

# INTRODUCTION

This manual has been developed as a study guide for the Florida State Fair Skillathon which is part of the Champion Youth Program. The topic for this year's Skillathon is **reproductive management**. Animal reproduction has become a complex science that involves a series of physiological and psychological events that must be properly timed and managed. Reproduction has at least three purposes within the animal industry: 1) perpetuation of the species; 2) genetic improvement; and 3) to provide food.

The Florida State Fair recognizes that agricultural education instructors, 4H agents, parents, and leaders provide the traditional and logical instructional link between youth, their livestock projects and current trends in the animal agriculture industry. **PLEASE NOTE:** This manual is provided as a **study guide** for the skillathon competition and should be used as an additional aid to ongoing educational programs.

Sections are labeled **Junior, Intermediate & Senior, Intermediate & Senior, or Senior** to help exhibitors and educators identify which materials are required for each age level.

**\*\*** Denotes additional information in the study manual for preparing for the Champion of Champions competition.

The knowledge and skills vary by age group and may include:

**Juniors (age 8-10 as of September 1, 2011)**

Breed Identification  
Selection: Visual Evaluation

**Intermediates (age 11-13 as of September 1, 2011)**

all of the above plus...  
Male and Female Reproductive Anatomy  
Reproductive Functions  
Processing Newborns  
Reproductive Equipment & Use

**Seniors (age 14 and over as of September 1, 2011)**

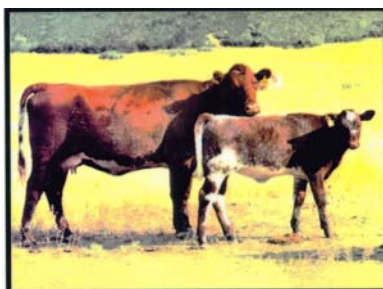
all of the above plus....  
Breeding Management Practices  
Selection: Pedigree/Performance Evaluation

**GOOD LUCK!**

# Animal Breed Identification

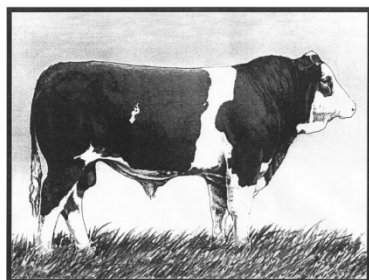
Animals are selected for traits or characteristics that are considered economically important. Though most of our livestock industries use crossbreeding systems, it is still important to consider the purebred animals that contributed the genetics to the composite breeds we see today. A purebred animal is one that has the characteristics defined by the breed registry and purebreds are expected to pass those traits on to their offspring with a high degree of predictability. When animals of different breeds are mated, we call it crossbreeding. Some crossbred animals are now listed as purebreds because they have a set of traits that they consistently pass on and they have established a breed registry. Some breeds of beef cattle and their descriptions are listed below.

## BREEDS:



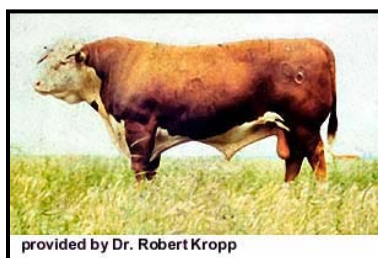
### **Shorthorn (American Shorthorn Association):**

This breed was brought to the United States from England in 1783. These animals can be red, white or roan in color. They are noted for their good disposition and mothering and milking abilities.



### **Simmental (American Simmental Association):**

This breed was imported into the United States around 1887 from Switzerland, France and Germany. These animals have red to dark red, spotted bodies with white to light straw faces. They are noted for their fast growth and milking abilities.



provided by Dr. Robert Kropp

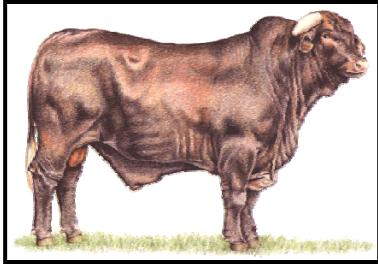
### **Hereford (The American Hereford Association):**

This breed was developed in England and brought to the United States in 1817. They have red bodies with white faces, and are known for their foraging ability, vigor, hardiness and quiet dispositions. A polled breed was developed in the U.S. from the original horned Herefords but the two breeds currently have one combined registry.



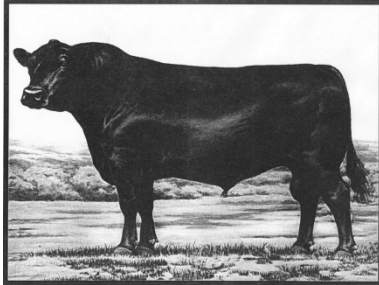
### **Limousin (North American Limousin Foundation):**

This breed, originating in the west-central part of France, was imported to North America (Canada) in 1968. They are solid to golden-red in color with lighter circles around the eyes and muzzle. The excellent carcass traits and feed efficiency make them highly sought after by packers and percentage Limousin steers have had great success in the showing.



**Santa Gertrudis (Santa Gertrudis Breeders International):**

At the turn of the century the King Ranch in Texas hoped to improve the performance of range cattle by crossing Shorthorn cows with Brahman/Shorthorn bulls. The USDA recognized Santa Gertrudis as a purebred breed in 1940. With 5/8 Shorthorn and 3/8 Brahman influence, these cattle are known for their growth rate, long life and hardiness.



**Angus (American Angus Association):**

This breed originating in Scotland came to the US in 1873 and is now the largest beef registry. Angus are polled with a black, smooth coat. They are known for their carcass quality, milking, mothering and reproductive ability. There is also a Red Angus registry which was the first performance breed registry.



**Brahman (American Brahman Breeders Association):**

Between 1910 and 1920, imported Bos Indicus type bulls (primarily Guzerat, Nellore and Gir) were bred to US cows and then to the descendants to produce the American Brahman. The color of these animals varies from light gray or red to almost black. Ability to withstand heat and insects are two of the breed's most important economic traits.



**Charolais (American-International Charolais Association):**

This breed was developed in France and imported into the United States from Mexico in the 1930's. These animals are large and white. They are noted for their fast growth rate and lean meat, thus are popular in cross breeding programs.



**Brangus (International Brangus Breeders Association):**

This breed was developed to utilize the superior traits carcass traits of Angus (5/8) with the superior production traits of Brahman cattle (3/8). They are known for their resistance to heat and humidity, as well as high fertility and milking ability.



**Chianina (American Chianina Association):**

This breed was developed in Italy. These animals are white with black skin pigmentation. They are large: a mature bull can weigh up to 4,000 pounds and stand 6 feet tall. They were originally used as draft animals but are now used primarily in terminal crossbreeding programs in the U.S.



**Gelbvieh (American Gelbvieh Association):**

Originating in Germany, the Gelbvieh breed was selected for meat, milk and work. Introduced into the United States in the early 1970's was through the importation of semen. The breed is red in color, with strong skin pigmentation, and horned. Polled cattle have been developed in the US. The breed reports superior fertility, calving ease, mothering ability, and growth rate of calves.



**Maine-Anjou (American Maine-Anjou Association):**

Originating in the northwestern part of France, Maine-Anjou is one of the larger breeds with mature bulls weighing from 2200 to 3100 pounds & mature cows from 1500 to 1900 pounds. Coloring is very dark red with white markings on the head, belly, rear legs and tail with white on other parts of the body common. Evolved as a dual-purpose breed, with the cows used for milk production and the bull calves fed for market, the breed was introduced into the United States in the early 1970's through the importation of semen from Canada.

Adapted from Beef Learning Laboratory Kit, The Ohio State Univ. Agric. Education Curriculum Service, 1993 and <http://www.ansi.okstate.edu/breeds/cattle>.

# Selection: Visual Evaluation

Many traits of economic importance can be evaluated by simply looking at the animal. In purebreds or registered animals, the “ideal” is usually described or illustrated by the breed registry and is referred to as breed character. There are many aspects of appearance that relate to reproductive efficiency. Most livestock show judges rely totally on the way the animal looks, moves and/or feels to make their decisions on class placings.

## Feet and Leg Structure

How well an animal can stand and move around will have a major impact on its ability to find food, mate and care for its young. Often, an animal that stands correctly will move freely while a crooked legged animal may have trouble getting around and may become sore or lame. Feet and leg structure as well as movement are important evaluation criteria for breeding animals. ***You should be able to visually recognize structural correctness as well as problems such as post legged, sickle hocked, cow hocked, splay-footed, buck-kneed, calf-kneed, and knock-kneed.***

## Muscling

There are several muscle indicators on beef cattle such as the forearm, gaskin, stifle, back, loin and round. Bulls should have thick, heavy, long muscling while heifers should be more moderately muscled. Too little muscle is undesirable but excessive muscle is also considered negative as it can interfere with movement in bulls and lower reproductive efficiency and milking ability in heifers.

## Body Structure

A long side with a level strong top line indicates faster, more efficient growth and larger mature weight. Excessively short cattle are prone to excessive fattening while excessive large cattle reach maturity later and produce calves with lower quality grades. Though frame size varies by breed type and use, generally a moderate size is preferred. Depth of body and spring of rib are indicators of body capacity, an important trait in selection of beef breeding animals.

## Reproductive Soundness

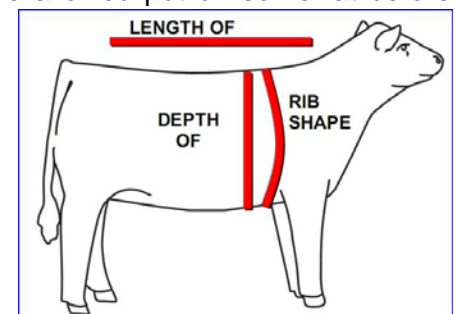
Testosterone is the male hormone that causes bulls to be heavy boned and heavy muscled, coarse haired, often with a cresty, thick neck. Testicles should be well-developed and scrotal circumference is an important evaluation tool in predicting a bull’s sperm producing potential. Cows and heifers should be more refined of bone and smoother in their muscle patterns. They should have an angular appearance, being clean in the shoulders, wide in the hooks, and long from hooks to pins. They should have udders with strong attachments and teats that are not too small and not too big.

## Degree of Fat

The amount of fat or finish on a breeding animal will vary by age, season, feed available and level of production. Excessive fat in bulls may cause a reduction in sex drive (libido) and too much fat in cows and heifers can reduce fertility and mild production. Cows should be allowed put on some fat before calving.

***You should take the time to look at live cattle as well as breed magazines and judging manuals in order to get a better idea of what the descriptions above look like.*** A good website to visit to see photographs and study in more detail is:

[http://www.uaex.edu/Other\\_Areas/publications/PDF/MP-398.pdf](http://www.uaex.edu/Other_Areas/publications/PDF/MP-398.pdf)



# Reproduction Overview\*\*

## Reproductive Process in Cattle

Sexual reproduction begins with mating, called **copulation**, when the bull deposits **semen** (seminal fluid + sperm) into the reproductive tract of the cow or heifer. This occurs during the time period called **estrus** or heat, when the female will accept the male for breeding. **Ovulation** is the release of the **egg** cell from the **follicle** on the **ovary**. **Fertilization** is the union of the sperm and the egg cell. Cows typically give birth to only one calf at a time but release of more than one egg is possible and twins are not out of the question. **Gestation** is the period of time during which the animal is pregnant and **parturition** is the process of giving birth called calving. **Dystocia** is a difficult birth and cows or heifers experiencing dystocia may have trouble re-breeding.



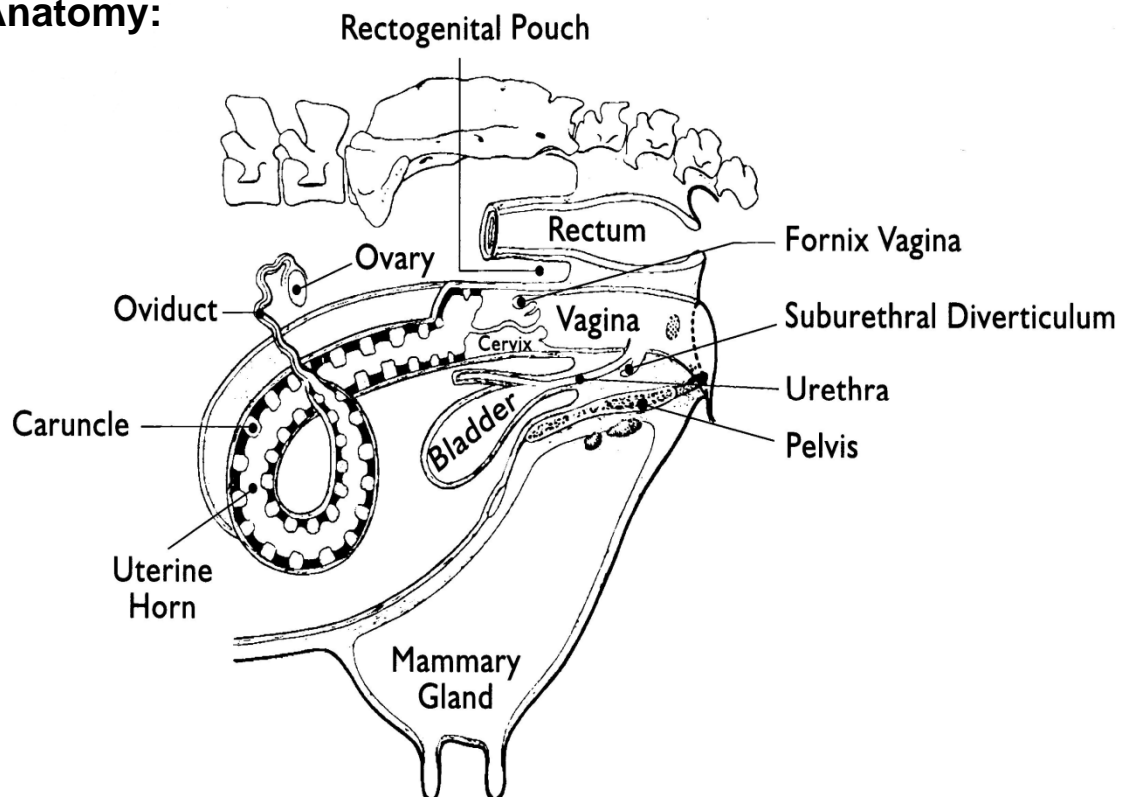
## Reproductive Anatomy

Most cows will give birth to a single calf each year. The way an animal reproduces will determine the type of reproductive tract it has. Understanding reproductive anatomy is basic to managing reproduction.

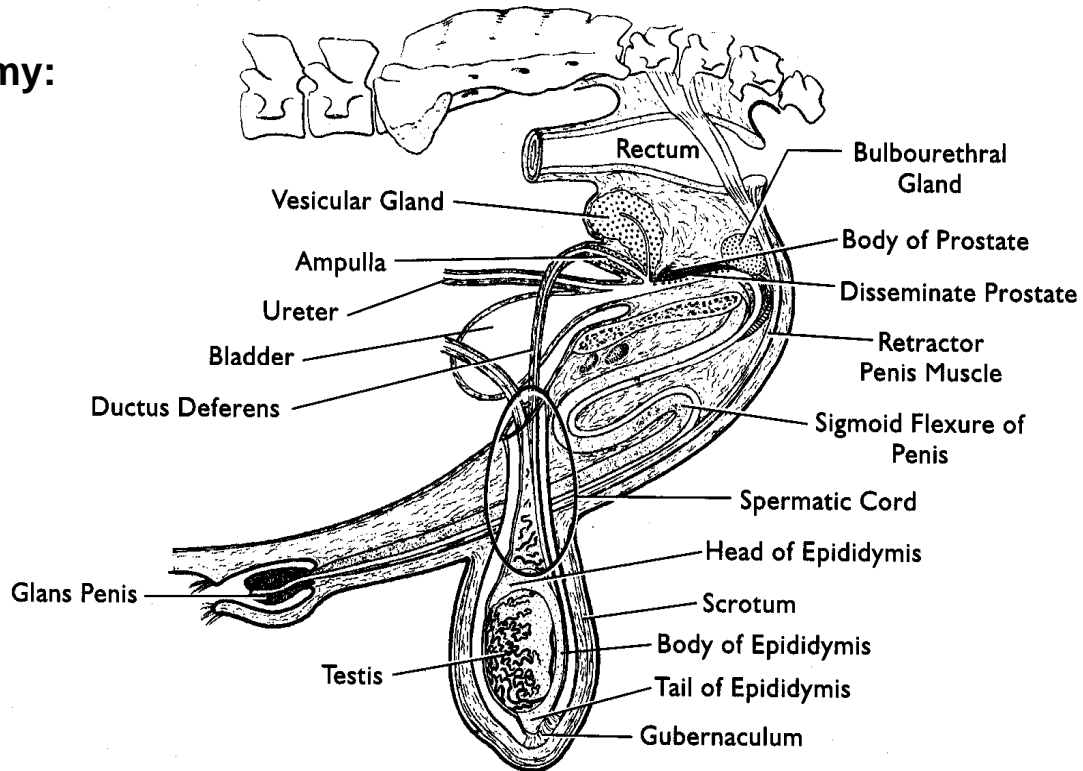
## Gender Names and Terminology

Baby – Calf, Young Female – heifer, Mature Female – Cow, Male – Bull, Castrated Male – Steer

## Female Anatomy:



## Male Anatomy:



## Reproductive Functions



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Once you know the names of all of the reproductive structures, the next step is to understand the role of each part. Understanding normal functional anatomy allows the manager to apply reproductive management tools.

### Female Functional Anatomy

**Ovaries** The paired female gonads that produce eggs and hormones. Follicles are blister-like structures that grow on the ovary which produce the hormone estrogen, causing heat or estrus, and release the egg at ovulation (rupture of the follicle). Following ovulation, the remaining cells change and form the corpus luteum which produces the hormone progesterone to maintain pregnancy.

**Oviducts** Tubes connecting the two ovaries to the uterine horns. The oviduct (also called the Fallopian Tube) transports egg and sperm cells, is the site of fertilization and moves the fertilized ova (embryo) into the uterus. The infundibulum is the funnel shaped opening at the end of each oviduct that partially surrounds the ovary and “catches” the egg at ovulation.

**Uterus** Supports, nourishes, and protects the embryo as it develops and expels the fetus at parturition. Walls are soft and spongy in non-pregnant animals. It is made up of the uterine body which divides into two uterine horns.

<b>Cervix</b>	A thick-walled tube with an irregular passageway that serves as a connection between the outside organs and the delicate inner organs. It contains tough cartilage, making it firm and dense to the touch. The cervix prevents microbial contamination of the uterus and closes tightly during pregnancy and then must open (dilate) at calving. It serves as a reservoir for sperm, a passageway for sperm during estrus.
<b>Vagina</b>	The passageway from the vulva to the cervix that serves as the organ of copulation and birth canal during parturition. This is the site of semen deposition. The rear of the vagina conducts urine to the outside of the cow.
<b>Urethra</b>	Tube connecting the bladder to the vagina that serves as a passageway for urine excretion.
<b>Vulva</b>	External opening of the female reproductive tract.

## Male Functional Anatomy

<b>Scrotum</b>	External sac; contains, supports, protects and provides temperature control for the testes.
<b>Testicles</b> <b>or Testes</b>	Paired male gonads that produce the sperm cells and the male sex hormone, testosterone.
<b>Epididymis</b>	Long coiled tube that sperm enter upon leaving the testicles. It is the site of sperm storage, concentration, maturation and transport. It is subdivided into the head, body and tail.
<b>Ductus</b> and <b>deferens</b>	Long tubes that connect the epididymis in the scrotum to the urethra near the bladder, transport sperm. The ampulla is the section of the vas deferens that dumps into the urethra.
<b>Vesicular Glands</b>	Paired glands that secrete seminal fluid into the urethra which serves as a transportation medium and provides nutrition and protection for sperm.
<b>Prostate Gland</b>	Found near the urethra and the bladder. It adds fluid to the semen.
<b>Bulbourethral Glands</b>	(Also called the Cowpers gland.) Secretes a fluid similar to that of the seminal fluid which flushes urine residue from the urethra.
<b>Urethra</b>	Tube that passes through penis and is the common passageway for semen and urine.
<b>Penis</b>	Organ used for copulation that deposits sperm into the female reproductive tract. An S-shaped bend called the sigmoid flexure allows the penis to be retracted into the body by the <b>retractor penis muscles</b> .
<b>Glans Penis</b>	The free end of the penis containing sensory nerves and the opening of the urethra.
<b>Prepuce</b>	Fold of skin serving to protect the penis by enclosing the free end when retracted.



# Pregnancy and Parturition

It is important to know if a cow is pregnant in order to feed her properly and to prepare for delivery. After breeding, failure to return to estrus is the first sign of pregnancy. In cattle, a gloved arm can be placed into the rectum and the uterus can be palpated (felt) for pregnancy after about 40 days. In addition, an ultrasound machine can be used to tell if the female is pregnant at about 25 days. This machine sends out sound waves which bounce back and register as a picture on a monitor.

If you know when a cow was bred and the length of gestation, you can figure out when to expect her to give birth. Pregnancy ends with the process of parturition. There are several signs of approaching birth: udder fills with milk, teats appear full, vulva relaxes and stretches and may appear moist, female becomes restless, may go off by herself.

As delivery begins, the female usually lies down and begins to push the calf out with her abdominal and uterine muscles. The first thing to appear from the vulva is the 'water bag' followed by two front feet and a nose.

When everything is normal, cows or heifers deliver their offspring without assistance. Sometimes things don't go well and the manager must help by carefully pulling along with the contractions of the female (pushes). Once the calf is delivered, the placenta (afterbirth) should be passed out as well. Difficult births (dystocia) and retained placenta usually lead to problems with the cow breeding back.

## Processing Calves

The newborn calf is fragile and requires special care. They must nurse within the first few hours after birth in order to get antibodies to fight disease. The first milk, called *colostrum*, contains antibodies, is thick and yellow and is only produced for a few days. If possible, to help prevent infection, the navel stump is dipped in a disinfectant like iodine or chlorhexadine. If calves are to be castrated (testicles removed), it should be carried out as early as possible to reduce stress, minimize bleeding and prevent the development of secondary sex characteristics. Other management practices carried out for identification or safety (like ear tagging or dehorning) should be done as early as possible for similar reasons. You should be able to describe the equipment used and/or demonstrate the techniques involved in the processes listed below.

### Castration

Bull calves are castrated in several different ways. The most common method of castration in cattle is the use of a knife. This method should be used at times of the year when flies are not a problem. Calves should not be more than 3 to 4 months of age. In this method the lower 1/3 of the scrotum is cut off and the testicles are removed by scraping the spermatic cord with the knife blade. The wound is left open to drain. Infection and excessive bleeding can occur. There are two methods that are used which are bloodless. One method is the use of Burdizzo pinchers which crush the cords above the testicles. However, if not used correctly, they may not crush all of the cords and the animal may not be truly castrated. Another method is the use of elastrator bands. A special instrument is used to place a tight rubber band around the scrotum above the testicles. This cuts-off the blood supply to the testicles and will cause the testicles to waste away. There is no open wound with either of the last two methods but complications may still occur. <http://www.youtube.com/watch?v=ReNPrI2u2O4>  
[http://www.dpi.nsw.gov.au/data/assets/pdf\\_file/0008/174167/castrating-calves.pdf](http://www.dpi.nsw.gov.au/data/assets/pdf_file/0008/174167/castrating-calves.pdf)

## Dehorning

There are several reasons for dehorning calves. First, horned calves often bring less when sold. When calves are dehorned, they require less space in feedlots and trailers and there is less chance of cattle bruising one another. They also cause less damage to facilities. Calves should be dehorned when they are very young. It is much easier to handle calves and it causes less stress to them when they are young. If possible do not dehorn during fly season. Several methods are in use for dehorning cattle. One method is the use of chemicals. These can be in the form of liquids, pastes, or caustic sticks which are applied to the horn button. The chemical must be dry before returning the calf to the mother. They must also be kept dry for several days after the chemical is applied. If using a paste, the hair does not need to be clipped first. Horns or horn buds can be removed with a hot iron for a fast and almost bloodless removal. Calves under 60 days of age may be dehorned with spoons, gouges, or tubes. Animals that have been dehorned by any cutting method should be watched closely to see that bleeding has stopped. <http://www.thebeefsite.com/articles/2261/dehorning-of-calves>

# Reproduction Equipment and Use



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## Equipment

It is important to recognize different equipment that is used in breeding, aiding parturition, and processing newborns. Following are some ideas of things to be able to identify. There may be others that are not listed so know about the equipment that is used for practices which are explained in this manual. Livestock supply companies' catalogs are a good study reference.

Semen tank	Thermometer
Breeding gun	Straw cutter or scissors
Breeding sheath	Forceps
Breeding gloves	Lubricant
Electric thaw box or thermos and water	Speculum
Insemination pipette	Ultrasound machine
Implant gun	Artificial vagina
Heat detection devices	Obstetrics chains
Calf puller	Scrotal circumference tape
Branding irons	Knife, scalpel
Burdizzo	Nursing bottle
Iodine/disinfectant	Syringe and needle
Horn spoons, tubes, scoops	Tattoo numbers &/or letters
Dehorning paste (chemicals), irons	Elastrator



# Breeding Management Practices

## Natural Mating

The easiest way to breed cattle is to let nature take its course. If bulls are allowed to be with the cows, they can find the ones ready to breed. The breeding season is the period of time that the cows are in the presence of the bulls and mating is occurring. Managers can limit the breeding season by removing the bulls after a specified period of time, typically 60 to 90 days. This shortens the subsequent calving season, reduces labor and increases the uniformity of the calf crop at marketing.

## Heat (Estrus) Detection

In herds where artificial insemination is to be practiced, one of the most important management practices is detecting *estrus* so that insemination can be performed at the proper time. The key to heat detection is frequent and careful visual observation of the herd. Cows in heat often attempt to mount other cows or show “riding” behavior, and stand to be mounted. Cows that are not in estrus will sometimes mount cows that are in estrus. However, mounting activity is more frequent when two or more cows are in estrus than when a single cow is in estrus. Mounting is more frequent in the evening and early morning hours than during the day, especially in the summer. Cows in estrus spend more time walking with less time resting and feeding. They may smell the vulva of other cows. Frequently they raise and switch their tail. They will have a swollen vulva and clear mucus can often be seen streaming from the vulva. Cows in other periods of the estrous cycle will not stand to be mounted. Therefore, standing for mounting is the strongest single behavioral indication of estrus. There are several aids in determining heat in cattle. Some of these aids include a chin-ball marker placed on a teaser animal or paint stick on the tailhead, and heat-check patches. A good record keeping system is critical for managing breeding and parturition. When managing an estrus detection and AI program, the actual insemination is conducted 8 to 12 hrs. after an animal is detected in estrus. Therefore, most producers use the AM/PM rule: cattle detected in heat in the AM are bred in the PM, those detected in heat in the PM are bred in the AM.

Hormones of the estrous cycle are listed below:

Estrogen – from the follicle on the ovary; causes estrus

Progesterone – from the corpus luteum (CL) on the ovary formed after ovulation; maintains pregnancy, prevents estrus and ovulation

Prostaglandin – from the uterus of the non-pregnant cow; causes regression of the CL and return to estrus.

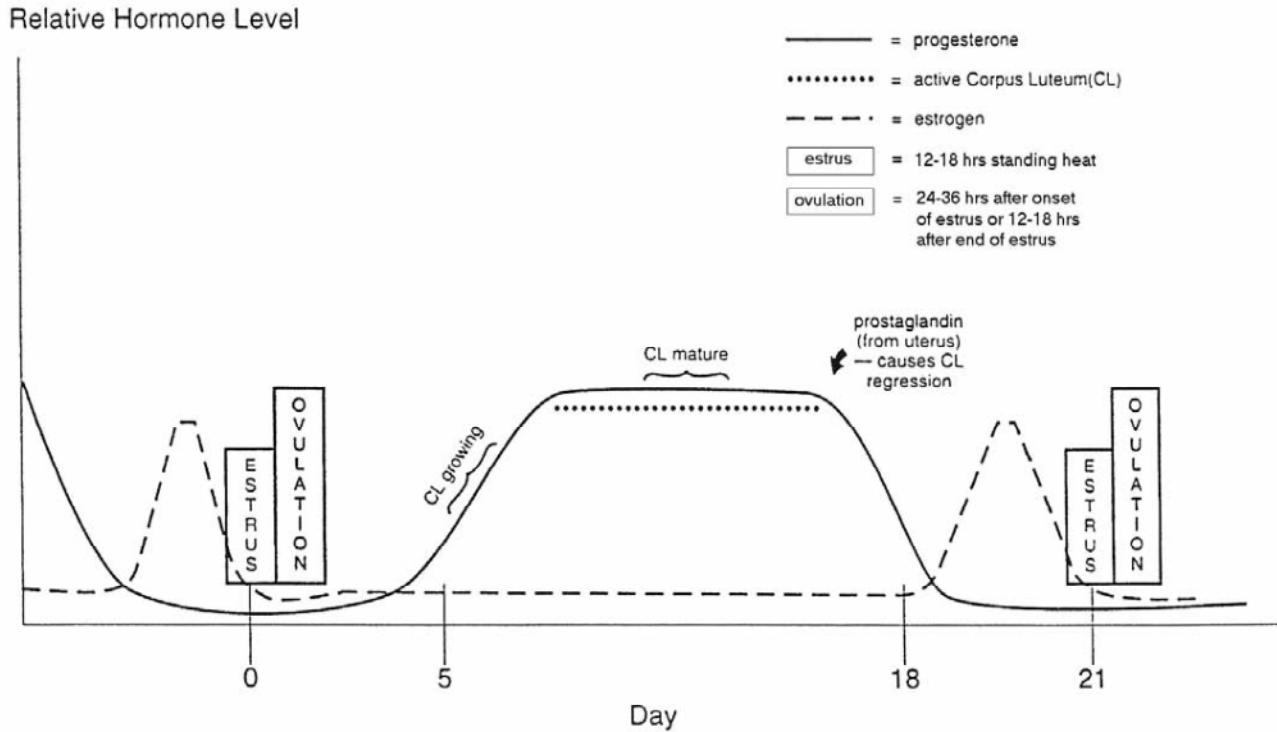
Follicle Stimulating Hormone (FSH) – causes follicle recruitment and growth and production of estrogen

Luteinizing Hormone (LH) – stimulate follicle maturation, causes ovulation, stimulates formation and maintenance of CL

Gonadotropin Releasing Hormone (GnRH) – from the hypothalamus (brain) causes FSH and LH release



# Seniors



## Timing of Reproductive events:

Breed/Type	Puberty*		Breeding Information*		
	Weight (lbs)	Age (mos)	Estrus (hrs)	Estrous Cycle (days)	Gestation Length (days)
Bos Taurus	575	10-15	12-18	21	279-284
Bos Indicus	675	17-27	4 - 8	21	293

## Artificial Insemination

If you do not own a bull, or if you want to breed to an animal that is too expensive for you to own, it is possible to buy semen and breed artificially. Semen is collected from genetically superior sires where it is processed, frozen, and stored for later use. Artificial insemination (AI) accelerates genetic progress by allowing outstanding bulls to breed more cows than they could with natural mating. Key components of artificial insemination are: selected matings, heat detection, semen collection, proper handling and storage of semen, proper insemination technique, and accurate record keeping. AI is practiced extensively in dairy cattle but to a lesser degree in beef cattle. Success (high conception rate) depends on all of the factors listed above and management of the cattle, particularly with regard to nutrition and health.



### Artificial Insemination Procedures

Bull semen is typically stored in 0.5ml straws in a liquid nitrogen tank at -320°F. When you have decided which bull you are going to use you must go to the tank and retrieve a straw to be used to breed the cow. While at the tank you must pull out the plug and select the canister that has the correct semen. Pull the canister up into the neck until the cane is 2 to 3 inches below the top of the tank. Locate the cane that you want and pull it out. Using the forceps, remove one of the straws from the cane. Now the canister should be let back down into the tank so as to prevent any damage to the semen via heat stress.

Quickly place the straw of semen into a thaw box or thermos which should have water temperature of 95 degrees F. The semen should be left in the water for approximately 30-40 seconds.

Before loading the insemination gun, warm the barrel of the gun by stroking it vigorously five or six times. This prevents the sperm from being cold shocked when the warm straw touches the gun. The plunger on the gun must also be pulled back about 6 inches.

Next, allow the split end of the individually wrapped breeding sheath to be exposed from the plastic about 3 inches while keeping the rest of the sheath covered. After 30-40 seconds, remove the straw from the water and wipe it dry with a paper towel.

Check the printing on the straw to see that you retrieved the correct semen and make sure the air bubble is at the crimped end. If the bubble is not at the crimped end, *gently* tap the straw until the bubble is in the correct place. Place the cotton plug end of the straw into the gun and it will stop at the right depth.

Cut the straw about 1/4 of an inch from the crimped laboratory seal. Make sure that the cut is at a 90 degree angle. Next slide the sheath over the straw and gun. Make sure that the ring is half way on the gun to allow the sheath to slide under it. Slide the sheath as far as it will go and push the ring tightly around it. The gun is now ready for breeding. Keep the gun away from any contaminants and the sun.

After restraining the cow, insert a lubricated, gloved left hand into the rectum of the cow to locate and grasp the cervix. The straw gun is inserted through the vulva and into the vagina at a slight angle to prevent it from entering the urethra. Move the gun through the vagina and to the opening of the cervix. Manipulations of the cervix with your hand in the rectum allow the straw gun to be threaded through the cervical channel, stopping at the anterior end. The plunger is depressed to release the semen into the uterus. The straw gun is removed, and the insemination recorded.

Detailed descriptions and illustrations can be found at: <http://edis.ifas.ufl.edu/an119>

## **Estrous Synchronization in Beef Cattle**

Synchronization is the altering of the normal estrous cycle through the use of hormones to cause cows to come into heat during a specific time period. Synchronized breeding reduces time required for heat detection and breeding. There are several ways to synchronize cattle, some are listed below. By understanding how each product works, the best system can be selected. Estrous *cycling* females respond most effectively to synchronization so most cows must have passed the postpartum anestrus, and heifers reached puberty. For any of the systems to work, it is important to have good nutritional management.

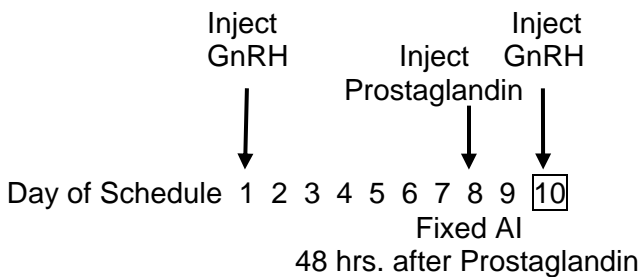
**Prostaglandin Method**

Prostaglandin given to a cycling cow any time between day 6 and 17 of her cycle will cause her to come into heat within 2 to 5 days. Prostaglandin works by causing the corpus luteum to regress so it *only works in cycling cows*. Cows may be bred on observed heat up 120 hours after the injection. Prostaglandins can cause abortion, so it is important to know that the animal that will be administered the drug is not already pregnant. There are many different brands of this hormone that are marketed under many different names (ex. Lutylase®, Estrumate®, Prostamate®). The dosage and route of administration depend on the manufacturer’s recommendations. All can be injected intramuscularly and preferably in the triangle area of the neck between the shoulder and head. There are one shot and two shot options used in combination with estrus detection and AI.

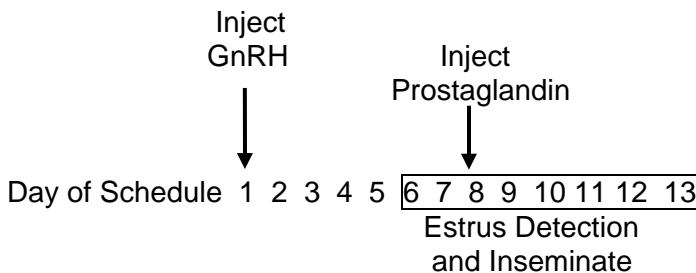
**GnRH and Prostaglandins**

Begin with an injection of the hormone GnRH to initiate ovulation and follicle turnover so a majority of cattle have a fertile follicle to ovulate at AI. Seven days later prostaglandin is given to regress the corpus luteum. There are several AI protocols that can be used with the GnRH + prostaglandin system depending on a producer’s ability/desire to use estrus detection and AI versus timed insemination.

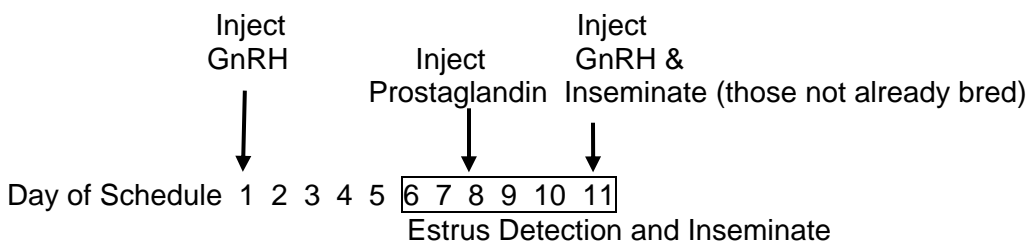
CO-Synch Program



Select-Synch Program



Hybrid-Synch



## Progestin Systems

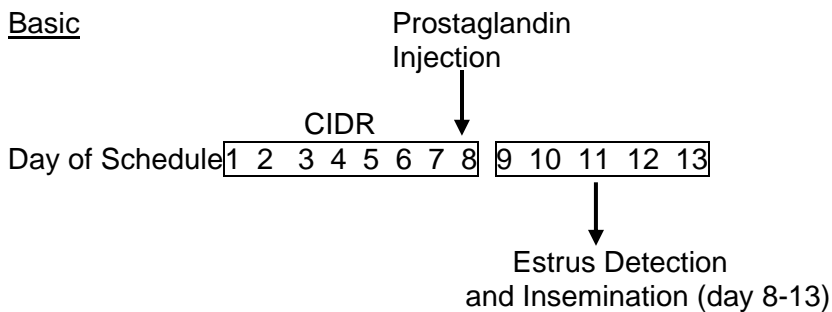
Progestins keep the cow from coming into heat and ovulating during the duration of the progestin even if the animal's CL regresses. An added benefit to a progestin is that it can induce estrus in some anestrus cows and heifers that have not reached puberty. Depending on the progestins, they are approved for use in lactating beef and dairy cows as well as beef and dairy heifers. There are different progestin products but most are used in combination with prostaglandin.

### Intravaginal Progestin Inserts

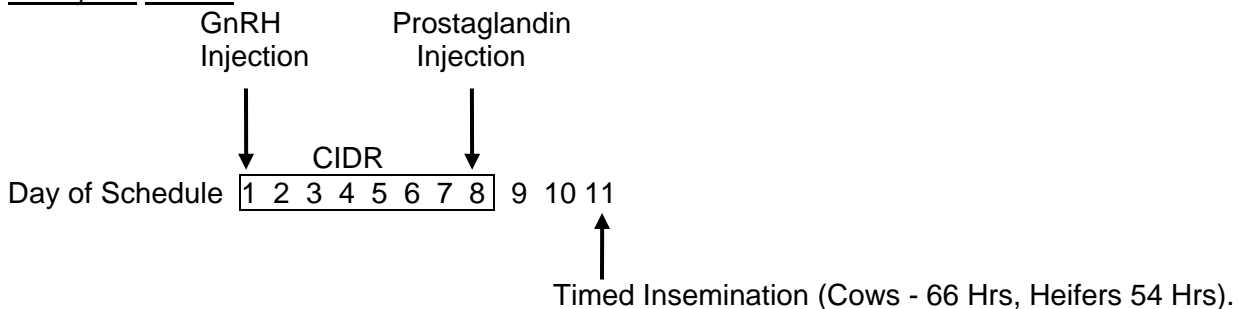
The primary progestin used by beef producers today is Controlled Internal Drug Release device or CIDR® for short. The device is T-shaped and impregnated with progesterone. The CIDR is inserted into the vagina with a special applicator and left for 7 days with a shot of prostaglandin administered on the day the device is removed. The CIDR releases progesterone into the blood stream to prevent the animal from coming into estrus. The CIDR is used in conjunction with the GnRH + prostaglandin synchronization and AI systems. Hence, one can just superimposed the CIDR on top of any of the three GnRH + prostaglandin systems previously described in the GnRH and prostaglandin section. The two primary benefits of the CIDR are that estrus detection can be eliminated for the two days before prostaglandin in the GnRH + prostaglandin systems and the CIDR induces estrus in some anestrus cattle.

### Estrus Synchronization Using CIDR

#### Basic



#### Co-Synch +CIDR

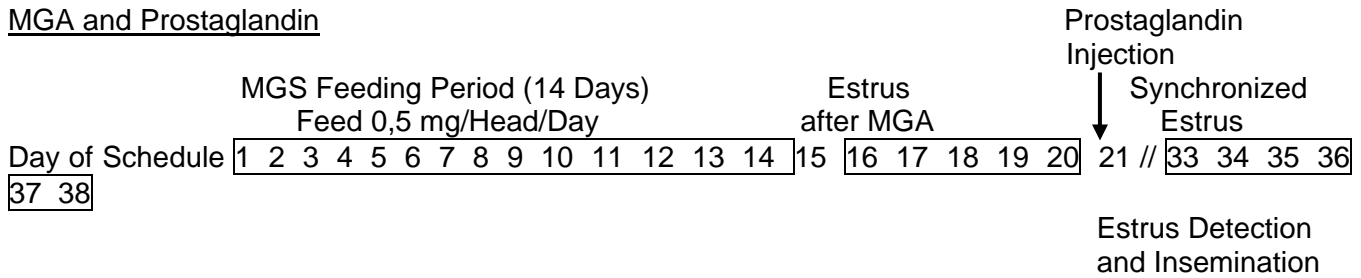


### MGA and Prostaglandin

Melengestrol acetate (MGA) is an orally active progestin that will suppress heat and prevent ovulation when consumed by cattle on a daily basis. MGA is label approved for use in beef and dairy heifers. MGA can be fed as a top dress or mixed into a batch of feed for 14 days. On day 14 MGA is stopped and animals will show estrus over the following 8 days. The cattle are not AI at this estrus since it is an infertile estrus. An injection of prostaglandin is given 19 days after the last day of MGA feeding. There

are two AI systems that can be used including 1) heat detection and AI for 6 days after prostaglandin; 2) heat detection and AI for 72 hours after prostaglandin and all cattle not showing heat receive GnRH and are timed-AI 72 – 84 hours after prostaglandin.

MGA and Prostaglandin



Please go to the following website to review more detail regarding the schedules and procedures described above: [http://www.uaex.edu/Other\\_Areas/publications/PDF/mp383.pdf](http://www.uaex.edu/Other_Areas/publications/PDF/mp383.pdf)



## Selection: Pedigree Performance/Evaluation

Proper selection is a critical factor in establishing a good breeding program. The goal of cattle selection is to produce cattle that will yield/produce high quality products at a low cost to the rancher and the consumer. This goal is the foundation of the standard “ideal animal” in the various species. That is, the animal that expresses, to the highest degree, traits that are of economic importance like milking ability, growth rate, birthing ease, or carcass merit is the type selected.

The expression of observable or measurable traits is called *phenotype*. Phenotype is affected by both heredity and environment. The inherited portion of a trait is referred to as *genotype*. How well an animal expresses the genotype is affected by the environment in which it is raised. Therefore, when making selected matings, use and management of the offspring should be considered.

We use both visual appraisal and performance records when selecting breeding stock. The following section outlines various traits and methods used to evaluate breeding animals. Use and management are expressed as *scenarios*.

### Performance Evaluation

How an animal looks may be important in the show ring but how that animal performs is more important to the rancher and packer. With advancements in the understanding of heredity and the increased use of computers for keeping records, the use of genetic information in selected matings has become easier. By keeping records on desirable traits and then carefully selecting bulls and cows to be mated using the available data, producers can improve the genetics, and thus the performance of their offspring.

## **Performance Data**

There are several types of performance data that, when used properly, are important tools in the selection and genetic improvement of animals. Many breed associations and commodity groups provide information, assistance and technical support to producers wishing to collect and use performance data.

## **Adjusted Performance**

Adjusted performance consists of an animal's actual performance record with an adjustment for age or other factors. For example, instead of weighing animals at the same day of age, they are weighed on the same day and the weights are adjusted for age. Below are examples of the most common data used in beef cattle. The desirability of a high or low value for the trait is dependant on the scenario.

Birthweight    Weaning weight    Yearling weight    Scrotal circumference    Maternal milk

## **Ratios**

Ratios rank an individual's deviation of performance from the herd average in a certain trait. The herd average is represented by a ratio of 100. For example, if a bull had a weaning weight ratio of 110, then his weaning weight was 10% higher than the herd average.

## **Expected Progeny Differences (EPDs)**

EPDs estimate how future progeny of an animal will compare to progeny of other animals within a breed and are computed in the units of the trait being measured. They are accompanied by an accuracy value between 0 and 1 which represents the reliability of the prediction. EPDs are based on an animal's performance along with measures of the performance of an animal's relatives, including ancestors, siblings and progeny. When comparing EPDs for selections, always keep in mind the situation or scenario in which the animals are to be used. For instance, a low birthweight EPD would be highly desirable for a bull that is to be bred to first calf heifers.

## **Selection Services**

The science of combining genetic and statistical models is called Animal Breeding (not to be confused with reproduction). Most breed associations provide their membership with extensive data on the cattle in their registry. Semen companies do as well. Bull test stations across the country contribute to the data. The organization dedicated to "improving the beef industry through performance evaluation" is the Beef Improvement Federation. For definitions of performance evaluation terms, go to: <http://documents.crinet.com/CRI-International/Beef/beefterm.pdf>

# **Advanced Breeding Technologies\*\***

Biotechnology continues to provide additional options in breeding management. Many are extremely expensive and not available to the average producer. However, as with most technology, as our knowledge advances, the cost typically comes down. Below are a few that you may hear/read about:

Sire catalogs – you can shop through on-line catalogs for bulls that fit your needs

Sexed semen – 90% accuracy on male or female bearing sperm is commercially available

Superovulation, Embryo Collection, Embryo transfer – allows a superior cow to produce large numbers of fertile eggs that can be transferred to recipient cows that will carry them to term. Embryos can be frozen and stored indefinitely.

DNA testing – DNA kits can be purchased and you can test your cows or bulls for specific genetic disorders

Single Nucleotide Polymorphism or SNP – There are 50,000 genetic “markers” that can be identified and they are use to predict the animal’s breeding values – often expressed as EPD’s

# FSF BEEF SHOWMANSHIP

**ATTIRE:** Required Dress Code: All exhibitors will be required to be clean and neat and dressed in white, green, blue or black jeans or slacks with a solid white shirt with a white collar. FFA and 4-H accessories are strongly recommended. No caps or hats. Closed-toed shoes or boots are required.



## Training Your Animal for Showmanship:

Begin training your beef animal as soon as possible. It takes hours upon hours to effectively halter break your animal, and teach it to respond to commands on the halter and show stick. Practicing often over short periods has been proven a more effective training technique than a few, long sessions. There are many methods of teaching an animal to give in to halter pressure. Choose the method that is the safest and least stressful for the animal considering your own abilities, help available, facilities and equipment Train the heifer or steer to tie, walk, stop and set up easily and quickly when asked.

## In the Show Ring:

**Use of Show Stick** -There are three main purposes for the show stick in beef showmanship.

- 1. Placing the Feet** To move the hind feet backward, push back on the halter and apply pressure with the show stick on the soft part of the animal's hoof, between the toes. However, remember not to jab too hard, for this is a tender area. To move a hind foot forward, pull forward on the halter and apply pressure with the show stick under the animal's dewclaw. If you find that the animal's hind legs are too close together, you can apply pressure with the show stick on the inside of the animal's leg, just above the hoof.
- 2. Keeping the Topline Straight** is important for the overall appearance of your animal in the judge's eye. To straighten the topline, apply pressure to the underline or place the hook of the stick inside the rear flank and apply slight pressure.
- 3. Calming and Controlling** Occasionally stroking the animal's underline as you place its feet or as it is standing still will help calm and relax the animal, especially if this technique is used during practice sessions. The show stick can also be used to keep your animal moving at a comfortable pace that is not too fast. Hold the stick in your left hand when leading and use the butt end of the show stick to tap the animal's nose if necessary to slow him down.
- 4. Moving in and out of line.** In moving your animal out the line and moving into another position, there are three general situations you are likely to encounter:
  - a.** The first is when you are pulled in very close to the rail. In this situation, the only thing you can do is back your animal out of the line and lead him to the new position.
  - b.** The second is when you are near the center of the line and have plenty of room between your animal's head and the rail. When told to move, pull your animal forward toward the rail, turn to the right and move back through the space the animal just vacated. When you have moved to the center of the ring, you may move into the position the judge and/or ring assistant have indicated.



c. The third situation is when you are standing near one end of the line and have adequate room between your animal's head and the rail. When instructed to move, simply pull your animal forward, circle the end of the line and pull your animal back into the position the judge has instructed.

**Comb:** All exhibitors should carry a scotch comb in their back pocket during the showmanship competition, unless the animals are slick sheared. If animals are close clipped, there is no need for a comb. The comb is used to fix the animal's coat after the judge feels for body condition on an animal. However, do not correct the hair obviously in front of the judge; wait until he/she has moved on to the next animal. For safety reasons, try to turn the teeth of the comb toward your body when carrying it in your pocket. This keeps other exhibitors from being harmed by your brush if they bump into you.

### **Proper Showmanship Procedure:**

1. Enter the show ring, circling in a clockwise direction, with a smile on your face.
2. Keep an eye on the judge and respond quickly to any instructions.
3. When pulling into a line or stopping, leave three or four feet on both sides of your animal and at least five feet between your animal's head and the edge of the ring. This space allows for more freedom of movement both for you and the judge.
4. Always keep your animal's legs set up correctly and posed in a position that accentuates the animal's best features.
  - set the hind legs squarely underneath the animal's body.
  - keep the animal's back level and its head up.
  - if the animal is high in the loin, apply pressure to the loin with a fingernail.
5. When leading, hold the halter strap in your right hand, 6 to 12 inches from the animal's head and your show stick in the left with hook down. Upon pulling into a line, switch the lead into the left hand and the show stick into the right. Always use caution when maneuvering the show stick.
6. If your animal acts up and you have to pull out of line, always turn the animal away from you.
7. For close inspection, move a half step to allow the view he/she seeks. Never step in directly front of your animal.
8. Be courteous to other exhibitors. Do not bump, crowd or strike another exhibitor's animal. However, if an animal in front of you is reluctant to move, you may assist by gently tapping it on the rump or twisting its tail.
9. Do not overwork your animal and always remain calm.
10. Show good sportsmanship by congratulating the winner.



Adapted from: Wrangler Jeans Beef Showmanship for Youth for America In Association with the National 4-H Council, 1987