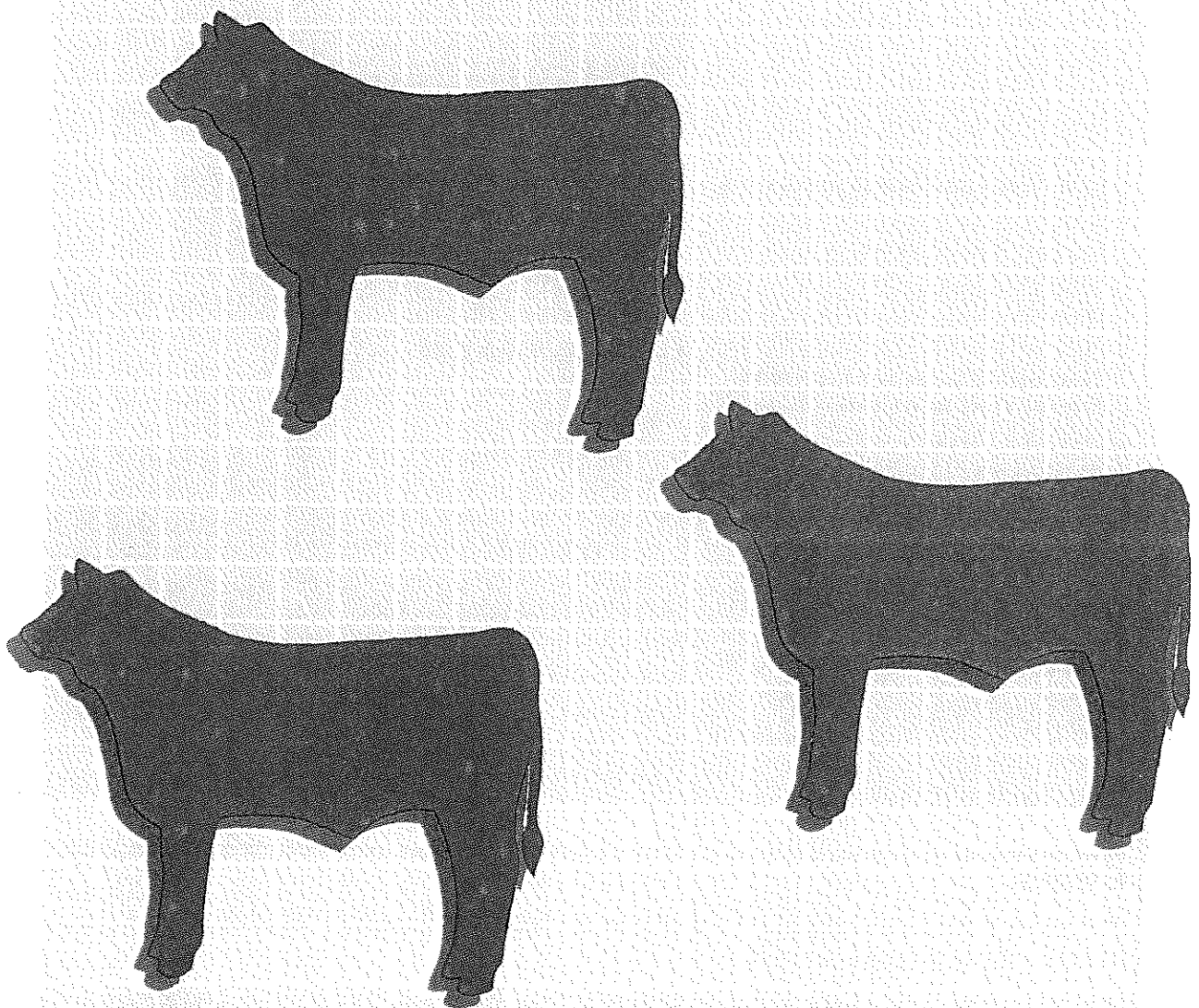
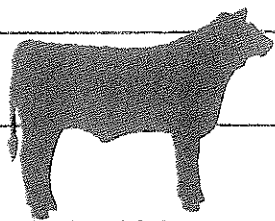

Your 4-H

Market Beef Project





Your 4-H Market Beef Project

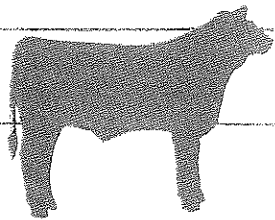
Contents

Introduction	1	Fats	13	Showing the Calf	25
What You Can Learn	1	Minerals	13	After the Show	26
Project and Member Objectives	1	Vitamins	13	Sportsmanship	26
Records to Keep	1	Feeds for Calves	14	Suggested Guidelines for Fitting and Showing Beef Cattle	27
Selecting Calves for Your Project	2	Energy Feeds or Concentrates	14	Beef Quality Assurance	28
Grade	2	Protein Supplements	15	Quality Time After Time	28
Conformation	2	Feed Additives	15	What Is a Residue?	28
When to Buy	3	Feeding Your Calf	16	Why the Concern?	28
What Kind of Calf to Buy	3	Nutrient Requirements	16	How You Can Prevent Residue Problems in Your Animals	28
Disposition	5	Set Your Goals	16	Points to Remember	29
Sources of Feeder Calves	5	Starting Your Calf	16	Marketing	30
Feeder Cattle Prices	5	Selecting a Ration	17	Determining Cattle Quality	30
Where to Get the Money	5	Basic Grain Rations	17	Production Traits	30
Early Care and Management	6	Two-Phase Feeding Systems	18	Carcass Traits	30
Stress	6	What Energy Level to Feed	18	Selling Your Steer	31
Trucking the Calf Home	6	Grain Preparation	19	Beef Products	32
Castration	6	Normal Feed Consumption	19	Other Activities	33
Dehorning	6	Mineral Mixes	19	Information Development	33
General Health	6	If Your Calf Goes Off Feed	19	Other 4-H Projects	33
Common Diseases/Ailments: Prevention and Control	7	Exhibiting Your Calf	20	Demonstrations and Illustrated Talks	33
Infectious Diseases	7	Halter Breaking and Training	20	Public Speaking	33
Noninfectious Diseases	9	Training to Lead	20	Judging	33
Facilities and Equipment	12	Hoof Trimming and Foot Care	21	Fitting and Showing	33
Housing	12	Hair Care	21	4-H Camp	33
Feed Lot	12	Clipping and Blocking the Hair	22	4-H Trips and Tours	34
Feeders	12	Preparing to Leave for the Show	23	Careers in Animal Science	34
Waterers	12	Transporting Cattle	23	References	35
Feed Nutrients	13	Leaving for the Show	24	American Beef Cattle Breed Associations	35
Water	13	Arriving at the Show	24	Glossary	36
Proteins	13	Exercise and Tie-Outs at the Show	24		
Carbohydrates	13	Show Day	24		
		Exhibitor Attire	25		

Credits

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Introduction

Congratulations on enrolling in the 4-H market beef project. You're a member of a very exciting and interesting 4-H project area and you'll have the opportunity to learn about one of Michigan's important industries—beef production. You'll also help produce the most popular meat on the American table—beef.

What You Can Learn

In this 4-H market beef project you can learn to:

- Select feeder calves for your project.
- Select proper feed for your calves.
- Combine these feeds into a balanced diet.
- Figure costs and returns from your project.
- Tell when your calves are sick.
- Tell when your calves are healthy.
- Prepare your calves for exhibition.
- Handle your calves in a show ring.
- Determine if your calves will be acceptable to the packer.

These are only a few of the many things you can learn. Working with your leader, you may want to make your own list of the things you want to learn from this project.

Project and Member Objectives

The objective of the 4-H market beef project is to encourage integrity, sportsmanship, cooperation and an ability to communicate through activities such as demonstrations, talks, judging events, tours and exhibits.

Knowing correct procedures for running and participating in a business meeting will be important to you all of your life. Your 4-H beef cattle club is an excellent place to learn and practice these skills.

Here are some objectives you should keep in mind for your market beef project:

- To acquire an understanding of scientific production and management practices by keeping records and owning and caring for livestock.
- To acquire skills in executing production and management decisions.
- To gain business experience and develop knowledge of the values and principles of purchasing, marketing, record-keeping and securing credit.
- To learn and use efficient procedures and methods in marketing livestock and their products.
- To develop an understanding and appreciation of the livestock/meat industry and its role in the agricultural and commercial economy of the country.
- To explore the livestock industry as a career.

The market beef project consists of feeding cattle to a market weight of approximately 1100 to 1300 pounds for steers and about 75 pounds less for heifers.

Don't expect to make a big profit on your project. Your profit or loss will depend on the cost of the calves when you start the project, the cost of the feed used, other costs (such as veterinarian and

equipment bills) and the price you receive for your calves when you sell them.

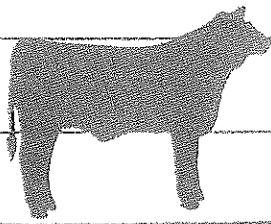
If you market your calves at your county or area fair or show, generous people in your community may pay more for your animals than their true market value. This increases your chance for a profit. However, it's important that you know the difference between the regular livestock market price or value of your calves and the price you receive at your fair or show sale. Your 4-H leader can help you get this information.

If your calves bring more than the regular market price, you should realize that this difference is a reward for your having participated in the project and for having carried out the practices you learned.

Records to Keep

The reasons for keeping records on your market beef projects are to:

- Help you learn more about animals; their rate of growth, the feed they require and their habits.
- Help you plan future projects.
- Determine if you made or lost money and how much.
- Improve your management practices.
- Give you a record of your project activities.



Selecting Calves for Your Project

Select animals that will produce the end product that is your goal for the project. Purchase calves at or near market price.

Grade

The quality of calves you buy will depend on several factors, including:

- The amount of money you have to spend for each calf.
- What you plan to learn from your project.
- Your age and experience.

The USDA Feeder Cattle Grades were revised in 1979 to better describe the types of feeder cattle being produced and increase accuracy in predicting feedlot performance potential. The factors used to grade feeder cattle are thriftiness, thickness of muscling and frame size.

Thriftiness refers to the health of an animal and its ability to gain weight and fatten normally.

Unthrifty cattle, regardless of frame size and muscle thickness, are graded Inferior.

Thickness of muscling refers to the development of the muscle system in relation to skeletal size. At a constant fat thickness, thicker cattle have a high ratio of muscle to bone and a more desirable yield grade. Feeder cattle are classified by thickness as No. 1, No. 2 or No. 3 (see figure 1).

Frame size refers to the animal's height and length in relation to its age. It indicates the animal's potential to grow and its probable mature size. Grade classification for frame size is Large, Medium and Small (see figure 2).

Each thrifty feeder calf is given a frame classification and a muscle classification. These two factors are then combined to give the calf one of ten feeder grades. The USDA grades of feeder cattle are as follows:

- Large Frame, No. 1
- Medium Frame, No. 1
- Small Frame, No. 1
- Large Frame, No. 2
- Medium Frame, No. 2
- Small Frame, No. 2
- Large Frame, No. 3
- Medium Frame, No. 3
- Small Frame, No. 3
- Inferior

Conformation

Conformation is the muscular development of your calf. To pick a good feeder calf, learn the parts of the animal and the value of each part (see figure 3).

When choosing your calf, look for a calf that has plenty of length, good skeletal structure, trimness and good muscling (see figure 4). Often a calf will appear more gangly than it will when it matures. If possible, pick a calf with records of performance (a record

Figure 1. Feeder cattle grading: thickness.

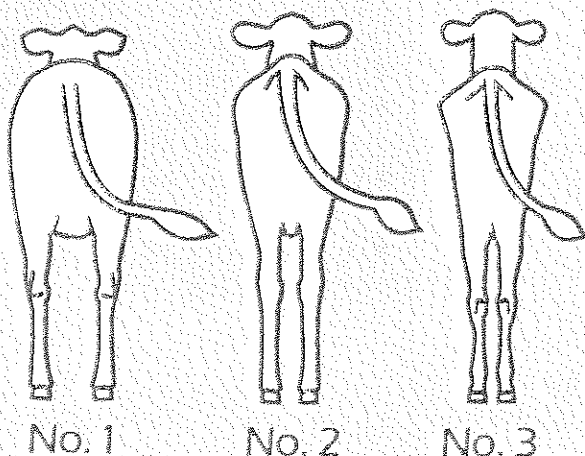
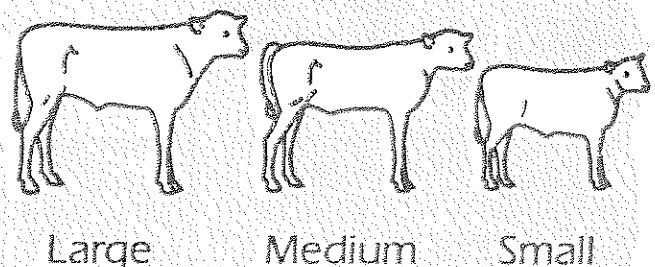


Figure 2. Feeder cattle grading: frame size.



of its growth up to weaning time). A calf with good weight for age will gain faster at less cost per unit of gain. Be sure to look for healthy, thrifty calves.

When to Buy

Buy calves in the fall or early winter, when the calves are approximately 6 to 9 months old. This is the time of the year when there is the greatest selection. Try to select calves that were born in March, April or May of the current year for showing at the county fair next year.

What Kind of Calf to Buy

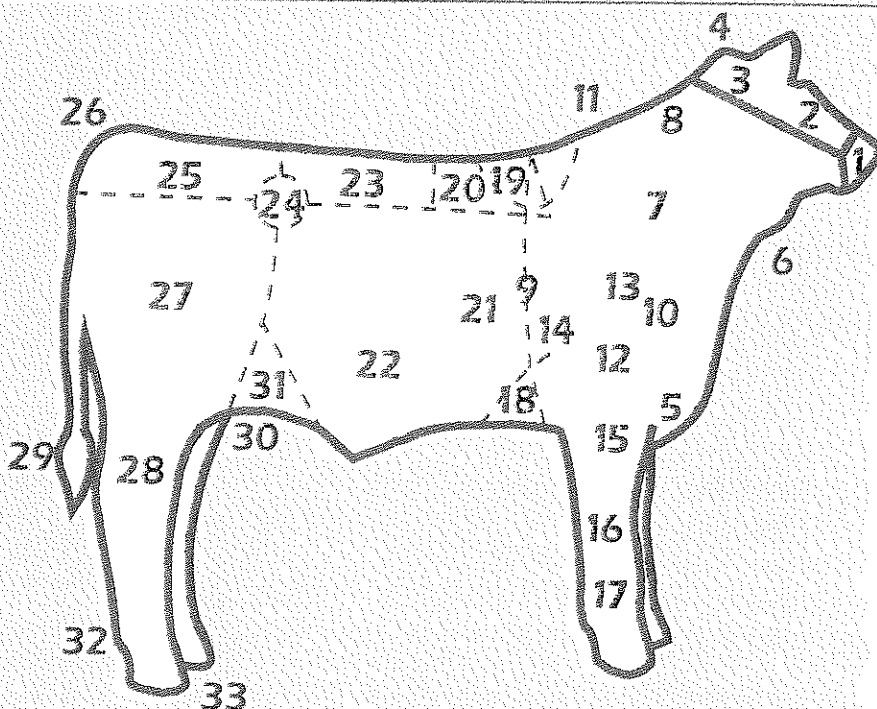
It's usually best to avoid the two extremes in type, that is, the extremely small-framed early-maturing type and the extremely large-framed, late-maturing type (see table 1 on page 4). The extremely small-framed, early-maturing calves will stop growing too soon and become fat at too light a weight. Extremely large-framed, late-maturing calves will undergo skeletal growth too long and won't accumulate enough finish to grade Choice until they become extremely heavy. As a rule, calves should grade Choice when they weigh from 1100 to 1300 pounds.

It makes little difference what breed or combination of breeds you buy as long as the calf is the right type. It's important to select a calf that is:

- Large framed enough to ensure that the calf will grow, gain and grade Choice at a desirable weight, but not so extreme that it will fail to finish in the correct weight range.

- Thick and heavily muscled in the quarter, but not so extreme as to indicate double muscling (an

Figure 3. Parts of a steer.



- | | | |
|--------------------------|---------------------|----------------|
| 1. Muzzle | 12. Shoulder | 23. Loin |
| 2. Face | 13. Shoulder vein | 24. Hook bone |
| 3. Forehead | 14. Elbow | 25. Rump |
| 4. Poll | 15. Arm | 26. Tailhead |
| 5. Brisket | 16. Knee | 27. Round |
| 6. Dewlap | 17. Shank | 28. Hock |
| 7. Neck | 18. Fore flank | 29. Switch |
| 8. Crest | 19. Crops | 30. Cod |
| 9. Forerib (heart girth) | 20. Back | 31. Hind Flank |
| 10. Point of shoulder | 21. Ribs | 32. Dew claw |
| 11. Top of shoulder | 22. Paunch or belly | 33. Hoof |

Figure 4. Points to look for when choosing a calf.

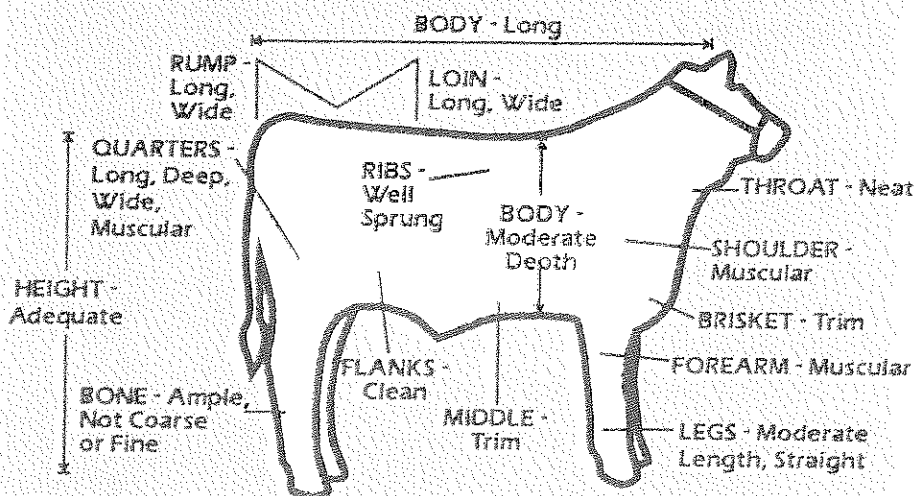


Table 1. Performance and Carcass Cutout of Various Types of Steers Fed a High Energy Ration

Item	Small-framed British	Large-framed British	Large-framed Exotic	Extremely Large-framed Exotic
Minimum starting weight				
(Nov. 20), pound:	400	450	500	550
Final weight, pound:				
For Aug. 1 show	925	1050	1150	1200
For Sept. 1 show	—	1100	1200	1275
For Dec. 1 show	—	—	1325	1400
Average daily gain, pound:				
For Aug. 1 show	2.10	2.35	2.55	1.60
For Sept. 1 show	—	2.25	2.50	2.55
For Dec. 1 show	—	—	2.20	2.25
Days on feed:				
For Aug. 1 show	253	253	253	253
For Sept. 1 show	—	284	284	284
For Dec. 1 show	—	—	375	375
Feed per pound gain, pound:				
For Aug. 1 show	8.0	8.0	8.0	8.0
For Sept. 1 show	—	8.2	8.2	8.2
For Dec. 1 show	—	—	8.8	8.8
Total feed consumed, pound:				
For Aug. 1 show	4200	4800	5200	5400
For Sept. 1 show	—	5330	5740	6150
For Dec. 1 show	—	—	7620	7920
Carcass quality grade:				
For Aug. 1 show	Low Choice	Low Choice	High Select	High Select
For Sept. 1 show	—	Average Choice	Low Choice	High Select
For Dec. 1 show	—	—	Average Choice	Low Choice
Fat thickness, inches:				
For Aug. 1 show	0.50	0.50	0.35	0.30
For Sept. 1 show	—	0.60	0.40	0.35
For Dec. 1 show	—	—	0.55	0.50
Rib eye area, square inches:				
For Aug. 1 show	10.00	10.50	12.00	12.50
For Sept. 1 show	—	11.00	12.50	13.00
For Dec. 1 show	—	—	13.25	14.00
Carcass yield grade:				
For Aug. 1 show	3.4	3.5	2.9	2.8
For Sept. 1 show	—	3.7	3.0	2.9
For Dec. 1 show	—	—	3.6	3.4

extremely muscled condition that isn't a desirable trait in the U.S. beef industry).

- Trim in the brisket, middle and underline, but not so shallow-bodied that the calf may not grow and gain weight rapidly.
- Straight in the topline and long and reasonably level in the rump.

Disposition

Try to pick a quiet, gentle calf. Never pick a wild calf even if the calf is very high quality because it will be hard to train and often won't gain weight rapidly.

Sources of Feeder Calves

You can obtain feeder calves from several sources, including:

- Your own or your parent's herd
- A neighbor's or friend's purebred or commercial herd
- Special feeder cattle sales
- Regular feeder cattle sales at weekly auctions
- Breed association feeder cattle sales
- Annual Northern Michigan and Upper Peninsula Cooperative Feeder Cattle Sales
- Local purebred and commercial breeders

If you feed calves you've raised at home, weigh them when they start on feed and figure their value using current market price. You'll need this information for your livestock record book.

Feeder Cattle Prices

Good project animals can be bought at or near top market prices. You'll probably sell your calf at or near market price at the end of the project, so don't pay much more than market price at the beginning of the project.

Remember, one of the purposes of feeding the calf is to make a profit. Don't pay a high price for a calf with the idea that this alone will assure you of winning a grand championship. It takes good feeding, a lot of hard work, the right kind of calf and good showmanship, to have a grand champion.

A calf at a sale may cost more than one found by searching individual farms and ranches, but actually may not be any more expensive when the time and expense of driving and looking for calves is considered. Beginning members should be very careful not to spend a lot of money for a calf. When you become more experienced in feeding calves, you can justify spending more for a high-quality calf.

Where to Get the Money

Your money problems are the same as those of any other cattle feeder: "Where will I get the money to buy and raise my feeder cattle?" and "How much money will I need?"

There are probably three sources of money available to you:

- Your savings account
- Borrowing from your parents
- Borrowing from your bank or lending institution

If you borrow the money from your parents, pay them interest as if you were borrowing from a bank. Keep the transaction on a businesslike basis.

Borrowing from your local bank will give you good business training. Have your parents go with you. Your banker will need to know three things:

- How much money will you need?

- How long will you need the money?

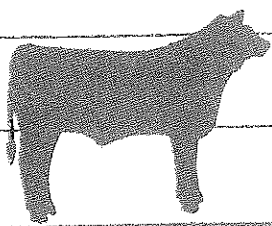
- How will you repay your loan if your calf dies or your project loses money?

If you need to borrow money to buy the feed for a project calf, you need to know how much feed your calf will eat. If your 500-pound calf will be sold at 1150 pounds, it will need to gain 650 pounds. You can estimate that it will take 8 pounds of feed for each pound of gain. Therefore, the total feed required should be about 5200 pounds (for 8 pounds x 650 pounds of gain).

If you estimate that a quarter of the total weight of feed is roughage (hay) and three quarters is concentrate (grain), you'll need 1300 pounds of roughage and 3900 pounds of concentrate. If hay is \$50 a ton (2.5 cents a pound) and your concentrate mixture costs \$130 a ton (or 6.5 cents a pound), your feed costs will be \$286. Thus, your cost of gain is 44.0 cents a pound. Experienced feeders who raise their own feed will do better, but these are good estimates for a 4-H member.

You'll pay interest on the money you borrow from the bank. If you borrow \$286 for a year to buy feed for your steer and the interest rate is 12 percent, you'll pay \$34.32 (\$286 x 0.12) in interest. So, when you repay the bank, you'll need to pay them \$320.32 (the original \$286 borrowed plus the \$34.32 interest).

Paying off your loan when it's due will help your reputation as a borrower. This is called your credit rating. Whether you obtain the money from your parents or borrow it from a bank, it's important to pay your debts by their due date. Honesty and integrity are important to you as a feeder and as a citizen.



Early Care and Management

Stress

Though stress is hard to define, it is important that you understand the concept so that you can give your feeder calf proper care early in its feeding period. Stress is a calf's physical or psychological reaction to circumstances that frighten, irritate, endanger or excite it. Any time a calf gets sick or scared, it has been stressed.

Hauling, vaccinating, introducing it to strange surroundings and strange calves, and many other things can scare or stress the calf. When a calf is stressed, it is more susceptible to sickness. It may eat less feed and grow slower. It is important to minimize stress throughout the feeding period, but especially when you first get your calf home.

Trucking the Calf Home

Handle your calf quietly during loading to avoid getting it too excited. To avoid chilling your calf in cold weather, cover the front and one-third of the top and sides of the truck or pickup with canvas or cardboard to keep out the wind. Clean your truck and bed the truck with clean straw.

When you arrive at the calf's new home, have a clean shelter available. Be sure to use dry bedding to make the calf as comfortable as possible during this high-stress period. The calf should have enough room in its pen to exercise and move about. Don't lock the

calf in the barn where there is no ventilation; this may cause respiratory problems.

Try to familiarize your calf with its new home so it will know where the feed, water and shelter are located. Do everything you can to ensure the comfort and well-being of the animal.

Castration

If you buy steer calves, make sure they are castrated. Knife castration is preferred to clamp castration. Knife castration minimizes the chance of having a staggy steer. A staggy steer shows many of the same physical characteristics as a bull (such as a very muscular neck and crest, and larger and broader head). This condition is caused by improper castration or castrating the steer at an older age (more than 12 months). Unless you or your parents are experienced, your local veterinarian should do the castrating.

Dehorning

When you buy a calf from a horned breed, make sure it has been properly dehorned. Otherwise, dehorn the calf while it is young. Wait until the calf is adjusted to its new home, is well started on feed and is past the danger of any disease outbreaks. This may mean waiting 30 days.

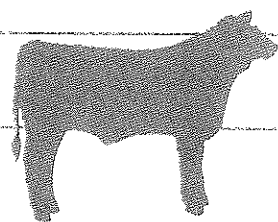
Calves you have raised at home can be dehorned by using a caustic paste before the calf is 10 days old. This simple method is less

stressful on the calf. If your new calf is not dehorned, the best method is to use a dehorning scoop, although other methods are acceptable. Use a sterile method and keep blood loss to a minimum. Get at least a quarter-inch ring of hair around the horn and be as humane as possible. Unless you've had a lot of experience, have your veterinarian do the dehorning.

General Health

It's important to maintain the health of your new calf. The first two or three weeks are critical, so you should check your calf several times each day during this period. Frequent observation allows you to detect any small problems before they grow into big ones. A strong appetite and body temperature of 101.5° F are signs of a healthy calf. A healthy calf is active and alert.

If you think a calf is sick, take its rectal temperature. If it's 2 degrees or more above normal, call a veterinarian immediately. Quick diagnosis and treatment will pay big dividends. Always handle sick animals with care.



Common Diseases/Ailments: Prevention and Control

It's important to keep your new calf healthy. The first two to three weeks after you bring it home are very important. New calves need a lot of care and attention. By careful observation you'll learn to tell a normal, healthy calf from a sick one.

Common signs of disease vary depending on the condition present. Signs of illness in calves include a dry, crusted muzzle, failure to rise or move about, poor appetite, difficulty breathing, high temperature, persistent cough and nasal discharge, diarrhea and depression. If you see these signs you should contact your veterinarian immediately. Early diagnosis and treatment will pay big dividends. Make your calf more comfortable during illness by giving it good feed, plenty of water, a clean, dry pen protected from dampness and drafts, and plenty of rest.

The following discusses some common diseases that affect cattle. Advice from your veterinarian is very important in identifying a disease and selecting treatments.

Infectious Diseases

Infectious Bovine Rhinotracheitis (Red Nose)

Signs—This disease is caused by a virus that attacks the upper respiratory system, but other areas of the body such as the eyes, nose and uterus of cows may also be affected. Because of this, a variety of signs are possible. This disease

usually affects younger calves during the fall and early winter.

Signs include an elevated temperature, excessive discharges from the eyes and nose, depression and refusal to eat. The calf's eyes become sore and the lining of its nostrils and muzzle appear unusually red and crusted. This explains why the disease is often called "red nose." Signs that show up later include diarrhea, secondary pneumonia and a deep cough.

This disease can be mild or severe and a calf will usually recover in 10 to 14 days. Once the disease starts, it's difficult to stop because it spreads to other animals. However, the death rate is usually low.

Prevention—Vaccinate two to three weeks after weaning or as soon as possible following shipment if the calf is in good health. Vaccinate alone or in combination with other vaccines.

Treatment—Antibiotics, sulfa and good nursing care during the illness will speed recovery.

Bovine Virus Diarrhea

Signs—Severe ulcers and sores develop inside the calf's mouth, on its tongue and inside its esophagus, abomasum and intestinal tract. The animal often shows signs of severe diarrhea, dehydration, elevated temperature, depression and complete loss of appetite. The diarrhea persists and the general condition of the animal rapidly deteriorates. Pneumonia may develop later. This disease may be mild or severe.

Severely affected animals aren't likely to recover.

Prevention—Ask your veterinarian about vaccination.

Treatment—There is no good specific treatment, but good nursing care may help the calf recover.

Parainfluenza (PI₃)

Signs—This disease is common to calves and usually occurs shortly after shipment. It's basically a respiratory disease caused by a virus. Soon after it arrives, a calf may show signs such as a fever, depression, going off feed, a light cough and nasal discharge. If the condition is left untreated, pneumonia, excessive weight loss and diarrhea will often follow.

If the disease seems to be mild, the calf will often recover on its own. Severe infection must be treated.

Prevention—Many stresses are placed on a young calf such as weaning, vaccination, worming, shipping, change in feed and water, and exposure to other cattle. Any combination of these can weaken the calf and increase its chances of developing parainfluenza. Try to avoid stressing your calf as much as possible and vaccinate it. Try to minimize stress for your calf after it arrives, and ask your veterinarian for the best way to prevent parainfluenza.

Treatment—Parainfluenza readily responds to treatment if diagnosed early. If you use antibiotics or sulfonamide drugs, follow

directions. Your veterinarian should advise and supervise all treatments. Early treatment and good care will aid recovery.

Pasteurellosis (Pneumonia)

Signs—This disease is caused by a bacteria that may be contracted through contaminated feed and water or by inhaling infective organisms. It affects the respiratory system and the calf will show signs of depression, fever, excessive salivation and nasal discharge.

Prevention—Proper vaccination and reducing stress on the calf is the best way to prevent this disease.

Treatment—Sulfonamide drugs and antibiotics are very useful for treatment. Consult your veterinarian for advisable treatments.

Bovine Respiratory Syncytial Virus (BRSV)

Signs—As the name implies, this disease is caused by a virus that affects the respiratory system. It is transmitted by exposure to infected cattle or facilities. Signs include fever, rapid breathing, nasal and eye discharge, coughing and slight swelling in the neck and jaw.

Figure 5.
Active ringworm.



Prevention—Vaccinate for BRSV.

Treatment—Administer antibiotics on the advice and supervision of a veterinarian.

Enterotoxemia (Overeating)

Signs—This disease is caused by an organism that produces a very strong toxin. It can grow and produce toxic material when the calf is overfed on grains or other high-energy feedstuffs. The disease progresses so quickly that often no symptoms are noticed before the animal is found dead. Signs in less severe cases include depression and weakness, loss of appetite, diarrhea and rapid weight loss. Recovery depends on the amount of overfeeding and the degree of intoxication.

Prevention—Avoid overfeeding the calf on grains and other feeds it isn't used to. A toxoid, which reduces the effect of a toxin, is available for prevention. Increasing the roughage in the diet will also help prevent enterotoxemia.

Treatment—Antitoxin and other treatments counteract the effects of the toxin and the diarrhea. Your veterinarian should treat this disease.

Blackleg and Malignant Edema

Signs—These are two similar diseases caused by related organisms that may be found in the soil. The organisms can enter the animal's body through the mouth or through open wounds. Toxins produced by the organisms bring about the disease. Calves aged 6 to 18 months are most susceptible. The first sign is a swelling over a heavily muscled area of the body. Beneath the skin in this area will be small gas bubbles and fluid. The calf also shows great pain and

stiffness, an elevated temperature and difficulty in breathing. Affected calves often die.

Prevention—A vaccination is available to use against these two diseases and should be used routinely if the problem exists on a farm or in an area. Avoid grazing cattle on creek pastures and wet lowlands where there is a greater chance for them to come in contact with the resistant spores. Affected carcasses should be properly buried.

Treatment—Treatment of affected cattle is difficult because of the rapid course and severity of the disease. Large doses of penicillin, if given early, may help the calf recover.

Ringworm

Signs—This common disease is a fungus infection of the skin surface (see figure 5). It spreads slowly through groups of cattle by direct contact between an infected calf and a susceptible one or by indirect contact with contaminated feed bunks, rubbing posts and grooming equipment. (Ringworm can also be transmitted to humans.) The disease first appears on the head, neck, shoulders or over the rump. The skin becomes dry and scaly, the hair falls out and a thick, grey scabby patch appears and grows larger. New areas will develop on other parts of the body as the disease spreads. Ringworm is common during winter, when calves are stabled, because the chances of exposure are greater and the calves aren't in the sun as much.

Prevention—Careful grooming and isolation of affected calves will help prevent the disease. Once the disease begins, it's difficult to control.

Treatment—Once you recognize the disease, you must treat it right away, so contact your veterinarian immediately. Scrape the dry scurf patches and then apply a solution containing iodine or other suitable material. A new oral medication is available that has shown good results. Many states, including Michigan, consider ringworm a contagious and communicable disease and won't allow affected cattle to be shown or sold. Consult your veterinarian for possible treatments.

Warts

Signs—This disease is a viral infection of the skin that causes growths that look like cauliflower (see figure 6). These warts spread slowly and commonly appear on the neck, shoulders and head. Warts occasionally become so large that they break off, bleed excessively and later become infected.

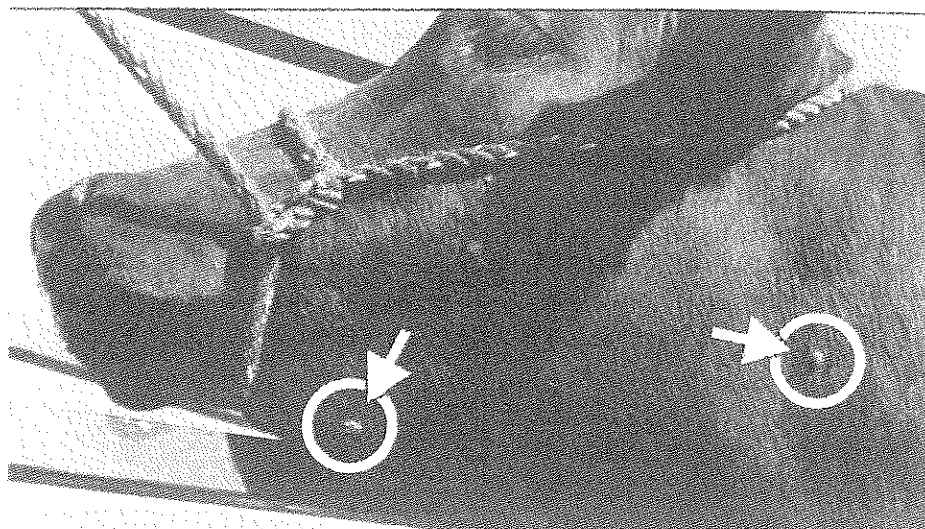
Prevention—Isolation of the affected calves will help prevent the disease from being transmitted to other animals.

Treatment—Small warts often disappear spontaneously, but you may need to have larger warts removed. A vaccine is also available. Ask your veterinarian for the best treatment. Many states, including Michigan, regard warts as an infectious disease and forbid sale or exhibition of affected cattle.

Pinkeye

Signs—The name of this disease accurately suggests an eye infection. It's caused by a bacteria and when severe can permanently blind the animal in one or both eyes. Pinkeye can also be spread to humans. Precautions should be taken to avoid transmission.

Figure 6. Warts.



The disease commonly occurs during the summer months when the organism is spread by flies. At first a clear discharge runs from the affected eye and down the side of the face. The eye appears red and may bulge. A white spot will appear and may remain if the eye doesn't heal properly. Affected eyes are sensitive to bright sunlight and the calf may not eat normally. The permanent loss of one or both eyes from this infection is a serious hazard to the calf.

Prevention—Pinkeye is contagious and infected calves should be separated from calves that haven't been infected. Effective fly control (spraying, dipping or dusting the calves) is important. You should also spray the pens. Dispose of manure frequently to eliminate places where flies lay eggs.

Treatment—Keep affected calves in a cool, darkened pen and give them plenty of feed and water. Apply antibiotic ointments on the affected eyes under the direction of a veterinarian. Severe cases may require other treatments or surgery.

Noninfectious Diseases

Foot Rot

Signs—This common disease involves the hoof and surrounding areas. The soft tissue between or around the toes will become tender if the calf stands in soiled, wet bedding, muddy yards or wet pasture ground. An open wound develops in the soft tissues and infection develops in the foot and surrounding joints. Lameness, soreness and swelling will develop between the toes and in the hairline above the affected hoof.

Prevention—Keep calves in clean, dry corrals and pens and locate water tanks in well-drained areas. Keep yards and pens free of glass, wire, cans and scrap metal. You can also use organic iodine in feed, but check with your veterinarian before doing so.

Treatment—Prompt attention is necessary and involves cleaning, medicating and wrapping the affected foot to protect it from more contamination as it heals. Penicillin can also be used. Your veterinarian can tell you about treatments.

Bloat

Signs—Bloat is caused by a combination of factors. Normal feed fermentation results in gas formation in a steer's rumen. The calf must eliminate this gas by belching to avoid a buildup of pressure. Bloat often happens when cattle graze on green, succulent alfalfa or clover in the prebloom stage of growth or are fed a high-concentrate ration. Various infections that depress the calf's appetite may indirectly cause bloat.

The first sign is a bulging of the area between the last rib and hip bone. As gas pressure increases inside the rumen, the entire abdomen enlarges on both sides. This causes pressure and pain resulting in difficulty breathing. Muscular weakness quickly occurs, the mucus membranes turn blue and the calf dies soon after.

Prevention—Bloat can be prevented by avoiding rich feeds such as lush alfalfa and by feeding adequate amounts of roughage with concentrate. Forgetting to feed your calf or changing its feed abruptly can also cause bloat. Sick calves tend to bloat more easily than healthy ones, so try to keep your calf healthy.

Treatment—The objective of treating bloat is to slow down fermentation in the rumen and help relieve the excess gas pressure. Your veterinarian can tell you what to give your calf orally to accomplish this. For emergency treatment give mineral oil orally. Another emergency treatment is passing a stomach tube or piece of garden hose into the rumen to release the gas. These practices require skill and should only be done under the supervision of an

experienced person. Use a speculum or wedge in the calf's mouth to help guide the tube and to prevent the animal from biting off a piece of the tube.

When a calf is in great pain, avoid handling or exciting it. Relieve the gas pressure quickly. Contact your veterinarian immediately.

Products can be mixed in the feed of calves that bloat repeatedly to reduce or eliminate the gas buildup. Contact your feed salesperson or veterinarian for information on these products.

Urinary Calculi or Water Belly

Signs—This disease of the urinary system can be caused by an improper balance of calcium and phosphorous in the diet, not enough vitamin A or not drinking enough water. The disease occurs more often in male calves than in female calves.

A small, hard stone develops inside the bladder. The stone eventually lodges in the tube leading from the bladder. This causes a partial or complete blockage of urine flow, and makes the calf very uncomfortable.

Signs include uneasiness, stomping the feet, switching the tail, arching the back and kicking at the belly. If the disease is untreated, the bladder will rupture and the calf will die from uremic poisoning.

Prevention—Making sure your calf has enough water at all times can usually prevent this condition. During the winter months, use heated water tanks. Provide recommended levels of vitamin A, calcium and phosphorous in the ration. Force feeding salt at the rate of 3 percent of the total ration will also help.

Treatment—Calfs need analgesics to help pass the stone. However, these are not always successful, and sometimes surgery is necessary. A successful recovery depends on prompt recognition and treatment of the condition. Calves usually recover after surgery. Once again, consult your veterinarian.

External Parasites of Cattle

Signs—External parasites are a serious problem. They can harm a calf as much or more than internal parasites or infectious diseases. Larger parasites, such as flies and ticks, are easily seen and recognized, but lice and mites may go unnoticed. You should constantly be alert for these external parasites. Calves will look and perform better once external parasites are controlled.

Control and Treatment—You can find useful information on the treatment and control of external parasites at your MSU Extension office. Recommendations on the kind and dosage of insecticides are constantly being changed, consult your 4-H staff for the latest information.

Insecticides are strong chemicals. It's important that you follow the manufacturer's directions on the label. Insecticides are available in sprays, wettable powders or dust preparations. Some are applied directly to the calf while others are mixed with water before application. Be certain to mark containers clearly and to use and store these chemicals safely.

Cattle Grubs

Signs—When present in large numbers, this common parasite can severely damage a calf. The life cycle of cattle grubs is compli-

cated and involves the movement of larvae inside the calf's body. Various organs in the calf become inflamed and the hide over its back is damaged when the grubs come through. Adult females torment the calves as they lay their eggs.

Control and Treatment—

Cattle should be treated for grubs in the fall to prevent infestation. Various products are available from your veterinarian.

Flies

Signs—Many species of flies aggravate and torment cattle. Flies prefer warm, moist surroundings that often result from poor sanitation and management. Face flies spread the organism that causes pinkeye. Female flies lay eggs in open flesh wounds and beneath moist, matted hair. Soon maggots infect the area.

Control and Treatment—

There is no practical way to eliminate flies, but you can minimize their effects. Keep calves reasonably clean and well-groomed at all times. Remove manure regularly and use clean straw bedding or good grass pasture. Spray the calves and the building where the calves are housed. This will control and treat at the same time.

Lice and Mange Mites

Signs—These small, external parasites often go unnoticed. The several species of each cause different kinds of damage. Some suck blood through small holes made in the skin, and others merely bite and feed on skin surface debris. The results are damaged, unhealthy skin; infection; and loss of hair, blood and body fluids. Heavy infestations can

Table 2. Stomach and Intestinal Worms

Common Name	Usual Location
Medium stomach worm	Abomasum (fourth stomach)
"Barberpole" worm	Abomasum
Thread-necked worm	Small intestine
Small intestinal worm	Small intestine
Strongyloides or hair worm	Small intestine

make a calf unthrifty and can cause serious infections.

Control and Treatment—Lice and mites are difficult to see with the naked eye and often go unnoticed until the problem becomes serious. If your calf is frequently rubbing against fences, feed bunks and other surfaces, it may have lice or mange. Check your calf frequently for these parasites and if you have questions, ask your veterinarian to examine your calf. Parasites can be controlled and eliminated with proper insecticides.

Internal Parasites of Cattle

Cattle are hosts to a variety of internal parasites. Different species affect various organs. Signs vary according to the organ involved and may be mild or severe, depending on the degree of infestation. Ask your veterinarian about a good control program. Table 2 lists common stomach and intestinal worms.

Signs—Signs of parasite infestation include poor weight gain and feed conversion, unthrifty appearance, rough hair coat, diarrhea or constipation, and in severe cases, anemia.

Control—The best method of parasite control is good management. Don't overgraze pastures—rotate them. Select previously

treated calves. Have your veterinarian make routine fecal examinations for parasites and other problems.

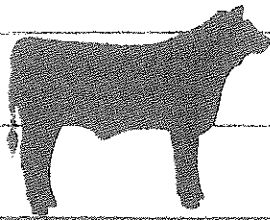
Treatment—Some products available for treatment include albendazole, fenbendazole, ivermectin and levamisole. Follow the manufacturer's recommendations when you use these products.

Coccidiosis

Signs—Coccidiosis parasites live in a calf's intestines. They can cause diarrhea, loss of blood in the intestine, poor appetite, weakness, loss of condition and weight, and death. The disease can spread rapidly through a group of calves; younger calves are more susceptible. Contraction of the disease is caused by ingestion of contaminated feed and water.

Control—Practice good herd sanitation and avoid fecal contamination of feed and water supplies. Separate older calves from younger ones.

Treatment—Prompt and early diagnosis and treatment is essential to avoid harm to your calf. Treatment includes the use of sulfonamide or amprolium in feed and drinking water. A calf with severe diarrhea may require fluid and blood transfusions.



Facilities and Equipment

Housing

Shelter for your calf doesn't need to be elaborate or expensive. The most important thing is plenty of fresh air. Shelter should provide a dry bed and protection from the wind, snow and freezing rain. However, be careful not to keep

your calf too warm in cold weather. If a calf becomes too warm and is then exposed to extremely cold temperatures, it can become sick and may develop pneumonia.

If you don't have a barn for your calf, an inexpensive, three-sided shelter (see figure 7) is fine for one to three project calves. The top and sides can be covered with corrugated steel roofing and the lower four feet of the walls can be hinged to open toward the south for summer ventilation.

Old barns can be converted for project calves, but may have to be renovated to provide enough ventilation and light. Stalls should be roomy and the bedding should be dry.

You can use a variety of bedding materials. Straw is the best for winter, while a 4- to 6-inch layer of sand is best in the summer. Wood shavings and sawdust also make good bedding.

Feed Lot

A 10,000 square foot feed lot is ideal for up to six project calves. A lot that is too large makes calves hard to catch at feeding time or when you want to show them to visitors. A small lot doesn't provide enough room for your calves to exercise. Plenty of exercise is very important to your calf.

The lot can be made of 1- to 2-inch boards nailed on treated posts or of hog wire with barbed wire on top.

Feeders

You may feed each calf in its own feed trough or pan. This way you can tell what each calf is eating. If you prefer to feed several cattle together, you can build a bunk (see figure 8). The bunk can be made of 2-inch lumber and its length can be varied for the number of calves. Each calf should have about 2.5 feet of bunk room. Clean the bunks periodically and discard any stale or moldy feed or manure that may accumulate.

Waterers

The ideal way to supply fresh, clean water to your steer is through an automatic waterer. Unfortunately, these are expensive to install. Water barrels or tanks are less expensive and work very well. Water tanks and barrels should be cleaned periodically to ensure that your calf always has fresh, clean water available.

Figure 7. Calf shed.

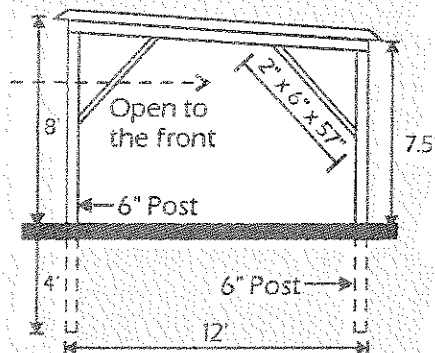
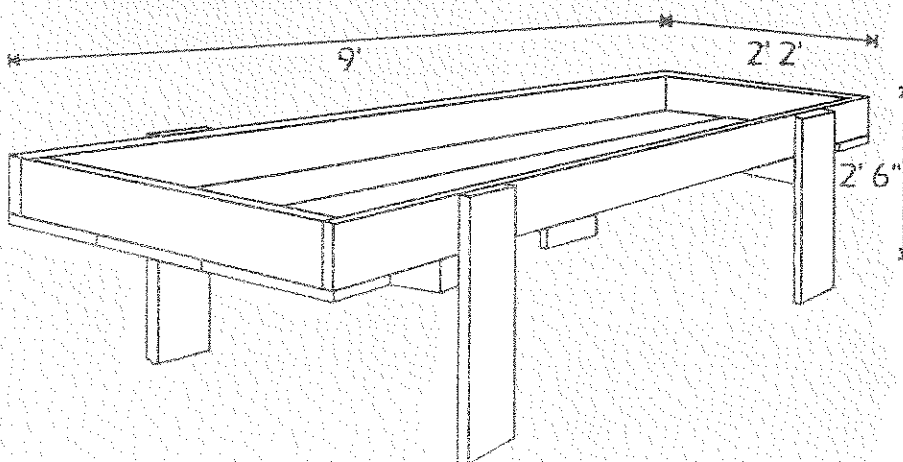
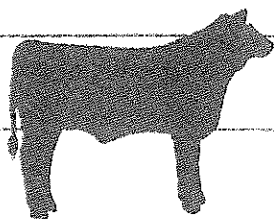


Figure 8. Bunk trough.





Feed Nutrients

To properly feed your project calf, you need to know what the various feed nutrients are and how they contribute to the growth and health of your calf.

Water

Water is the most important part of a calf's diet. Strictly speaking, water is not a nutrient. However, without it many of your calf's important body functions can't happen. The calf's body is more than two-thirds water. Your calf should be supplied with as much fresh water as it will drink.

The calf needs water to properly digest its feed and carry nutrients to body cells. Water also carries away waste products, lubricates joints and is a built-in cooling system. A calf can live longer without feed than without water.

Proteins

The protein a calf eats as part of its feed is called dietary protein. It is broken down by the calf's body into amino acids. These amino acids are then used by the calf to build body proteins, which make up muscles, internal organs, bones and blood. Body proteins are also part of hair, hooves, skin and many other body parts.

There are two kinds of amino acids: those the calf's body can manufacture and those the calf's body can't make on its own. The second group of amino acids is

called essential amino acids, and they must be included in the calf's diet. If you feed more dietary protein to your calf than it needs, the extra protein is used for energy. Grains, such as corn, supply part of the calf's protein (amino acid) needs. A commercial protein supplement of soybean, cotton or linseed meal is used to balance the protein (amino acid) content of the diet.

Carbohydrates

Carbohydrates are to a calf what gasoline is to an automobile. They supply the energy or fuel the calf needs to walk, breathe, stand and grow. Carbohydrates also produce heat to keep the body warm. Energy nutrients, not used right away, are stored as fat until the body needs them.

Sugars and starches are carbohydrates. Grains such as corn and wheat contain a lot of sugar and starch. Cellulose is one of the more complex carbohydrates. Grasses and hays are high in cellulose.

Fats

Fats provide energy for movement and heat. They produce about 2.25 times as much energy as carbohydrates. Fats also are needed to help digest certain vitamins. Fats digest easily in the calf's body but at a slower rate than carbohydrates. Most calf diets contain enough fat, so it doesn't need to be added.

Minerals

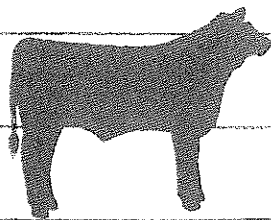
Minerals build bones and teeth and support other life processes in calves. Calcium and phosphorus are called macrominerals because they make up the largest percentage of minerals in a calf's body.

Minerals that are needed in very small amounts are called trace minerals. Some trace minerals are copper, iron, zinc and iodine.

Minerals can be added separately to diets or can be supplied in a commercial protein supplement.

Vitamins

Vitamins are just as important as other feed nutrients, but they are needed in smaller amounts. Vitamin A is needed for healthy eyes, nasal passages and lungs. Vitamin D is necessary for strong bones and healthy blood. Calves need other vitamins to aid additional body functions. The calf's body produces some vitamins such as vitamin D, which is manufactured by a calf that is exposed to sunlight. Other vitamins may be added to the diet.



Feeds for Calves

Feed will represent from 70 to 75 percent of your market beef project costs. This, along with the need of growing calves for certain essential nutrients, makes it very important for you to understand a few basic rules for selecting the proper feeds in the right proportions for your calf.

It's a good idea to learn and use proper terminology when referring to cattle feeding programs. Your 4-H market beef project is a good place to begin. Often, the terms diet and ration are used to refer to the same thing, but there is a difference between the two. A beef **diet** is a nutritionally-balanced mixture of feed ingredients. A **ration** is the amount of feed a calf is allowed to eat in a 24-hour period.

Beef calves are ruminant animals. This means they have a specialized digestive system that manufactures most of the necessary feed nutrients from hays and grains. Calves' stomachs are divided into four compartments.

In general, feed is used in the following ways:

- **Growth**—an increase in the size of muscles, bones and other body parts. Increasing the size of the calf by adding fat is not growth.
- **Maintenance**—maintaining body functions such as digestion, breathing and heartbeat, and repairing worn out body tissue.
- **Fattening**—the build-up of fat between skin and muscles and

inside the body. Feed given a calf over and above what it needs for growth and maintenance is stored as fat.

When you feed your calf, make sure you give it enough feed for rapid growth and proper maintenance, with just enough extra to provide a small covering of outside body fat and internal fat.

Energy Feeds or Concentrates

Farm grains are the most common and the best source of energy feeds for calves. The following tells how farm grains can be used and how they compare as feeds for calves.

Corn is an excellent energy feed for calves. It's an ideal finishing feed because it's high in digestible carbohydrates, low in fiber, tastes good and is a safe feed. Since it's low in protein, it's necessary to feed a high-protein supplement along with it. It can be rolled, cracked (preferred) or fed whole, but it shouldn't be finely ground.

Finely ground grain isn't desirable for several reasons. The calf may eat less or the feed may ball up in the animal's mouth. When finely ground grain is used, a calf is more likely to go off feed and there is a greater chance of bloat or digestive upset.

Barley is a good finishing feed. It has about 90 to 95 percent the finishing value of corn. It should be coarsely ground or rolled and fed

with other grains. Cattle fed only barley have a tendency to bloat, especially if they are fed legume hay.

Wheat gives good results in finishing cattle, but should not make up more than 50 percent of the ration. Feeding only wheat can cause a calf to bloat or go off feed. Wheat is similar in feed value to corn and should be fed coarsely ground. When ground too fine, it has a tendency to form a pasty mass in the calf's mouth and become less palatable (tasty).

Grain sorghums (milo) have many of the same virtues and deficiencies as corn. The kernel is hard and small and should be ground before mixing with other ingredients. The feeding value of grain sorghums is about 95 percent that of corn.

Oats are an excellent feed for growing calves and the feed value is about 75 to 85 percent that of corn. Oats are bulky (high in fiber) and cattle like it. Since oats produce more growth than finish in calves, other finishing feeds must be added to the ration to produce the desired finish at marketing time. Cattle prefer rolled oats, but can be fed whole oats. Never feed cattle finely ground oats.

Wheat bran (the outside of the wheat kernel) adds bulk to the diet and also acts as a mild laxative. It's high in protein and phosphorus, and calves like it.

Dried beet pulp is a by-product of the manufacture of sugar from beets. It can be used as a source of energy as long as it doesn't make up more than 40 percent of the ration. At this level, dried beet pulp has about the same feed value as corn or barely, adds bulk and variety, and helps to keep an otherwise heavy grain ration from causing digestive disorders.

Beet molasses can be added to the ration as an appetizer since cattle like it. It has about 70 to 95 percent of the feed value of corn but is low in protein. It may act as a laxative if fed in large amounts, especially while cattle become accustomed to eating it.

Protein Supplements

After reading the previous section, you should recognize that all feeds are deficient in both the quantity and quality of the protein they provide. Therefore, it's necessary to supplement the grains used in cattle diets with protein-rich feeds. Usually, 4-H members find it more convenient and cheaper to buy a commercial protein/vitamin/mineral supplement prepared especially for cattle. The commercial supplement should contain all the required minerals and vitamins along with the protein (amino acids) missing in the grain ingredients. If you supplement the calf's diet yourself, the following is a list of protein concentrates you can use.

Cottonseed meal is made after the oil has been extracted and contains 41 to 44 percent crude protein. It's high in phosphorus.

Soybean meal has less fiber than cottonseed meal and is slightly higher in crude protein (45 percent). This is the most popular

protein additive source for feeding beef cattle.

Linseed meal contains about 38 percent crude protein. Some people like to feed it to their cattle because it acts as a slight laxative and adds gloss to the hair coat. However, it may cost more than cottonseed or soybean meal.

Alfalfa hay is excellent roughage for cattle. It contains large amounts of protein, carotene (vitamin A) and calcium. However, leafy, high-quality, alfalfa hay fed alone acts as a laxative and can cause bloat.

Mixed hay (alfalfa and grass) doesn't contain as much protein as alfalfa hay but is very satisfactory roughage for feeding calves.

Grass hay is lower in protein than either alfalfa or mixed hays, and the ration would probably require some protein supplement. Grass hays are sometimes easier to feed to beef calves on a heavy grain diet because there is less chance of digestive upsets.

Silage can be used in a limited amount. About 3 pounds of good silage is equal to 1 pound of hay. Some silage in a ration may prevent bloat, but too much can cause a heavy middle or belly and lack of proper finish.

Pasture should be used in a limited way. Calves on a good pasture will grow but not finish properly. They will also lose their appetite for grain. Lots with a small amount of pasture can be used for exercise at night.

Feed Additives

Growth promoting implants stimulate growth on a high-energy diet. Gain can be increased 10 to 15 percent with 10 percent less feed per pound of gain. These are administered by placing the implant

just under the hide or the back side of the ear. The required withdrawal time should be rigidly followed. Withdrawal time is the time before slaughter that the calf can't receive hormones.

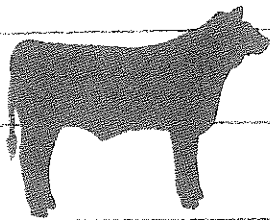
Antibiotics help to keep calves healthy but don't take the place of good management and regular feeding. Some people believe long-term antibiotic feeding is a potential threat to human health. They point out that continuous feeding of antibiotics may result in bacteria that become resistant to antibiotics. If people are infected with antibiotic-resistant bacteria, antibiotics wouldn't be effective in curing the disease.

Because of the potential threat to human health, the safety of feeding antibiotics to livestock has been questioned. The effect of future regulations concerning the use of antibiotics and hormones in feeds is uncertain at this writing.

If you decide to use antibiotics in your calf diet, be sure to read and follow all label directions. Following the recommended withdrawal time is especially important. Contact your county MSU Extension office for the latest regulations and recommendations concerning antibiotics in cattle diets.

Vitamin supplements should not be needed in the normal, well-balanced ration. Supplements may be added to the feed or given by injection in some cases.

Mineral supplements are generally provided free-choice for calves on feed. These might be a commercial mineral supplement or a home-mixed supplement such as dicalcium phosphate and salt or steamed bone meal and salt. Trace mineralized salt in place of plain salt ensures an adequate supply of trace minerals in the ration.



Feeding Your Calf

Nutrient Requirements

The nutrient requirements (on a dry matter basis) of a calf during the feeding period are presented in table 3.

Feeding your 4-H calf is exciting. A scoop of grain and a flake of hay "bursts" into energy as your calf romps in the feedlot. What was once a calf becomes a grown animal, and you become an animal nutritionist.

A calf first needs the inherited ability to grow rapidly. The success of your project depends on the calf's growing ability and the ration you feed it. A ration must contain the nutrients a calf needs and may contain only a few feeds or many feeds. Nutrients can be supplied by different feeds. These should be easy to get in your area (home grown or locally grown feeds when available), low-cost and high in quality. They should taste good so the calf will eat them.

Set Your Goals

Before you decide on a ration, ask the following questions:

- Am I planning to show the calf, or is my project a commercial beef project?
- When will I show or sell the calf?
- For what weight and market grade am I feeding?
- What is the weight and feeder grade of my calf at the beginning of the project?

Starting Your Calf

If your calf was fed grain before you bought it, find out what its diet was. Try to duplicate the diet to some degree for the first few days. During the next two weeks, gradually replace it with your own grain diet.

If your calf has never been fed grain, start it on hay free-choice plus one pound of grain per 100 pounds of body weight daily, or on corn silage free-choice plus one pound of protein supplement daily. After the calf is eating 11 to 15

pounds of hay plus grain, or 30 to 40 pounds of corn silage daily, increase the grain by a half pound and decrease the hay by half a pound or the corn silage by 1.5 pounds daily until the desired level of roughage is reached. A calf should receive a daily minimum of a half pound of hay or 1.5 pounds of silage for each 100 pounds of body weight.

There is less danger of the calf going off feed if the grain, supplement and silage are completely mixed. Hay is usually fed in a separate feeder, but it can also be chopped and mixed with the grain. If haylage is used instead of hay, mix it with the grain. Your calf should eat every day at least 2.5 percent of its body weight in the form of ration dry matter.

For example, start a 500-pound calf on a hay-grain diet which consists of 5 pounds of grain plus a full feed of hay (about 7.5 pounds). Gradually increase the grain and decrease the hay until the calf is eating about 10 pounds

Table 3. Nutrient Requirements for Cattle

Nutrient as percentage of diet	WEIGHT OF CATTLE		
	600 to 800 lbs.	800 to 1000 lbs.	1000 lbs. and heavier
Crude Protein	13.0	12.0	11.0
Calcium	0.4	0.3	0.3
Phosphorus	0.3	0.2	0.2

Vitamin A: 1000 International Units (IU) per pound of dry matter.

Salt and trace minerals: normally supplied at adequate levels in trace mineral salt.

Table 4. Dry Matter Composition of Common Feeds

Feed	Expressed as Percent of Dry Matter				Vitamin A IU/lb.	Normal Dry Matter, Percent
	TDN% ¹	CP% ²	Ca% ³	P% ⁴		
Corn	91	10.0	0.03	0.40	800	85
Barley	83	13.0	0.09	0.47	—	89
Ground ear corn	82	8.9	0.05	0.33	600	86
Oats	75	13.0	0.10	0.43	—	89
Milo	80	11.0	0.04	0.37	—	88
Wheat	88	12.3	0.10	0.33	—	89
Molasses, cane	72	4.3	1.20	0.11	—	76
Beet pulp	70	9.0	0.60	0.08	—	91
Soybean meal (44%)	81	48.8	0.36	0.75	—	90
Corn silage	70	8.0	0.28	.21	2000	35
Wheat bran	67	18.0	0.11	1.35	—	89
34% commercial supplement	65	37.7	2.25	1.10	33,000	90
Alfalfa hay or haylage	55	14.0	1.00	0.23	8000	35-90
Grass hay or haylage	50	9.0	0.40	0.30	4000	30-90
Dicalcium phosphate	—	—	21.50	18.50	—	100
Limestone	—	—	38.00	—	—	100

¹TDN = Total Digestible Nutrients.

²CP = Crude Protein.

³Ca = Calcium

⁴P = Phosphorus.

of grain and 2.5 pounds of hay. If the calf will eat more than this, gradually increase the level of feed until the calf reaches a maximum (about 3 percent of its body weight). Be careful of going beyond the calf's normal limit and throwing it off feed.

Normally, a calf will eat about three-quarters of its grain in the first 30 minutes and nearly all of it in about 60 minutes. If grain is still left in the bunk at the next feeding, remove it and put in fresh feed. Never let old feed accumulate in the bunk because the calf may go off feed. For the best results, feed your calf twice a day and try to schedule the feedings for the same time each day. An irregular feeding schedule is another reason a calf may go off feed.

The calf should always have access to clean, fresh water. During the winter, it's important to keep the water from freezing so that the calf can drink at any time. If this isn't possible, break the surface ice frequently so the calf doesn't go thirsty for an extended period. A calf drinks less water when the temperature is near the freezing point. It will drink more if the water is in a heated cup or tank. Daily water consumption will average about 8 percent of body weight during cold weather and up to 19 percent of body weight during hot weather. Stated in volume, the range from cold weather to hot weather is about 5 to 20 gallons of water per calf each day.

Manure, bedding or other debris should always be removed from

the water. Don't force your calf to drink dirty water. If salt and minerals aren't mixed in the grain ration, provide them free-choice in a place where they will stay dry.

Selecting a Ration

Table 4 lists commonly fed feedstuffs and their composition on a dry matter basis.

As you can see from the table, no single feed can meet all your calf's nutritional requirements. Therefore, it's necessary to feed a combination of ingredients.

Basic Grain Rations

Following is a list of some basic grain rations that use common feedstuffs.

High Energy Rations (more than 83% TDN)

Ration No. 1

(86.7% TDN, 13.1% CP)

- 80% corn
- 10% oats
- 10% supplement (34% CP)

Ration No. 2

(85% TDN, 13.4% CP)

- 70% corn
- 20% oats
- 10% supplement (34% CP)

Ration No. 3

(83.3% TDN, 13.7% CP)

- 60% corn
- 30% oats
- 10% supplement (34% CP)

Medium Energy Rations (80-83% TDN)

Ration No. 1

(81.9% TDN, 13.1% CP)

- 47% corn
- 47% oats
- 6% supplement (34% CP)

Ration No. 2

(80.0% TDN, 13.2% CP)

- 85% ground ear corn
- 15% supplement (34% CP)

Ration No. 3

(82.6% TDN, 13.0% CP)

- 40% corn
- 30% oats
- 25% barley
- 5% supplement (34% CP)

Ration No. 4

(82.9% TDN, 13.7% CP)

- 65% corn (dry matter basis)
- 20% corn silage (dry matter basis)
- 15% supplement (34% CP)

Ration No. 5

(81.2% TDN, 13.6% CP)

- 70% corn
- 20% coarsely chopped or ground alfalfa hay
- 10% supplement (34% CP)

Low Energy Rations (75-79% TDN)

Ration No. 1

(75% TDN, 13% CP)

- 60% corn silage (dry matter basis)
- 25% corn (dry matter basis)
- 15% supplement (34% CP)

Ration No. 2

(78.6% TDN, 13.3% CP)

- 65% oats
- 30% corn
- 5% supplement (34% CP)

Ration No. 3

(78.2% TDN, 13.6% CP)

- 60% oats
- 20% corn
- 15% barley
- 5% supplement (34% CP)

Ration No. 4

(77.3% TDN, 13.3% CP)

- 60% corn
- 33% coarsely chopped or ground alfalfa hay
- 7% supplement (34% CP)

Two-Phase Feeding Systems

You may want to consider a two-phase feeding system. It involves feeding a low- or medium-energy ration during the first half of the feeding period, then switching to a high-energy ration when the calf reaches about half of the expected gain for its frame size.

For example, assume you're starting a 500-pound calf of the large-framed exotic type on a low to medium diet. You plan to show it September 1 when it should weigh about 1200 pounds. When the calf weighs between 800 and 850 pounds, gradually switch it to a high-energy diet for the rest of the feeding period. The switch

should take place during a one- to two-week period.

The advantages of such a system follow.

- Most two-phase systems tend to be slightly more efficient in the use of total ration energy. The cost of gain in the first half of the feeding period is less expensive with little or no reduction in performance during the entire feeding period.

- Feeding a low- or medium-energy diet early in the feeding period permits maximum muscular and skeletal growth and minimizes the risk of the calf becoming too fat too soon.

If the calf is an extremely large-framed type, it probably should not be put on a two-phase system. Instead, you should feed it a high-energy diet from start to finish.

What Energy Level to Feed

Deciding whether to feed your calf a low-, medium- or high-energy grain ration depends on several factors, including the type or size of the calf's frame, the starting weight of the calf, the condition of the calf, when you bought the calf and when you're going to show it.

Table 1 (see page 4) gives the expected gain, feed composition, final weight and carcass cutout of various types of calves fed to be ready for an August 1, September 1 or December 1 show. The assumed starting date is November 20. In this example, the ration was assumed to be a medium- to high-energy ration.

Most of the time you'll want to feed a medium- or high-energy ration. Most large-framed calves should receive a high-energy

ration. If you're aiming for an early county fair, you also need to feed a high-energy ration. If you're feeding small-framed steers and aiming for later shows, a medium-energy ration may be more appropriate, or you might start on a medium-energy ration and switch to a high-energy ration.

It's generally not a good idea to feed a low-energy diet entirely because the calf may not grow adequately to meet weight requirements. The exception is if you're feeding smaller-framed cattle with the intention of showing them at a later show.

Grain Preparation

Coarsely cracking corn and lightly crimping oats and barley are probably the ideal methods of processing grain. However, many local elevators aren't equipped to do this; they usually make the grain too fine and dusty.

Feeding whole corn, oats and barley is not as desirable as crimping, but is preferable to fine grinding. When fed whole, the kernels can be seen plainly in the manure. This is no cause for alarm, because ground grain also passes through but isn't as visible.

Normal Feed Consumption

To get maximum performance from your calf, feed it to the limit of its appetite. Table 5 lists the expected daily dry matter intake for cattle of different weights.

Most dry grains and hays average about 88 percent dry matter. Therefore, "as-fed" daily feed consumption will average about 12 percent higher than the levels listed in Table 5.

Table 5. Normal Daily Dry Matter Intake of Growing Finishing Cattle

Body Weight in Pounds	Dry Matter Intake in Pounds	Intake as Percentage of Body Weight
300	9.0	3.00
400	10.9	2.73
500	12.9	2.58
600	14.8	2.46
700	16.6	2.37
800	18.3	2.29
900	20.0	2.22
1000	21.4	2.14
1100	22.3	2.03
1200	22.9	1.91
1300	23.1	1.85
1400	23.1	1.65

Cattle fed corn-silage diets will consume slightly less dry matter daily than previously mentioned (about 0.1 to 0.2 percent of body weight lower daily intake).

Mineral Mixes

If minerals aren't included in the supplement, they should be offered free-choice in a covered box. Following are acceptable mixtures:

Mixture 1

- 1 part trace mineral salt
- 2 parts bonemeal or dicalcium phosphate

Mixture 2

- 2 parts trace mineral salt
- 1 part limestone

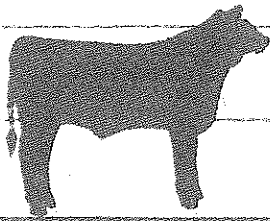
If Your Calf Goes Off Feed

Keeping your calf on full feed will take skill. Watch your calf for signs of going off feed (refusing to eat all of the feed). Try to prevent this situation, but if it does happen, take the following steps:

- Cut the concentrate feed in half. Continue feeding this amount until the calf readily eats it.

■ When the calf eats its feed readily, increase the amount slowly until the calf is receiving nearly as much as it did when it went off feed. Watch the calf closely as you make further increases.

■ Slightly increase the amount of hay you feed.



Exhibiting Your Calf

You and the other members of your club may want to exhibit your market calves at your county or area fair or show. This is often a requirement if you are to sell your calf there. Exhibiting your calf should be a pleasant experience for you; however, it is only one part of your project.

It is perfectly normal for you to want to win and to feel badly if you don't. The important thing to remember is not to let the results of the show spoil what would have otherwise been an enjoyable experience in your 4-H project.

To exhibit your calf properly and to enjoy your experience in the show ring, you must begin preparing for the show when you start your project. Your calf must be healthy and free from internal and external parasites. It must be fed at the proper rate so it will show the proper weight for its age.

The showperson, as well as his or her calf, is evaluated in a fitting and showmanship contest. Judges look for signs of care, attention, training and preparation given the calf as well as the appearance of the exhibitor.

Halter Breaking and Training

Assuming that your calf is eating properly and is healthy, the first step in preparing it for a show is halter breaking. It's important that you do this as early as possible. It is much easier for the calf and the

people involved to halter break a 500-pound, 7-month-old calf than it is to halter break a 1000-pound, 12-month-old steer or heifer.

After the calf has adjusted to its new environment (approximately 7 to 10 days), begin halter breaking it. A sturdy rope halter is essential. Confine the calf in a small pen (about 12 feet by 12 feet). Squeeze the calf between two gates or put the calf in a chute to halter it the first few times. Take care not to get the calf over-excited. Some people prefer to let the calf simply drag a rope for a few days before tying it to a sturdy fence or rail. This is a good way for the calf gradually to become accustomed to the halter and the pressure it can apply. Other people prefer to tie the calf immediately. In either case, it is important to remain calm and patient when working with your calf.

When tying the calf, secure it to a sturdy fence and don't allow the rope to slide back and forth along the fence or rail. During the first week, it helps to tie the calf daily for short periods. Be sure the halter isn't cutting into the hide over the bridge of the nose or under the jaw. If this happens, simply adjust the halter to a different area on the calf's nose. Only allow the calf 1½ to 2 feet of rope when tying it.

After the calf becomes used to being tied up, try to scratch the calf's shoulder or top line with your hand or a scotch comb or

curry comb. Once the calf realizes you aren't going to hurt it and that the scratching, rubbing or combing feels good, this motion will help calm and relax it. In the early halter breaking stages, never leave the calf unattended to ensure its safety.

Training to Lead

Once the calf is halter broke and is comfortable with your presence when you brush and comb it, the next step is breaking the calf to lead. Begin by trying to lead the calf in the small pen for a few minutes before removing the halter and turning the calf loose for the day. Another method would be to halter and tie the calf after it finishes the morning feed. After the calf has been tied for a few hours, place a bucket of water or small flake of hay in the opposite corner of the pen and try to lead the calf to that area. After a few tries, the calf will begin to associate your leading it with a drink of water or a small treat. Once you gain the calf's trust, the entire process becomes easier.

Next, teach your calf to stop with its head up and to respond to the use of a show stick. The show stick is used to position the calf's legs so it stands squarely on all four legs. At first the calf may shy from the show stick. Begin by scratching its belly with the show stick. Eventually, the calf will come to enjoy this. Next, use the point or the nook of the show stick to

properly position the calf's legs and "set it up," as it is called.

Continue to lead and set up the calf frequently for several days or even weeks. With practice and time, the calf will begin to set up on its own when you stop. There is no short-cut to accomplish this, but with much practice, it will occur.

Hoof Trimming and Foot Care

Care of the feet also comes under the category of fitting and is very important. Proper hoof trimming can change the position and set of the legs, thus changing the entire balance and lines of an animal.

Trim the hooves 4 to 6 weeks before the show. Place the calf in stocks or on a mechanical table to do this. When possible, consult an experienced hoof trimmer. Hoof trimming is an art few people thoroughly master. Many, but not all, cattle require routine or corrective foot trimming.

A few points on general hoof trimming:

1. Trim the inside toe and heel before the outside, because the inside toe generally grows faster

and longer than the outside toe. This is probably the most frequent reason for trimming. Trim the toe before the heel to ensure the animal will walk up on its toes.

2. Remove the outgrowth or rim of the sole around the edge of the toes (see figure 9) and along the side of the foot with a pair of nippers (see figure 10). Be careful to keep the foot level while trimming.

3. Many times you can't trim the toe as closely as you would like. When the bottom of the foot is springy to the touch, the next cut will probably draw blood and you have trimmed too far.

4. Shape the foot and all rough edges with a rasp. **Electric sanders may be used (see figure 11), but do so with caution!** An electric sander often generates too much heat and may seal the pores in the foot, inhibiting its proper growth.

5. The bottom of the calf's foot, between the toes, should be hollowed out slightly to allow mud and other materials to ooze up through the toes. This works as a self-cleaning mechanism.

6. Make the side of the toes relatively straight on the inside by rasping between them.

7. Apply a disinfectant to the hoof when you're done trimming to heal any cracks or cuts in the foot, especially between toes and along the hoofhead.

Hair Care

A good hair coat that has shine and luster indicates that a calf is healthy and has had proper care. In addition, a good hair coat helps to cover or mask some conformation or structural faults of the steer or heifer.

All cattle will have longer, more dense hair coats in the fall and winter months. As spring comes with warmer temperatures and longer days, the winter hair coat will begin to shed out. The quicker the winter hair sheds, the quicker the new hair coat will begin to grow out. You can hasten this process by frequent brushing and combing. Another method involves clipping or shearing the calf's entire body. In most cases, it's best to clip downward (in the direction of hair growth) to re-

Figure 9. Hoof trimming.

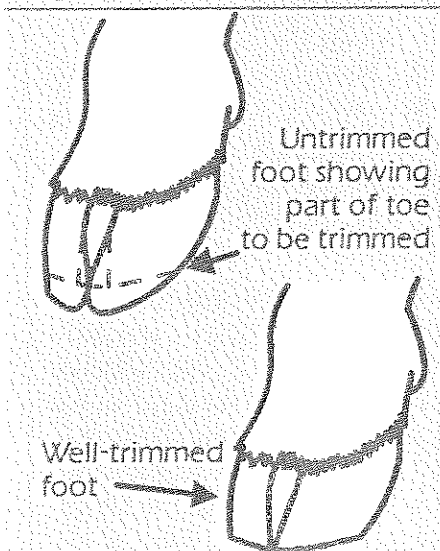


Figure 10. Use of nippers.

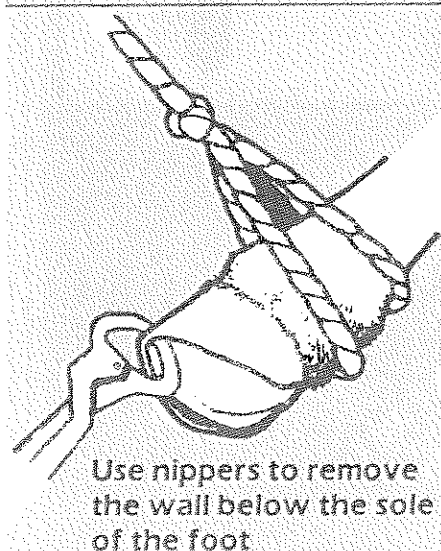
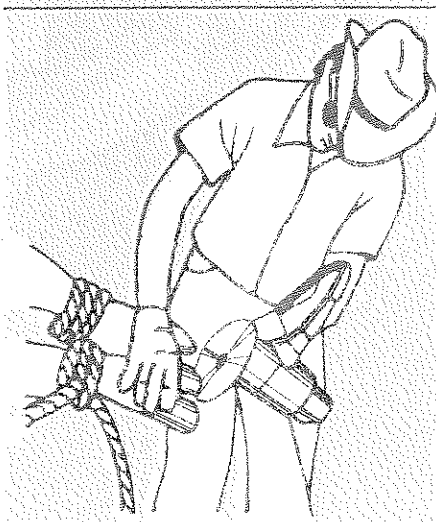


Figure 11. Safe use of electric sander.



move old, dead hair. The new hair that grows in will have a higher luster and shine. If you plan to shear the calf do it in late March or April.

As temperatures start to warm up in the spring, you can begin rinsing your calf with plain water. This will keep the hair coat clean and stimulate hair growth. Rinse your calf daily, or even more often if possible. This will also help to tame the calf as it will learn to enjoy the routine, particularly in hot weather. Periodically, the calf can be washed with a mild live-stock soap or dish soap. Laundry detergents are too harsh on the hair and hide. It isn't necessary to use soap each day. Be sure to thoroughly rinse all soap residue out of the animal.

When washing or rinsing the calf, tie it to a secure post and fence.

Avoid getting water in the ear canals because this will cause the calf's ears to hang down in an unnatural fashion. If your calf has excessive dandruff or scales, mix one pint of white vinegar with three gallons of water and apply this to the calf's body. This will help ease the dandruff problem.

After washing or rinsing, brush and comb your calf's hair forward (from rear to front) and slightly upward (see figure 12). This brushing and combing will stimulate hair growth, and with the longer hair coat, will give the calf a smoother appearance. Be sure to comb all of the hair, including the inside and outside of the legs. It is most helpful to continue brushing until the calf is nearly dry.

In warm weather, try to keep the calf cool to preserve the hair. To

do this you may need to rinse the calf more frequently, provide shade and perhaps use a fan to provide a cool, brisk breeze.

Clipping and Blocking the Hair

A professional job of clipping and blocking requires a great deal of time and patience. Clipping will not change the actual size or conformation of an animal, but it will greatly enhance its appearance. Use great care in this phase of the fitting routine.

To clip and block the hair coat, most people place the calf in a simple metal pipe chute with a headgate. It holds the animal still and reduces grooming time.

It is important that the animal be very clean before clipping and that the hair is properly combed and brushed. This will reduce the amount of time you need to do a complete and uniform job of clipping. It is a good idea to wash the calf the day before you plan to clip it. Also, never try to clip a wet animal because wet hair is difficult to clip evenly and it's hard on the clipper blades.

There are four areas that will, in most cases, be clipped short. These include the brisket and dewlap, head, belly and tail. There is some variation among breeds as to how much a breeding animal's head should be clipped or shaved. Check with the specific breed association on recommendations.

With most breeds of cattle and market steers, the head is shaved in front of a line that starts directly behind the ear. Clip forward to the nose and clip the entire forehead. Some hair may be left on the poll to give it more prominence. Some people prefer to leave the hair on

Figure 12. Brushing the hair coat.



the side of the face or cheek to give the animal a longer bodied appearance when viewed from the side. In either case, the hair should be blended carefully from the area where the hair is short to the area where the hair is left longer. Clip the long hair around the ears and shape uniformly.

Clip the brisket and dewlap area and, once again, blend in accordingly. When clipping the belly, start from the elbow and, following the natural contour of the belly, clip to the rear flank. Clip all of the hair below that line. If the calf appears to be shallow bodied, you may want to merely block or clip the longer hair on the belly. This will give the calf a deeper bodied appearance.

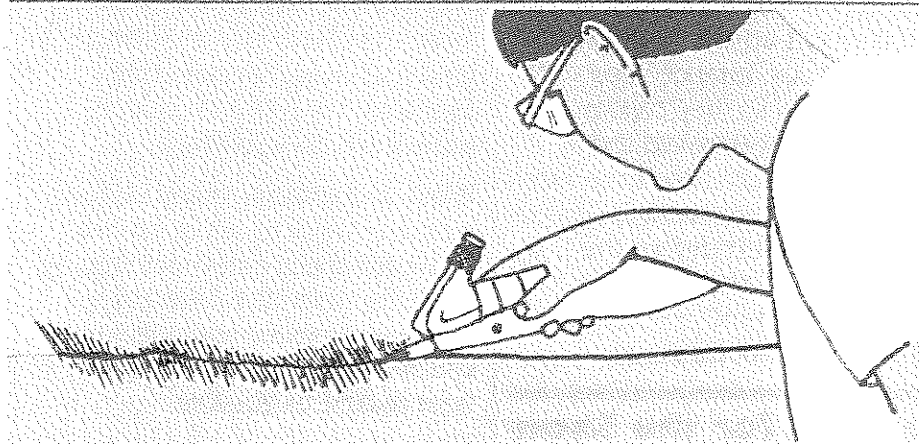
When clipping the tail, view the calf from the rear. Clip the tail starting at the midpoint and go upward. As you clip upward, your goal is to try to make the calf's rump, when viewed from the side, appear square (straight up the rump and straight across the top).

After clipping these areas, clip and block any long hair on the top line (see figure 13) and on the sides. Blend in hair carefully. Your goal is to make the calf smooth, muscular, well-balanced and structurally correct. Even the most competent show people may spend several hours on an animal. Remember to be patient, and that with practice comes a superbly prepared animal.

Preparing to Leave for the Show

Starting two to four weeks before the show, accustom the calf to various things that will occur at the show or fair. Make certain the calf is used to eating from feed pans and drinking from a water

Figure 13. Clipping and blocking top hair line.



bucket. It is helpful to play a radio in the barn so that the calf gets used to unfamiliar sounds.

It's important that the calf is accustomed to a leather show halter with a chain that goes under the jaw. To work the stiffness out of a new leather halter, apply hair oil or saddle soap to make it softer and more supple. When using a show halter for the first time on a calf, place it over the top of the rope halter. Lead the calf with both halters a few times. This will gradually get it used to the chain. This should be done two to four weeks before the show. Eventually, the calf can be led with only the show halter.

When show day arrives, place the show halter on the calf and then place the rope halter over the top to tie the calf as you prepare it for the show. Most leather show halters are not strong enough to secure the calf if something startles it.

When tying the calf in a stall at the fair or show, tie it securely with the rope halter and a neck rope. This is done primarily for safety reasons. Cattle have a tendency to rub their heads on fences and can accidentally slip the halter off. The

neck rope serves as insurance for keeping the calf secured.

In addition, reconfirm that the following items are in order for the upcoming show:

- Show entries with the appropriate fees paid
- Cattle health papers, if necessary
- Registration papers for breeding cattle
- Show box with necessary equipment such as:
 - Extra rope halter
 - Neck rope
 - Show halter
 - Show stick
 - Scotch comb
 - Rice root brush
 - Brush for washing
 - Towels or rags
 - Feed pan and bucket
 - Fork, rake, shovel, etc.
 - Extension cord
 - Clippers
 - Scissors
 - Spray adhesive, hairset, hair oil, soap, etc.
 - Fan, if necessary
 - Garden hose
 - Blocking chute, if necessary

Transporting Cattle

Transport show cattle in a manner that will cause a minimum of stress. Most trucks or trailers

suffice when properly used. Good footing is a must. Sand with straw on top works best. If cattle are hauled a great distance, they should be tied so they can lie down. Don't overcrowd show cattle. Trips should be planned so cattle have at least a day or, better yet, two days rest before the show. This will allow them to regain their "shrink" and appear in a more natural condition.

Leaving for the Show

It is best to feed and water the calf lightly, or feed 50 percent of normal amount, the day before leaving for the show. Cattle travel better and will be more responsive to eating and drinking after arriving at the show.

It is important that the exhibitor get a good night's sleep and is well-rested before leaving. Shows are hard work and tiring—rest up!

Arriving at the Show

When you arrive at the show grounds, locate your stalls and place straw or other suitable bedding in the space provided. Unload the calf and place it in the stall to let it rest and get settled. Some people prefer to wash the calf before stalling it. Be certain to double-tie the calf with the neck rope when stalled.

Be sure to check with the show office and/or superintendent to get any necessary information about the show, such as weighing and check-in time, show time and show order.

Keep the calf comfortable and on the same daily feeding schedule as was used at home. Keep the calf clean, brush and comb its hair, and keep the stalls and bedding clean. Do not leave a water bucket or

feed pan in the pen all day long. This can be unattractive and will make the stall messy. In addition, if feed and water is constantly available, the calf will not consume them as vigorously.

While at the show, many visitors who are eager to ask questions and learn about cattle will stop by. Keep the stalls clean and attractive. Be courteous and polite to visitors and try to answer questions as best as possible.

Before the show, take the calf to the show ring to allow it to become familiar with the surroundings. This will help on show day.

Exercise and Tie-Outs at the Show

To keep cattle fresh and looking their best under the stress involved with transporting and showing them, tie them outside in the evenings. Tying at the tie-out provided by the show or merely tying to one's trailer is sufficient. Bedding should be provided. Tying out and proper exercise keep cattle from appearing stale at the show.

Show Day

On show day, rise early and make sure that there is enough time to get chores and preparations accomplished. Make certain that the calf is properly fed and exercised. It is best to rinse the calf with water to remove any dust and dirt. This will also serve to freshen up the calf. Allow enough time to dry the calf's hair and for the calf to rest before beginning preparation for the show.

The amount of time required to prepare the calf for the ring on show day will vary. Generally, allow yourself 45 minutes to 1 hour

for preparation. Begin by placing the show halter on the calf. Remember, it is a good idea to put the rope halter over the top of the show halter while working on the calf. Remove the rope halter just before entering the show ring.

Plan a systematic schedule for the fitting and grooming process. This might include the following:

1. Place the calf in a blocking chute, if necessary, to restrain it.
2. Blow or brush all dust from the calf.
3. Pull up the hair (boning) on all sides of the legs using a light-weight spray adhesive. This gives the calf a stouter boned, straighter legged appearance. Clip the long hair on the legs to smooth and blend in.
4. Spray paint the hooves with black lacquer (if the calf has black or dark hooves) or with clear lacquer (if the calf has light hooves). Never use oil on the hooves as this has a tendency to collect dust when the calf walks.
5. Pull up the hair on the tail head using adhesive. With scissors or clippers, clip the hair to give the rump a square, level appearance.
6. Pull up the hair on the poll, if necessary, using adhesive. Once again, clip off any long, unnecessary hair.
7. Rat the tail switch hair into a tight, oval-shaped ball. Spray with a heavy-weight adhesive and shape accordingly. Trim off any excess, long hair strands. This procedure will help fill in the lower quarter when viewing the calf from the rear and to give the calf more balance when viewing it from the side. Study the calf from a side view and position the bottom of the tail on an imaginary

horizontal line with the bottom of the brisket. Many people have a tendency to position the tail switch too high, which creates a heavy-fronted and shallow rear-flank appearance.

8. Using any one of a variety of hair setting products, brush or comb the body hair forward to give a smoother, wider body appearance. If the calf has a long dense hair coat, it may be possible to pull the hair up. Using an electric blower will help you work the hair up or forward.

9. Spray a light amount of oil mist on the calf's head to give it shine and luster. Be careful that oil is not applied where adhesive was used earlier as oil has a tendency to dissolve adhesive.

10. Before going to the ring, give the calf a drink of water. This will give the calf a fuller middle and make it more comfortable.

Before going to the show ring, make sure you have a scotch comb in your back pocket, the exhibit or entry number (if necessary), and the show stick. You should also be dressed in suitable and appropriate attire. This will be discussed in the next section.

If possible watch how the judge is working the classes. This will give you a better idea as to what is expected when it is time for your class. Also, know which person is the judge.

Exhibitor Attire

You should dress in a manner that does not divert attention away from your calf but rather complements the exhibit. Attire should be clean, attractive and practical. Dress pants/slacks or denim jeans and shirt/blouse are recommended. Some shows may have a

uniform dress code that includes a specially designed shirt or t-shirt. Check on rules before the show.

Shorts, skirts or dresses are **not** appropriate attire. Some type of substantial, leather footwear, such as work shoes or boots or western boots should be worn in the show ring. This is primarily for safety reasons. Tennis or athletic shoes or higher heeled fashion boots are **not** appropriate footwear for the beef cattle show ring. Pants should not be tucked inside western boots, as this may detract from the exhibit. It also is suggested that you wear a belt.

If you wear a cap or western hat, it should not interfere with your sight or hinder you from satisfactorily showing the calf. However, some judges are opposed to exhibitors wearing any type of cap or hat. Discretion is advised. Your hair should be well combed or brushed.

Showing the Calf

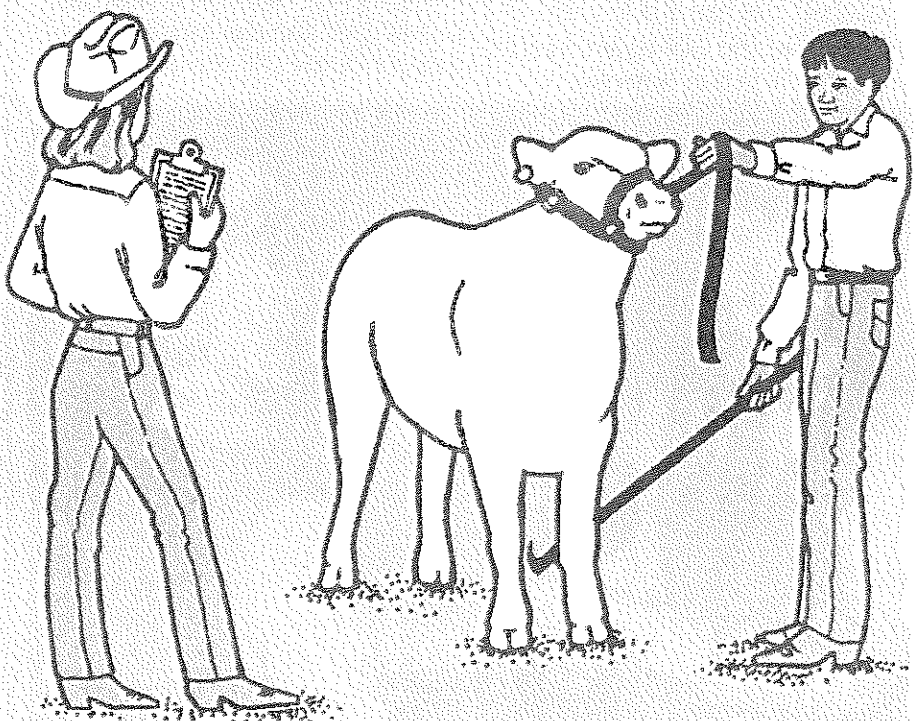
Before entering the show ring, you should have your exhibitor number on, a show stick and a scotch comb in the back pocket.

Always be prompt and ready to enter the ring when the class is called. When entering the ring, be alert and have the animal at its best.

Lead the animal from the left side, with the show stick in the left hand and the lead strap in the right. Hold the strap about 12 inches from the animal's head. Walk at the speed at which the animal looks its best. Always try to lead the calf in a clockwise direction, unless you are instructed by the judge or ringperson to do otherwise.

Generally, cattle will be lined up side by side at the beginning of the class. Leave plenty of room and try to place the calf's front feet on higher ground if possible.

Figure 14. Posing the calf in the ring.



A good exhibitor always knows the high and low spots of the ring and uses them to advantage. You should survey the ground far enough ahead so as not to be forced to set the animal in a low spot. Get the animal set as quickly as possible. If you pull up on the animal's head just before stopping, the calf will usually stop with its front feet placed correctly. In many instances, one hind foot will also be placed correctly, leaving only one hind foot to place. Scratch the animal's underline with the show stick once or twice to settle it and then place its feet. Make sure the top line is straight and the head is up. If time permits, check the hair coat to make sure it is properly combed.

When leading the calf around the ring stay to the outside edge of the ring. If the calf in front slows down or if that exhibitor appears to need assistance, be courteous and offer help if necessary.

At the appropriate time, the judge or the ringperson will ask you to stop so they can see a side view of the calf. Set the calf again. Make sure the calf is in line with the

other cattle in the class. As the judge walks around the cattle in the class, **be alert**. When the judge approaches, change hands on the lead strap and show stick. Calmly continue to scratch the calf's belly with the show stick. Stay to the front and left side of the calf (see figure 14 on page 25). If the judge moves to view the front of the calf take a short step back from the calf to allow the judge a better front view. If the judge handles the calf, calmly scratch the calf's belly with the show stick and maintain control. After the judge walks away and begins to handle the next calf in line, use the scotch comb to straighten any hair that the judge messed up.

Most of all, relax and let the judge view the animal. Do not overshadow; you are showing the animal, not yourself. A top showperson is an unnoticed part of the animal that is presented to the judge. When the judge signals you to move to another position, promptly pull out of line and get to that spot. Do this as rapidly as possible while still showing the

animal to its best advantage. Set the calf and stay alert. Be courteous to the showperson next to you; help to position the animal and provide assistance at the walk if needed. Show your animal from the time it enters the ring until it walks out the gate. Most of all, be courteous and considerate.

After the Show

When the show is over, replace the show halter with the rope halter and prepare to wash the calf. There are products specifically designed for removing the adhesive you applied earlier. Occasionally the aerosol hair oil will help break down the adhesive before washing. Soap and water alone **will not** remove the adhesive. It is important to wash the calf soon after the show, as many show-day hair care products can be irritating to the calf.

Sportsmanship

Always be a good sport.

Whether you win or lose, be humble and gracious. Congratulate the winners and be sincere. In a like fashion, if you are fortunate enough to win a class or a show, accept congratulations from others humbly and sincerely.

After returning home from the show, be sure to express appreciation with a thank you note or letter to the people who helped in some way. Some of the people to include are:

- Show management officials
 - Superintendent(s)
 - 4-H staff and leaders and/or FFA advisors
 - Buyer of your calf, if sold
- (Note:** It's also a good idea to send a picture of you and the calf.)
- Donators of trophies and awards
 - Auctioneer



Suggested Guidelines for Fitting and Showing Beef Cattle

The exhibitor is responsible for the fitting and showing of the animal and the appearance of the exhibitor. **Note:** These guidelines are written for exhibitors who use their own animals in the contest. However, the general principles also apply in contests where animals are on loan for exhibitors.

Perfect
Score

Appearance of the Exhibitor

70

- Clothing and person should be neat and clean.
- Clothing should be appropriate for the job and should not attract undue attention to the exhibitor or the exhibit.
- Boots or leather shoes should be worn for protection. Canvas shoes should not be worn.

Appearance of the Animal

40

- The animal should give every indication of being healthy and free of disease and parasites.
- The animal should show evidence of proper nutrition.
- The animal must be clean.
- Hair should be clipped to enhance the appearance of the animal. Head, bricket, underline and tail should be clipped according to breed recommendation.
- Hooves should be trimmed and shaped to enable the animal to stand squarely. Hooves should also be clean.
- The coat should be clean and free of stains. It should be lustrous to show evidence of care.
- Hair should be brushed or combed in a way that emphasizes the animal's strong points.
- Equipment used in the show ring should include a show halter, show stick and pocket dressing comb to dress the hair coat after the judge has handled the animal.
- All equipment should be clean, properly adjusted and in good repair.

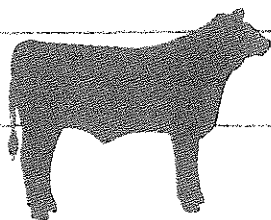
Showing Procedure

30

- Cattle should enter the ring promptly in a clockwise direction when the class is called. Each animal should be led from the left side with the exhibitor holding the lead strap in the right hand.
- When posing or standing, the exhibitor should face the calf and change the lead strap to the left hand. The exhibitor should use the show stick in the right hand to set the animal's legs. A good exhibitor does not obstruct the judge's view of the animal or of other animals in the ring.
- Exhibitors should not leave the ring until the class has been placed, properly recorded, reasons given and awards presented.
- Exhibitors should be alert at all times and should carefully and quickly respond to all instructions issued by the judge, clerk or ringmaster.
- The exhibitors should be courteous to everyone involved with the show.

TOTAL

140



Beef Quality Assurance

Most beef producers understand the value of learning about beef selection, showmanship, management and health care. Even more important than acquiring these skills is taking the responsibility to provide a product that people want to buy.

Quality Time After Time

Consumers want the beef they buy next week in the grocery store to be as good as the beef they bought this week. They want to select from a consistent product in the meat case. Practicing quality assurance means making sure there are no harmful residues in the beef products you market. It is the bridge that links the responsibilities of production and marketing. Every beef producer must accept the responsibility of consistently providing quality beef products.

Residue avoidance is an important part of a beef quality assurance program. Many organizations, including consumer groups, government agencies and beef producers, are interested in the production of residue-safe beef products. If you want to be a successful producer, you need to make the practice of avoiding residue an essential part of your production and marketing strategies. Know the medications you use and withdrawal times, how to properly mix feed and deliver it, how to identify treated cattle and how to manage feeders and pens

to minimize residues. The National Cattlemen's Association has additional information on quality assurance programs.

What Is a Residue?

You may gain a clearer understanding of what a residue is by imagining yourself drinking a glass of milk. If you finish the glass of milk and fill it again with water without rinsing it, your water will be cloudy. That is because milk residue is left in the glass.

A residue is the amount of a substance that remains in an animal's body tissue after exposure to that substance. The substance can enter the animal's body when it is used as a feed or water additive, as an injectable or external treatment, or by accident. Some substances may leave an animal's body tissues a few hours after exposure, others may leave in several months, and some may never completely leave certain tissues. Low-level drug residues are not physically harmful to humans, but may cause loss of confidence in the quality of the food products.

Why the Concern?

It is illegal to adulterate a food substance. This is why the U.S. Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA) have set strict guidelines to protect our food supply. Random tests at slaughter

facilities can indicate which producers aren't following regulations. If illegal levels of residue are found in the tissue of a slaughtered animal, the USDA can stop a facility from accepting beef cattle from that producer until the herd tests safe from residue. This loss of a market can cause great economic concern for a beef producer.

Perhaps the worst consequence of not obeying withdrawal guidelines is that it can cause consumers to lose confidence in beef. Consumers are increasingly health conscious. They demand that their food be lean and wholesome. Some consumers are concerned that certain people may develop severe allergic reactions if traces of medications are present in meat. Although this is not likely to happen, it's important that residue in animal products be kept below FDA levels.

How You Can Prevent Residue Problems in Your Animals

Not all medications pose a potential residue problem. Withdrawal times listed on labels tell you when to remove medications to prevent illegal residues. The withdrawal time is when the medication must be removed from a steer before it is slaughtered. The time varies from one day to several months, depending on the type of medication.

Most medications leave the body by way of the urine and feces at a predictable rate. This rate is called a half-life, which is the length of time it takes a substance to reduce its concentration by one-half. Every medication has a different half-life. Once a medication is taken away completely, its half-life countdown begins. Withdrawal times are based on half-life rates.

If you don't completely withdraw medications, half-life values will increase and withdrawal times will be longer. To prevent withdrawal times from increasing, be sure to properly manage feed additives and feed mixing and handling systems so feed isn't accidentally contaminated.

Carryover of medications in feeders, bulk bins, auger systems, feed mixers and manure can cause residue problems. Giving too much medication, or giving injectable products improperly, also will lengthen withdrawal times. Contamination of livestock water systems may extend withdrawal times after water medication. Monitor all chemicals that your calf comes in contact with. Products used for the control of rodents or external parasites may contaminate a steer's feed supply or environment and cause residue problems in beef unless precautions are taken.

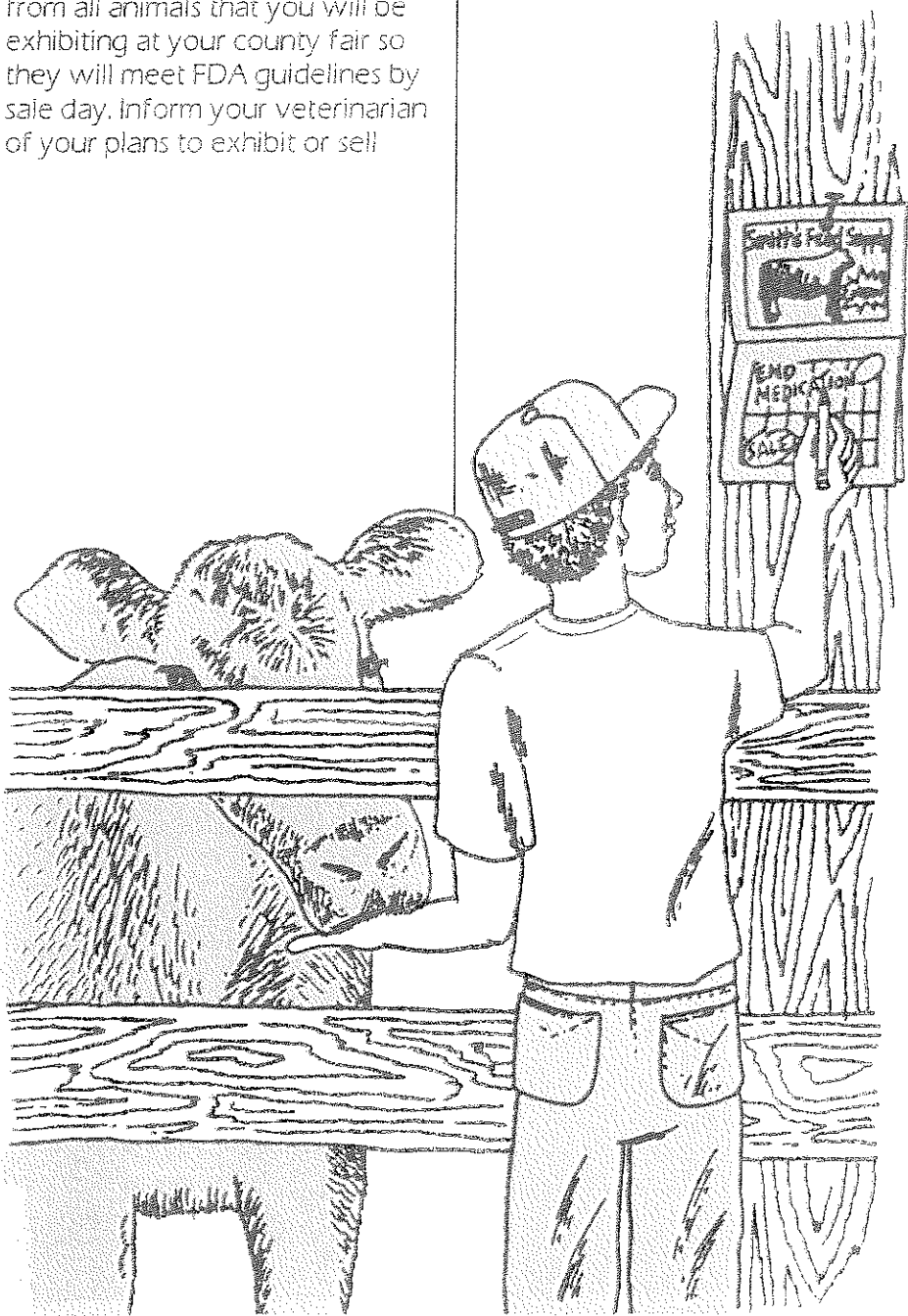
Points to Remember

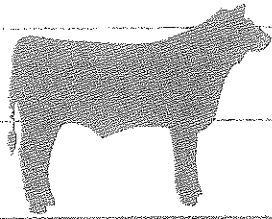
Feed additives and other medications, when used correctly, can improve the growth rate, feed efficiency and survival of your 4-H project. As a beef producer, you should know which feed additives and other medications you are using and why you are using them. Give your cattle feed additives

only at approved levels and in approved combinations. Use all other products according to label instructions and observe the directions and cautions.

Good day-to-day management is critical in preventing a residue problem in your herd. Identify treated animals, and mark your calendar to indicate withdrawal periods according to the date that you plan to sell your cattle. Plan in advance to withdraw medications from all animals that you will be exhibiting at your county fair so they will meet FDA guidelines by sale day. Inform your veterinarian of your plans to exhibit or sell

cattle before treatment. Ignoring regulations and withdrawal time is expensive and may cause a medication to be banned. Remember, producing wholesome beef for the consumer that is residue-safe can mean more profit for every producer.





Marketing

Beef producers, like other business operators, are working to produce and sell a top quality product. The goal of the beef industry is to raise cattle that will yield a maximum amount of edible meat. To properly market your steer and decide on a fair price for it, you must be able to determine its quality.

Determining Cattle Quality

When assessing the quality of cattle, two major areas must be considered: production traits and carcass traits. Production traits such as average daily gain, days required to reach market weight and feed efficiency are important to the beef producer. These traits are always used to measure how quickly and efficiently a calf grew. Production traits are measured on the live steer.

Carcass traits are measured after the steer is slaughtered and is in carcass form. Some commonly measured carcass traits are backfat depth, loin eye area, carcass length and percent muscle in the carcass. Many times producers and buyers try to predict carcass quality by estimating these carcass traits before the animal is processed. This is not always very accurate, but it can be a useful selection tool.

It is important that you know these measures of performance and carcass quality and understand what they mean. The normal ranges and average values for several of these traits are shown in table 6.

Production Traits

Growth rate—Average daily gain (ADG) and days required to

reach finished weight are both measures of growth rate. A greater value for ADG and fewer days to finished weight indicate a fast growing calf.

Feed efficiency value—This measures the amount of feed a calf requires to gain 1 pound. A feed efficiency value (sometimes called feed-to-gain ratio) of 70 means that a calf must eat 7 pounds of feed to increase its body weight by 1 pound. A low feed efficiency value is more desirable.

Carcass Traits

Many times, 4-H'ers don't receive carcass information on their project cattle. This is unfortunate, because seeing how your steer looks in carcass form can be very educational. Evaluating the carcass of the steer you raise this year might make choosing a calf easier next year. This section describes the physical measurements and characteristics of beef cattle that are known as carcass traits.

Dressing percentage—Dressing percentage represents the amount (percentage) of the steer's live weight that is present in carcass form. To calculate dressing percentage, divide the chilled carcass weight by the live weight and multiply by 100.

The amount of fat and the amount of fill (stomach and intestine contents) are the two factors that

Table 6. Normal Ranges and Average Values for Various Production and Carcass Traits

Traits	Normal Range	Average Value
Production		
Average daily gain (pounds per day)	2.00-3.50	2.75
Age (months)	12-18	15
Feed efficiency (pounds feed/pounds gain)	6-9	7.5
Carcass		
Live market weight (pounds)	1100-1300	1200
Dressing percent	60-65	62.5
Ribfat depth (inches)	0.2-0.7	0.4
Ribeye (square inches)	11.0-15.0	13.0
Yield grade	1.0-4.0	2.5
Quality grade	Low Select-High Choice	Low Choice

influence dressing percentage. Fat steers will dress higher than lean steers, while steers that are full of feed and water will dress lower than shrunk steers (those off feed for 12 to 24 hours).

Ribfat depth—Ribfat depth is measured at the 13th rib on the steer's topline. (see figure 15).

Ribeye area—This is a measurement of the size of the major muscle that is found in the loin. Ribeye area is determined by cutting the loin crosswise at the 13th rib and measuring the area of the muscle face. Ribeye area is a good indicator of the total amount or degree of muscling in an animal.

Yield grade—This identifies cattle for differences in the yield of boneless, closely trimmed retail cuts from the round, loin, rib and chuck (cutability). The yield is generally expressed as a percentage and indicates the amount of edible product in a given carcass. Throughout the beef industry, the percentage figure is converted to a yield grade designation between 1.0 and 5.9. A designation of 1.0 indicates the most desirable animal and a designation of 5.9 the least desirable. Table 7 lists the relationship between yield grade and percentage.

Quality grade—This is an estimation of the potential eating quality of the product, which would include flavor, tenderness and juiciness. Carcass quality grade is based upon an evaluation of marbling and age of the cattle. Marbling is the distribution of fat within the muscle. The beef quality grades are Prime, Choice, Select, Standard, Utility, Cutter and Canner. A designation of Prime is the most desirable and Canner is the least desirable.

Figure 15. Ribfat depth measurement.

Approximate location of the 13th rib where fat thickness is estimated.

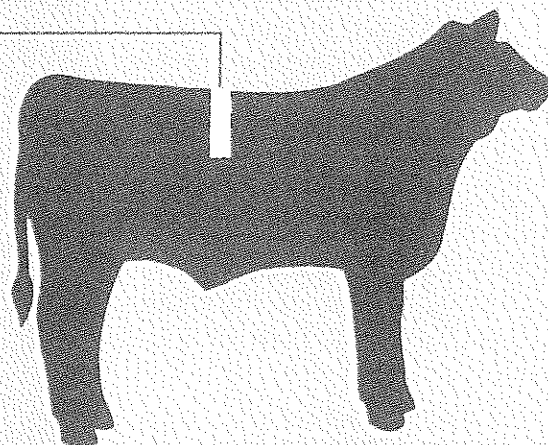


Table 7. Relationship Between Yield Grade and Cutability Percentage

Yield Grade	Percentage of Cutability
1.0	54.6
2.0	52.3
3.0	50.0
4.0	47.7
5.0	45.4

Selling Your Steer

Most 4-H members market their steers at their county fair or show sale. If you sell your steer by this method, you should check with your 4-H leader about the market price farmers are receiving for steers of similar weight and quality. If you receive more than this amount, it's due to the generosity of the person who bought your steer. You should consider it a reward for your efforts and not as the true value of the animal.

Many 4-H clubs find it advantageous to promote their county fair sale. You can promote your sale by visiting or sending letters to local businesses asking them to bid on your market steers. You can promote your auction by holding a buyer appreciation banquet after the sale as a special way of

thanking your buyers. You, your fellow club members and the club leader probably can think of additional ways to increase community support for your livestock auction.

If you don't market your steer at your county fair sale, there are livestock auctions and buying stations statewide that will buy your steer. Desirable market steers are always in demand. Your 4-H leader can help you choose one of these markets.

No matter where you sell your steer, have it look as attractive as possible and avoid filling it with extra feed and water. Buyers don't want to pay for this extra fill. They base their price on the pounds of meat your calf will produce. Market your steer when it's finished to the proper grade

and as near the desired weight as possible.

Send a thank you letter to the buyer of your 4-H steer as soon as you get home from the show. This lets the buyer know you appreciate their efforts and encourages support for future sales. It's also a good idea to thank your show and sale officials for their efforts in organizing a good show and sale. Also remember to thank your 4-H leader, parents and 4-H staff for all their help during the year.

Beef Products

The main reason for breeding, selecting, raising and selling beef cattle is to produce beef. The final step in beef production is the processing of beef cattle carcasses to yield a lean, meaty product for human consumption. After the steer has been slaughtered, carcasses are cut into wholesale cuts.

The wholesale cuts are depicted in figure 16 and the percentage of carcass weight and percentage of total carcass value are listed in table 8.

Each wholesale cut is trimmed of excess fat and separated into retail cuts. Retail cuts of beef are the meat that is sold in grocery stores and restaurants (see figure 17). It's important that you know all the wholesale and some of the more popular retail cuts of beef. This will give you a greater appreciation for the need to produce lean, meaty steers. Lean, meaty steers result in wholesale and retail cuts of beef with a larger proportion of lean than of fat.

Figure 16. Wholesale cuts of beef.

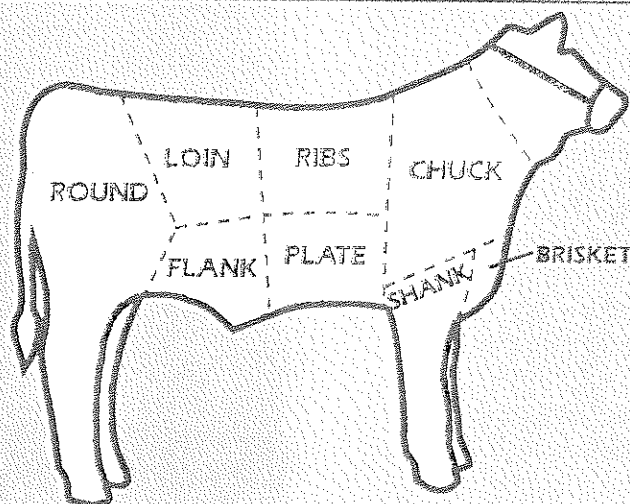
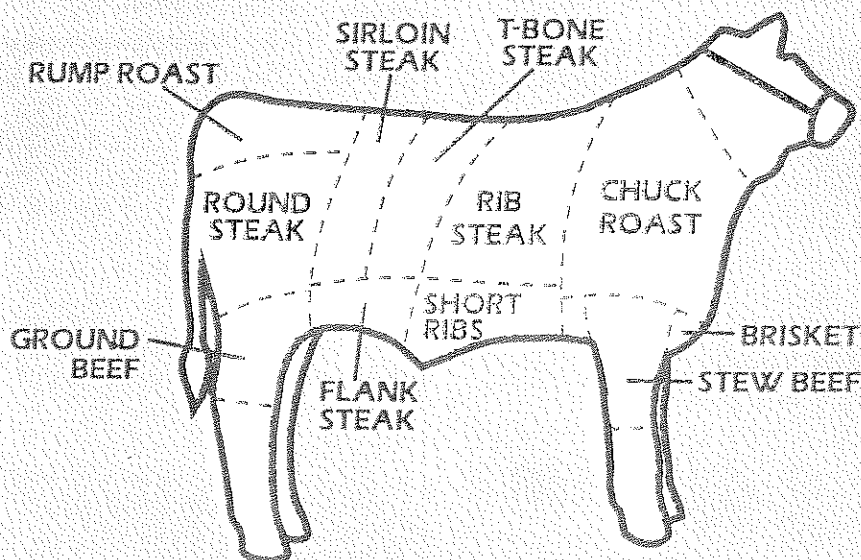


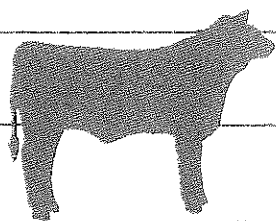
Table 8. Carcass Weight and Percentage of Total Carcass Value

	Percentage of Carcass Weight	Percentage of Total Carcass Value
Round*	22	29
Loin*	17	29
Rib*	9	11
Chuck	25	21
Brisket	6	4
Shank	5	15
Plate	8	25
Flank	4	15
Kidney knob	3	05

*Round, loin and rib account for approximately 50% of carcass weight and about 70% of carcass value.

Figure 17. Retail cuts of beef.





Other Activities

Information Development

You can use the information you have recorded in the **4-H Live-stock Record for Intermediate and Advanced Members** (4-H 1177) to figure the following information:

- Weight of each calf at the start of the project.
- Weight of each calf when marketed.
- Total cost or value of the calf at the start of the project.
- Money you received from the sale of your steer.
- Market value of your calf when sold.
- Total amount of feed used.
- Total cost or value of the feed used.
- Total cost of any medicine or veterinary fees.
- Other expenses.
- Interesting or unusual things that happened to you and your calf during the project year.

From this information you can:

- Make a chart or graph showing the growth of your calf.
- Figure the rate of gain a day.
- Determine the feed cost for each unit of gain.
- Determine the number of units of feed required for each unit of gain.

Other 4-H Projects

A 4-H beef project is more than just owning and caring for cattle. Other projects will broaden your experience and help you with

your market beef project. These include:

- **Veterinary science**—Study how to keep your calf healthy.
- **Crop science**—Produce forages and grain for your steer.
- **Photography**—Tell the story of your steer project with pictures.
- **Entomology**—Learn about parasites of cattle.

Demonstrations and Illustrated Talks

A demonstration or illustrated talk means getting up in front of a group and demonstrating or illustrating something from your project. You learn from the preparation and practice and your audience learns from your presentation. It teaches you how to speak and express yourself to a group. Demonstrations can be given in your club, at the county fair or in a national contest. You might give one at a community meeting or on television.

Some topics for your demonstration or talk might be:

- How to select a feeder calf.
- How to trim a calf's feet.
- The parts of a feeder calf.
- How to prepare a ration for a calf.
- How to make a rope halter.
- How to control parasites in beef cattle.
- How to prevent injuries when loading cattle.
- How to vaccinate a calf.
- Feeder calf grades.
- Cuts of beef.

You and your 4-H leader can think of other topics.

Public Speaking

Giving a speech on some phase of beef production will help you learn to express yourself and will give you a chance to learn more about beef cattle. You may want to pick a topic you don't know much about to increase your knowledge. Some topics for your speech might be:

- The beef industry in Michigan.
- The importance of beef cattle to the American people.
- The nutritive value of beef.
- By-products of beef.
- Why I chose a beef cattle project.

Judging

Livestock judging will help you learn to observe, evaluate and make decisions. It will give you a chance to see good livestock and to meet other 4-H members. Giving oral reasons will help you to feel comfortable expressing yourself.

Fitting and Showing

Fitting and showing teaches you to prepare and show an animal, as well as yourself. It teaches you to be a good showperson in and out of the ring, and it encourages good sportsmanship.

4-H Camp

Participating in activities such as 4-H camp will make you a well-

rounded 4-H member. 4-H camp is fun and provides an opportunity for you to meet other 4-H members in your county.

4-H Trips and Tours

Following are some trips and tours your club might take:

- A tour to 4-H members' homes to observe their project steers.
- A visit to the animal science farms and laboratories at Michigan State University.
- A trip through a feed manufacturing plant or a local elevator. If possible, have one of the nutritionists discuss how the livestock diets are formulated.
- A visit to the farm or ranch of a purebred beef breeder participat-

ing in a performance testing program. Have the breeder explain what he or she is doing and why.

- A visit to one or more of the various breed association field days that are scheduled each summer.
- A visit to a packing plant or food store. Emphasis should be on carcass desirability of slaughtered animals. Ask an official to explain the importance of a good carcass.
- A visit to a large livestock show or sale.

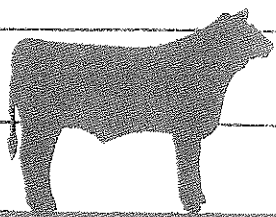
Careers in Animal Science

Use your 4-H beef project as a way of exploring careers in animal

science. Many professionals, such as farm managers, cattle buyers and veterinarians, work directly with animals. Other professionals, such as food scientists, meat cutters or meat inspectors, work with animal products.

With the help of your 4-H leader, make a list of all the careers related to animal science. Choose three or four careers from your list and investigate them. You may want to present your findings at your 4-H club meeting so others can benefit from your research.





References

Practices used in the beef cattle industry change as new technology becomes available. As you make decisions concerning your 4-H beef project, you will want to obtain the most current information. Current information is available from a number of sources.

- Michigan State University produces numerous publications and audiovisual materials dealing with various phases of beef production. Contact your county Extension office for this information.

- 4-H offers special learning opportunities for 4-H'ers in the

beef project. Visit with your county 4-H and youth leader for more information concerning educational activities at the county, area and state levels.

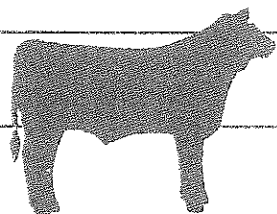
- Materials on beef and other meats can be obtained from the National Live Stock and Meat Board, 444 North Michigan Ave., Chicago, IL 60611.

- The U.S. Department of Agriculture (USDA) publishes a number of bulletins about beef that can be obtained from your county Extension office.

- The Michigan Cattleman's Association, P.O. Box 387, DeWitt, MI 48820, provides information and educational materials about the beef industry.

- Information on beef quality assurance and other beef-related topics can be obtained from the National Cattleman's Association, 5420 S. Quebec St., Englewood, CO 80111.

- Other books dealing with beef and livestock in general may be found in your library.



American Beef Cattle Breed Associations

Listed below are some of the major beef breed associations.

- American Angus Association
3201 Frederick Blvd.
St. Joseph, MO 64501
(816) 233-3101

- American Chianina Association
P.O. Box 890
Platte City, MO 64079
(816) 431-2808

- American Gelbvieh Association
5001 National Western Dr.
Denver, CO 80216
(303) 296-9257

- American Hereford Association
1501 Wyandotte
Kansas City, MO 64101
(816) 842-3757

- American International Charolais Association
P.O. Box 20247
Kansas City, MO 64195
(816) 464-5977

- American Maine-Anjou Association
528 Livestock Exchange Bldg.
Kansas City, MO 64195
(816) 474-9555

- American Polled Hereford Association
4700 E. 63rd St.
Kansas City, MO 64130
(816) 333-7731

- American Salers Association
5600 S. Quebec
Suite 220A
Englewood, CO 80111
(303) 770-9292

- American Shorthorn Association
8288 Hascall St.
Omaha, NE 68124
(402) 393-7200

- American Simmental Association
1 Simmental Way
Bozeman, MT 59715
(300) 548-0205

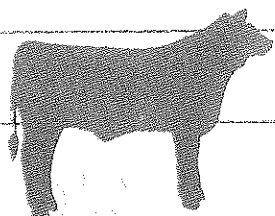
- American Tarentaise Association
P.O. Box 446
Reed Point, MT 56069
(406) 532-7911

- International Brangus Breeders Association, Inc.
P.O. Box 696020
San Antonio, TX 78269-6020
(512) 696-8231

- North American Limousin Foundation
7383 S. Alton Way
Englewood, CO 80111
(303) 296-8835

- North American South Devon Association
Box 68
Lynnville, IA 50153
(515) 527-2437

- Red Angus Association of America
4201 I-35 North
Denton, TX 76201
(817) 387-3502



Glossary

Amino acids—small compounds that are the building blocks of proteins

Average daily gain (ADG)—a measure of a calf's daily growth rate; calculated by dividing the calf's total weight gain by the number of days required to achieve that gain

Beef cattle—refers to the bovine or beef cattle family in general

Blackleg—a disease of cattle caused by an organism

Bloat—abnormal condition in ruminants due to accumulation of gasses; usually seen on the animal's upper left side

Body proteins—amino acids linked together to form protein molecules that make up muscles, skin, internal organs, bones, blood, hair and hooves

Bovine virus diarrhea—an infectious disease of cattle caused by a virus

Bull—an intact (noncastrated) male

Calcium—a macromineral cattle need to build bones and teeth and to support other life processes

Calf—young, lightweight cattle of either sex

Carbohydrates—food including starch, sugar and cellulose

Carcass traits—characteristics of cattle such as muscling and leanness, which can be estimated on live animals but accurately measured only on beef carcasses

Castration—surgical removal of the testicles in male animals

Cattle grubs—an external parasite in cattle

Conformation—animal's physical form, shape and arrangement of parts

Coccidiosis—an internal parasite in cattle

Days to finish—amount of time from birth to when an animal reaches acceptable finished weight

Diet—nutritionally balanced mixture of feed ingredients

Dressing percentage—the portion of live weight that is represented as carcass weight; calculated by dividing live weight into carcass weight and multiplying the result by 100

Dry matter (basis)—feed after water content has been removed

Enterotoxemia—a disease caused by the secretion of toxins into the digestive system

Feed efficiency value—a measure of how many pounds of feed are required for the cattle to gain 1 pound; calculated by dividing the weight gain of an animal into the pounds of feed it eats

Feeder calf—an animal that needs further feeding before marketing as a finished animal

Finish—amount of fat cover on an animal

Foot rot—disease caused by an organism that affects the hoof and surrounding area

Frame size—an animal's size and stature relative to its age

Free-choice—a feeding system that offers feed ingredients cafeteria-style to the cattle

Going off feed—an animal's reluctance to eat

Growth rate—rate of weight gain

Heifer—female cattle less than two years old that have not had calves

Infectious bovine rhinotracheitis—a disease of cattle caused by a virus; rednose

Malignant edema—a disease of cattle caused by an organism

Market price—the normal selling price (value) of cattle on any given day

Market steer—finished cattle that are ready for marketing

Minerals—elements required by the cattle to build bones and teeth and to support other life processes

Phosphorus—a macromineral required by cattle to build bones and teeth and to support other life processes

Pinkeye—a disease caused by a bacteria

Pneumonia—inflammation of the lungs that results in breathing difficulties

<p>Production traits--characteristics of beef measured by beef producers dealing with growth rate, feed efficiency and soundness</p> <p>Protein--a dietary nutrient that supplies amino acids to the calf</p> <p>Protein supplement--an ingredient of cattle diets that supplies protein, vitamins and minerals to the calf</p> <p>Quality assurance--the conscious effort of beef producers to provide quality beef products that are residue-safe for consumers</p> <p>Quality Grade--an estimation of the eating quality of beef products</p> <p>Ration--the amount of feed consumed by a calf in one day</p> <p>Red nose--see infectious bovine rhinotracheitis</p> <p>Residue avoidance--following withdrawal times for medications, properly managing facilities and monitoring beef environments to prevent residue</p> <p>Ribeye area--area of the major muscle in the loin; determined by cutting the loin of a beef carcass cross-wise and measuring the area of the exposed muscle.</p> <p>Ribfat depth--a measure of the thickness of the fat layer covering a calf's back.</p> <p>Ringworm--a contagious fungus that causes hair loss</p> <p>Ruminant--an animal that has four stomach compartments (rumen, reticulum, omasum and abomasum)</p> <p>Shipping fever--a respiratory disease of cattle</p> <p>Steer--a castrated male</p> <p>Thriftiness--general healthy appearance</p>	<p>Toxin--a poison produced by organisms</p> <p>Urinary calculi--a disease caused by improper balance or insufficient levels of minerals; water belly</p> <p>Vitamins--dietary nutrients needed in very small amounts for the health of eyes, nasal passages and lungs; for strong bones; for blood clotting; and for other body functions</p> <p>Warts--a viral infection of the skin</p> <p>Water belly--see urinary calculi</p> <p>Withdrawal time--the length of time that medications must be removed from a cattle before slaughter</p> <p>Yield grade--an estimation of the edible product in a beef carcass</p>	
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