BEEF

Leader Guide

CANADA
4-H Alberta

4-H MOTTO

"Learn to do by doing."

4-H Pledge

I pledge,
My **head** to clearer thinking,
My **heart** to greater loyalty,
My **hands** to larger service,
My **health** to better living,
For my club, my community,
my country, and my world

Created 2015

Welcome to the 4-H Alberta Beef Leader's Guide

This guide is designed to be a supplement to the Beef eLearning Tool, by covering various topics areas in the following sections:

Choosing A Project.....1

Selecting An Animal.....9

Animal Husbandry 27

Breeding Management 67

Production Management.....91

Marketing & Economics 99

Each section of the Leader's Guide provides an overview of the corresponding elearning section available online, as well as useful diagrams, reference sheets and member activity sheets for you to provide to your beef project members. Refer to the Beef eLearning Tool often, and encourage your members to take advantage of it. The order in which sections and topics are covered is completely up to you and your members.

Anyone can access the Beef eLearning Tool at www.4h.ab.ca/beef. Leaders and families can also request that their club orders the Beef eLearning Tool on a USB through the online Club Supply Catalogue.

Section 1: Choosing A Project

Projects explored in the *Choosing A Project* section of the eLearning tool:

Novice Beef Project 3
Market Beef - Live Project 3
Heifer Project.....4
Two Year Old Cow with Calf Project or Three Year Old Cow with Calf Project.....4
Market Beef- Carcass Project 5
Beef Pen Project.....5
Green Certificate - Beef Project 6
Creative Options Project 6
Leadership Project.....7

An option for project extension that is explored in the *Choosing A Project* section of the eLearning tool:

Venture Out

Key Takeaway:

There are a lot of beef project options for members, leaders and clubs to consider. Members should choose the project or projects they are most interested in, and that also are a good fit for their knowledge/skill level, as well as the type of support available. Leaders and clubs should keep an open mind to new project ideas, and help each member and their family to make a plan for successfully managing their beef project or projects.

By completing the *Choosing A Project* section of the eLearning tool, members will be able to:

- List 4-H Alberta's beef project options.
- Understand what's involved in each of the different project options.
- Brainstorm their own ideas for beef project options.

Novice Beef Project

The Novice Beef Project involves raising a calf born in the calendar year for show. This project is intended for members with little to no beef knowledge or experience.

- Members will select, manage and care for a calendar year calf and keep records on the animal for at least 90 days prior to the club's Achievement Activity.
- Participating in beef project-related activities at the club, district, regional and provincial levels of 4-H will help members gain knowledge and skills related to their beef project.
- Members show their Novice Beef Project at the club's Achievement Activity.

Please note:

- Members registered in this project are not eligible to register in an additional beef project within the same 4-H year.
- Members have the option of carrying this project over to the following 4-H year as a Market Beef – Live Project or as a Heifer Project.

Market Beef – Live Project

This project involves raising a steer or heifer for show and slaughter. The Market Beef – Live Project is intended for members with little to no beef knowledge or experience.

- Members will select, manage, care for and market a steer or heifer born in the same calendar year in which it is registered. Records must be maintained for a minimum of 160 days prior to the club's Achievement Activity.
- Participating in beef project-related activities at the club, district, regional and provincial levels of 4-H will help members gain knowledge and skills related to their beef project.
- Members show their Live Market Beef Project at the club's Achievement Activity and may market their project at the 4-H club sale or privately.

Heifer Project

The Heifer Project involves raising a heifer for show and cattle production. This project is intended for members with some beef knowledge and experience.

- Members will select, breed, manage, care for and market a beef heifer calf. Records are to be maintained on the heifer from weaning through to the club's Achievement Activity or September 30th if being carried forward as a Two Year Old with Calf Project.
- Participating in beef project-related activities at the club, district, regional and provincial levels of 4-H will help members gain knowledge and skills related to their beef project.
- Members show their Heifer Project at the club's Achievement Activity and may market their project at the 4-H club sale or privately.

Please note:

- Members may retain the heifer; have the heifer bred and carry it forward for the Two Year Old Cow with Calf Project.

Two Year Old Cow with Calf Project & Three Year Old Cow with Calf Project

These projects are a continuation of the Heifer Project to a mature animal for cattle production. The projects are intended for members with previous beef project experience.

- Participating in beef project-related activities at the club, district, regional and provincial levels of 4-H will help members gain knowledge and skills related to their beef project.
- Members are to show the cow and calf pair at the club's Achievement Activity.

Please Note:

- For the Two Year Old Cow with Calf Project , the cow must have been a registered Heifer Project the previous 4-H year to be carried forward for this project.
- For the Three Year Old Cow with Calf Project , the cow must have been a registered Two Year Old Cow with Calf Project to be carried forward for this project.

Carcass Market Beef Project

The Carcass Market Beef Project involves raising a steer or heifer for slaughter and carcass evaluation. This project is intended for members with at least two years of beef project experience.

- Members will select, manage and care for the carcass project steer or heifer until it goes to slaughter. Additionally, they will market the carcass.
- Participating in beef project-related activities at the club, district, regional and provincial levels of 4-H will help members gain knowledge and skills related to their beef project.
- A display on the Carcass Market Beef Project is to be featured at the club's Achievement Activity. The carcass may be marketed through the 4-H club sale or privately.

Beef Pen Project

The Beef Pen Project is intended for experienced beef project members interested in advanced cattle and beef production.

- Members will select, manage and care for three or more beef animals for breeding or private sale, in addition to developing a business plan for their project.
- Participating in beef project-related activities at the club, district, regional and provincial levels of 4-H will help members gain knowledge and skills.
- Members may conduct a tour of their operation and create a display as part of their Achievement Activity.

Green Certificate - Beef Project

Green Certificate is an apprenticeship-style training program. The Green Certificate Beef Project is designed for senior members who are at least 15 years of age, in grades 10-12 or have graduated from high school. Please note that members may take Green Certificate for school credit and as a 4-H project. To register in Green Certificate, members should talk to their school's Green Certificate Representative, who will contact the appropriate Green Certificate Regional Coordinator.

- The Green Certificate Beef Projects are:

Cow-Calf Beef Production	• Level 1: Cow-Calf Beef Production Technician • Level 2: Cow-Calf Beef Supervisor
Feedlot	• Level 1: Feedlot Beef Technician • Level 2: Feedlot Beef Supervisor

- Members are to meet the basic 4-H member requirements, including the completion of a record book, as well as meet the requirements outlined by Green Certificate.
- Participating in project activities and competitions at the club, district, regional and provincial levels of 4-H will help members gain knowledge and skills related to their beef project.
- Members should create a display and/or presentation to give at the club's Achievement Activity.

Creative Options Project

Beef Project Members are welcome to take on a Creative Options Project that is beef-related. The Creative Option Project can be taken by an individual or by a group of members. It is designed for intermediate and senior members to pursue an interest, but can be adapted for a group that includes junior members.

- Members will expand their beef-related knowledge and experience, taking on the development of the project from start to finish; including planning, implementation, management and evaluation.
- Participating in project activities and competitions at the club, district, regional and provincial levels of 4-H will help members gain knowledge and skills related to their beef project.
- Members should conduct a tour or develop a display for club members, highlighting their learning's, cash flow and/or business plan. Their project should be exhibited and marketed if possible.

Leadership Project

The Leadership Project is for senior members who have been in 4-H for at least two consecutive years. This project provides senior members with the opportunity to take on a leadership role under the mentorship of club leaders. The responsibilities members carry out in a Leadership Project will vary from one member to the next because each of us is unique in our abilities, past experiences, training and desires. When choosing a project job, leaders should ask members to consider special interests, talents, needs within the local club, or where the member thinks they can thrive.

Members in the Leadership Project may get to experience:

- Helping other 4-H members learn a skill or concept through the use of effective leadership and teaching tools.
- Building awareness of their club and 4-H in the community.
- Taking responsibility for certain elements of the club's program or getting involved in 4-H at the district or regional level.

The Leadership Project is a fantastic way for senior members to utilize their abilities, experiences, interests and knowledge in a way that further develops their leadership skills and contributes to the club. Helping their club leaders and their fellow members expands the 4-H experience for members who have been involved with 4-H for some time and would like a new and exciting project to pursue.

Venture Out

Venture Out is a supplemental resource that can be used in conjunction with any project or as part of the club's program plan. Leading members in developing their entrepreneurial skills is a way to nurture and cultivate future leaders who will benefit their community. Entrepreneurial development is all about getting the members to define their own success, supporting them to meet their goals during the 4-H year, and providing feedback throughout their experience.

You don't have to be an entrepreneur yourself to integrate Venture Out into beef projects. Do you like to see your club members interested, engaged, and stretching their horizons? Do you like to see them inspired and motivated? Most importantly, do you like to see them having fun? Venture Out aims to cover all those bases.

You may explore the key concepts of entrepreneurship with the 4-H members through the activities and media presented at 4-H Alberta's website. You may also direct the members to use activities in the Member Supplement, also available at www.4h.ab.ca.

Section 2: Selecting An Animal

Lessons included the *Selecting An Animal* section of the eLearning tool:

Lesson 1: Animal History 12
Lesson 2: Anatomy 15
Lesson 3: Frame Score 17
Lesson 4: Estimating Finish Weight 19
Lesson 5: Grading System 22
Lesson 6: Cuts of Meat 24
Lesson 7: Beef Breeds 26

Key Takeaway:

Considerations for selecting animals to be a part of a herd must be aligned with the producer's operation, as well as their overarching production and profit goals. The animal's history and potential for cattle or beef production should be top of mind when selecting an animal.

By completing the *Selecting An Animal* section of the eLearning tool, members will be able to:

- Work through the assessment of an animal's history using a checklist.
- Locate the parts of a beef animal's anatomy on a diagram.
- Measure an animal's hip height and determine the animal's frame score, finished weight and the average daily gain needed to achieve finished weight.
- Give an overview of the beef grading system in Canada and list what characteristics differentiate the quality grades.
- Label a diagram of a beef animal's carcass with the different cuts of meat.
- Reflect on what breed traits would be most important to them and their production and profit goals.

Lesson 1: Animal History

Reference Sheet: Assessing an Animal's History

Checklist: Assessing an Animal's History

Lesson 2: Anatomy

Diagram: Anatomy of Beef Cattle

Activity Sheet: Anatomy of Beef Cattle

Lesson 3: Frame Score

Reference Sheet: Determining and Using Frame Score

Charts: Frame Score for Females and Males

Lesson 4: Estimating Finish Weight

Reference Sheet: Estimating Finish Weight

Reference Sheet: Average Daily Gain

Activity Sheet: Determining Frame Score, Finished Weight & Average Daily Gain

Lesson 5: Grading System

Reference Sheet: Beef Grading in Canada

Chart: Quality Grades

Lesson 6: Cuts of Meat

Diagram: Cuts of Meat

Activity Sheet: Cuts of Meat

Lesson 7: Beef Breeds

Reference Sheet: Selecting Beef Breeds

Reference Sheet

Assessing an Animal's History

An animal's history and previous management will affect how the animal will grow, develop and generally maintain its overall health in the future. When building a comprehensive history of an animal, producers consider the following:

- ***Date of Birth/Age Verification.*** Ask for an age verification certificate and make sure the certificate matches the tag number.
- ***Weaning.*** Ask when the animal was weaned and what it weighed at weaning.
- ***Breeding Considerations.*** Will the animal's dominant breed traits will help to meet your cattle and beef production goals. If you're considering a purebred animal, ask to see a copy of the registration papers.
- ***Castration.*** For a steer, determine when it was castrated and what method was used. Be sure to check that its castration was done properly and is in fact complete.
- ***Horns.*** Check to see if the animal is horned, dehorned or polled. If the animal is not polled, ask when it was dehorned and what method was used. Inspect the head for any regrowth. If there is regrowth, will the process need to be repeated?
- ***Health.*** Observe to see if the animal is it alert and active. Does it have a good appetite? Is the hair coat smooth and shiny? Does the animal have bright, clear, eyes? Are the ears upright, not drooping? Does the animal drink the water provided? Is the manure and urine normal for its age? Is there evidence of disease or parasites? Is the animal too fat or too thin? What is the current weight of the animal?
- ***Vaccinations and de-worming.*** Ask for a record of both.
- ***Disposition.*** Is it calm and comfortable around people and other animals or does it seem agitated? What is it's positioning in a corral?
- ***Implants.*** Ask if the animal received any growth implants. If so, with what product and when?

Checklist

Assessing an Animal's History

Date of Birth (DOB) / Age Verification

- ☐ Does the animal meet the age requirements for the project?
  Refer to the 4-H Alberta Beef Project Policy #6.05 for specific age requirements for projects.
- ☐ Have you seen the age verification certificate?
  - ☐ Does the certificate match the tag number?

Weaning

- ☐ What was the weaning date?
- ☐ What was the weaning weight?

Breeding Considerations

- ☐ Is the animal a purebred or crossbred?

If crossbred,

- ☐ What are the major breed influences?
- ☐ Will this cross's traits help meet your project goals?

If purebred,

- ☐ Will the breed's traits help meet your project goals?
- ☐ Are there registration papers for the animal?

Castration

- ☐ If selecting a steer, when was it castrated?
  - ☐ What method was used to castrate?
  - ☐ Is there evidence that castration was incomplete?

Horns

- ☐ Is the animal horned, dehorned or polled?
  - ☐ When was the animal dehorned?
  - ☐ What method was used to dehorn the beef project animal?
  - ☐ Is there any regrowth, and if so, will the process have to be done again?
    Check the 4-H Alberta Beef Project Policy 6.05 for further guidelines.

Checklist Cont

Assessing an Animal's History

Health

- ☐ Does the animal look healthy?
  - ☐ Is the animal alert?
  - ☐ Does it have a good appetite?
  - ☐ Is the animal active?
  - ☐ Is the hair coat smooth and shiny?
  - ☐ Does the animal have bright, clear, eyes?
  - ☐ Are the ears upright, not drooping?
  - ☐ Does the animal drink the water provided?
  - ☐ Is the manure and urine normal for the age of the animal?
  - ☐ Is there evidence of disease or parasites?
  - ☐ Is the animal either too fat or too thin?
  - ☐ What is the current weight of the animal?

Vaccination & Deworming

- ☐ Did you ask for a record of vaccinations and deworming?

Disposition

- ☐ What is the beef project animal's disposition?
- ☐ How does the animal behave?
- ☐ Is the animal calm and comfortable around people and other animals?

  Some things to look for and avoid are:

  Eyes - wild, fiery, scared

  Legs - fidgety, pawing, kicks

  Stance - charging, shaking, cowering

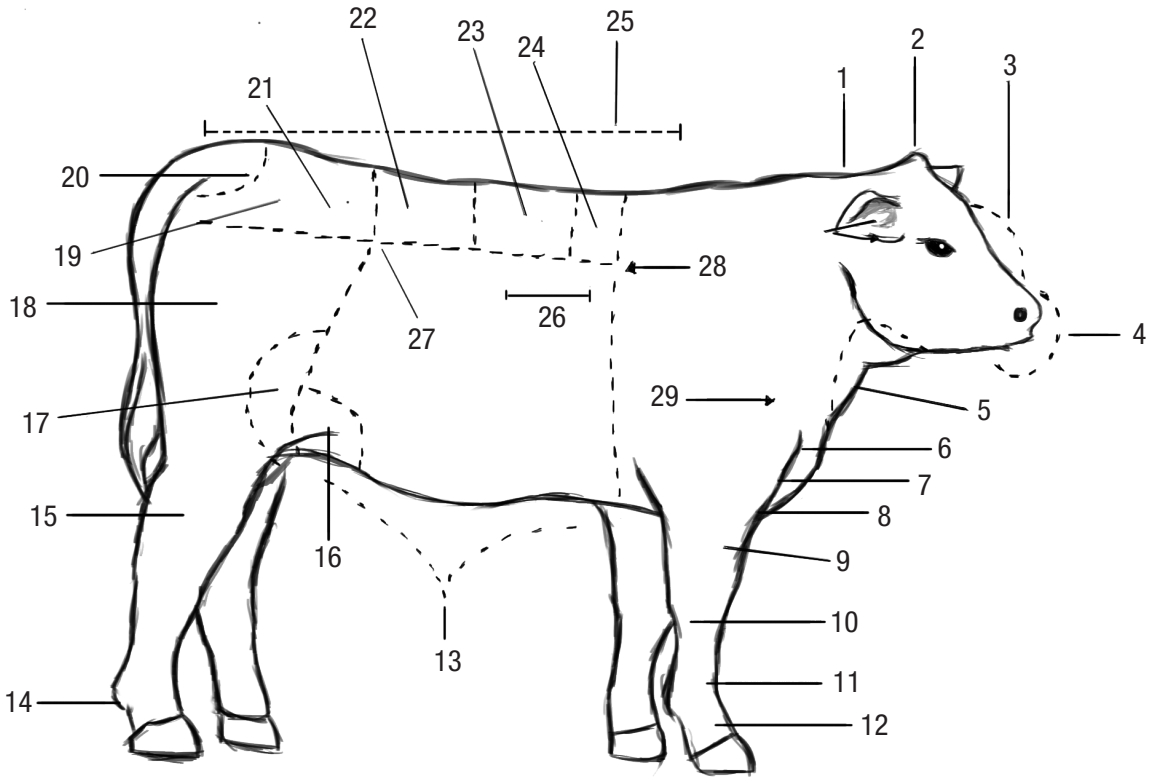
  Positioning in the corral – if the animal stays far away from you at all times, stay far away from it as a project.

Implants

- ☐ Has the animal received a growth implant?
  - ☐ If so, with what product?
  - ☐ When was it implanted?

Diagram

Anatomy of Beef cattle

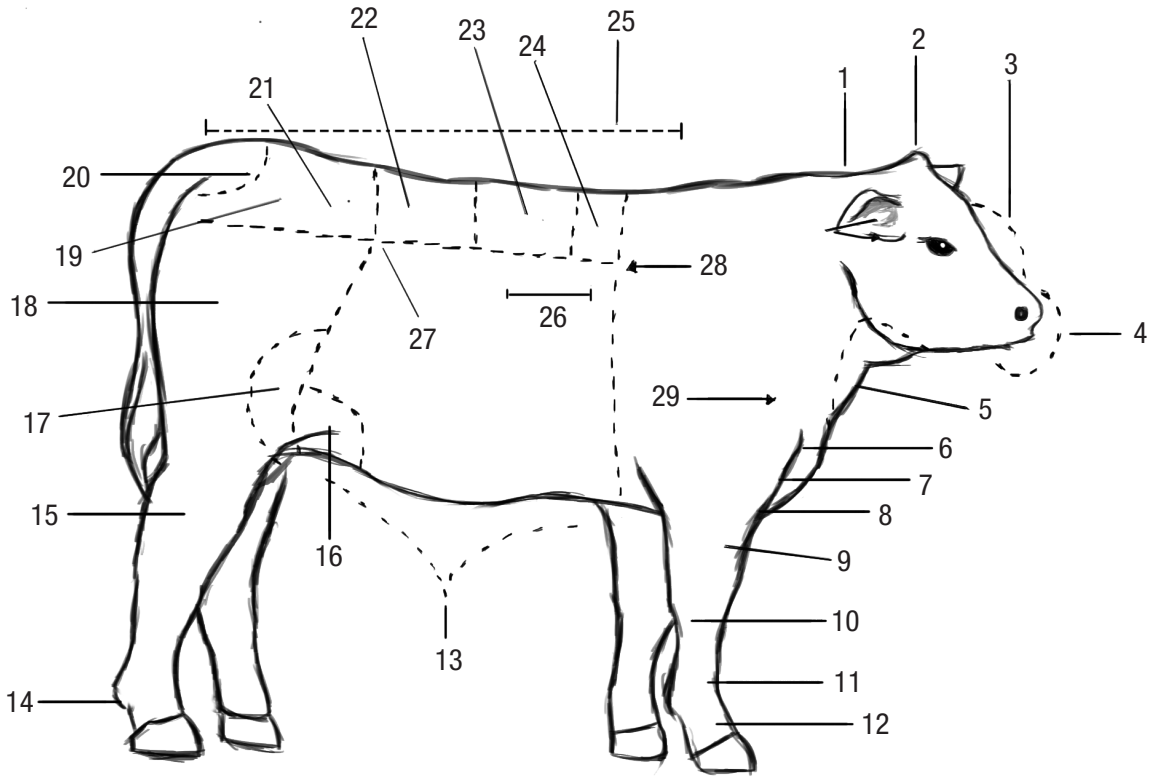


1. Crest	7. Brisket	13. Underline	19. Pin Bone	25. Topline
2. Poll	8. Chest Floor	14. Dew Claw	20. Tail Head	26. Ribs
3. Face	9. Forearm	15. Hock	21. Rump	27. Hooks
4. Muzzle	10. Knee	16. Flank	22. Loin	28. Heart Girth
5. Dewlap	11. Shank	17. Stifle Region	23. Back	29. Shoulder
6. Point of the Shoulder	12. Pastern	18. Quarter	24. Crop	30. Ear

Member Activity Sheet

Anatomy of Beef cattle

Instructions: Correctly match the parts of the animal to their location on the diagram.



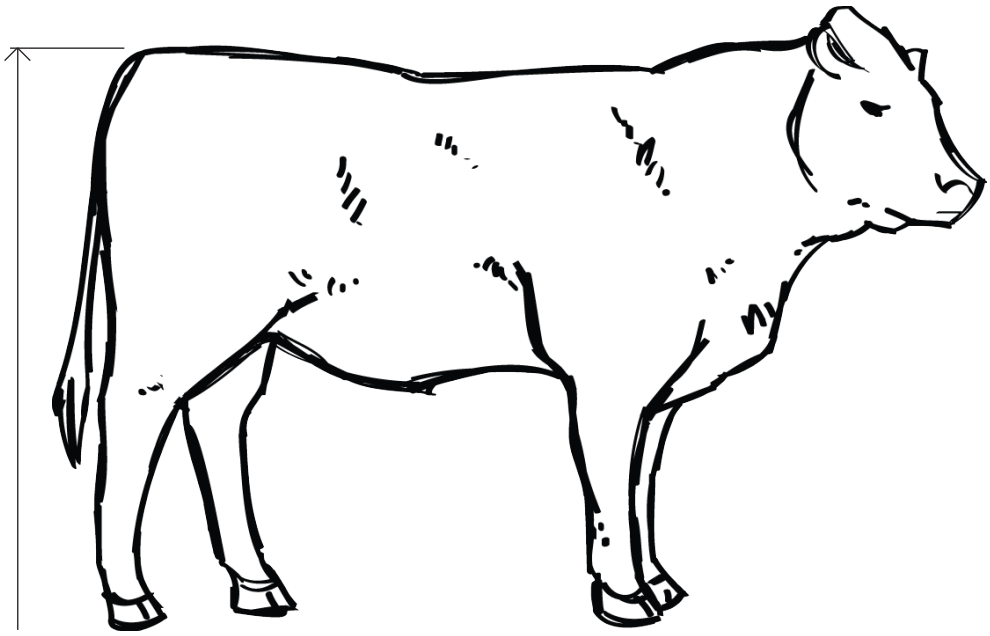
_____ Poll
_____ Tail Head
_____ Pin Bone
_____ Crest
_____ Quarter
_____ Shoulder
_____ Shank
_____ Knee
_____ Heart Girth
_____ Hock
_____ Chest Floor
_____ Ribs
_____ Underline
_____ Point of the Shoulder
_____ Crop
_____ Back
_____ Dewlap
_____ Flank
_____ Hooks
_____ Forearm
_____ Dew Claw
_____ Topline
_____ Brisket
_____ Pastern
_____ Ear
_____ Stifle Region
_____ Muzzle
_____ Loin
_____ Rump
_____ Face

Reference Sheet

Determining and Using Frame Score

Frame score is determined by the age and the hip height of the animal. With the frame score, the producer can better determine how best to feed the animal in the time that they have. The higher the frame score, the longer it will take to finish the animal or the larger it will be as a mature cow or bull.

Measuring Hip Height



Ensuring that the animal is standing on a level surface, in inches, measure to the point directly over the hip bones.

Charts

Frame Score for Females and Males

Frame Score for Females

Age (months)	Frame Score for Heifers								
	1	2	3	4	5	6	7	8	9
5	33.1	35.1	37.2	39.3	41.3	43.4	45.5	47.5	49.6
6	34.1	36.2	38.2	40.3	42.3	44.4	46.5	48.5	50.6
7	35.1	37.1	39.2	41.2	43.3	45.3	47.4	49.4	51.5
8	36.0	38.0	40.1	42.1	44.1	46.2	48.2	50.2	52.3
9	36.8	38.9	40.9	42.9	44.9	47.0	49.0	51.0	53.0
10	37.6	39.6	41.6	43.7	45.7	47.7	49.7	51.7	53.8
11	38.3	40.3	42.3	44.3	46.4	48.4	50.4	52.4	54.4
12	39.0	41.0	43.0	45.0	47.0	49.0	51.0	53.0	55.0
13	39.6	41.6	43.6	45.1	47.5	49.5	51.5	53.5	55.5
14	40.1	42.1	44.1	46.1	48.0	50.0	52.0	54.0	56.0
15	40.6	42.6	44.5	46.5	48.5	50.5	52.4	54.4	56.4
16	41	43	44.9	46.9	48.9	50.8	52.8	54.8	56.7
17	41.4	43.3	45.3	47.2	49.2	51.1	53.1	55.1	57.0
18	41.7	43.6	45.6	47.5	49.5	51.4	53.4	55.3	57.3
19	41.9	43.9	45.8	47.7	49.7	51.6	53.6	55.5	57.4
20	42.1	44.1	46.0	47.9	49.8	51.8	53.7	55.6	57.6
21	42.3	44.2	46.1	48.0	50.0	51.9	53.8	55.7	57.7
	Hip Height (Inches)								

Example: A heifer born on March 15th with a hip height measurement of 46.1 inches on October 15th will have a Frame Score of 6.

Frame Score for Males

Age (months)	Frame Score for Steers								
	1	2	3	4	5	6	7	8	9
5	33.5	35.5	37.5	39.5	41.6	43.6	45.6	47.7	49.7
6	34.8	36.8	38.8	40.8	42.9	44.9	46.9	48.9	51.0
7	36.0	38.0	40.0	42.1	44.1	46.1	48.1	50.1	52.2
8	37.2	39.2	41.2	43.2	45.2	47.2	49.3	51.3	53.3
9	38.2	40.2	42.3	44.3	46.3	48.3	50.3	52.3	54.3
10	39.2	41.2	43.3	45.3	47.3	49.3	51.3	53.3	55.3
11	40.2	42.2	44.2	46.2	48.2	50.2	52.2	54.2	56.2
12	41.0	43.0	45.0	47.0	49.0	51.0	53.0	55.0	57.0
13	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8	57.7
14	42.5	44.5	46.5	48.5	50.4	52.4	54.4	56.4	58.4
15	43.1	45.1	47.1	49.1	51.1	53.0	55.5	57.0	59.0
16	43.6	45.6	47.6	49.6	51.6	53.6	55.6	57.5	59.5
17	44.1	46.1	48.1	50.1	52.0	54.0	56.0	58.0	60.0
18	44.5	46.5	48.5	50.5	52.4	54.4	56.4	58.4	60.3
19	44.9	46.8	48.8	50.8	52.7	54.7	56.7	58.7	60.6
20	45.1	47.1	49.1	51.0	53.0	55.0	56.9	58.9	60.9
21	45.3	47.3	49.2	51.2	53.2	55.1	57.1	59.1	61.0
	Hip height (Inches)								

Example: A steer born on February 1st with a hip height measurement of 49.3 inches on October 1st will have a Frame Score of 7.

Reference Sheet

Estimating Finish Weight

Frame Score is used to estimate the finished or mature weight at which the animal will be ready for market or breeding. After producers determine the frame score, they use this chart to estimate the finished weight:

Frame Score	Finished Weight (estimated in pounds)
2	850
3	950
4	1050
5	1150
6	1250
7	1350
8	1450
9	1550

Example: A steer with a Frame Score of 6 would have an estimated finished weight of be 1250 pounds.

Reference Sheet

Average Daily Gain

Once producers know the estimated finished weight of an animal, they can calculate the Average Daily Gain they need to achieve in order to reach a desired finished weight at the time they'd like to market or breed the animal.

Step 1

Target Weight or Estimated Finished Weight (pounds)
-
Current Weight or Weight at Weigh-In Day (pounds)

_____

Weight to Gain or Pounds needed to gain to reach Target Weight (pounds)

Step 2

Months Until Desired Sale or Breeding Date
x
30 (days)

_____

Number of Days Until Desired Sale or Breeding Date

Step 3

Weight to Gain
÷
Number of Days Until Desired Sale or Breeding Date

_____

Average Daily Gain

Member Activity Sheet

Determining Frame Score, Finished Weight & Average Daily Gain

Instructions: Work through the following process to determine the average daily gain needed to achieve a desired finished weight for your project animal.

Frame Score

Your steer calf or heifer calf's age in months: a. _____

Current hip height of your steer calf or heifer calf in inches: b. _____

Referring to the appropriate Frame Score Chart, use the age in months (a.) and the hip height in inches (b.), to determine the frame score of your steer calf or heifer calf: c. _____

Estimated Finished Weight

Referring to the Estimated Finish Weight Chart, use the frame score (c.), to determine your steer calf or heifer calf's approximate finished weight: d. _____

Average Daily Gain

Estimated Finished Weight (d). _____

\-

Current Weight of your Steer Calf or Heifer Calf: e. _____

Weight to Gain f. _____

Months Until Desired Sale or Breeding Date g. _____

x

30 (days in a month) h. _____

Days Until Desired Sale or Breeding Date i. _____

Weight to Gain (f). _____

÷

Days Until Desired Sale or Breeding Date (i). _____

Average Daily Gain (j). _____

Reference Sheet

Beef Grading In Canada

It is important for beef producers to understand the grading system because carcasses with top quality grades are sold at a premium, and the information collected from the grading process can be used to improve production and marketing techniques.

Grading gives customers a consistent way of selecting beef and therefore greater consistency and predictability in the eating quality of specific grades of beef. Beef grading is overseen by the Canadian Beef Grading Agency and is conducted by certified graders after a carcass has been inspected and approved for health and safety standards and bears a federal or provincial meat inspection legend or stamp.

The grader assesses a carcass based on several criteria influencing carcass quality and the lean yield.

Quality – Predicted tenderness, juiciness, customer acceptability and shelf life are assessed based on maturity (age), sex, conformation (muscling), fat (colour, texture and cover) and meat (colour, texture and marbling). The assessment of marbling is based on the average amount, size and distribution of fat particles or deposits in the rib eye.

Yield – Carcasses qualifying for Canada Prime or any of the Canada A grades are also assessed for an estimation of lean meat yield. This is done by graders using a yield ruler to determine the rib-eye size and fat class between the 12th and 13th ribs.

Each of the characteristics assessed while grading has an influence on quality.

- ***Maturity.*** Affects tenderness.
- ***Sex.*** Pronounced masculinity affects meat colour and palatability.
- ***Muscling.*** Meat yield is influenced by the degree of muscling.
- ***Fat.*** Colour and texture of fat influence consumer acceptability whereas fat cover affects yield.
- ***Meat.*** Marbling affects eating quality for juiciness and tenderness. Colour and texture influence consumer acceptability.

The grades that all feedlots feeding youthful cattle strive for is Canada A, Canada AA, Canada AAA and Canada Prime with a lean meat yield of around 60%.

Chart

Quality Grades

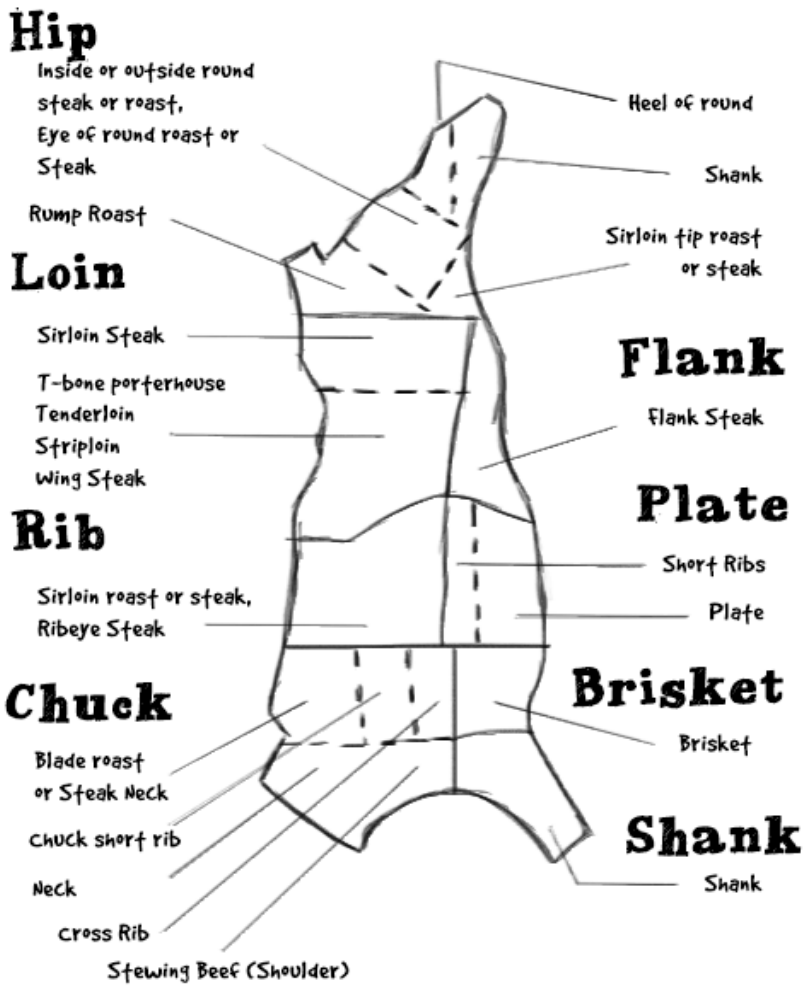
This chart shows what characteristics are required for many of the quality grades.

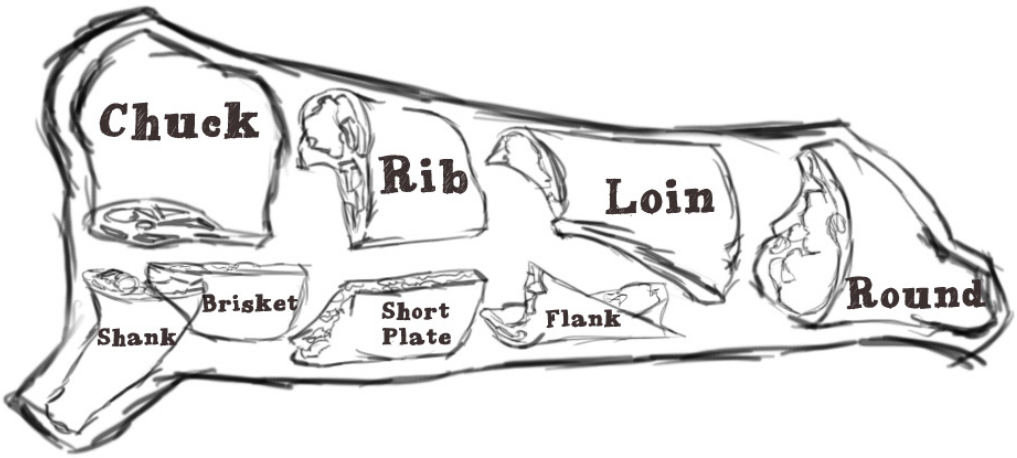
The Quality Grades						
Grade	Maturity (Age)	Muscling	Rib Eye Muscle	Marbling	Fat Colour & Texture	Fat Measure
Canada prime	Youthful	Good to Excellent with some deficiencies	Firm, Bright Red	Slightly Abundant	Firm, White or Amber	2mm or more
Canada A, AA, AAA	Youthful	Good to Excellent with some deficiencies	Firm, Bright Red	A- Trace AA- SLight AAA- SMall	Firm, White or Amber	2mm or more
B1	Youthful	Good to Excellent with some deficiencies	Firm, Bright Red	No requirement	Firm, White or Amber	Less than 2mm
B2	Youthful	Deficient to Excellent	Bright Red	No requirement	Yellow	No requirement
B3	Youthful	Deficient to Good	Bright Red	No requirement	White or Amber	No requirement
B4	Youthful	Deficient to Excellent	Dark Red	No requirement	No requirement	No requirement

Diagram

Cuts of Meat

Consumers are drawn to different cuts of meat for different uses. The values associated with each cut vary as a result.

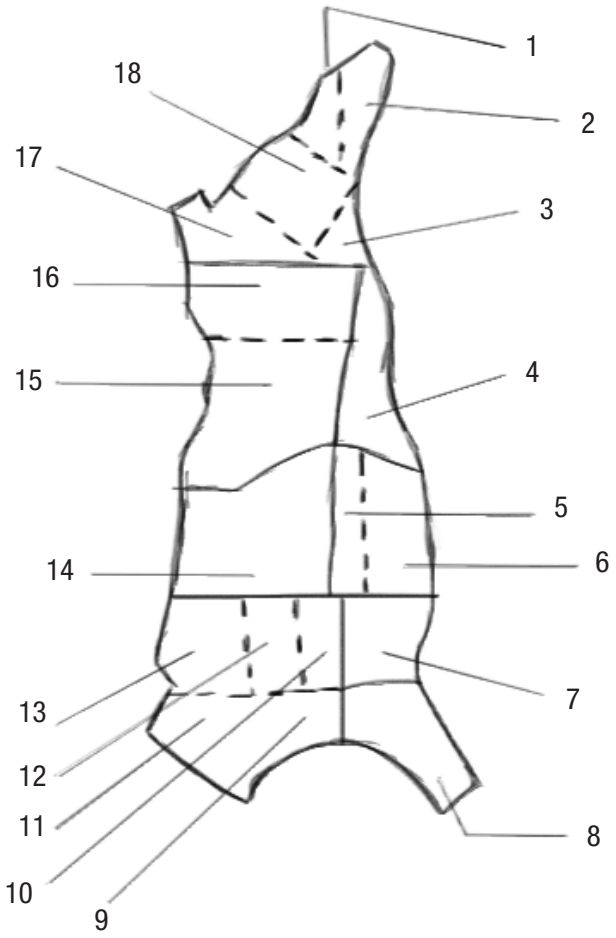




Member Activity Sheet

Cuts of Meat

Instructions: Match each cut of meat to the location on the carcass that it comes from.



_____ Sirloin roast or steak, Ribeye steak

_____ Heel of round

_____ Chuck short rib

_____ Plate

_____ Stewing Beef (Shoulder)

_____ Short ribs

_____ Shank

_____ Inside or outside round steak or roast, eye of round roast or steak

_____ Shank

_____ Brisket

_____ T-bone
Porterhouse
Tenderloin
Striploin
Wing steak

_____ Blade roast or Steak neck

_____ Sirloin tip roast or steak

_____ Flank steak

_____ Neck

_____ Rump roast

_____ Sirloin steak

_____ Cross rib

Reference Sheet

Selecting Beef Breeds

There are a lot of different breeds of beef in Alberta. Each breed has some important trait differences. For instance, some breeds have been bred with an emphasis on carcass and growth characteristics while some have been bred for their hardiness and maternal qualities.

Producers make decisions on breed or breeds based on what type of operation they're running and the breed traits that are mostly likely to help them meet their production, marketing and profit goals.

It's not unusual for a group of beef producers to end up in a friendly debate about the various breeds! Learn more at the various breed association websites.

Section 3: Animal Husbandry

Lessons included the *Animal Husbandry* section of the eLearning tool:

Lesson 1: Animal Care & Welfare 32
Lesson 2: Safe & Effective Animal Handling 35
Lesson 3: Facilities 40
Lesson 4: Animal Identification 47
Lesson 5: Digestive System 49
Lesson 6: Nutrition & Feeding 53
Lesson 7: Animal Health 60

Key Takeaway:

The care and treatment an animal receives greatly impacts its state of welfare as well as its ability to function efficiently. There is much that producers can do to ensure that the care and treatment they are providing is positively contributing to these outcomes.

By completing the *Animal Husbandry* section of the eLearning tool, members will be able to:

- List the Five Freedoms of Animals and the characteristics of an animal in a good state of welfare.
- Describe the limitations around cattle's sight, and how one can use the point of balance to move cattle with ease.
- Name various cattle behaviours that should be kept top of mind when handling cattle.
- Adopt best practices for use of personal protective equipment.
- Identify different components of cattle facilities and considerations for designing your own.
- Recognize the importance of traceability and compliance with animal identification regulations.
- Describe the difference between ruminants and monogastrics, as well as the mature beef animal's and a calf's digestion. Also, label the parts and the path of the mature beef animal's digestive tract.
- List the Five Essential Nutrients and explain why a watering plan is so important.
- Expand on why function and other factors affect the nutrient requirements of cattle.
- Give examples of concentrates, roughages and supplements.
- Express how feed analysis can better help you to achieve a properly balanced ration.
- Explain how a herd health planning focuses on prevention and why record keeping is such an important aspect of a herd health plan.
- Label injection sites for vaccinations or medications.
- Walk through what they'd do if they suspected their animal was sick.
- Explain what biosecurity is.

Lesson 1: Animal Care & Welfare

Reference Sheet: Animal Care versus Animal Welfare

Reference Sheet: Five Freedoms of Animals

Activity Sheet: Five Freedoms of Animals

Lesson 2: Safe & Effective Animal Handling

Reference Sheet: How Cattle See

Reference Sheet: Point of Balance

Reference Sheet: Flight Zone

Reference Sheet: Cattle Behaviour

Reference Sheet: Personal Protective Equipment (PPE)

Lesson 3: Facilities

Reference Sheet: Cattle Facility Considerations

Reference Sheet: Cattle Facility Components

Activity Sheet: Handling System Design

Lesson 4: Animal Identification

Reference Sheet: Identification Tags & Traceability

Diagram: Applying Identification Tags

Lesson 5: Digestive System

Reference Sheet: The Ruminant Animal & Their Digestion

Diagram: Mature Beef Animal's Digestive Tract

Activity Sheet: Mature Beef Animal's Digestive Tract

Reference Sheet: The Calf's Digestion

Lesson 6: Nutrition & Feeding

Reference Sheet: Essential Nutrient Requirements of Cattle

Reference Sheet: Function & Other Factors Affecting Cattle's Nutrition Requirements

Reference Sheet: Concentrates, Roughages & Supplements

Reference Sheet: Conducting a Feed Analysis

Activity Sheet: Steps for Formulating Rations

Reference Sheet: Devising a Watering Plan

Lesson 7: Animal Health

Reference Sheet: Herd Health Planning

Reference Sheet: Vaccination Program

Diagram: Injection Sites

Activity Sheet: Injection Sites

Reference Sheet: You Suspect Your Animal is Sick

Reference Sheet: Biosecurity

Reference Sheet: Record Keeping

Reference Sheet

Animal Care versus Animal Welfare

There's an important distinction between animal welfare and animal care. Animal welfare refers to the state of the animal, or in other words, how it's coping with the conditions it lives in. Animal care, often called animal husbandry, refers to the specific treatment or care an animal receives.

Protecting an animal's welfare means providing for both its physical and mental needs, including:

- Disease prevention and treatment by a veterinarian;
- Appropriate shelter, management, nutrition, and;
- Humane handling, slaughter or euthanasia.

An animal is in a good state of welfare if it is:

- Healthy;
- Comfortable;
- Well nourished;
- Safe;
- Able to express natural behavior, and;
- Is not suffering from pain, fear, or distress.

So while animal care involves taking care of the animal's basic needs, animal welfare refers to the overall physical and mental state of an animal. Producers are responsible for both the care and welfare of their animals. The livestock industry and its regulators do not tolerate animal neglect or cruelty.

Reference Sheet

Five Freedoms of Animals

The five freedoms are the basic needs of animals that producers should provide while animals are under their care:

1. Freedom from thirst, hunger and malnutrition by providing access to fresh water and a healthy diet.
2. Freedom from discomfort by providing a suitable environment including shelter and a comfortable and clean resting area.
3. Freedom from pain, injury and disease through prevention as well as quick diagnosis and treatment.
4. Freedom to express normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind.
5. Freedom from fear and distress by ensuring conditions don't create mental suffering.

Member Activity Sheet

Five Freedoms of Animals

Instructions: Write down what you are doing to ensure that you animal or animals are having each of their five freedoms met.

1. Freedom from thirst, hunger and malnutrition by providing access to fresh water and a healthy diet.

2. Freedom from discomfort by providing a suitable environment including shelter and a comfortable and clean resting area.

3. Freedom from pain, injury and disease through prevention as well as quick diagnosis and treatment.

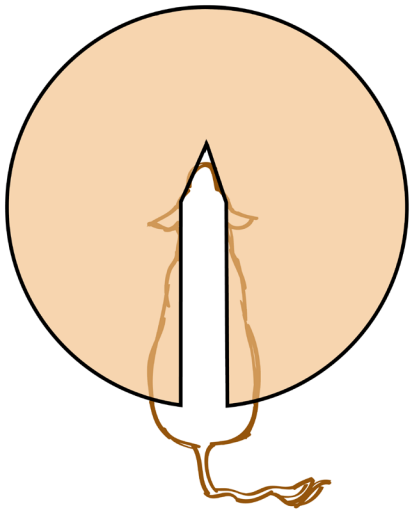
4. Freedom to express normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind.

5. Freedom from fear and distress by ensuring conditions don't create mental suffering.

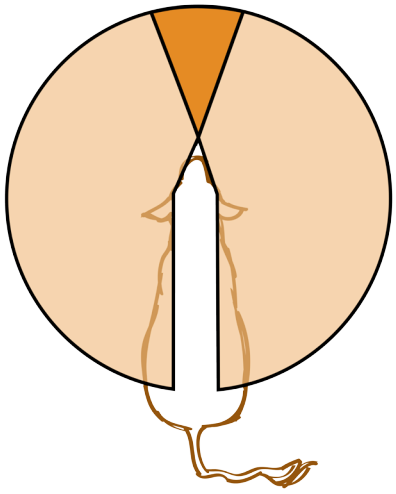
Reference Sheet

How Cattle See

The physical limitations and the natural behaviours of cattle should be kept in mind at all times for safe, low-stress and effective handling. Doing so will result in a reduced risk of stress and injury for both the animal and the producer. One thing that's important to understand is that cattle see very differently than humans, and have certain vision limitations. Cattle's eyes are located on the sides of their head, giving them excellent wide-angle vision.



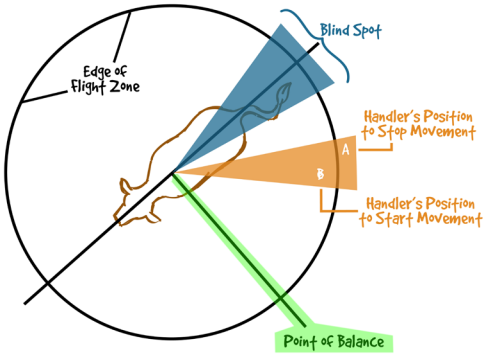
The downside of cattle having wide-angle vision is that their lack of depth perception at ground level when walking with their heads up. So in addition to having a hard time seeing what's behind them, there's only a very small area directly in front of them that cattle can clearly see. This may explain why cattle balk at distractions such as a sudden change in floor level or texture, loud noises, flapping objects, unfamiliar smells as well as contrasting shadows, patterns and light.



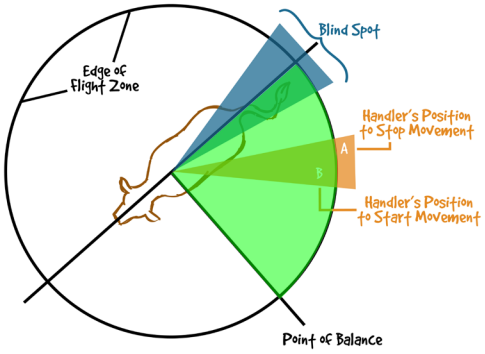
Reference Sheet

Point of Balance

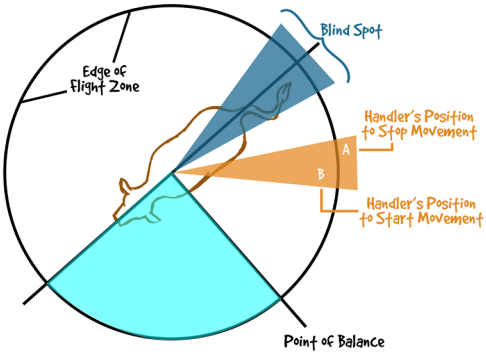
When handling cattle, producers keep the vision limitations of cattle in mind and take care to position themselves so that the animal is able to see them. Producers use the point of balance, which is usually in line with the animal's shoulder, to move cattle with ease. Cattle move forward or backwards depending on the position of the handler in relation to the animal's point of balance.



Cattle will move forward when the handler stands behind the point of balance.



Cattle will move backwards when the handler stands in front of the point of balance.



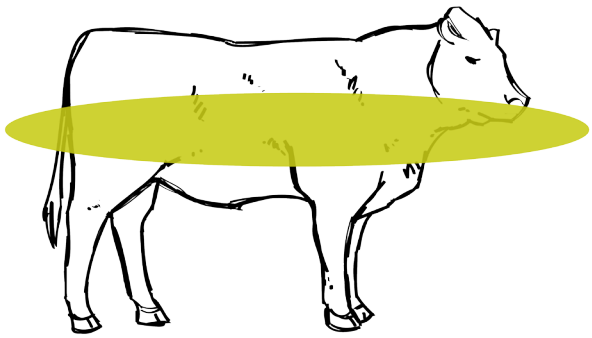
Groups of cattle in a chute will often move forward when the handler walks past the point of balance in the opposite direction of each animal in the chute - no prodding necessary.

Reference Sheet

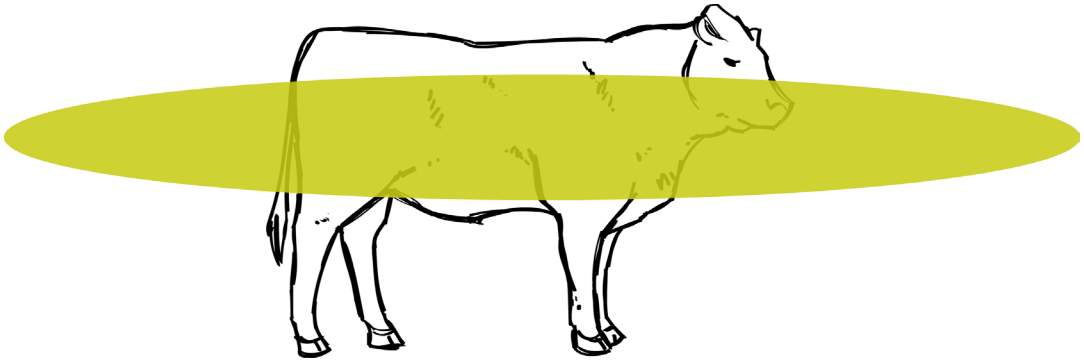
Flight Zone

Think of the animal's flight zone as a human would of their own personal space. If a stranger stood too close to a human, they'd most likely feel uncomfortable and move away. The same principle can be applied to cattle - if someone or something unfamiliar enters their flight zone they will move away.

Every animal has a flight zone, but the size of it will vary between animals and situations. If the animal is familiar with its surroundings and the person approaching, the flight zone decreases or disappears and the handler will be able to get closer to the animal.



If the animal feels threatened or scared or if it is approached head-on, its flight zone increases in size and the animal will move sooner.



The flight zone typically decreases when an animal is in a single-file chute, but if the animal rears in the chute, back off. Handlers who understand the concepts of point of balance and flight zone will be able to move animals with greater ease.

Reference Sheet

Cattle Behaviour

By understanding cattle behaviour, producers can adapt their handling methods accordingly. Like humans, cattle are more likely to remain calm if those who are dealing with them remain calm.

Here are some things every good cattle handler should know:

- Cattle like to travel in pairs or trios, they don't like to be alone.
- Cattle have a strong herd instinct to follow the leader and are more likely to move if they can see others ahead of them.
- Cattle move naturally in a circular manner and will stop if they seem to be approaching a dead end or a sharp turn.
- Cattle respond negatively to non-uniform light or shadows and to sudden movement or noises from people or objects.
- Cattle move at their own speed. Pushing or prodding or yelling only agitates them and makes them more difficult to handle.
- Cattle have long memories. If the last time through a handling system was rough, or they received a vaccination or injection, they may be more stressed or difficult to handle the next time through.

Reference Sheet

Personal Protective Equipment (PPE)

When handing animals, producers can protect themselves by using the appropriate personal protective equipment. Here are some considerations when it comes to PPE.

Footwear

- Safety footwear is especially important around large animals where there is a possibility of having a foot stepped on.
- Western boots or closed toe shoes with non-slip soles are ideal.

Clothing

- Choose fitted clothing. Clothing that is too loose may become tangled or get caught on something.
- Remove watches or loose jewelry before working with cattle.

Lung Protection

- Protect lungs with a dust mask or respirator when there are dusty conditions.

Skin Protection

- Long sleeved shirts and pants can protect individuals treating livestock that may be infected with disease.
- It is also important to protect oneself from sun damage by wearing sunscreen, sunglasses and a brimmed hat.

Work Gloves

- Work gloves can prevent cuts and scrapes. Work gloves are also important to protect hands while halter training.
- When administering medications or during activities such as tattooing it is beneficial to wear latex or silicone gloves.

Goggles or Face Shield

- Eyes are very vulnerable to injury. Eye protection with goggles or a face shield is important for preventing damage due to an object or chemical getting into one's eye.

Sharps Container

- Be sure to always handle sharp materials with care. Separate sharp materials from other waste as soon as you're done with them, then dispose of them safely.

Reference Sheet

Cattle Facility Considerations

Each producer needs cattle facilities that work for their cattle as well as their own unique situation. In addition to animal welfare and behaviour, producers consider a whole bunch of different things when creating their facility plans:

- The purpose of the facility.
- Current facility components.
- Cost.
- Local weather.
- Land topography and environmental stewardship.
- The type, size, weight and number of cattle.
- How temporary or permanent they may want their components to be.
- Applicable regulations and guidelines for their selected location.
- Labour available.
- Time available for management and upkeep.
- Possible future additions they may be considering.

A well thought out facility will promote the well-being of cattle, which in turn benefits producers.

Reference Sheet

Cattle Facility Components

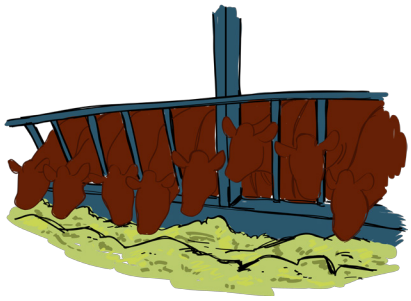
There are a lot of different facility components and layout options, so it's important that producers choose what works the best for their operation's needs.

Watering System

Watering systems allow for an animal's basic water requirements to be met. Before choosing which watering system components you'll use as part of your facility, you need to consider the available water sources and the amount of water needed. Animals with easy access to enough good quality water are healthier and more productive.

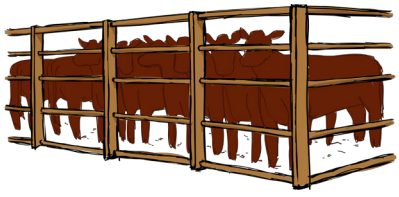
Feeding System

Feedings systems allow for the basic feed requirements of animals to be met. It allows feed to be distributed appropriately to specific animals. Before choosing which feeding system components you'll use as part of your facility, you need to consider the type and amount of feed being fed, feeding frequency and whether you're feeding an individual or a group of animals. Animals that are fed properly have the greatest chance to be efficient and productive. The right feeding system will also reduce the amount of feed that goes to waste.



Fencing

Whether temporary or permanent, fencing is used for containment and to keep groups of animals separate. Fences can also help guide animals that are being moved.

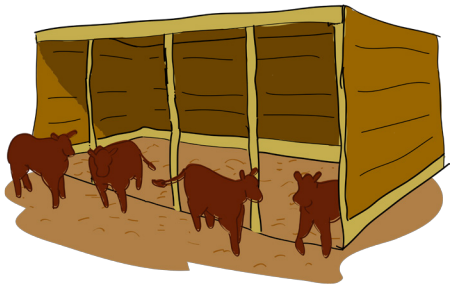


Reference Sheet Cont.

Cattle Facility Components con't

Shelter

Shelter allows animals to better cope with the extreme weather conditions that can occur throughout the year - which in Canada is pretty much a guarantee! Access should be given to areas, either natural or man-made, that provide relief from weather that is a serious risk to an animal's welfare. Animals with appropriate shelter have more energy to put into production.

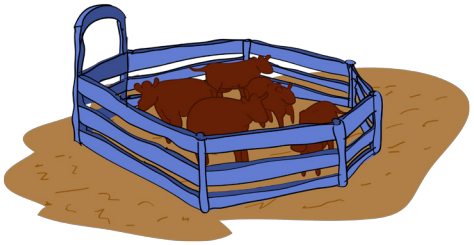


Handing Facility

A complete cattle handling facility has the appropriate equipment for safely handling, restraining, treating, segregating, holding, loading and unloading cattle.

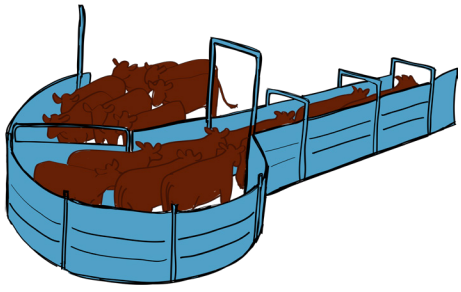
Corrals

Corrals are the most typical component of handling facilities. Corals are used to facilitate moving, segregating and holding specific groups of animals.



Handling System

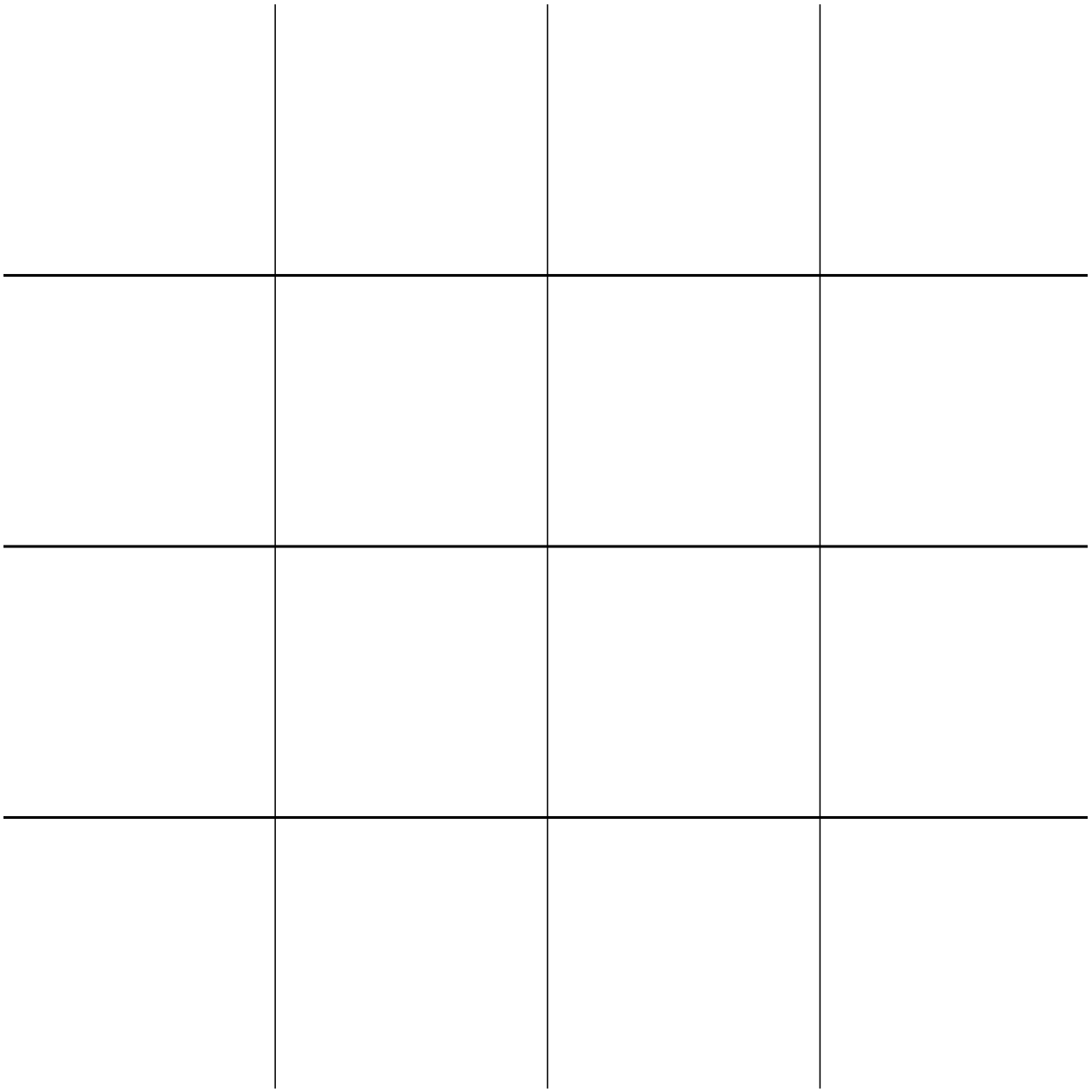
A properly designed handling system allows for the safe, low stress and efficient flow of animals through it.



Member Activity Sheet

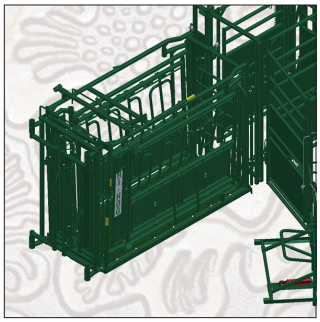
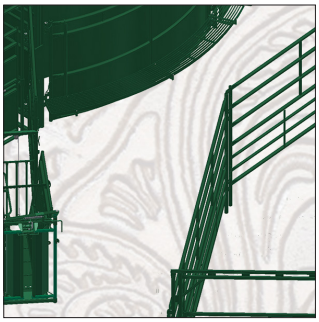
Handling System Design

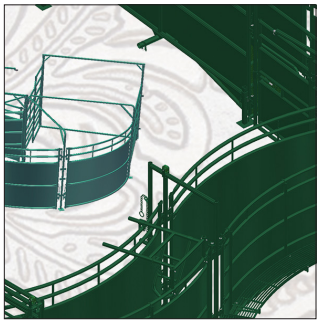
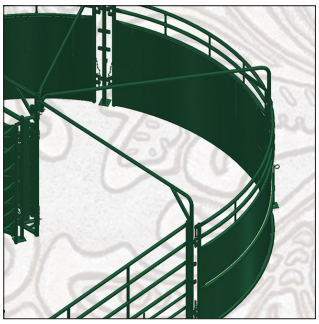
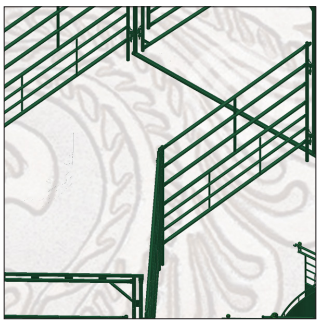
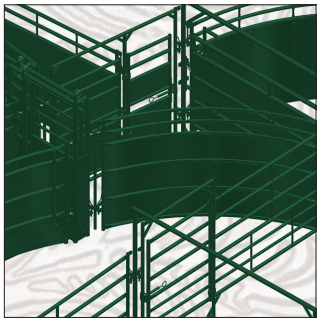
Instructions: Cut out the puzzle pieces and place them accordingly for a complete image of various cattle handling systems.

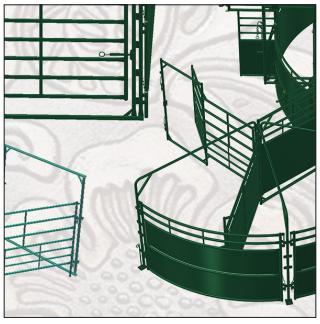
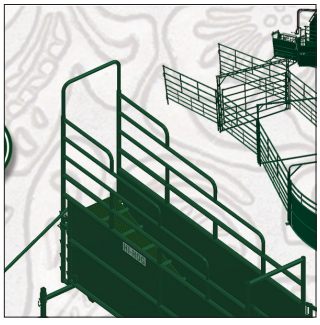


Member Activity Sheet Cont

Handling System Design

Reference Sheet

Identification Tags & Traceability

Radio Frequency Identification Tags

Radio Frequency Identification tags (RFID tags) are applied to the ears of beef cattle to assist with the identification and traceability of the animal. Each RFID tag has a written and electronically pre-programed number that is associated with the animal wearing it, much like a license plate on a truck. Each animal's number acts as a unique and accurate identifier. The tag can be read visually, or it can be scanned through the use of radio frequency technology using hand-held or panel readers.

RFID Tags & Traceability

The beef industry is committed to protecting animal health, public health and food safety and traceability is key to that. The Canadian Food Inspection Agency regulates and enforces animal identification, while the Canadian Cattle Identification Agency (CCIA) administers the identification program and manages the national Canadian Livestock Tracking System (CLTS) database.

The CLTS database allows producers to record tag information that relates to the three pillars of traceability: animal identification, premise identification and animal movement. This way, instances of serious animal health, public health or food safety concerns can quickly and easily be traced and contained. Producers can also enter value-added information, like age verification details, into the CLTS.

It is a federal requirement that all beef cattle raised in Canada be tagged with an approved CCIA RFID ear tag prior to leaving the farm they were born on, also called their "herd of origin." These tags prove valuable in the event of an animal disease outbreak or natural disaster, and play an important role when it comes to customer assurance and effective herd management.

Management Tags

In addition to RFID tags, many producers also use management tags with a number and colour of their own choosing for easy identification within their own herd. They are particularly useful when identifying the animal in a pasture or pen as they can be read visually from a distance, eliminating the need to run the animal through the chute to get close enough with a RFID tag reader.

Diagram

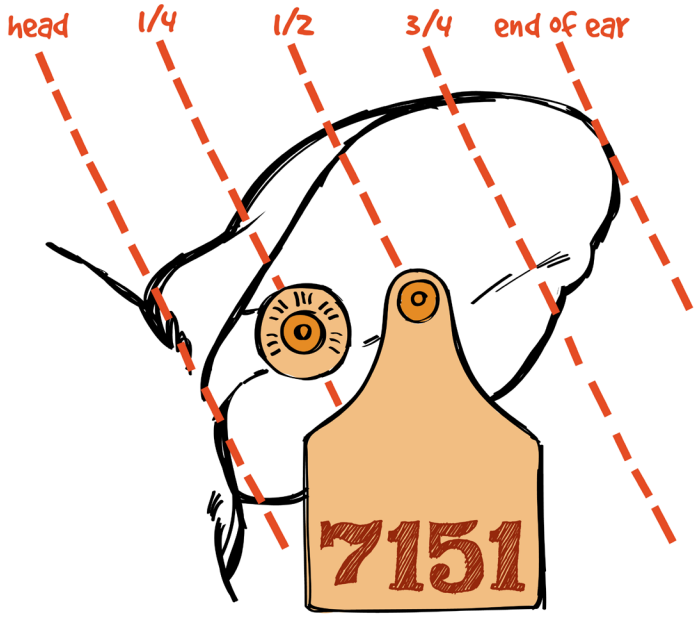
Applying Identification Tags

Applying RFID Tags

Placing the tag within the first ¼ of a beef animal's ear between the two ribs is best. Doing so minimizes the risk of bleeding, infection as well as the tag catching on something and being pulled out of the animal's ear. Be sure to follow the manufacturer's directions to ensure the tags stay on! Correct placement is also important for easy scanning.

Applying Management Tags

Insert in a similar manner, within the first ½ the same ear or the other ear.



Tips for Making Sure Tags Stay Put

- Properly restrain the animal so it cannot move its head while you are applying the tag.
- Use the recommended tag applicator and pin for the specific tag type and brand, and follow the manufacturer's directions.
- Make sure the tags and applicators are clean.
- Wipe clean and disinfect both sides of the animal's ear before applying the tag.
- Apply antiseptic to tags and tag applicator between tagging different animals, this will help to control infection.
- Do not apply a new tag in a hole from a previous tag.

Reference Sheet

The Ruminant Animal & Their Digestion

Ruminants versus Monogastrics

Cattle are called ruminants, meaning that they have a digestive system which includes one stomach with multiple stomach compartments. Each of these stomach compartments has their own special job to help the animal efficiently digest its fibrous diet.

Humans and animals such as pigs and horses are monogastrics - meaning that they have one stomach that has one compartment. Cattle and humans have different types of digestive systems because they eat very different things. To remember which stomach-type is which, just think of it this way, "mono" means one and "gastric" means stomach.

The Digestive Tract

Food enters through the mouth and travels down the esophagus to the rumen, the largest stomach compartment in a mature beef animal. The rumen acts like a huge fermentation vat in which enzymes and the mixing-action caused by the contraction of the muscle walls process the animal's diet for further digestion.

The reticulum is a small extension of the rumen and its main function is to help form "cud" for regurgitation. The reticulum also traps anything that the animal may have accidentally eaten such as a nail or piece of wire.

In the omasum, food is further broken down into smaller pieces so that it can enter the abomasum. From here, digestion proceeds the same as a monogastric animal - going through the small and large intestines and then out the anus.

Ruminating or Chewing Cud

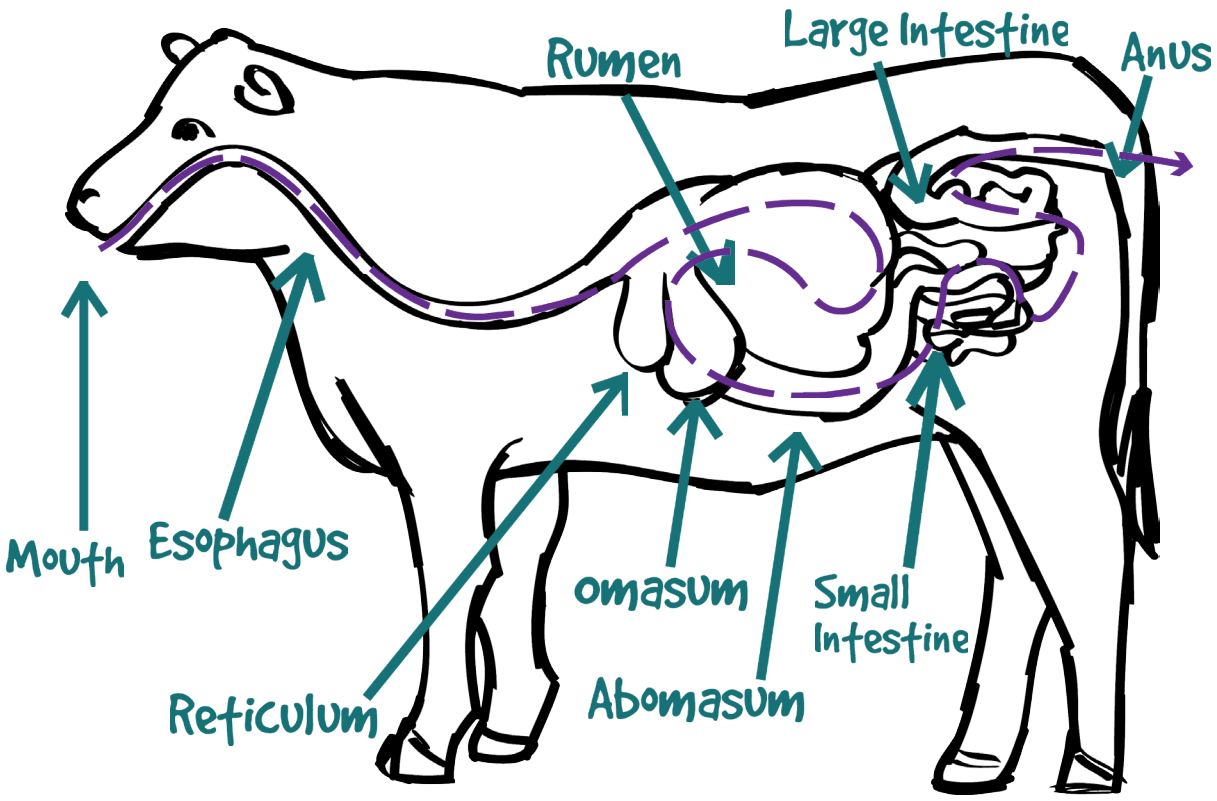
When a mature beef animal first ingests their food, they don't really chew that much before swallowing it. They will regurgitate the food later for a more thorough chewing. The ball of food they regurgitates is called "cud". Ruminants are known for chewing their cud and a word for "chewing cud" is ruminating! That's where ruminants get their name.

Eructation or Belching

As part of their digestion, cows belch. When their cud is regurgitated, the fermentation-gas produced in the rumen is also forced up and out through the esophagus resulting in a belch or "eructation" necessary for eliminating the gas produced. If they didn't eructate then they'd end up bloating.

Diagram

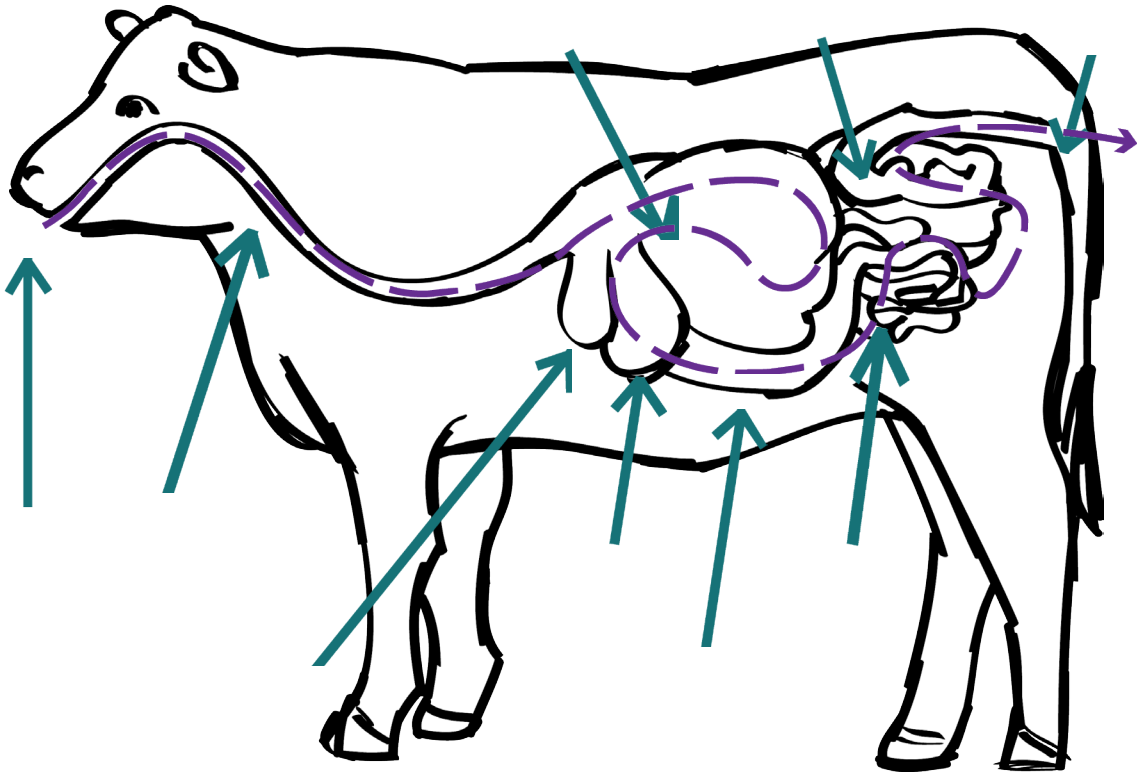
Mature Beef Animal's Digestive Tract



Member Activity Sheet

Mature Beef Animal's Digestive Tract

Instructions: Correctly label the animal's digestive tract.

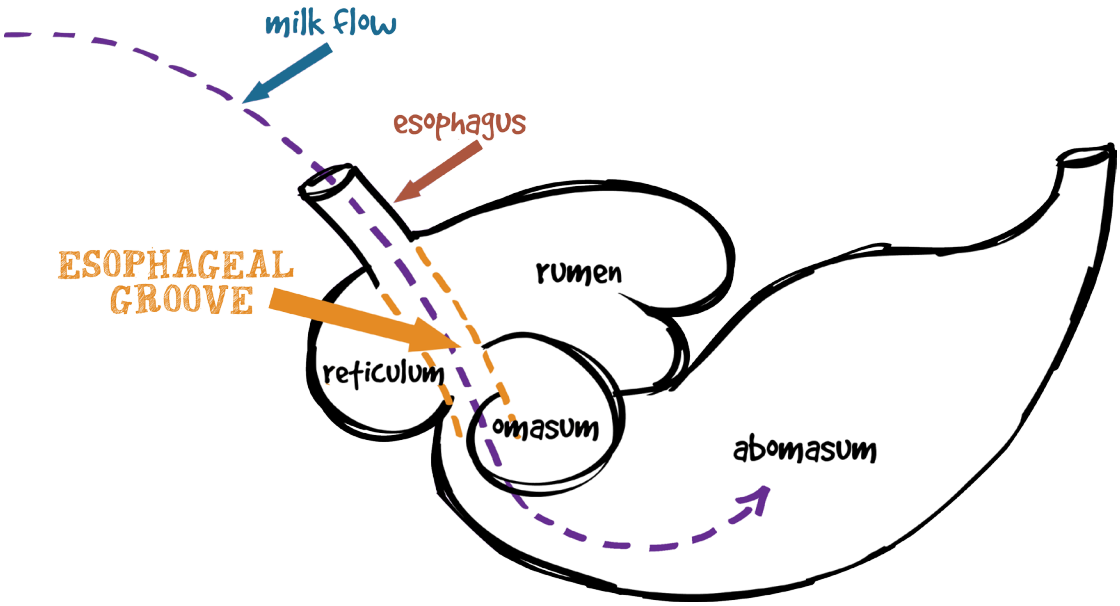


Rumen	Mouth	Reticulum	Small Intestine
Large Intestine	Anus	Omasum	Abomasum
Esophagus			

Reference Sheet

The Calf's Digestion

A calf's rumen is actually the smallest of the stomach compartments when it is very young. An esophageal groove is formed when the calf is nursing from its mother or a bottle. Muscular folds form a tunnel that allows colostrum or milk to travel straight through to the abomasum. The suckling reflex and milk protein stimulate the groove to open. The formation of the esophageal groove is essential for newborn calves and their digestive health.



Reference Sheet

Essential Nutrient Requirements of Cattle

A properly balanced diet is just as important for cattle as it is for humans. It is necessary that the animal's daily nutrient requirements are being met through their diet - better known as a ration.

A nutrient is a substance that provides the nourishment needed for life. Failing to provide an essential nutrient in an animal's ration would be like forgetting a key ingredient while baking a cake. In both cases, the end result wouldn't be what you'd want it to be.

The five essential nutrients that cattle require on a daily basis are:

- Water
- Protein
- Energy
- Vitamins
- Minerals

Reference Sheet

Function & other Factors Affecting cattle's Nutrient Requirements

Feeding a balanced ration is important in that it ensures that your cattle are getting the right amount of nutrients in the correct proportion.

The nutrient requirements of an animal depends on it's function or type. A nutrient requirement is the amount of a specific nutrient that is required to meet an animal's minimum need in order to function properly (maintain, grow, produce or reproduce). For example, the weaned steer calf, two-year old lactating cow and mature bull all require the five essential nutrients but in different amounts due to their different functions.

Before they can determine an animal's nutritional requirements, producers must determine whether the animal's main function should be:

- Maintenance
- Growth
- Production
- Reproduction

Factors other than function affect the amount of nutrients the animal requires too, including:

- Environmental factors, such as extreme temperatures and wind
- The animal's frame size and condition score
- Whether the animal is female or male
- The animal's health status
- The age of the animal
- The animal's level of activity

Reference Sheet

Concentrates, Roughages & Supplements

Producers typically provide roughages, concentrates as well as supplements. What producers feed their cattle depends a lot on what feedstuffs are available to them.

Concentrates are high in energy or high in protein, and are low in fibre. Concentrates are typically grains such as barley or wheat.

Roughages are high in fibre. Grass, hay, silage, straw and other forages are roughages.

Supplements are a good source of one or more nutrients. They're man-made and may be added to a ration to correct or prevent a nutrient deficiency, or in other words, balance the ration. Supplements may contain high levels of energy, protein, minerals and/or vitamins – basically, anything that may be missing in the ration.

Reference Sheet

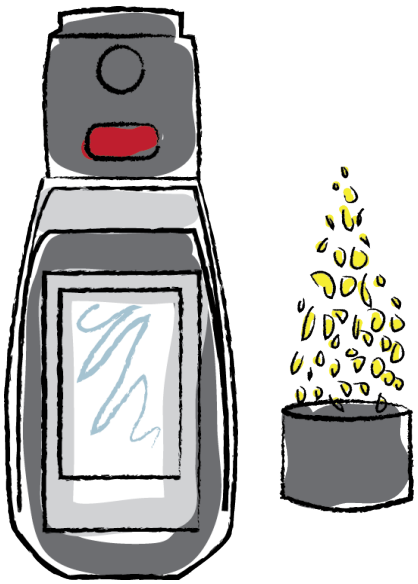
Conducting a Feed Analysis

A balanced ration is one that supplies nutrients in the proper amount and proportion for an animal's function. To formulate a balanced ration you'll need to know the animal's nutrient requirements, in addition to how nutritious your feed is.

The best way to find out more information about your feed is to have it analyzed. This test can tell you a lot - including, but not limited to the level of nutrients in your sample, the moisture level and how easily digestible it is. Having feed analyzed will help you decide if supplements are necessary, and if they are, the type and amount needed to achieve a balanced ration.

To get a feed analysis done, contact a feed analysis laboratory. They will provide specific instructions on how to take a sample and submit feed for analysis. They will also provide a list of all the different tests they can do, and how much each test costs. The staff at feed analysis laboratories and local feed companies, as well as veterinarians and cattle nutritionists are great sources of information on this topic!

When you get your feed analysis results back, you can then compare the results against the nutritional requirements of the type of animal you're feeding. Then, you're ready to start balancing rations for your cattle. By formulating balanced rations, you are more likely to increase animal nutrition and lower feed costs. Overfeeding, underfeeding and/or feeding nutritionally are inefficient management practices. But remember, changes to cattle's rations should be made gradually.



Member Activity Sheet

Steps for Formulating Rations

Instructions: Order these ten steps correctly.

_____ Compare the results of the feed analysis with the nutritional requirements of the animal(s) being fed to determine the difference between what the feed can provide, and what your animal(s) needs.

_____ Evaluate your feeding program on an ongoing basis so that you can be proactive when it comes to any issues or necessary changes.

_____ Determine the nutrient requirements of the animal(s).

_____ Determine how and where to feed cattle.

_____ Determine the target or goal estimated finished weight and average daily gain you're aiming to achieve during the feeding period.

_____ Determine what kind of feed is readily available.

_____ Determine the primary function of the animal(s). Is it Maintenance, Growth, Production or Reproduction?

_____ Contact a feed analysis laboratory about conducting an analysis of your feed. You may also talk to the staff at your local feed company, your veterinarian or a cattle nutritionist.

_____ Balance the ration by hand or by using ration balancing software. Evaluate and compare various feedstuffs to determine which combination is most cost-efficient.

_____ Consider factors in addition to function that may affect the amount of nutrients the animal requires. Factors may include the animal's health status, sex, age, frame size, condition score and level of activity, as well as environmental factors.

Reference Sheet

Devising a Watering Plan

Water helps the body to function in so many different ways we really couldn't live without it - and neither could cattle! Here's information on Water from Section 2 of the Beef Cattle Code of Practice. For the complete document, including appendices, visit www.nfacc.ca/codes-of-practice/beef-cattle.

WATER

Cattle need access to water of adequate quality and quantity to fulfill their physiological needs. Water availability and quality are extremely important for cattle health and productivity. Beef cattle will drink between 26-66L (5-14gal) per day (13). Water quality and palatability affect water consumption. Cattle may limit their water intake to the point of dehydration if the quality of drinking water is compromised (14).

Snow is used as a water source in some extensive western Canadian beef operations. There is scientific evidence that cattle can maintain body condition using loose snow for water under certain specific conditions (15). These conditions can be highly variable, and can result in risks to cattle welfare if they are not carefully monitored. These variables include snow conditions and quality, feed quality, cattle body condition and weather conditions.

It is extremely important to ensure there is a sufficient supply of loose, clean snow (15,16). Further, cattle with higher energy requirements (such as growing, lactating or in poor condition) risk losing excess energy when accessing and melting snow. It can take inexperienced cattle several days to learn to consume snow as a primary water source so they should be monitored during this acclimation period (17). Using snow as a sole winter water source is not appropriate in all geographic areas, even within the same province. Contact your local or regional beef cattle specialist or your veterinarian for advice (See Appendix G).

Reference Sheet

Devising a Watering Plan con't

REQUIREMENTS

Ensure that cattle have access to palatable water of adequate quality and quantity to fulfill their physiological needs. Monitor water sources, feeding habits, behaviour, performance and health on an ongoing basis and be prepared to adjust the watering program accordingly.

Snow may only be used as a sole winter water source providing it is of sufficient quantity and quality to meet the animals' physiological requirements.

Snow must not be used as a sole water source for the following cattle:

- lactating, or
- newly-weaned, or
- that have a body condition score of less than 2.5 out of 5, or
- that don't have access to optimal feed resources.

Only adequate quantities of clean, loose snow may serve as the sole water source. Monitor snow conditions on an ongoing basis.

Have a back-up water source in the event of insufficient loose snow or an interruption in water supply.

RECOMMENDED PRACTICES

a. ensure that water sources are easy for cattle to locate and access
b. manage cattle and water sources to avoid competition that would limit access to water
c. check automated water sources daily to ensure they are dispensing properly
d. test water quality in the event of problems such as poor performance, reluctance to drink, or reduced feed consumption
e. if utilizing natural water sources, provide water in troughs or bowls wherever possible to ensure cleanliness of water supply and safe animal access
f. be aware of the signs of stray (tingle) voltage around water sources, such as reluctance to drink or reduced feed consumption
g. if using a frozen-over natural water source in winter, provide an area of open water and restrict cattle from areas of thin ice.

Reference Sheet

Herd Health Planning

When it comes to keeping cattle healthy, it's important that producers work with their veterinarian on a prevention-focused Herd Health Plan. The time and money spent preventing injury, illness and disease is usually much less costly to producers than treating an individual animal or the whole herd. That's why having a Herd Health Plan is such an important part of an overall animal husbandry and management program.

Because each herd is different, there's no one-size-fits all approach when it comes to creating a Herd Health Plan. So, producers should work with their veterinarian to create a yearly plan that works best for their herd.

A typical Herd Health Planning session with your veterinarian may cover the following topics:

- How to create a healthy living environment for animals.
- A vaccination program and parasite control.
- What to watch for when monitoring or observing animals.
- What to do if one suspects an animal is sick or unhealthy.
- Preventing exposure to sickness or disease and preventing its spread if exposure occurs,
- And last but not least, proper record keeping.

One of the most important things that producers can do to keep their animals healthy is provide them with a safe and healthy living environment. An environment where:

- Stress and discomfort are minimized.
- Normal behaviours can be expressed, and
- There is nutritious feed and plenty of quality water or snow.

Reference Sheet

Vaccination Program

Vaccination is the administration of a vaccine to increase immunity, or in other words, strengthen the ability to fight-off illness or disease. A vaccination program is a really important part of a Herd Health Plan.

Producers and their veterinarians discuss what they're going to vaccinate the herd against. They look at what was an issue last year and anticipate what may be an issue this year. They will also review the proper handling, storage and administration techniques and protocols for the vaccines that they've chosen. These factors, along with the timing of vaccination, can have a huge impact on how effective your vaccination program is.

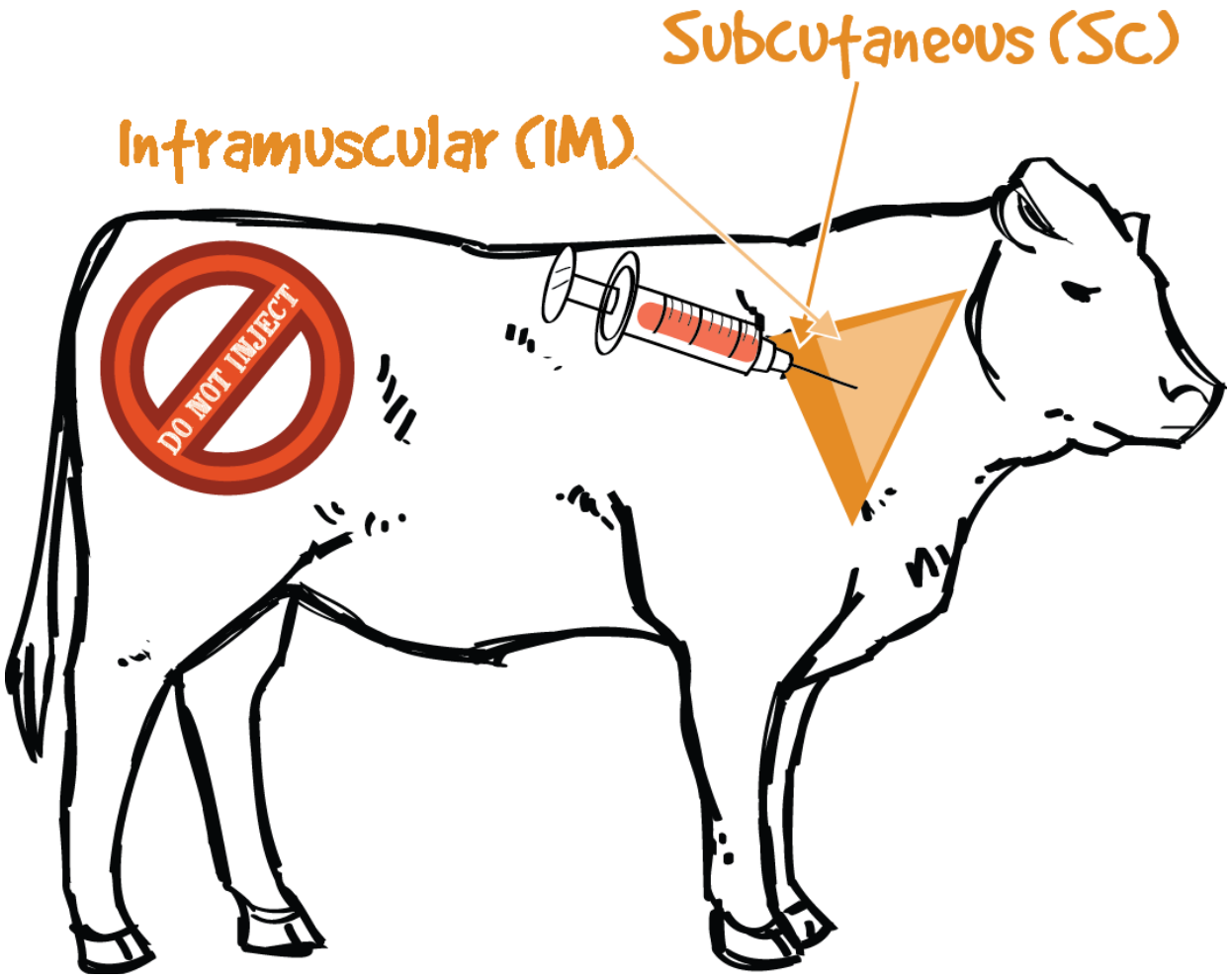
When it comes to vaccinating your herd, timing can be everything. It's important that the herd's vaccination schedule is in sync with the overall production and management cycle. A veterinarian that is familiar with the herd can help producers to time vaccinations correctly to maximize the benefit in terms of disease prevention and cost effectiveness.

Remember to have a vaccination plan in place ahead of time, use proper cleaning, sanitation and disposal practices, always follow the manufacturer's directions and consult your local veterinarian if you have any questions or concerns when it comes to your vaccination program.

Diagram

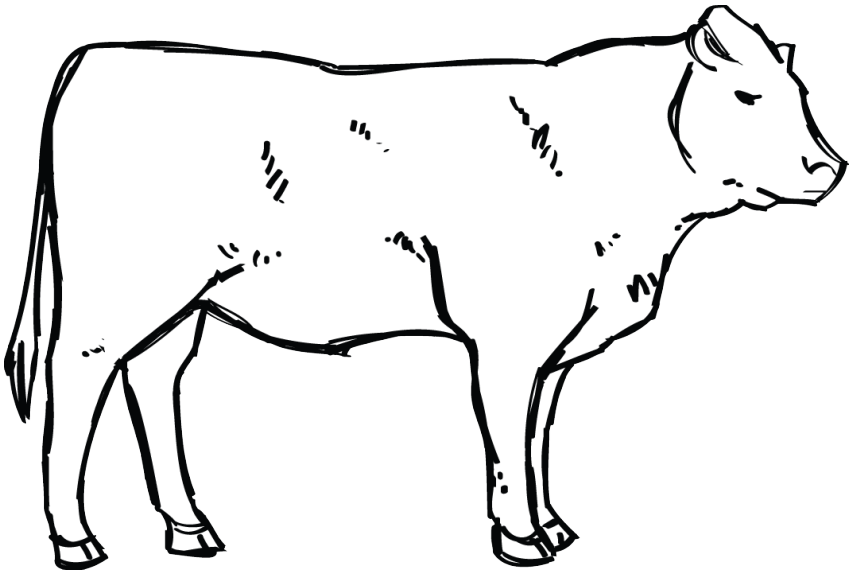
Injection Sites

Vaccines are typically injected Subcutaneously (beneath the skin) or Intramuscularly (directly into the muscle). It is recommended that producers use vaccines that can be injected using the subcutaneous, or subQ, method whenever possible. They should be injected under the loose skin of the neck, in front of the shoulder. If a vaccine must be given intramuscularly, inject it into the muscles of the neck, also in front of the shoulder. Never inject in the hip or thigh.

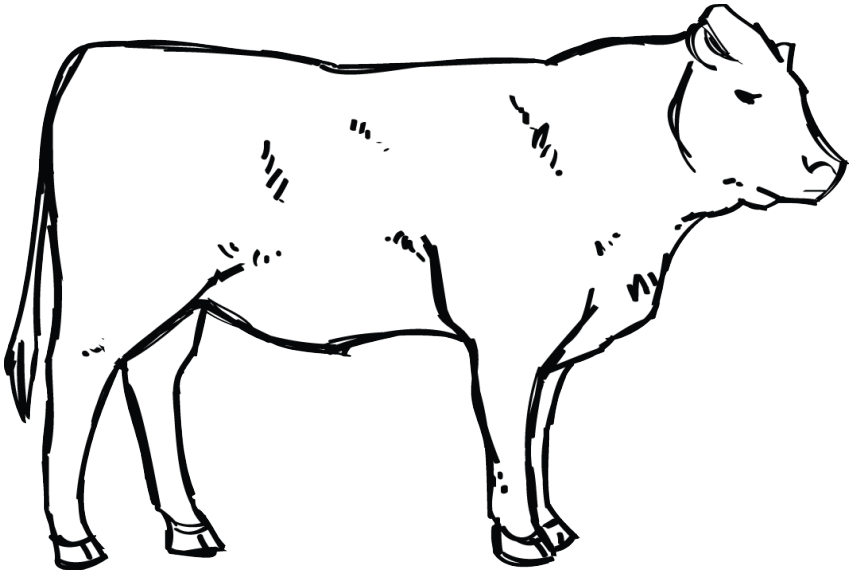


Member Activity Sheet

Injection Sites



Where would you inject this animal Subcutaneously?



Where would you inject this animal Intramuscularly?

Reference Sheet

You Suspect Your Animal Is Sick

Observe, observe, observe! Producers who carefully monitor their herd are more familiar with their animals and will therefore have a better idea of what's normal and abnormal for them. Generally, healthy animals have the following characteristics:

- Consumes feed provided, ruminates and manure is normal.
- Consumes water or snow and urine is normal.
- Has a shiny coat, bright and clear eyes, bright and clear nose, upright ears and is in good condition.
- Is alert and exhibits normal behaviours.
- Stands easily and walks with a normal gait.

If a producer has observed a visible injury or an abnormality in an animal's appetite, manure, urine, condition, behaviour, stance or gait they should examine the animal carefully. Note any symptoms, such as abdominal swelling or discharge from the eyes, nose or mouth and check the animal's vital signs.

Vital Signs of Cattle

The ***temperature*** of cattle may vary depending on a number of factors (such as age, recent physical activity, stage of digestion or gestation, time of day or environmental factors) but when measured with a rectal thermometer, the normal temperature should be 38 - 39 degrees Celsius.

The ***heart rate*** can be measured with two fingers on the animal's pulse, in one minute you should count 40-80 beats.

The ***breathing rate*** of an animal at rest should be 10-30 breaths per minute. When observing the breath, see if the animal is having any difficulty by listening to and watching the breaths. Remember, normal breathing should be noiseless except when the animal is exercising or at work.

Producers may then call their veterinarian and explain the injury or the symptoms they have observed and recorded. The veterinarian will provide a diagnosis and the appropriate treatment options, which may include medication.

For any medication that is given, it's important to follow the veterinarian's and the manufacturer's instructions in regards to handling, storage and administration. Also be sure to ask about withdrawal periods.

Reference Sheet

Biosecurity

Biosecurity practices help to prevent and reduce the introduction and spread of illness or disease amongst animals. Isolating sick animals from the rest of the herd while following proper cleaning, sanitation and disposal procedures for equipment and facilities are just a few things producers can do to prevent the spread. The same goes for when you're introducing outside animals to your herd! Take the necessary precautions and quarantine new animals for at least three weeks so that you can monitor them for illness or disease before introducing them to the rest of the herd.

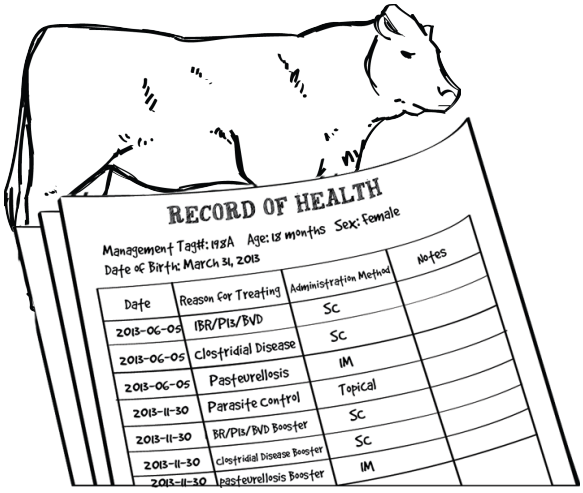
Reference Sheet

Record Keeping

Good record keeping is the glue that keeps a producer's Herd Health Plan together. Using an electronic or paper system, producers should keep up to date records on each individual animal in their herd.

When it comes to keeping track of the health of your herd, a note should be made any time a health abnormality or injury is observed, a vaccination, diagnosis, treatment or medication is given, or when an animal has to be re-tagged. When new animals are introduced to the herd, their health record should be added to your herd health records as well.

Veterinarians find accurate and complete herd health records to be extremely useful when it comes to diagnosing an animal or analyzing how effective the Herd Health Plan was, so that necessary improvements can be made for next year. Remember, a healthy herd is a productive herd!



Section 4: Breeding Management

Lessons included in the *Breeding Management* section of the eLearning tool:

Lesson 1: Cattle Reproductive Systems 70

Lesson 2: Breeding Season.....79

Lesson 3: Pregnancy Checking 84

Lesson 4: Managing the Calving Season 85

Key Takeaway:

The overarching goal of cow/calf producers is to improve the fertility of their herd in order to increase the potential for profitability. In other words, to have as many heifers and cows as possible be successfully bred and give birth to healthy calves that achieve a desired weaning weight.

By completing the *Breeding Management* section of the eLearning tool, members will be able to:

- Identify parts of cattle reproductive systems and understand their functions.
- Recall advantages of a short, well-timed breeding season, list considerations for culling cows and choosing replacement heifers and explain how artificial insemination works.
- List methods for performing pregnancy checks.
- Outline a plan for preparing for the calving season, list the stages of parturition and differentiate between normal and abnormal calf presentations as well as explain why colostrum is so important for newborn calves.

Lesson 1: Cattle Reproductive Systems

Diagram: Mature Female Reproductive System - Anatomy and Physiology

Reference Sheet: Mature Female Reproductive System - Anatomy and Physiology

Activity Sheet: Mature Female Reproductive System - Anatomy

Reference Sheet: Estrous Cycle

Diagram: Mature Male Reproductive System - Anatomy and Physiology

Activity Sheet: Mature Male Reproductive System - Anatomy and Physiology

Reference Sheet: Breeding Soundness Examinations

Activity Sheet: Breeding Soundness Examinations

Lesson 2: Breeding Season

Reference Sheet: Timing and Length of the Breeding Season

Activity Sheet: Determining a Breeding Season

Reference Sheet: Culling Cow and Selecting Replacement Heifers

Reference Sheet: Natural Service versus Artificial Insemination

Activity Sheet: Natural or Artificial Insemination

Lesson 3: Pregnancy Checking

Reference Sheet: Pregnancy Checking

Lesson 4: Calving Season

Reference Sheet: Preparing for Calving Season

Reference Sheet: Parturition or Calving

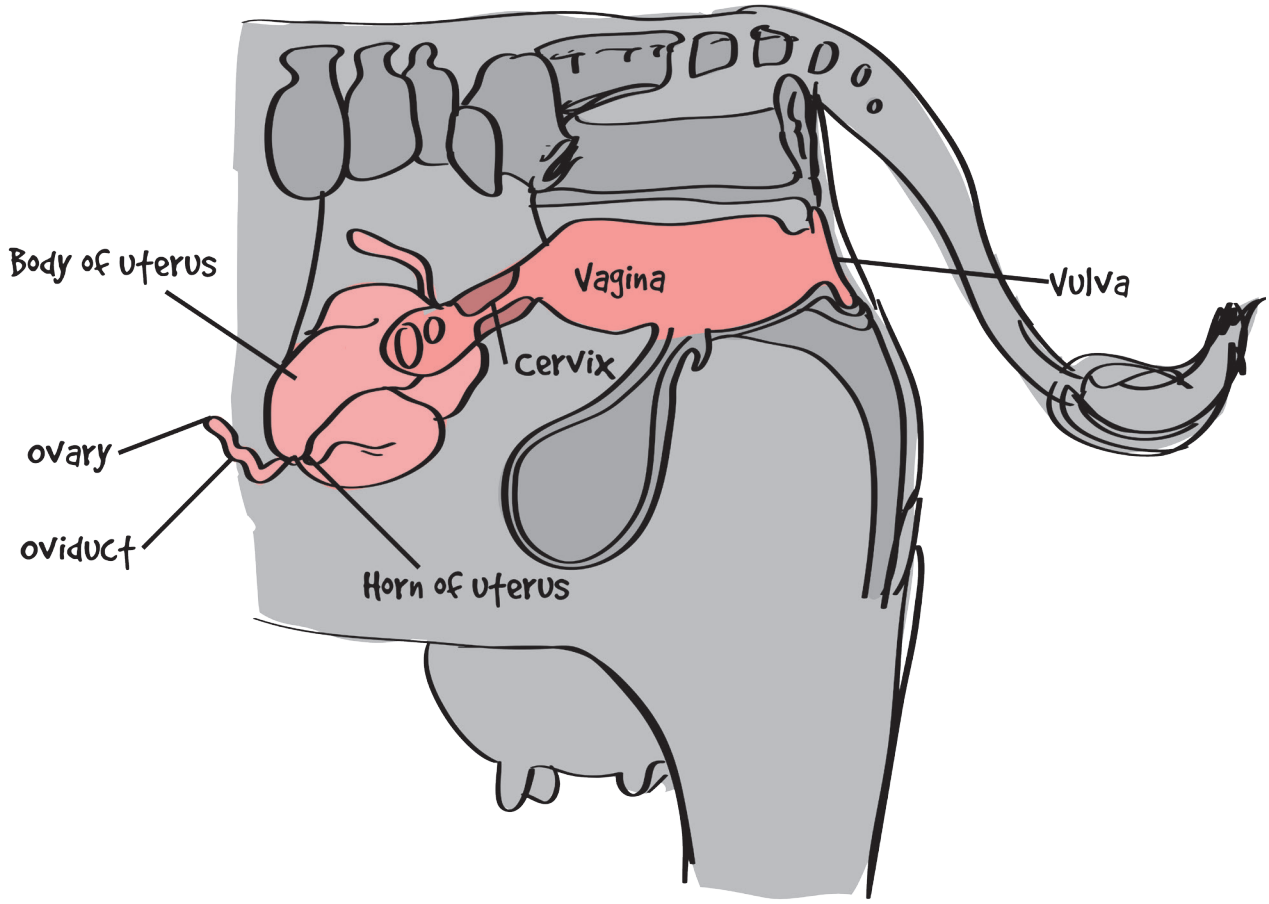
Diagram: Calf Presentation During Calving

Activity Sheet: Is the Calf's Presentation Normal?

Reference Sheet: Caring for a Newborn Calf

Diagram

Mature Female Reproductive System – Anatomy



Reference Sheet

Mature Female Reproductive System – Anatomy & Physiology

The ***ovaries*** produce eggs or ovum as well as hormones essential for reproduction.

The ***oviducts*** are the funnel-shaped tubes where fertilization will occur if both an egg and viable sperm are present at the same time.

If an egg is fertilized, it develops into an embryo and will travel to the ***uterus*** to implant itself to the wall of the uterus. The main function of the uterus is to provide a suitable environment for fetal development. This is where the fetus will remain until birth.

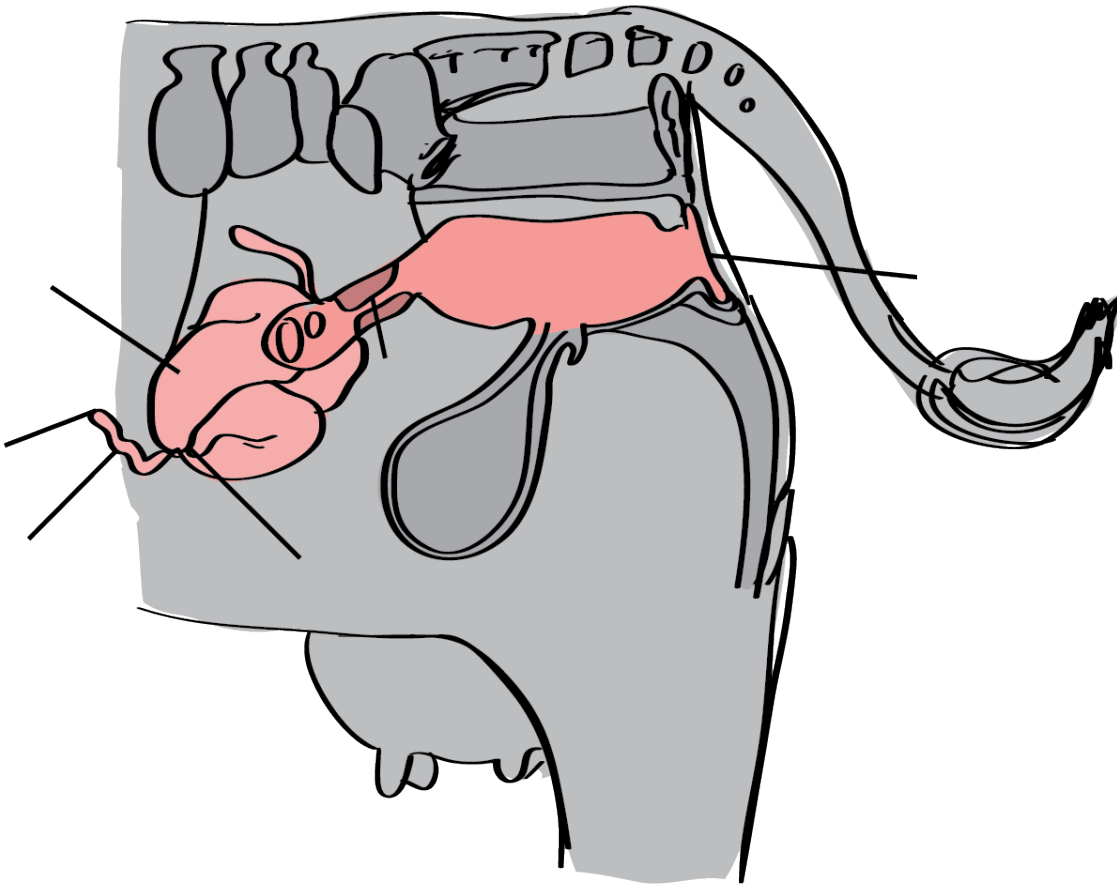
The ***cervix's*** thick walls and opening to the uterus relax only to create a passageway for sperm to enter and for the calf to travel through during birth. The cervix remains tightly closed during pregnancy.

The ***vagina*** is the passageway that connects the cervix to the outer opening of the reproductive tract called the ***vulva***.

Two of the essential organs for reproduction are located in the animal's brain – the hypothalamus and the pituitary gland.

Member Activity Sheet

Mature Female Reproductive System – Anatomy



Instructions: Label the diagram with the following terms.

Ovaries

Body of the Uterus

Oviducts

Uterus

Cervix

Vagina

Vulva

Reference Sheet

Estrous cycle

An estrous cycle is a series of changes in a mature female animal's reproductive system that happen in response to hormonal and physiological changes also happening in the animal's body.

The length of the cycle is measured as the time between two consecutive estrus or heat periods. The average length of a cycle for mature female beef cattle is 21 days, but a cycle that lasts between 17 to 24 days is still considered normal.

The beginning of the cycle is signaled by the mature female showing signs of being in estrus, or standing heat.

Estrus, or Standing Heat

Estrus, or standing heat, is the time period when a cow or heifer will accept the male. The best way to detect standing heat is to observe cycling cows or heifers for changes in behaviour.

The best time of day for detecting if cows or heifers are in standing heat is early in the morning or evening. Observe them 2-3 times a day, without disrupting their normal behaviour, for approximately 30 minutes.

- Look for the following indicators:
- Stands to be mounted by a bull or other cows, or has mud on her rump and sides.
- Is restless or nervous, may be bawling or more vocal than usual.
- Groups together with other animals in heat.
- Vulva is swollen, and bright red in color.
- A clear, mucous discharge may be observed.

Estrus or heat detection is of utmost importance for successful breeding management. This is due to the fact that ovulation occurs not long after the beginning of a period of estrus or standing heat, and is the optimal time for natural service or artificial insemination to occur for successful fertilization.

If the animal was bred, and fertilization did occur:

- The hormone progesterone will prepare the uterus for pregnancy and the animal will produce chemical signals for the animal's body not to return to estrus.

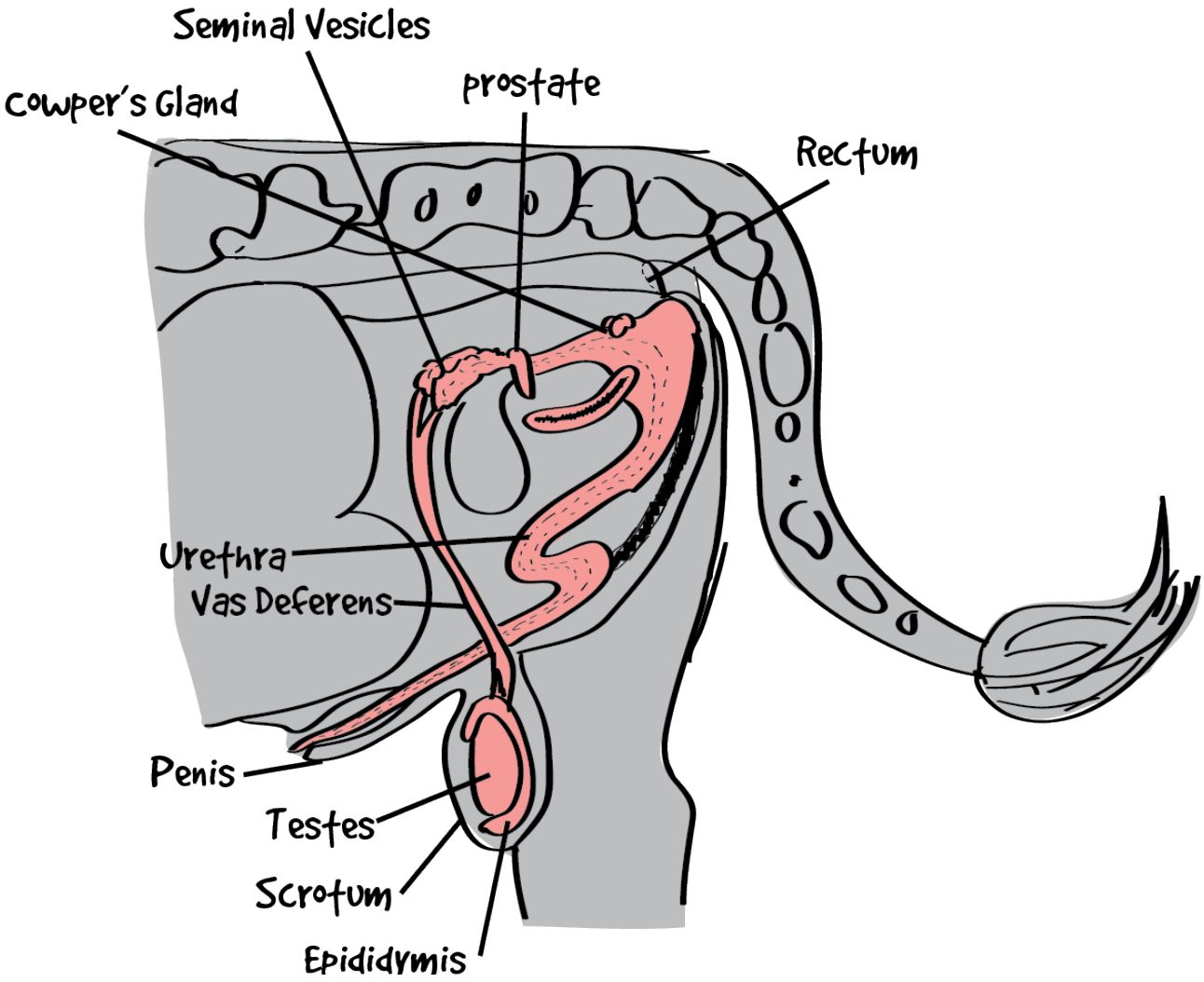
If the animal was not bred, and fertilization did not occur:

- The hormone prostaglandin will be produced and bring the animal back into estrus or standing heat in the next two to three weeks, when the cycle will begin again.

The estrous cycle will repeat over and over until the mature female animal becomes pregnant. Producers need to be aware that some mature female animals do not cycle normally and others may show no signs of estrus. They should talk to their veterinarian if they think that either of these things may be happening.

Diagram

Mature Male Reproductive System – Anatomy



Fact Sheet

Mature Male Reproductive System – Anatomy & Physiology

The ***scrotum*** provides protection to the testicles and also helps to regulate the temperature for optimum sperm development.

The two ***testes*** produce sperm, as well as the hormone that gives the mature male his masculine characteristics and appearance.

The ***epididymis*** stores viable sperm and carries it from the testicles to the vas deferens.

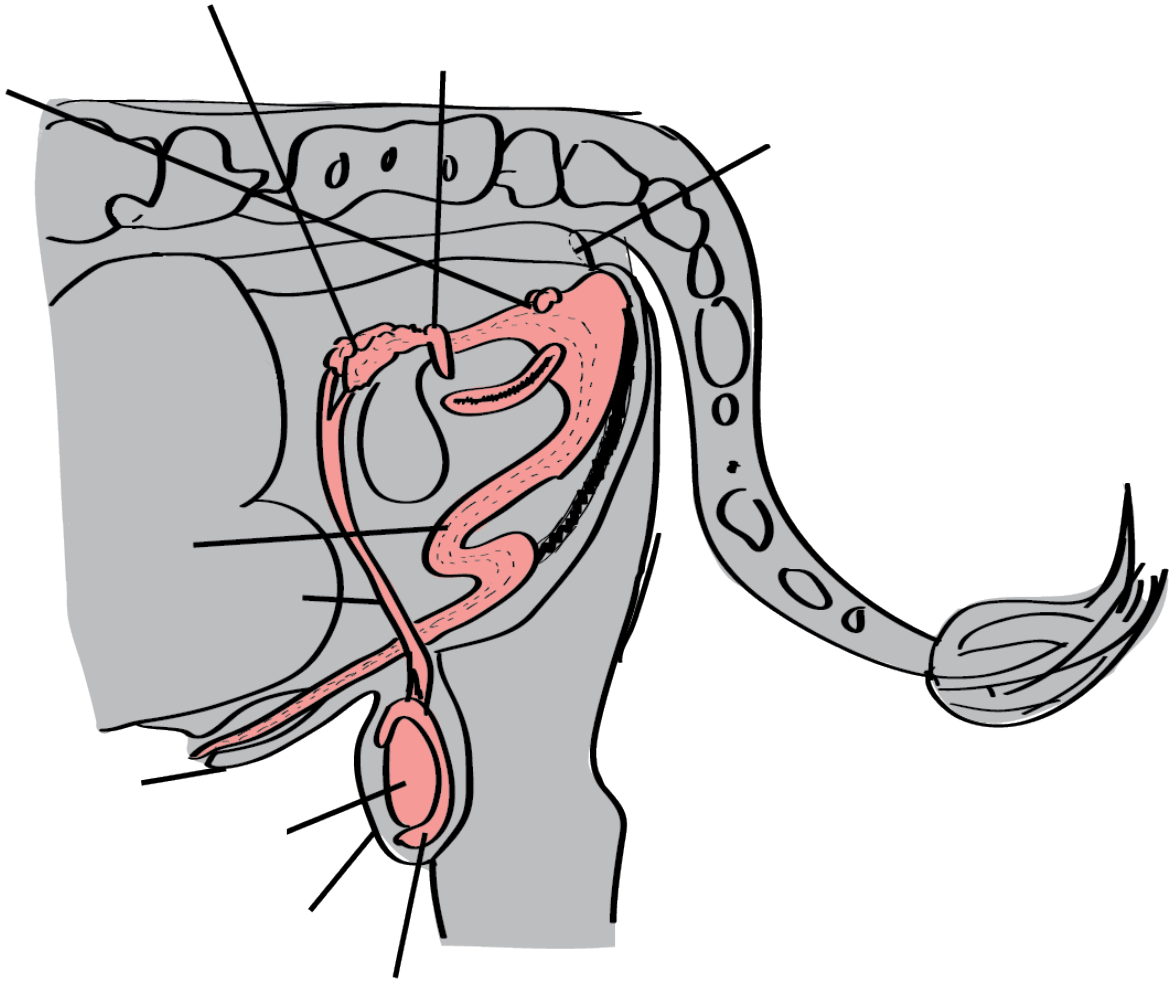
The ***vas deferens*** unite into a single tube that is called the ***urethra***.

The urethra contains the ***accessory glands*** that secrete fluids that add volume to the sperm, activate them to be mobile as well as flush and cleanse the reproductive tract.

The semen travels out of the body through the ***penis***.

Member Activity Sheet

Mature Male Reproductive System – Anatomy



Instructions: Label the diagram with the following terms.

Scrotum	***Testes***
Epididymis	***Vas Deferens***
Penis	***Seminal Vesicles***
Cowper's Gland	***Prostate***
Urethra	***Rectum***

Reference Sheet

Breeding Soundness Examinations

Breeding soundness examinations may be conducted to assess whether or not cattle are ready for the breeding season. Breeding soundness examinations should be administered by a veterinarian. It's a small investment that can really enhance a producer's breeding program and therefore profitability.

Breeding Soundness Examinations for Bulls

Prior to the breeding season, it's important to assess the breeding potential of bulls, or herd sires, as they have a huge impact on the overall herd fertility. A breeding soundness examination of a bull involves a:

- Physical soundness examination
- Careful internal and external examination of the reproductive tract
- Semen evaluation

By not conducting Breeding Soundness Examinations, producers risk lower pregnancy rates.

Member Activity Sheet

Breeding Soundness Examinations

Instructions: Answer the following questions on breeding soundness examinations.

Q: Why is it important to conduct breeding soundness examinations?

A: _____

_____

_____

_____

_____

_____

Q: Who should perform a breeding soundness examination?

A: _____

_____

_____

_____

_____

_____

Q: Describe what is involved in a Breeding Soundness Examination for bulls?

A: _____

_____

_____

_____

_____

_____

Reference Sheet

Timing & Length of the Breeding Season

The gestation period for beef cattle is 283 days, approximately nine months. Therefore, producers determine the timing and the length of the breeding season based on what that will mean for the calving season.

Timing of Breeding Season

Producers may choose to calve in the Winter, Spring, Summer or Fall. The decision around the most suitable timing for the breeding season may be based on other farm/ranch commitments, production targets, weather trends and the availability of necessary resources and labour at the time of calving. Not one of the seasons works for all producers.

Length of Breeding Season

A 60-90 day breeding season is the goal of many cow/calf producers, but a shorter breeding season lasting 45-60 days can offer producers a lot of advantages such as:

- To be able to identify cows that need to be culled due to lack of performance more easily.
- Being able to more effectively meet the nutrient requirements of the cow herd during each stage of reproduction, because all of the heifers and cows will be at a similar stage.
- Saving on time and labour required for breeding season and calving season management, because the seasons will be concentrated.
- Calves will be more uniform in age and weight, making calf management easier.
- Calves born earlier in the calving season are typically heavier at weaning than calves born late in the calving season.

Member Activity Sheet

Determining a Breeding Season

Reference: ***When Should I Calve My Cows?***
http://www.gov.mb.ca/agriculture/livestock/production/beef/when-should-i-calve-my-cows.html

Instructions: Determining the timing of your breeding season and calving seasons is a major decision, weigh your options carefully!

Winter Calving Season – January, February and March

- When would the breeding season need to take place? _____
- What would be some advantages of a winter calving season?

  _____
- What would be some disadvantages of a winter calving season?

  _____

Spring Calving Season – April and May

- When would the breeding season need to take place? _____
- What would be some advantages of a winter calving season?

  _____
- What would be some disadvantages of a winter calving season?

  _____

Summer Salving Season – June and July

- When would the breeding season need to take place? _____
- What would be some advantages of a winter calving season?

  _____
- What would be some disadvantages of a winter calving season?

  _____

Fall Calving Season – August, September and October

- When would the breeding season need to take place? _____
- What would be some advantages of a winter calving season?

  _____
- What would be some disadvantages of a winter calving season?

  _____

Reference Sheet

Culling Cows and Selecting Replacement Heifers

Cull Cows

One of the ways to improve the reproductive performance of the herd is to remove, or cull, animals that aren't performing well.

Producers might consider culling:

- Cows that are open, or in other words, do not become pregnant.
- Cows that calve late in the calving season.
- Cows that lost their calf due to excessive calving difficulty.
- Cows that perform poorly, or in other words, produce poor quality calves.
- Cows that have a poor disposition, poor health, conformation or aren't structurally sound.

Producers often replace culled cows by:

- Purchasing replacement cows, or
- Selecting replacement heifers from their own heifer calf crop.

Replacement Heifers

Producers should consider the following when selecting their replacement heifers:

- Was the heifer calf born early in the calving season?
- What is the heifer calf's estimated mature frame score and size?
- Is the heifer calf structurally sound with good conformation?
- Does the heifer calve have a good disposition?
- Was the heifer calf's dam (or mother) a good producer?

It's important that a proper management plan is developed specifically for these heifer calves as most producers aim for heifers to have their first calve by 24 months. To achieve this goal it's crucial that they manage their heifers, and their nutrition program, so that the heifer calves will gain the necessary weight to come into estrous in order to conceive by the time they are 15 months of age.

Reference Sheet

Natural Service versus Artificial Insemination

Natural service involves the use of bulls to breed heifers and cows. Artificial Insemination, or AI, involves a technician using an instrument to deposit semen that has been collected from a bull, through the vagina and cervix and into the body of the uterus of the heifer or cow. Estrus synchronization is a method often used as part of an artificial insemination program.

Estrus Synchronization

Producers use estrus synchronization to cause groups of cycling heifers and cows to come into estrus and to ovulate at approximately the same time. It's a reproduction management tool that shortens, and helps producers to better manage, the breeding and calving seasons.

When deciding to naturally and/or artificially inseminate their cattle, producers need to think about the advantages and disadvantages of each method before making a decision that works best for their operation.

Member Activity Sheet

Natural Service or Artificial Insemination?

Reference: ***Natural Service & Artificial Insemination***
http://www.beefresearch.ca/research-topic.cfm/artificial-insemination-17

Instructions: Determine whether or not natural service or artificial insemination, or a combination of both, is best for your herd.

Natural Service

What are the advantages?

_____

_____

_____

What are the disadvantages?

_____

_____

_____

Artificial Insemination

What are the advantages?

_____

_____

_____

What are the disadvantages?

_____

_____

_____

Would you choose to use natural service or artificial insemination for your operation, or a combination of both? Why?

_____

_____

_____

_____

_____

Reference Sheet

Pregnancy checking

If estrus or standing heat cannot be detected within 17-24 days of being bred, you can generally assume the cow or heifer is pregnant. But many producers test their female animals for pregnancy after the breeding season.

There are a few methods for pregnancy testing out there, with each method varying slightly in terms of who can conduct it, when it can be conducted, how much information you can get from the test, how accurate it can be and how long it takes to find out the results. The most common methods out there are:

- Palpation
- Ultrasound
- Blood or Milk Test

The benefits of conducting pregnancy checks is finding out approximately when the calving season will be, which can help producers to make better management decisions, especially when it comes developing a feeding and nutrition plan based on stage of gestation.

Producers can also use the information to identify fertility or health issues in the herd as well as any open cattle (heifers or cows that are not pregnant and cycle again), which will help to facilitate culling and marketing decision-making.

Reference Sheet

Preparing for Calving Season

Proper management of the calving season is extremely important for an operation! The producer's main goal is to minimize calf losses. Producers must have a plan in place and be prepared in order to prevent calf loss as the birth and the days that follow are the most critical of a calf's life.

Producers can prepare for the calving season in the following ways:

- Proper nutrition management. This is essential to ensuring that heifers and cows are in good body condition going into the calving season.
- A good vaccination program. This should ensure that the dam's immune system can protect the calf.
- Supplies should be accessible and any facilities that will be used during the calving season should be prepared ahead of time.
- The calving area should be clean and dry to limit the spread of disease.

Reference Sheet

Parturition or Calving

Regular observation during the calving season is a must. Producers often separate their heifers and cows, as heifers are more likely to need assistance during calving and therefore should be monitored closely.

Signs that indicate that the beginning of calving season is near:

- Udder fills with milk.
- Vulva relaxes and swells, called springing.
- Cervical plus is lost.

Signs that parturition or calving is going to occur within the next 24 hours or so:

- Relaxation of the pelvic ligaments and
- Behaviours such as isolating herself or not eating.

The three stages of parturition, or calving, are:

1. This first stage is the dilation or opening of the cervix, vagina and vulva. This stage may go completely unnoticed, but at the end of this stage the cow or heifer may raise or switch their tail and there may be an increased mucous discharge from the vulva. She may also isolate herself or stop eating.
2. The second stage has officially begun when you can see the water sac hanging from the vulva, and it ends once the newborn calf has been delivered. The heifer or cow usually lies down during this stage.
3. In the third stage the placenta is shed.

If a producer thinks that the heifer or cow may be having dystocia, or calving difficulty, a good rule of thumb is that if a heifer or cow has been actively labouring but has made no progress, she may need help.

If a producer decides to intervene with the calving process, they must remember that safety and cleanliness are of utmost importance. Using a gentle touch, many producers determine whether the calf's presentation is normal before they do anything. It's important that producers know their limitations and contact their veterinarian if dealing with calving difficulty.

Diagram

Calf Presentation During Calving

Figure 1 is a diagram of a normal presentation. As you can see, the calf is right side up and facing frontward with its head and both front legs extending out towards the vulva. All other presentations are considered abnormal.

Figure 1: Anterior presentation

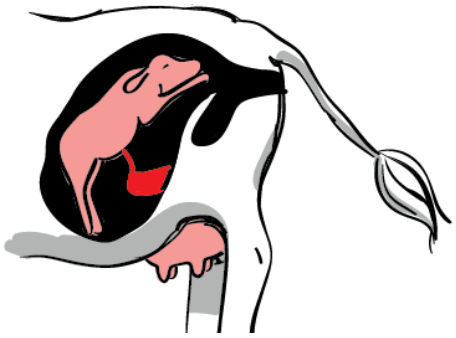


Figure 2: Breech presentation

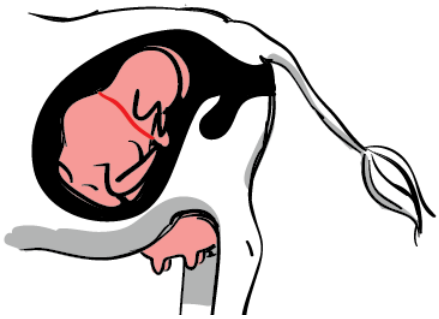


Figure 3: Head turned sideways

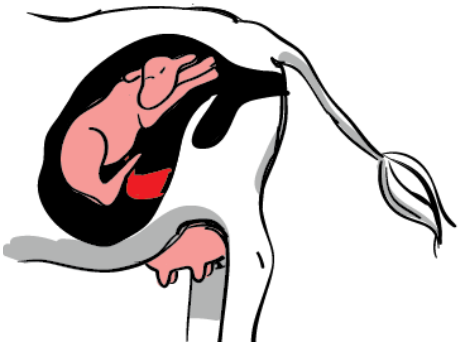


Figure 4: One or more forelegs back

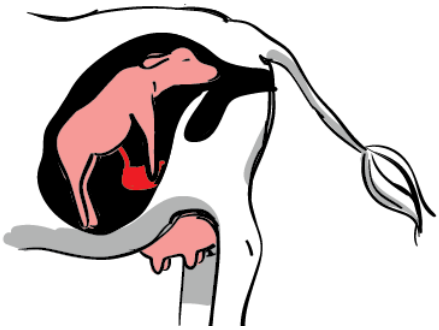


Figure 5 Upside down anterior presentation

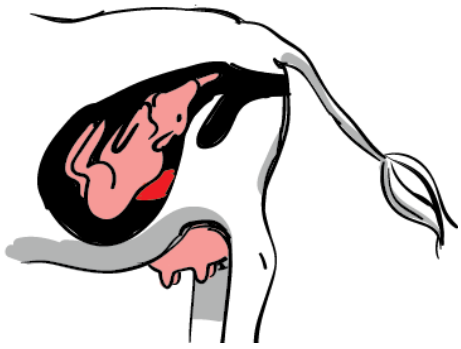
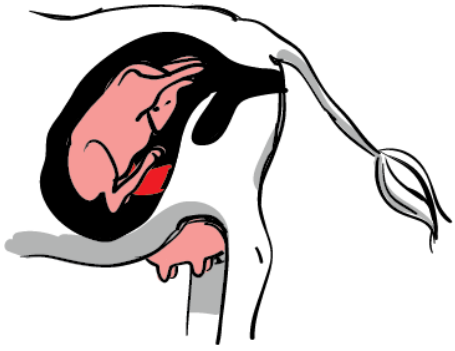


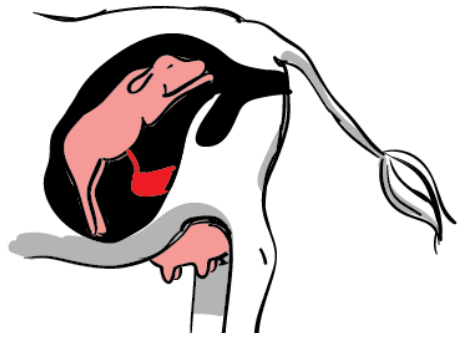
Figure 6: Head Down

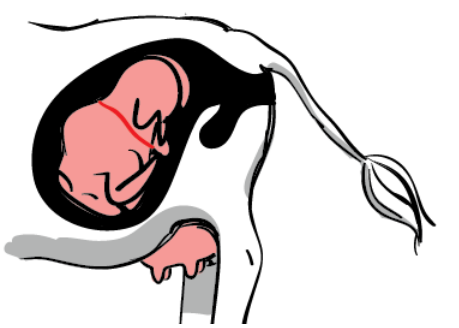


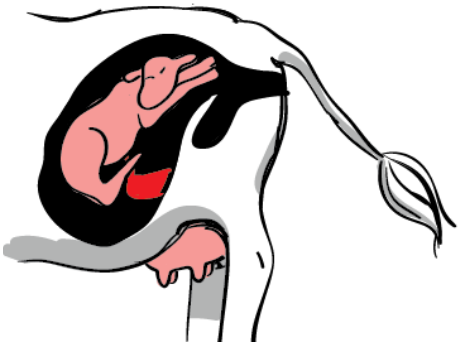
Member Activity Sheet

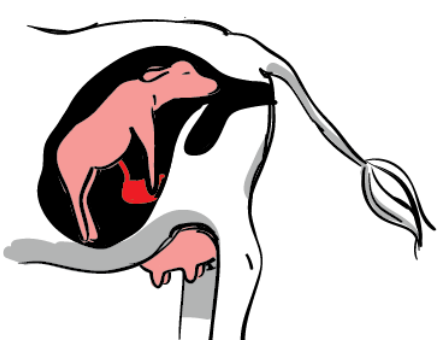
Is the Calf's Presentation Normal?

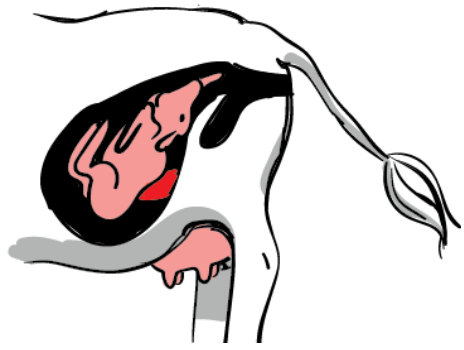
Instructions: Circle and name the abnormal presentations.

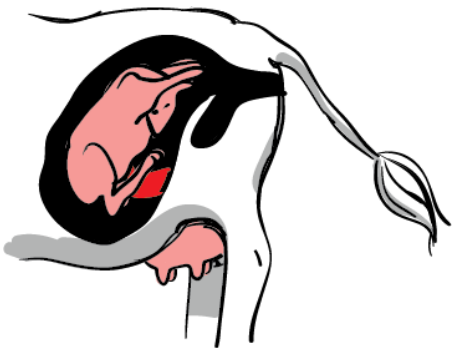












Reference Sheet

Caring for a Newborn Calf

Colostrum is critical to the development of the newborn calf's immune system because it contains the antibodies necessary to protect the calf from disease. Calves should receive colostrum as soon as possible following birth.

Calves that aren't able to nurse should be given 5-6 % of their body weight in colostrum or commercial colostrum supplements within six hours of birth and the same amount again at 12 hours.

Producers should look over and keep a close eye on heifers, cows and calves following calving. It's important that heifers and cows to recover well from pregnancy and calving so that they return to estrus, and for calves to be strong and healthy.

Section 5: Production Management

Lessons included the *Production Management* section of the eLearning tool:

Lesson 1: Market Steer Management 94

Lesson 2: Herd Sire Management 96

Lesson 3: Cow & Heifer Management 98

Key Takeaway:

Production Management is the term used to describe the best practices, or methods used for managing the many important elements at each stage of beef production.

By completing the *Production Management* section of the eLearning tool, members will be able to:

- Understand how to feed for proper gain at each phase of production for a market steer.
- List the impact that the herd sire has on the calf crop.
- Understand the different requirements of the herd sire in the breeding period and the maintenance period and how to combat phosphorus and vitamin A deficiencies.
- Speak to the differing nutrient requirements of heifers and cows.

Lesson 1: Market Steer Management

Reference Sheet: Getting Started with Feeding a Market Steer

Reference Sheet: Feeding a Market Steer – Growing & Finishing Phases

Lesson 2: Herd Sire Management

Reference Sheet: Herd Sire Health

Reference Sheet: Feeding a Herd Sire

Lesson 3: Cow & Heifer Management

Reference Sheet: Nutrient Requirements of Heifers & Cows

Reference Sheet

Getting Started with Feeding a Market Steer

How you feed a market steer is determined somewhat by what phase of the production cycle the steer is in - the starting phase, growing phase or the finishing phase.

The best way to calculate how to feed is to work backwards from the desired finished weight to the current starting weight. If the starting weight is 677 pounds and the expected finish weight is 1,252 pounds, you simply subtract the starting weight from the expected finish weight. In this case, the total weight gain needs to be 575 pounds.

The next step is to figure out how much the animal needs to gain, on average, each day. We do this by counting the number of days until sale day. So in this case, let's say our achievement activity is June 3rd, and today is near the beginning of the 4-H year, November 17th. So there is 198 days until the sale. If we divide the total weight gain we are looking for by the number of days until the sale, we see that we are looking for an average daily gain of 2.9 pounds.

These calculations are really the basis for getting started on your feeding plan. It tells you where you are starting so you can set goals and develop a plan.

Starting Phase

The starting phase will last about 2-4 weeks, depending on the animal. A key element of the starting phase is monitoring the amount of roughage and the amount of concentrate the calf is receiving. For approximately the first 10 days of the starting phase, it's important to have 80% roughage and 20% concentrate. This will increase to 40% concentrate by the end of the starting phase. Too much concentrate too fast can cause digestive upset. It's a good idea to feed half the concentrate in the morning and half in the evening along with all the good quality hay the steer will eat.

To start, the steer should have 0.75% percent of his body weight in dry feed. By day 14 that will be increased to 2.5% of his body weight in dry feed every day. So for our 677 pound steer, that's about 17 pounds of dry feed by day 14.

For the concentrate, it's important to start off slowly, with approximately 2 pounds of grain each day. Once the calf eats all the grain provided, slowly increase the amount by about 1 pound every second day until the calf is eating 1% of its body weight in grain.

By the end of the first week, the ration will look something like this for our 677 pound steer:

16.93 lbs of total feed per day
\- 6.77 lbs of grain (concentrate)
= 10.16 lbs of hay (roughage)

Reference Sheet

Feeding a Market Steer – Growing Phase & Finishing Phases

Growing Phase

The Growing Phase lasts approximately 68 days. During this phase, the calf should eat approximately 1.5% of his body weight in grain.

To calculate how much grain to feed the steer, first estimate its weight. Simply multiply the number of days since weigh-in by an estimated 1.54 lbs, which is approximately what he gained each day of the starting phase, and add that to the starting weight. In this example, we are suggesting the starting phase lasted the full 28 days.

Then, multiply the estimated weight by 1.5%. In this case the calculation tells us that the steer should be eating 10.80 lbs of grain per day.

Like the starting phase, in the growing phase the steer will eat approximately 2.5% of its body weight in dry feed. So the same calculation that is used in the starting phase to determine total feed and forage applies. The calf should gain around 2.49 lbs per day during the growing phase.

Finishing Phase

The finishing phase begins about 3 or 3.5 months before the achievement activity. During the finishing phase it is reasonable to expect the calf to gain between 3.5 and 4 lbs per day.

As is the case in the first two phases, the calf should eat 2.5% of his body weight in dry feed each day. However the grain in the ration needs to be increased to 2% of body weight. This needs to be a gradual increase of about 1 lb every second day. It will take about 15 days to get the animal to the required amount of grain.

Reference Sheet

Herd Sire Health

Herd Sire management is a key element of production management, so it's really important to take great care of the herd sire. This includes good nutrition and making sure you take care of any disease or injury. A good bull can greatly improve herd performance. In fact, the herd sire has a big impact on:

- The Number of calves born each year.
- The Length of the calving season, and when calves are born in the calving season.
- The Difficulty or ease of calving.
- The Growth rate of calves.
- The Genetic potential of the herd.

In the case of the herd sire, his function is breeding. Without proper nutrition and care for this function, his ability to breed cows and heifers can be lowered. So, just as market steers are fed for proper weight gain, herd sires should be fed to be successful breeders. It is important that the bull is taken care of so it is not too fat or too thin. Bulls that are too fat or too thin may have:

- A lower libido.
- Less ability to mate.
- A fat bull in particular may have more feet and leg problems caused by the extra weight he carries around.

Reference Sheet

Feeding a Herd Sire

Breeding Period & Maintenance Period

There are two phases of the feeding cycle for herd sires: The breeding period and the maintenance period.

Feeding for the breeding period starts about six weeks before the breeding season and continues throughout the breeding season. During the breeding season, the bull must be in very good condition and physical shape. He is more active at this time than during the rest of the year because he is breeding cows and heifers.

The maintenance period is the remainder of the year between breeding periods. A well-balanced diet providing the correct amount and types of nutrients is needed to ensure there are no nutritional deficiencies. Winter is generally considered the maintenance period. Proper conditioning of bulls is important because bull fertility has a major impact on determining whether a cow will conceive and whether they calve early or late in the calving season which in turn influences calf weaning weight and uniformity.

Nutritional Deficiencies

Two common nutritional deficiencies in bulls are phosphorus deficiencies and vitamin A deficiencies. Both can lead to great difficulty in breeding. A producer can ensure the bull gets enough phosphorus by supplementing forages with grains. A mature bull needs at least 25 grams of phosphorus per day.

Grains and dry forages are both often low in vitamin A. Green feeds, such as alfalfa or other immature forages are often high in vitamin A. The best indicator of forage being mature is if it has been cut for more than 90 days. It's around that point that the vitamin's precursors are losing strength so the vitamin will not be converted into a useful form in the animal's body. The liver of the beef animal actually stores vitamin A for up to four months, so deficiencies will only occur if the bull has been deficient for several months.

If their animal seems to have a deficiency, producers can provide their bulls with supplements to ensure they are receiving about 60,000 IU of vitamin A per day. Use supplements like a salt-mineral mix, green feeds such as alfalfa or ADE injections.

If a bull is in poor condition prior to the beginning of the breeding season, increase his level of nutrition to get him into good condition before breeding season starts.

Reference Sheet

Nutrient Requirements of Heifers & Cows

The function of heifers and cows is to produce calves. Producing a calf puts great demands on the heifer or cow's body. There are basically five factors that affect the amount of nutrients that cows and heifers will need:

- Age
- Level of activity or exercise
- Climate
- Gestation
- Lactation

Heifers and young cows require a more nutrient dense ration than mature cows because they are still growing. As well, a pregnant heifer requires a higher quality ration than a mature cow. To develop the calf to term, a pregnant heifer requires a more nutrient dense ration because during pregnancy the growing calf consumes much of the nutrients. During pregnancy the heifer is still growing herself, and is unable to consume as much feed as a mature cow; therefore, nutrient density or quality of the ration must be higher than a ration fed to mature cows. At the age of two, a heifer is losing its baby teeth and its adult teeth are emerging. During this time they do not consume as much feed so again, the quality of the ration must be higher.

Cattle grazing on pasture or range land use energy as they move so they need more nutrients than cattle in pens that don't roam as far. As far as climate goes, cold temperatures, strong winds and high humidity increase the amount of nutrients the cattle need. The amount of feed and water they consume changes with their environment.

Gestation is the period of time that the cow is pregnant; from the time she is bred and conceives to the time the calf is born. As the calf develops inside the cow or heifer, she needs more and more nutrients to take care of both of them. Lactation is the period of time when the mother is producing milk. Lactation is when her nutrient requirements are highest. Here is a chart to refer to that shows the amount of protein, energy and calcium needed as a beef cow transitions through the stages of pregnancy.

Minimum Daily Nutrient Requirements of the Beef Cow -20°C

Cow (500-650 kg)	Protein (kg/day)	Energy DE(Mcal/day)	Calcium (g/day)
Early Pregnancy	0.59-1.45	19.2-27	20-21
Late Pregnancy	0.68-1.45	22.1-32	25-32
Lactating	1.27-1.54	32.2-47	46-57

(Source - cowbytes 2013)

Section 6: Marketing & Economics

Lessons included the *Marketing & Economics* section of the eLearning tool:

Lesson 1: Canadian Beef Industry.....102

Lesson 2: Beef Value Chain.....104

Lesson 3: Cattle Cycle 107

Lesson 4: Beef Marketing 109

Key Takeaway:

In an ever-changing industry and marketplace, being a knowledgeable, efficient and dynamic producer is crucial to sustainability and profitability. Producers must stay up to date on industry and market information, adjust to changing best practices, consumer preferences and markets while minimizing costs and maximizing returns.

By completing the *Marketing & Economics* section of the eLearning tool, members will be able to:

- Summarize the Canadian Beef Industry's history.
- Advocate for how the Canadian Beef Industry ensures the safety and quality of Canadian Beef.
- Describe why it is important that producers understand how each of the links in the Beef Value Chain work together, and are knowledgeable of market conditions.
- Name the 4Ps of marketing.

Lesson 1: Canadian Beef Industry

Reference Sheet: History of the Canadian Beef Industry

Reference Sheet: Ensuring the Safety & Enhancing the Quality of Canadian Beef

Lesson 2: Beef Value Chain

Reference Sheet: The Canadian Beef Value Chain

Diagram: The Canadian Beef Value Chain

Activity Sheet: The Canadian Beef Value Chain

Lesson 3: Cattle Cycle

Reference Sheet: Cattle Cycle

Diagram: Cattle Cycle

Lesson 4: Beef Marketing

Reference Sheet: Marketing & The 4Ps

Activity Sheet: The 4Ps of Your 4-H Beef Project

Reference Sheet

History of the Canadian Beef Industry

1700s
- Settlers and rural dwellers of the Northwest Territory rely on cattle for their meat, milk, leather and as beasts of burden.

Late 1800s
- Growth and expansion of Western Canada is a result of the completion of the railway. Cattle are moved from the United States and large, commercial herds are established.

1940s-50s
- The cattle feeding industry becomes part of the supply chain. Finishing efficiencies and a more consistent beef product is achieved.
- Marketplace is growing.

1970s-80s
- Major processing plants are built.
- Packing industry evolves from carcass to boxed beef production.
- Transportation and logistical improvements allows industry to meet global market demand.

1990s-2000s
- Radio frequency identification and genetic technologies are adopted.
- Improvements to pasture management systems and herd health practices are made.

Early 2010s
- There are approximately 4 million beef cows in Canada.
- There are approximately 70,000 farms and ranches with beef cattle in Canada.
- Around 60% of those cattle farms or ranches have less than 50 cows.
- The average number of head per beef farm or ranch in Canada is 147, in Alberta it is 228.
- There are nearly 3 billion pounds of beef produced in Canada per year.
- Producing 1.8% of the world's beef supply, Canada is the 11th largest beef producing nation in the world.
- Canadian's are collectively consuming over 900,000 tonnes of beef per year, or about 44 pounds per person!
- Canada is the 6th largest beef exporter in the world. Excluding live cattle exports.
- Canada exports approximately 40% of total beef and cattle produced in the nation, mostly to the United States.
- The Canadian beef industry contributes over $30 billion dollars per year to Canada's economy.
- The Canadian beef industry also creates over 200,000 full-time equivalent jobs directly or indirectly linked to the beef industry supply chain.

The Canadian Beef Industry – Today

The Canadian Beef Industry is over 300 years old and today, it contributes significantly to the Canadian economy! It's a leader in industry research, innovation and marketing. Canada's natural environment is well suited to cattle production. We have a cooler climate that doesn't limit the selection of breeds to those which can tolerate high heat conditions, and there's an abundance of fresh water, wide open spaces as well as access to high quality feed.

Reference Sheet

Ensuring the Safety & Enhancing the Quality of Canadian Beef

The Canadian Beef Industry is continually enhancing beef quality and safety through:

- Sustainable cattle production, including breed selection, genetics and feeding improvement programs;
- Animal welfare standards and enforcement;
- Disease surveillance and the protection of animal health;
- The National Cattle Identification System, designed for rapid and accurate animal identification;
- Environmental stewardship practices as well as provincial and federal laws that protect the natural environment, including water and soil quality;
- Rigorous and regulated inspection systems, and
- A beef grading system that sets and upholds quality standards and facilitates production improvements.

In Canada, all of this and more is done to ensure consumers have a consistently great eating experience!

Reference Sheet

The Canadian Beef Value Chain

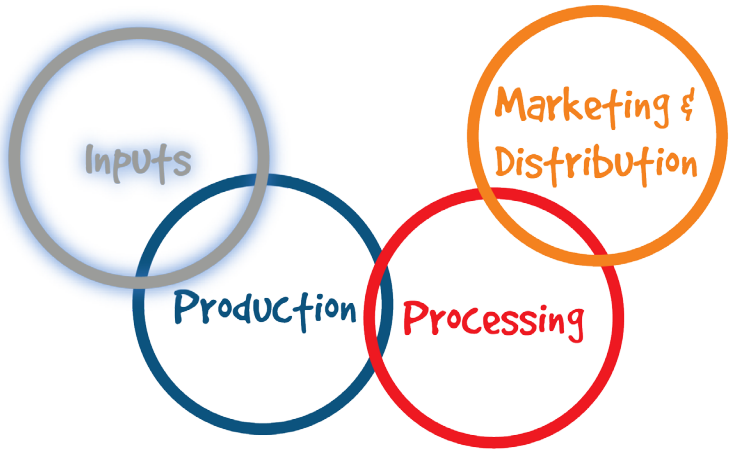
A value chain provides a structure and a process for cooperation between each "link" in a chain of enterprises that adds value to an end product that a customer purchases –in this case the product is beef.

The links in the beef value chain include input suppliers (such as feed suppliers), producers, processors, food services, retailers, traders and associations as well as federal and provincial government policy makers. As part of the Canadian beef value chain, it's important that producers are engaged and look beyond their farm gate to see the big picture.

Each link in the value chain must work together to give the Canadian Beef Industry a long-term competitive advantage in both domestic and international markets, and to effectively and efficiently respond to customer preferences. To achieve these goals, the Canadian beef value chain engages in the:

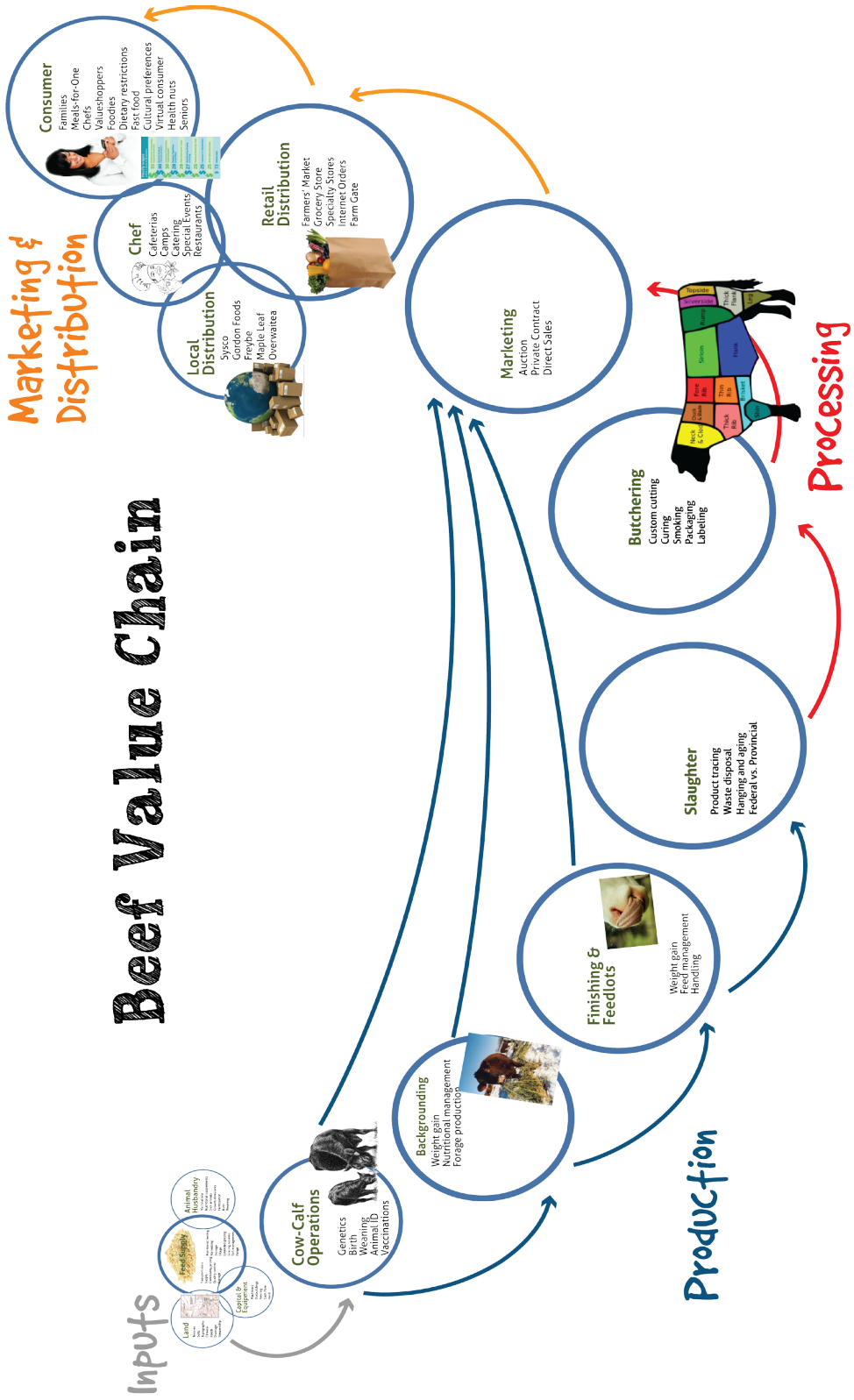
- Creation of a shared vision, trust and long-term, cooperative strategies;
- Identification of research, policy, regulatory and technical requirements;
- Sharing of information and data;
- Evaluation of performance; and
- Coordinated response to crises.

The value chain is key to the success of the Canadian beef industry, ensuring that each aspect of the industry is responding effectively to changing markets and customer preferences in order to keep that competitive edge!



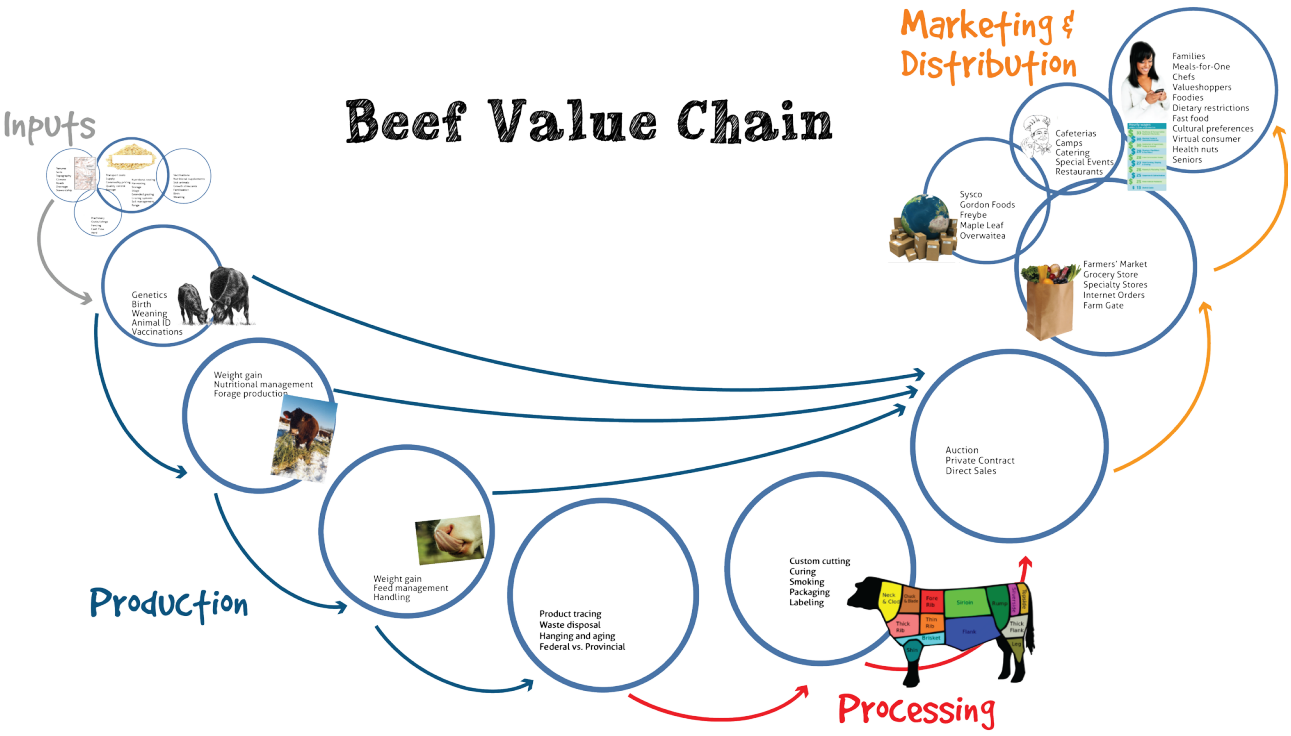
Diagram

The Canadian Beef Value Chain



Member Activity Sheet

The Canadian Beef Value Chain



Instructions: Label each of the following links on the Beef Value Chain.

Finishing & Feedlots	Capital & Equipment
Marketing	Consumer
Retail Distribution	Feed Supply
Local Distribution	Backgrounding
Land	Butchering
Cow/Calf Operations	Animal Husbandry
Chef	Slaughter

Reference Sheet

cattle cycle

The more knowledgeable of market conditions a producer is, the better they can position themselves for success and the more profit they could potentially realize when the time comes to market their product. It's important that producers stay up to date as markets for Canadian beef are constantly changing, along with factors that affect the domestic and international markets, such as supply and consumer demand.

Cow-calf producers tend to expand inventory numbers in response to profits and reduce herd size in response to losses. Generally, as cattle numbers go down, prices go up and as cattle numbers go up, prices go down. Ultimately, this process has resulted in long-term patterns in the cattle inventory, what is commonly called the cattle cycle.

The lag time between when producers get the price signal to expand production, and when they can actually expand due to beef cattle biology, is what makes the average length of a typical cycle about 10 years.

Typical Cattle Cycle

Beginning of the Cycle

- There are low cattle numbers and prices begin to increase because of this;
- The increasing prices encourage existing producers to expand and new producers to enter the market, causing cattle number to increase.

Mid-Cycle

- Cattle numbers begin to peak and these high inventory numbers begin to push prices downwards;
- This is followed by a turn-around phase where cattle numbers begin to decrease as price margins become less attractive.

End of the Cycle

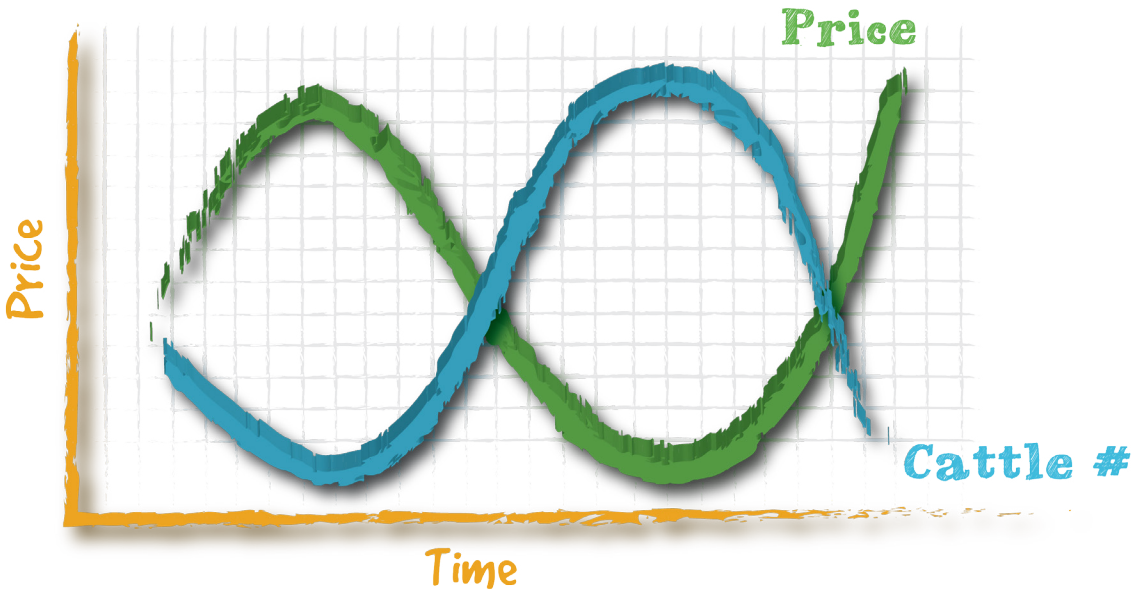
- Cattle numbers are at their lowest since the beginning of the cycle;
- Prices begin to increase and the cycle begins again.

Keep in mind that this is a typical cattle cycle, and that changing consumer demand, mixed market signals, internal production factors as well as external factors such as weather or trade barriers for example, can have a greater influence on producer decisions than price, and can therefore disrupt the cycle. Therefore, no two cycles are exactly the same.

4-H beef project members should keep in mind that most 4-H market beef animals are bought at a premium price that exceeds actual market price.

Diagram

cattle cycle



Beginning of the Cycle:

As cattle numbers decrease, price begins to increase.
Increasing prices encourage expansion
and new producers to enter the market

Mid-Cycle

Cattle numbers begin to peak; high inventory pushes prices downwards.
Cattle numbers then begin to decrease as price margins become less attractive.

End of Cycle

Cattle numbers are at their lowest since the beginning of the cycle.
Prices begin to increase, cycle begins again.

Reference Sheet

Marketing & The 4Ps

Marketing is a process that involves identifying and understanding customer's needs and wants, and profitably producing a product or service that satisfies those needs and wants. When developing a marketing plan for a product or service, one that will positively impact production and your bottom line, think about the 4Ps: Product, Price, Place and Promotion.

Product: What are you going to sell?

- Is your product replacement heifers, live steers, bulls, semen or embryos, carcasses, boxed beef, valued added products or individual meat cuts for example?
- Is your beef Grass Finished or is it produced organically or locally? Is your product part of a current consumer trend?

Price: How much can you charge for your product?

- What are your estimated costs of producing your product?
- What are the market conditions and price forecasts for your product?
- Based on estimated production costs and breakeven calculations, what is your target price?
- Is there currently a premium offered for your product?
- How will the product be delivered to the buyer? How does that affect the price?

Place: Where will you sell your product?

- Through live, video or electronic auction, private contract, producer or breed association sales, direct sales to packers, wholesale distribution or retail distribution including farm-gate, farmer's markets or speciality stores for example?
- What is the associated pricing method for each market delivery option?

Promotion: How will people find out about your product?

- Will your product be branded?
- Does what you're saying about your product align with what you're delivering?
- Is your product meeting the customer's wants or needs?

With so much to think about when it comes to marketing, having a plan to refer back to is crucial. And like any plan, it's important that you refer back to it and evaluate how well it worked in order to make timely adjustments and improvements.

Member Activity Sheet

The 4Ps of Your 4-H Beef Project

Instructions: For your 4-H beef project, work through the 4Ps of Product, Price, Place and Promotion.

Product: What are you going to sell?

Price: How much can your charge for your product?

Place: Where will you sell your product?

Promotion: How will people find out about your product?