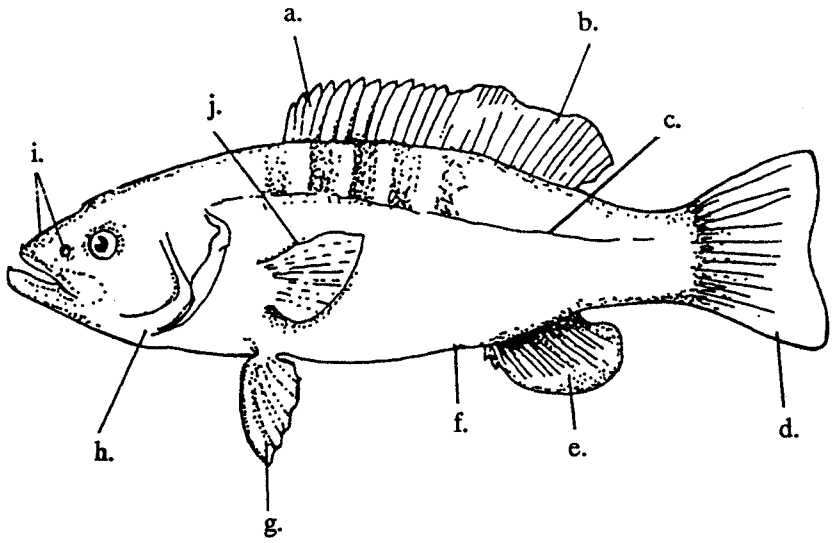
c. _____

d. _____

e. _____

f. _____

22. Label the parts of the external anatomy of a bony fish.



a. _____ f. _____

b. _____ g. _____

c. _____ h. _____

d. _____ i. _____

e. _____ j. _____

SPECIALTY ANIMAL PRODUCTION

AG 310 - L

ANSWERS TO TEST

1.

a.	23	g.	10	m.	9	s.	21
b.	7	h.	13	n.	22	t.	3
c.	17	i.	1	o.	6	u.	12
d.	18	j.	19	p.	24	v.	8
e.	2	k.	5	q.	16	w.	11
f.	14	l.	15	r.	4	x.	20

2. Answer should include six of the following:

   Head--fairly long, strong with flattened skull; Face--clean, smooth; Comb--large, bright red; Eyes--large, bright, prominent, richly-colored iris; Body form--deep, broad, angular; Heart girth--large capacity; Back--broad, flat; Keel--long; Shanks--bright yellow; Feet and toes--well-balanced

3. d, g, h, i

4. Grade AA; Grade A; Grade B; Grade C

5. All mash; Mash and concentrate; Free choice

6. b, c, e, g, h

7. Answer should include five of the following:

   Purchase high quality stock; Purchase only from reputable, disease-free hatcheries; Clean and disinfect equipment and buildings between production cycles; Keep waterers and feeders clean; Disinfect and fumigate facilities regularly; Control spread from other poultry farms by controlling visitors; Isolate diseased birds (kill and either bury or burn); Regularly and rigidly cull the flock; Control litter dampness; Eliminate disease carrying insects, rodents and wild birds; Keep informed of disease symptoms; Quarantine show birds one month before returning to the rest of flock; Develop and follow a sound vaccination program

8. Purebred; American; Recorded grade; Crossbred; Unrecorded grade

9.

a.	3	c.	5	e.	6
b.	2	d.	1	f.	4

10. Milk/butterfat; Meat; Wool; Hair; Leather

11.

a.	Head	f.	Thighs
b.	Back	g.	Barrel
c.	Legs	h.	Heart girth
d.	Feet	i.	Udder
e.	Flank		

12.
a. Head
b. Shoulder blades
c. Feet
d. Neck
e. Withers
f. Flank
g. Barrel
h. Heart girth

13. Answer should include five of the following:

Milking practices: Milk every 12 hours; Wash udder and teats before milking; After milking, dip teats in dairy teat dip solution; Disbudding: 4-7 days old; Caustic paste; Electric iron; Castrating: 1-3 weeks old; Cutting; Emasculation (crushing); Elastration (rubber ring); Feed out for butchering; Hoof trimming: Check hooves once a month; Pruning shears; Farrier's knife; Tattooing: Ear; Side of tail; Vaccination: Tetanus; Soremouth; Vibriosis; Leptospirosis; Deworming: 6 weeks after mating; 3 weeks after kidding; Weaning: 8-12 weeks old

14. Vaccinate regularly; Fecal exams and parasite control; Trim hooves regularly; Trim hair regularly around udder and flanks to keep milk clean; Disbud and castrate; Clean feeders and waterers regularly; Get regular bacteria counts of milk; Get yearly blood tests for tuberculosis and brucellosis

15.
a. ear
b. poll
c. forehead
d. ridge of nose
e. nostril
f. muzzle
g. jaw
h. throat
i. dewlap
j. neck
k. point of shoulder
l. heart girth
m. brisket
n. point of elbow
o. chest floor
p. barrel
q. knee
r. toe
aa. teat
bb. fore of udder
cc. hoof
dd. pastern
ee. hock
ff. tendon
gg. medial suspensory ligament
hh. rear udder
ii. stifle
jj. thigh
kk. rear udder attachment
ll. escutcheon
mm. pin bone
nn. tail
oo. tail head
pp. thurl
qq. rump
rr. back

s. sole
t. heel
u. dewclaw
v. milk vein
w. fore udder attachment
x. fore udder
y. flank
z. orifice
ss. hip
tt. loin
uu. chine
vv. rib
ww. crop
xx. withers
yy. shoulder blade

16. Rainbow trout; Cutthroat trout; Coho salmon; Channel catfish; Blue catfish; Tilapias

17. c, e, g, h

18. a. Broodstock or egg-producing facility--Raised to sexual maturity (3 years old); Manually spawned for 3-4 years; Control of light cycle used to induce spawning during any season; Individuals can spawn twice a year; Females can produce 2,000 - 8,000 eggs per spawning; Sold for processing or fee-fishing stock

b. Incubation--Deep cylindrical incubators containing several thousand eggs; Upwelling velocities used to roll eggs for oxygen distribution; After eggs hatch, the alevins are carried by the flow from the incubator to receiving troughs

c. Receiving troughs--Alevins absorb their yolk; Remain through the fry stage; Fed 9% of body weight per day; Remain until weigh 1-2 grams

19. Landowners with water resources on their property build ponds to raise stockers; Lease facilities to large farms or raise stockers themselves to sell to processors; Transfer fingerlings to farm pond; Harvest a few months later; Tank truck the live fish to a processing plant

20. Transferred by tank trucks to the processing plant; Killed by dewatering or cold shock; Placed in processing line (mostly automatic); Super-cooled; Packaged or further processed

21. Answer should include six of the following:

Chemist of water and plants; Geneticist of aquatic plants and animals; Veterinarian; Biochemist and physiologist of aquatic plant and animal nutrition; Feed formulator and aquaculture supplier; Engineer of aquatic confinement systems, transportation and protection; Aquatic pathologist and epidermiologist of fish diseases; Foreman or manager of fish farm

22. a. Dorsal fin (spinous)
b. Dorsal fin (soft)
c. Lateral line
d. Caudal fin
e. Ananl Fin
f. anus
g. pelvic fin
h. operculum
i. nostrils
j. pectoral fin

FITTING AND SHOWING LIVESTOCK

AG 310 - M

UNIT OBJECTIVE

After completion of this unit, students should be able to fit and show livestock and list the equipment and tools needed for fitting and showing. This knowledge will be demonstrated by the completion of a unit test with a minimum of 85 percent accuracy.

SPECIFIC OBJECTIVES AND COMPETENCIES

After completion of this unit, the student should be able to:

1. List six tools and equipment needed to fit and show beef animals.
2. Describe how to fit a beef animal for showing.
3. Describe how to show beef animals.
4. List the areas that should be clipped on a beef steer.
5. List six tools and equipment needed to fit and show sheep.
6. Describe how to fit a market lamb for showing.
7. Describe how to show sheep.
8. List six tools and equipment needed to fit and show swine.
9. Describe how to fit swine for showing.
10. Describe how to show swine.
11. List six tools and equipment needed to fit and show dairy animals.
12. Describe how to fit dairy animals for showing.
13. Describe how to show dairy animals.
14. List the areas that should be clipped on a dairy animal.
15. List four qualities of a good showman.
16. List three tools used to trim hooves and the purpose of each.
17. Explain the purpose of fitting and showing livestock.

FITTING AND SHOWING LIVESTOCK

AG 310 - M

SUGGESTED ACTIVITIES

I. Suggested activities for instructor

A. Order materials to supplement unit.

1. Filmstrips

a. *Fitting and Showing Beef Cattle*, sound filmstrip; available from: Vocational Education Productions, California Polytechnic State University, San Luis Obispo, California 93407, (1-800-235-4146); approximate cost $30; order no. 1-416-201J.

b. *Grooming Techniques for Steer Exhibition*, 58 colored slides and 18 minute cassette tape covers the basic steps for fitting and showing beef steers; available from: Hobar Publications, 1234 Tiller Lane, St. Paul, Minnesota 55112, (612-633-3170); approximate cost $45; order no. 441.

c. *Fitting and Showing of Beef Cattle*, VHS video, 25 minutes; includes selection of calf, facilities, feeding, exercise, training, grooming, fitting, showing and showmanship; available from: Hobar Publications, 1234 Tiller Lane, St. Paul, Minnesota 55112, (612-633-3170); approximate cost $50; order no. CEV-211.

d. *Fitting and Showing Sheep*, sound filmstrip; shows how to clip, shape, wash and trim sheep; available from: Vocational Education Productions, California Polytechnic State University, San Luis Obispo, California 93407, (1-800-235-4146); approximate cost $20; order no. 1-431-131J.

e. *Basic Sheep Handling Skills*, sound filmstrip; shows how to catch, herd and load sheep safely; available from: Vocational Education Productions, California Polytechnic State University, San Luis Obispo, California 93407, (1-800-235-4146); approximate cost $20; order no. 1-431-136J.

f. *Sheep Showmanship*, VHS video; available from: Vocational Education Productions, California Polytechnic State University, San Luis Obispo, California 93407, (1-800-235-4146); approximate cost $30; order no. 6-011-100J.

g. *Fitting and Showing of Sheep*, VHS video, 25 minutes; includes selection of lamb, facilities, feeding, exercise, training, grooming, fitting, showing and showmanship; available from: Hobar Publications, 1234 Tiller Lane, St. Paul, Minnesota 55112, (612-633-3170); approximate cost $50; order no. CEV-212.

h. *Fitting and Showing Swine*, sound filmstrip; available from: Vocational Education Productions, California Polytechnic State University, San Luis Obispo, California 93407, (1-800-235-4146); approximate cost $45; order no. 1-440-235J.

i. *Fitting and Showing of Swine*, VHS video, 19 minutes; includes selection of pig, facilities, feeding, exercise, training, grooming, fitting, showing, showmanship and summary; available from: Hobar Publications, 1234 Tiller Lane, St. Paul, Minnesota 55112, (612-633-3170); approximate cost $50; order no. CEV-210.

j. *Fitting Dairy Cattle*, VHS video, 17 minutes; includes selection of calf or cow, base selection dates, training, feeding, trimming feet, washing, clipping, fitting tips and safety; available from: Hobar Publications, 1234 Tiller Lane, St. Paul, Minnesota 55112, (612-633-3170); approximate cost $50; order no. CEV-504.

k. *Showing Dairy Cattle*, VHS video, 16 minutes; includes showing scorecard, leading , posing, showing animal to best advantage, sportsmanship, exhibitor appearance and tips for successful showing; available from: Hobar Publications, 1234 Tiller Lane, St. Paul, Minnesota 55112, (612-633-3170); approximate cost $50; order no. CEV-505.

l. *Clipping Dairy Cattle*, VHS video; available from Vocational Education Productions, California Polytechnic State University, San Luis Obispo, California 93407, (1-800-235-4146); approximate cost $30; order no. 6-000-100J.

B. Make transparencies and necessary copies of materials.

C. Provide students with objective sheet and discuss.

D. Provide students with information sheets and discuss.

E. Make arrangements for a field trip to a local fair or livestock show to see how animals are fitted and shown.

F. Plan a field trip to one or several farms or ranches. Make arrangements for demonstrations on proper fitting and showing of beef, sheep, swine and dairy. Provide students the opportunity to practice what they have learned on other animals.

G. Invite a purebred breeder to talk to the class about the importance of proper fitting and showing in purebred shows.

H. Obtain various livestock breed magazines for up-to-date information on fitting and showing.

I. Organize four boxes containing tools and equipment used for fitting and showing beef, sheep, swine and dairy.

J. Review and give test.

K. Reteach and retest if necessary.

II. Instructional materials

A. Objective sheet

B. Suggested activities

C. Information sheet

D. Transparency masters

1. TM 1--Equipment for Fitting and Showing Beef

2. TM 2--Fitting Market Lambs

3. TM 3--Trimming Pigs' Feet

4. TM 4--Trimming Hooves of Cattle

E. Test

F. Answers to test

III. Unit references

A. Fiez, Edward A., *The Calf and Yearling in 4-H Dairying*, PNW 78, Oregon State University Extension Service, Washington State University Cooperative Extension, University of Idaho Cooperative Extension Service and United States Department of Agriculture, July, 1988.

B. Frischnecht, Dean, et. al., *4-H Beef Project*, Oregon State University Extension Service, Corvallis, Oregon, July, 1981.

C. Harvey, Raymond W., and Sweeney, Pete, *Beef Showmanship*, Published by Wrangler Jeans, 1987.

D. Landers, John H., et. al., *4-H Sheep Project*, PNW 181, Oregon State University Extension Service, Washington State University Cooperative Extension, University of Idaho Cooperative Extension Service and United States Department of Agriculture, September, 1983.

E. Landers, John H., et. al., *4-H Swine Project*, PNW 330, Oregon State University Extension Service, Washington State University Cooperative Extension, University of Idaho Cooperative Extension Service and United States Department of Agriculture, July, 1988.

F. Pond, Roger, *Livestock Showman's Handbook*, Pine Forest Publishing, Goldendale, Washington 98620, 1986.

FITTING AND SHOWING LIVESTOCK

AG 310 - M

INFORMATION SHEET

I. Tools and equipment for fitting and showing beef (Transparency 1)

- A. Leather show halter
- B. Adjustable rope halter
- C. Showstick
- D. Round, steel curry comb
- E. Scotch comb
- F. Stiff brush for washing
- G. Rice brush and comb
- H. Lining comb
- I. Soft rags
- J. Clippers
- K. Soap
- L. Horn and hoof rasp

II. Fitting beef animals

- A. Trim hooves (three weeks before fair)
- B. Clip
- C. Wash
- D. Curl/dress hair
- E. Bleach/powder white hair
- F. Hooves
  - 1. Trim, if needed
  - 2. Clean
- G. Clean ears

H. Switch

1. Clean

2. Form into puffy ball

III. Showing beef animals

A. Halter

1. Hold strap 6-12 inches from animal's head

2. Don't wrap extra around hand

3. Use leather show halter with chain under chin

B. Showstick

1. Place feet so they are square under animal's body

2. Straighten topline by scratching animal under belly

3. Calm animal by stroking underline

4. Control animal

C. Showing equipment

1. Showstick

2. Grooming tool

3. Knowledge of birthdate, weight and breed of animal

D. Showing

1. Set up quickly

2. Keep front feet out of holes

3. Leave ample room when lined up

4. Stay alert--always watch judge and animal

5. Keep animal between yourself and the judge

6. Re-comb animal after animal is handled by judge

7. Walk forward with lead rope in right hand

8. Do not wrap lead rope around hand

IV. Clipping beef steers

(Note: Obtain information on local customs and from various breed shows to determine exactly how your steer should be clipped.)

A. Head--(Do not clip inside of ears)

B. Tail--Trim with scissors (Do not clip tailhead)

C. Belly

D. Brisket

E. Other?

V. Tools and equipment for fitting and showing sheep

A. Fitting stand

B. Bucket

C. Shears

D. Stone for sharpening shears

E. Wool card

F. Curry comb

G. Scrubbing brush

H. Hoof trimmers

I. Scrubbing cloth

J. Blanket

VI. Fitting market lambs (Transparency 2)

A. Shear

B. Trim hooves if needed

C. Wash

D. Blanket

E. Trim fleece

F. Card

G. Clean hooves

H. Clean ears

VII. Showing sheep

A. Lead--Left hand under jaw, right hand on the dock

B. Set up squarely, quickly

C. Be in control--stand or squat

D. Keep animal between yourself and the judge

E. Respond promptly to directions

F. Keep eye on judge and animal

G. Brace while judge feels lamb

H. Re-groom after handling

I. Keep front feet out of holes

J. Be alert--watch judge and animal

VIII. Tools and equipment for fitting and showing swine

A. Scrub brush

B. Clippers

C. Grooming brush

D. Sprinkling cans

E. Show cane

F. Rags

G. Soap

IX. Fitting swine (Transparency 3)

A. Wash

B. Clip ears and tail

C. Clean ears

D. Trim feet if needed

(Note: This may be done with a sharp pocket knife.)

E. Use mild bleach for stains

F. Brush to dress hair

X. Showing swine

A. Move pig slowly

B. Side view 10-20 feet from judge

C. Keep pig between yourself and the judge

D. Keep pig on level ground--front feet out of holes

E. Keep eye on the judge and animal

F. Respond quickly to judge's directions

G. Tap pig with cane--never hit hard

H. Don't step between fighting pigs (get hog hurdle)

XI. Tools and equipment for fitting and showing dairy

A. Rope halter

B. Leather show halter

C. Tail comb

D. Rubber curry comb

E. Clippers

F. Stiff brush

G. Soft brush

H. Wire hoof brush

I. Rags

XII. Fitting dairy animals (Transparency 4)

A. Trim hooves

B. Brush daily

C. Blanket when hot and sunny

D. Clip

E. Wash

F. Clean ears

G. Clean hooves

XIII. Showing dairy animals

A. Walk animal slowly

B. Showman walks backward

C. Be alert--watch judge and animal

D. Respond quickly to judge's directions

E. Set feet correctly

(Note: When showing a heifer, the rear leg nearest the judge should be a step backward from the other rear leg; when showing cows, the leg nearest the judge should be a step forward.)

F. Keep animal between yourself and judge

G. Keep front feet out of holes

H. Keep eye on the judge and animal

XIV. Clipping dairy animals

A. Head

B. Neck

C. Tail

XV. Qualities of a good showman

A. Well-groomed

B. Courteous

C. Alert

D. Modest winner/gracious loser

XVI. Tools for trimming hooves

A. Hoof trimmers or nippers--To take off length from underneath

B. Hoof knife--Best for getting a smooth, straight trim

C. Rasp--To smooth and shape

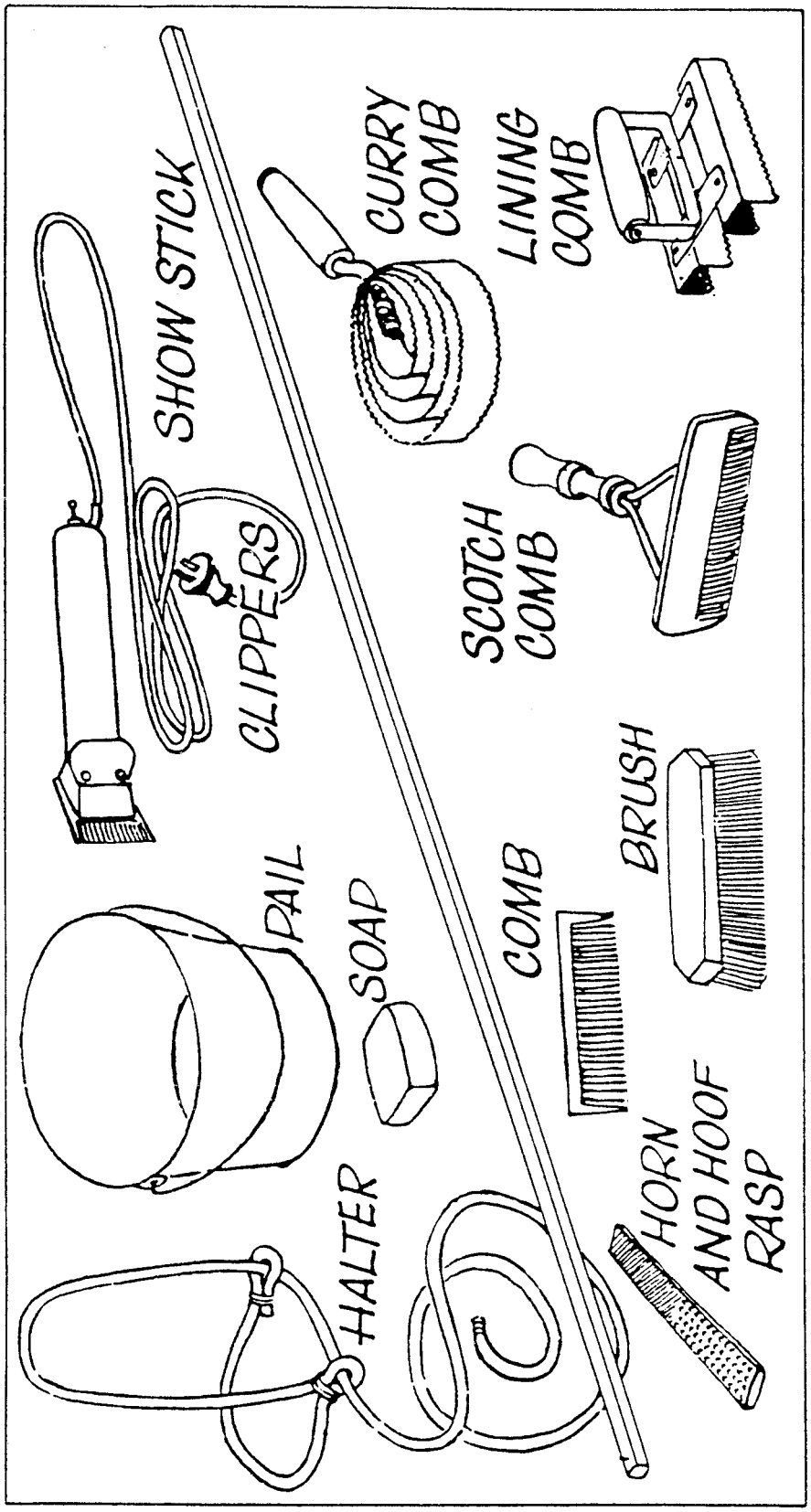
XVII. Purpose of fitting and showing

A. To present an animal in a manner that will develop the most favorable impression on the judge

B. To downplay undesirable qualities of your animal and emphasize good qualities

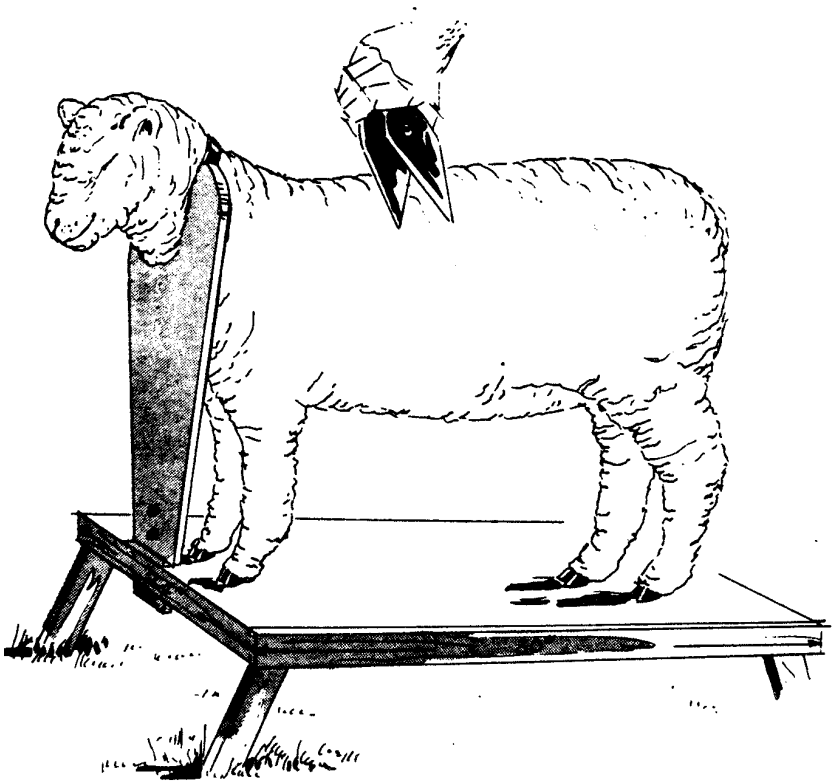
C. To present your animal so that the judge has a chance to look him over and make comparisons with other animals

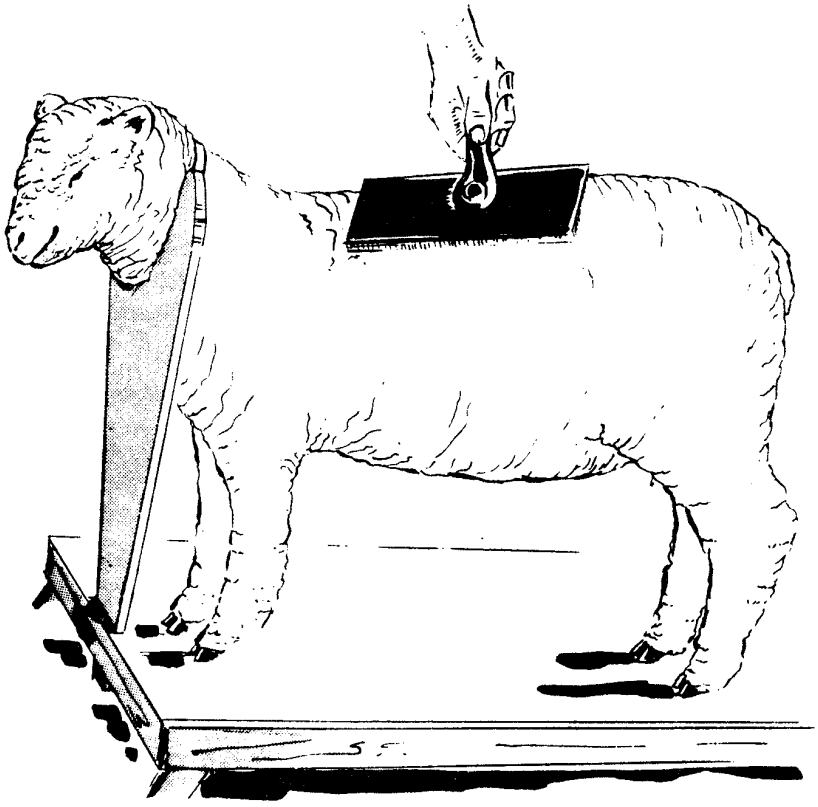
EQUIPMENT FOR FITTING AND SHOWING BEEF



TM 1

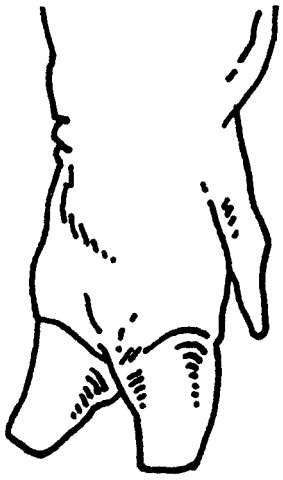
Fitting Market Lambs



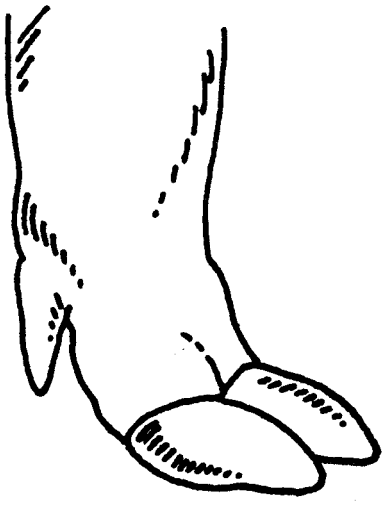


TM 2

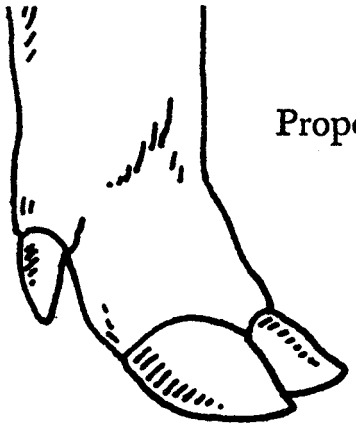
Trimming Pigs' Feet



Toes spread too much. Outside toe needs to turn inward more.

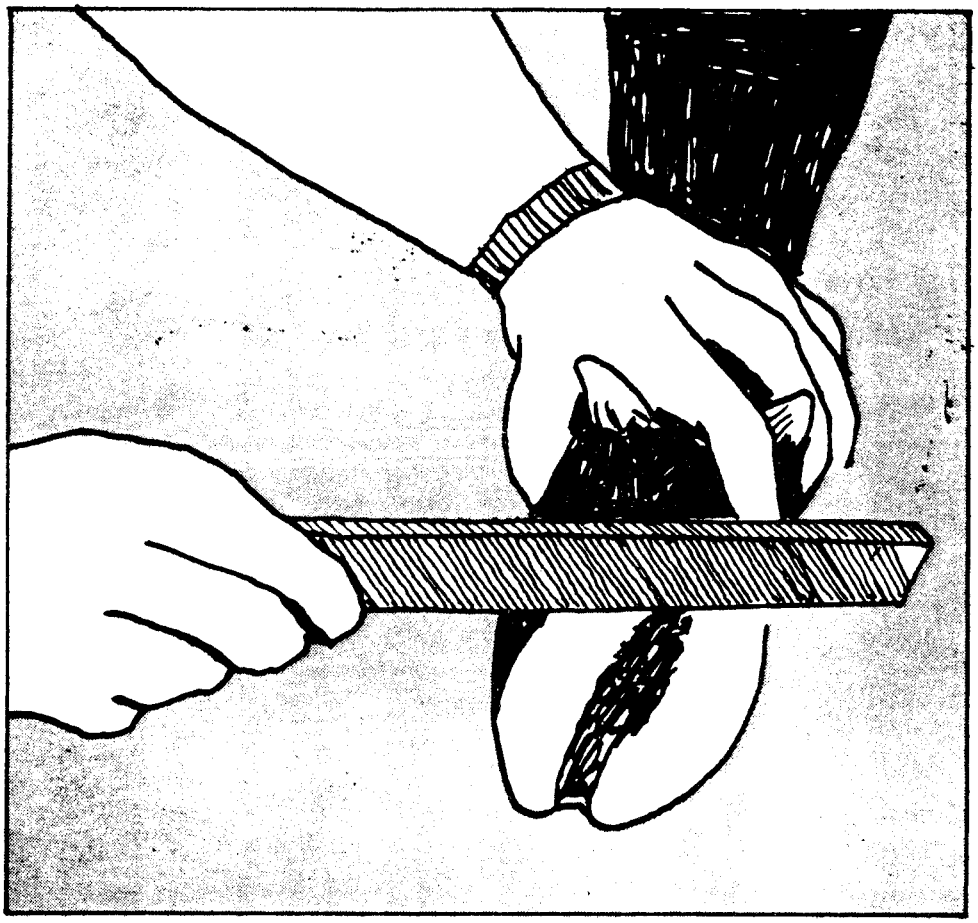


Toes and dew claws too long; need trimming.

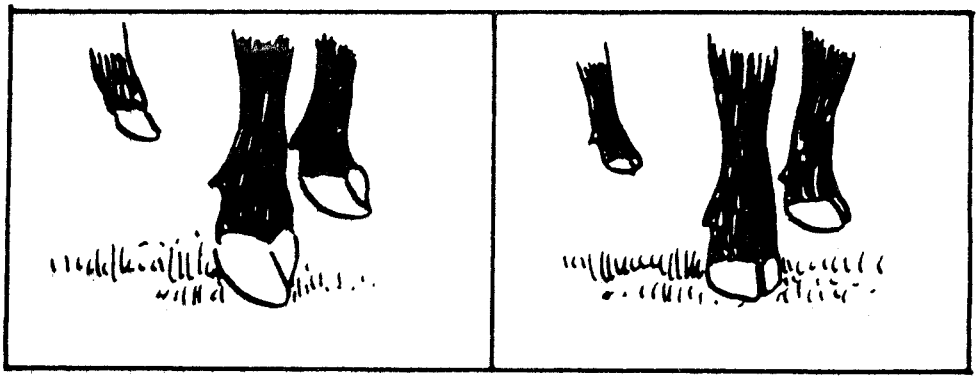


Properly trimmed foot.

Trimming Hooves of Cattle



Shape the outer wall of the hoof with a rasp. Below, is the untrimmed hoof at the left. Right, is how it should appear after trimming.



FITTING AND SHOWING LIVESTOCK

AG 310 - M

UNIT TEST

Name_____ Score_____

1. List six tools and equipment needed to fit and show beef animals.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

   f. _____

2. Describe how to fit a beef animal for showing.

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

3. Describe how to show beef animals.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

4. List the areas that should be clipped on a beef steer.

a. _____

b. _____

c. _____

d. _____

5. List six tools and equipment needed to fit and show sheep.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

6. Describe how to fit a market lamb for showing.

_____

_____

_____

_____

_____

_____

_____

_____

_____

7. Describe how to show sheep.

_____

_____

_____

_____

_____

_____

_____

_____

_____

8. List six tools and equipment needed to fit and show swine.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

9. Describe how to fit swine for showing.

_____

_____

_____

_____

_____

_____

_____

10. Describe how to show swine.

_____

_____

_____

_____

_____

_____

_____

_____

_____

11. List six tools and equipment needed to fit and show dairy animals.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

12. Describe how to fit dairy animals for showing.

_____

_____

_____

_____

_____

_____

_____

13. Describe how to show dairy animals.

_____

_____

_____

_____

_____

_____

_____

_____

14. List the areas that should be clipped on a dairy animal.

a. _____

b. _____

c. _____

15. List four qualities of a good showman.

a. _____

b. _____

c. _____

d. _____

16. List three tools used to trim hooves and the purpose of each.

a. _____

_____

b. _____

_____

c. _____

_____

17. Explain the purpose of fitting and showing livestock.

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

FITTING AND SHOWING LIVESTOCK

AG 310 - M

ANSWERS TO TEST

1. Answer should include six of the following:

   Leather show halter; Adjustable rope halter; Showstick; Round, steel curry comb; Scotch comb; Stiff brush for washing; Rice brush and comb; Lining comb; Soft rags; Clippers; Soap; Horn and hoof rasp

2. Trim hooves (three weeks before fair); Clip; Wash; Curl/dress hair; Bleach/powder white hair; Hooves: Trim, if needed and clean; Clean ears; Switch: Clean and form into puffy ball

3. Answer should include information from the following:

   Halter: Hold strap 6-12 inches from animal's head; Don't wrap extra around hand; Use leather show halter with chain under chin; Showstick: Place feet so they are square under animal's body; Straighten topline by scratching animal under belly; Calm animal by stroking underline; Control animal; Showing equipment: Showstick; Grooming tool; Knowledge of birthdate, weight and breed of animal; Showing: Set up quickly; Keep front feet out of holes; Leave ample room when lined up; Stay alert--always watch judge and animal; Keep animal between yourself and the judge; Re-comb animal after animal is handled by judge; Walk forward with lead rope in right hand; Do not wrap lead rope around hand

4. Head--Do not clip inside of ears; Tail--Trim with scissors (Do not clip tailhead); Belly; Brisket; Other?

5. Answer should include six of the following:

   Fitting stand; Bucket; Shears; Stone for sharpening shears; Wool card; Curry comb; Scrubbing brush; Hoof trimmers; Scrubbing cloth; Blanket

6. Shear; Trim hooves if needed; Wash; Blanket; Trim fleece; Card; Clean hooves; Clean ears

7. Answer should include information from the following:

   Lead--Left hand under jaw, right hand on the dock; Set up squarely, quickly; Be in control--stand or squat; Keep animal between yourself and the judge; Respond promptly to directions; Keep eye on judge and animal; Brace while judge feels lamb; Re-groom after handling; Keep front feet out of holes; Be alert--watch judge and animal

8. Answer should include six of the following:

   Scrub brush; Clippers; Grooming brush; Sprinkling cans; Show cane; Rags; Soap

9. Wash; Clip ears and tail; Clean ears; Trim feet if needed; Use mild bleach for stains; Brush to dress hair

10. Answer should include information from the following:

    Move pig slowly; Side view 10-20 feet from judge; Keep pig between yourself and the judge; Keep pig on level ground--front feet out of holes; Keep eye on the judge and animal; Respond quickly to judge's directions; Tap pig with cane--never hit hard; Don't step between fighting pigs (get hog hurdle)

11. Answer should include six of the following:

    Rope halter; Leather show halter; Tail comb; Rubber curry comb; Clippers; Stiff brush; Soft brush; Wire hoof brush; Rags

12. Trim hooves; Brush daily; Blanket when hot and sunny; Clip; Wash; Clean ears; Clean hooves

13. Answer should include information from the following:

    Walk animal slowly; Showman walks backward; Be alert--watch judge and animal; Respond quickly to judge's directions; Set feet correctly (When showing a heifer, the rear leg nearest the judge should be a step backward from the other rear leg; when showing cows the leg nearest the judge should be a step forward); Keep animal between yourself and judge; Keep front feet out of holes; Keep eye on the judge and animal

14. Head; Neck; Tail

15. Well-groomed; Courteous; Alert; Modest winner/gracious loser

16. Hoof trimmers or nippers--To take off length from underneath; Hoof knife--Best for getting a smooth, straight trim; Rasp--To smooth and shape

17. To present an animal in a manner that will develop the most favorable impression on the judge; To downplay undesirable qualities of your animal and emphasize good qualities; To present your animal so that the judge has a chance to look him over and make comparisons with other animals