

## The 4-H Motto

“Learn to Do by Doing.”

## The 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 and my country.



## The 4-H Grace

(Tune of Auld Lang Syne)

We thank thee, Lord, for blessings great  
on this, our own fair land.

Teach us to serve thee joyfully,  
with head, heart, health and hand.

## Published by

4-H Branch

Alberta Agriculture, Food and Rural Development

7000 - 113 Street NW Rm 200, Edmonton, Alberta, Canada T6H 5T6

Check out our web site at: <http://www.4h.ab.ca>

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revised August 1997

revised July 2002/cas

revised September 2004/cs/cas

## Level Two

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**Unit One****Welcome To The 4-H Beef Project****Dear 4-H  
Beef Member:**

**Hi!** We're excited that you chose to become a member of the 4-H Beef Project. We hope you have a great time this year making new friends, taking part in 4-H activities, working with your beef project, and learning more about beef production!

To complete your project year in 4-H beef, you must

- complete four to six units in level two
- take part in at least 70% of club activities
- take part in your Achievement Day
- complete a record book
- have FUN!

**About the  
Beef  
Project  
Material**

Use a 3-ring binder to put this material in. During the year, you will build your own book about beef production. This is also a good place to keep your 4-H diary. Make it **your** book by designing your own cover. Add any pictures or related information you find. After you have been in the project for several years, you will have a special book.

**About Your  
Record Book**

You will be using the livestock record book. The project portion of the book that you complete depends on if you have a steer or heifer. Your leader will tell you which pages to fill out. Since you have some experience in the project, you will do more year-end calculations than in Level One. Spaces are there to add pictures, newspaper, or magazine clippings you have of yourself, your farm, or your beef project.

**Achievement  
Day  
Requirements**

For Achievement Day you should

- exhibit your beef project
- participate in the showmanship and judging classes
- display your completed record book to date

**Other  
Opportunities  
in 4-H**

Your beef project is only a part of 4-H. Many activities are offered at club, district, regional, and provincial levels.

- ✓ Public Speaking/Presentations
- ✓ Highway Clean-Up
- ✓ Regional Camps
- ✓ Summer Camps
- ✓ District Activities and Workshops
- ✓ Livestock Judging
- ✓ Provincial Beef Heifer Show

The provincial 4-H program booklets have application forms for all the provincial 4-H events. You can find the program booklets in the Cloverleaf Quarterly which is delivered to you four times a year or on the 4-H web site at [www.4h.ab.ca](http://www.4h.ab.ca).

## Available Beef Projects

Alberta 4-H offers an opportunity for young people to develop mentally, emotionally and socially through association with others.

### Objectives

The **4-H Beef Project** gives members an opportunity to:

- ❖ Acquire an understanding of beef cattle production and management through the experience of owning, caring for, and maintaining records on beef cattle.
- ❖ Develop the skills, patience and understanding of the handling practices essential in working with beef cattle.
- ❖ Develop an appreciation of the cattle industry and its importance in the local community, the province and the country.



**NOTE:** All 4-H members must meet the **Current Year's Provincial 4-H Livestock Project Regulations** and must abide by any regulations put forth by the local beef committees.

## The Fed Calf Unit

- ❖ This unit is intended for 4-H members with little or no beef experience.
- ❖ It provides an opportunity for members to learn about the responsibility involved in caring for a beef steer.
- ❖ Each member is to select and provide the majority of the feed, management and care of the beef steer.
- ❖ The steer is to be registered in some manner to the 4-H member.
- ❖ Feeding records must be maintained for a minimum of 160 days prior to Achievement Day.
- ❖ The club must approve any replacements of project animals.

### Achievement

- ◆ Exhibit steer.
- ◆ Take part in skill competitions as designated by club such as showmanship, judging, grooming, project knowledge events.
- ◆ Met 4-H basic member expectations so far.
- ◆ Record book up to date.

## The Heifer Unit

- ❖ Members should wish to gain more experience in the practical aspects of purebred or commercial beef production.
- ❖ With successful development of the heifer, the heifer may be retained for subsequent years in the cow/calf unit.
- ❖ Each member is to select and provide care for a beef heifer calf. Records are to be maintained on the heifer from weaning through to Achievement Day and, or breeding time of the following year.
- ❖ If the member is carrying both the fed calf and the heifer calf, detailed records are to be kept only on the fed calf, and partial records on the heifer calf. If the member is carrying only the heifer calf, the whole record book must be kept on the heifer calf. Partial records are the animal sections of the record book.

### Achievement

- ◆ Exhibit heifer.
- ◆ Other requirements as in Fed Calf Unit.

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## The Cow/Calf Unit

### Two Year Old with Calf and/or Three Year Old with Calf

- ❖ The cow must be a previous heifer project carried through to this unit.
- ❖ Supplemental records must be kept on this unit.

#### Achievement

- ♦ Exhibit cow and calendar year calf (natural pair). (If a member shows an embryo or orphaned calf as part of the pair, show officials must be notified.)
  - ♦ Other requirements as in Fed Calf Unit.
- 

## The Pen Unit

- ❖ This unit is designed for beef members with at least three years of 4-H beef project experience who is interested in advanced beef production.
- ❖ Each member selects, feeds, manages and markets at least **five** beef animals. (District or Regional guidelines may state at least **three beef animals**.)
- ❖ Members must develop a cash flow and business plan for their project.
- ❖ Members market their project on their own.
- ❖ Members can begin this project any time of the year. Members must arrange to have club leader(s) tour and observe operation.

#### Achievement

- ♦ Conduct a tour or develop a display for club members highlighting management practices learned, cash flow and business plan.
  - ♦ Other requirements as in Fed Calf Unit.
- 

## The Novice Beef Unit

- ❖ This unit is designed for 4-H beef members with no 4-H beef project experience. Members 9 to 11 years of age (Juniors) as of January 1 of the 4-H year enroll in this project for one year.
- ❖ Each member selects, feeds, manages and exhibits a calendar year calf. (January 1 to March 1) of that 4-H year.
- ❖ Members must keep records on the animal for at least 90 days prior to achievement day.
- ❖ Members have the option of continuing to exhibit this project as a Fed Calf (Beef Steer) Unit or a Heifer Unit.

#### Achievement

- ♦ Exhibit animal
  - ♦ Other requirements as in Fed Calf Unit
- 

## The Carcass Unit

- ❖ This unit is intended for 4-H members with at least two years beef experience.
- ❖ It provides an opportunity to learn more about the beef industry by following the project from weaning through to the cooler.
- ❖ Members can market their project on their own
- ❖ Feeding records must be maintained for the period determined by the club.

#### Achievement

- ♦ Exhibit project
- ♦ Attend Carcass Display
- ♦ Other Requirements as in Fed Calf Unit

## The Green Certificate Unit

- ❖ This unit is designed for members at least 15 years of age at the beginning of the club year, who have completed their project studies outlined in Unit I through Unit III of the beef project.
- ❖ Members must arrange with their club leadership to take this as a 4-H Project. Members who are taking Green Certificate program through school may also carry this as a 4-H Project. Members must have the approval and support of club leadership.

Requirements of completing a Green Certificate 4-H Project are:

- ❖ Members must do three demonstration/talks on the training objectives that they are striving for through the Green Certificate program, during the club year that tie in with the club's program plan. Units that are offered by Green Certificate are: Cow-Calf Beef Production Technician or Feedlot Technician.
- ❖ Under Cow-Calf Beef Technician members cover Training Objectives: Handling Cattle, Maintaining Cattle Health, Operating a Feeding Program, Operating General Farm Equipment, Operating Trucks and Tractors, Personal Working Skills.
- ❖ Under Feedlot Beef Technician members cover Training Objectives: Processing and Handling Cattle, Treating Cattle Chute Side, Pen Checking, Feeding Cattle, Operating and Servicing Equipment and Facilities, Personal Working Skills.

### Achievement

- ◆ Members complete the requirements of the Green Certificate program.
- ◆ Deliver three talks/demonstration or workshops during the year.
- ◆ Develop and present a display or oral presentation on their Green Certificate Unit to their local 4-H club or district council on their project.
- ◆ Other Requirements as in Fed Calf.

## The Creative Option Project (COP)

- ❖ This unit is designed for intermediate (12 to 14 years old) and senior (15 to 20 years old) members as of January 1st of the current club year.
- ❖ The members must have completed at least three years of 4-H project work and wish to design their own area of study. In this unit, members select, plan, share and evaluate their own projects.
- ❖ Further information on this project is available by ordering the Creative Opportunities Project Book or by contacting your regional 4-H specialist.

### Achievement

- ◆ Conduct a tour or develop a display for club members highlighting management practices learned, cash flow and business plan.
- ◆ Other Requirements as in Fed Calf.

## **4-H Livestock Project Requirements**

These requirements apply to all 4-H livestock projects.

### **A. 4-H Member Requirements**

In order for a 4-H member to receive credit for a club year, the member must

- ❖ Complete project records and have them signed by the club or project leader.
- ❖ Attend a minimum of 70% of club activities.
- ❖ Complete a communication activity.
- ❖ Participate in their 4-H Club Achievement Event.

### **B. 4-H Livestock Project Minimum Requirements**

- ❖ Animals must be registered with the club.
- ❖ Animals must be identified as the 4-H member's project either by a 4-H tag, CCIA tag, breed registration tattoo, or brand, and a bill of sale to or a lease agreement in the name of the member.
- ❖ Replacement of animals can only be done with permission of the achievement sale committee.
- ❖ 4-H members must personally provide the major part of the feeding, care, and management for their animals. (check with you sale committee for any further definition)
- ❖ The use of tranquilizing products on 4-H animals, immediately proceeding or at any 4-H project event is prohibited. (Tranquilizing products give the handler an unfair advantage in displaying their livestock handling and control skills). Any animal that is tranquilized cannot be shown or sold at a 4-H event.
- ❖ Drugs and some feed additives have withdrawal periods listed on their labels according to the dosage given. It is the legal responsibility of the owner of the animal, to be sold for slaughter, to insure that the withdrawal period has passed. If withdrawal period(s) have not passed at the time of sale, it is the responsibility of the member to tell the 4-H sale committee and the responsibility of the sale committee to communicate this to the potential buyers. Animals that show drug residues at time of slaughter are condemned.

### **C. Local or Interclub Project Regulations**

- ❖ In addition to these basic provincial minimum requirements there may be additional regulations from the local or interclub project committees. It is your responsibility to know these rules and regulations.

**Any one violating any of the above requirements will not be able to advance with that project to any 4-H project event, during the remainder of the project year.**

Revised  
September - 2002



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## Weighing Your Animal

Using a scale is the best method to get an accurate weight of your animal. However, if you do not have scales, borrow one from a neighbour if possible. Remember that trucking your animal over to his farm is good practice for you and your animal.

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## Tape Measuring

One method which you can use to estimate the weight of your animal is the tape measure. You may use any tape measure, but there are specially marked tape measures which you can purchase at most livestock and farm supply outlets.

Remember that it only gives you an estimate of the animal's weight. Variations from the actual weight may be due to the length of the body and, or the legs.

To use the measuring tape, measure the circumference of the heart girth as indicated in the diagram below. Stand the animal with the head in the normal position and the four legs set squarely under the body. Pass the tape tightly around the body just back of the shoulders at the smallest circumference.



**“H” is the heart girth.**

Use one of the following charts to estimate the weight of your project. Record the weight each month on page seven of your livestock record book. You should weigh your animal on about the same day each month.

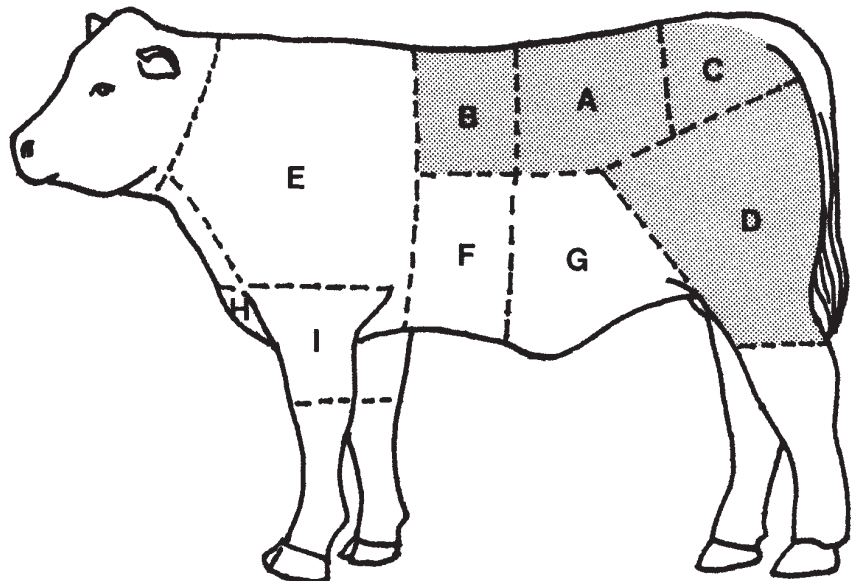
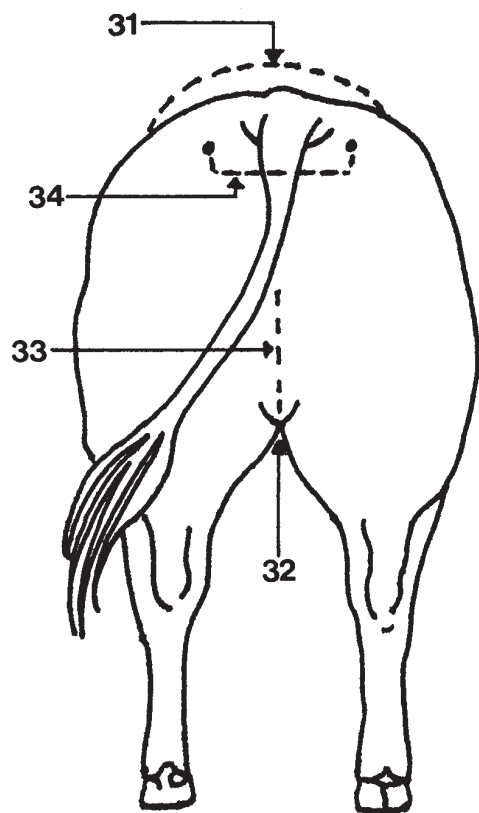
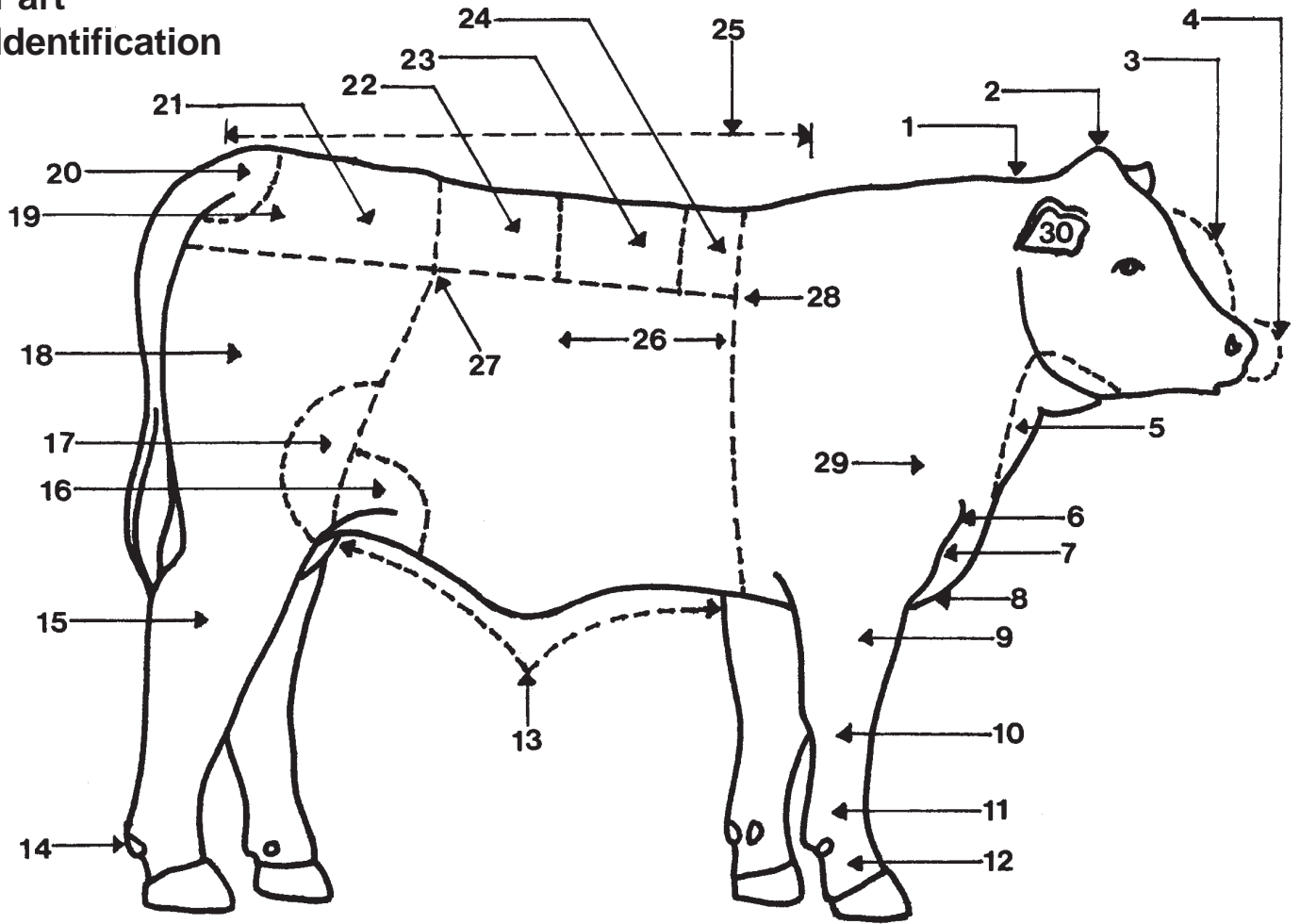
**Measuring****Values to Use When Estimating the Weight of Beef Animals by Heart Girth****Metric Measurements:**

Heart Girth (cm)	Heart Weight (kg)	Heart Girth (cm)	Heart Weight (kg)	Heart Girth (cm)	Heart Weight (kg)	Heart Girth (cm)	Heart Weight (kg)	Heart Girth (cm)	Heart Weight (kg)
76.2	41.3	106.7	107.0	137.2	219.5	167.6	378.3	198.1	584.2
77.5	43.1	108.0	110.7	138.4	225.0	168.9	385.6	199.4	594.2
78.7	44.9	109.2	114.8	139.7	230.9	170.2	394.2	200.7	604.2
80.0	46.7	110.5	118.8	141.0	236.8	171.5	401.9	201.9	613.7
81.3	49.0	111.8	122.9	142.2	242.7	172.7	409.6	203.2	623.2
82.6	51.3	113.0	126.6	143.5	248.6	174.0	417.8	204.5	633.2
83.8	53.5	114.3	130.6	144.8	254.9	175.3	425.9	205.7	643.2
85.1	55.8	115.6	134.7	146.1	260.8	176.5	434.1	207.0	653.2
86.4	58.1	116.8	138.2	147.4	266.6	177.8	447.2	208.3	663.6
87.6	60.3	118.1	143.8	148.6	272.5	179.1	450.4	209.6	673.6
88.9	63.0	119.4	148.3	149.9	280.3	180.3	458.6	210.8	684.0
90.2	65.8	120.7	152.9	151.1	286.7	181.6	467.2	212.1	694.4
91.4	68.5	121.9	157.4	152.4	293.5	182.9	475.8	213.4	705.3
92.7	71.2	123.2	162.4	153.7	299.8	184.2	484.4	214.6	715.8
94.0	73.9	124.5	168.4	154.9	306.6	185.4	493.1	215.9	726.2
95.3	76.7	125.7	171.9	156.2	313.4	186.7	502.1	217.2	736.6
96.5	79.8	127.0	176.9	157.5	320.7	188.0	511.2	218.4	747.5
97.8	83.0	128.3	181.9	158.8	327.5	189.2	520.3	219.7	758.4
99.1	86.2	129.5	186.9	160.0	334.3	190.5	529.3	221.0	769.7
100.3	89.4	130.8	192.3	161.3	341.6	191.8	539.0	222.3	780.6
101.6	93.0	132.1	197.8	162.6	349.3	193.0	546.6	223.5	791.5
102.9	96.2	133.4	203.2	163.8	356.5	194.3	556.1	224.8	802.9
104.1	99.8	134.6	208.7	165.1	363.8	195.6	565.6	226.1	814.7
105.4	103.4	135.9	214.1	166.4	371.0	196.9	574.7	227.3	826.0

**Measuring****Imperial Measurements**

Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)
30	91	42	236	54	484	66	834	78	1,288
30.5	95	42.5	244	54.5	496	66.5	850	78.5	1,310
31	99	43	253	55	509	67	869	79	1,332
31.5	103	43.5	262	55.5	522	67.5	886	79.5	1,353
32	108	44	271	56	535	68	903	80	1,374
32.5	113	44.5	279	56.5	548	68.5	921	80.5	1,396
33	118	45	288	57	562	69	939	81	1,418
33.5	123	45.5	297	57.5	575	69.5	957	81.5	1,440
34	128	46	307	58	589	70	975	82	1,463
34.5	133	46.5	317	58.5	603	70.5	993	82.5	1,485
35	139	47	327	59	618	71	1,011	83	1,508
35.5	145	47.5	337	59.5	632	71.5	1,030	83.5	1,531
36	151	48	347	60	647	72	1,049	84	1,555
36.5	157	48.5	358	60.5	661	72.5	1,068	84.5	1,578
37	163	49	369	61	676	73	1,087	85	1,601
37.5	169	49.5	379	61.5	691	73.5	1,107	85.5	1,624
38	176	50	390	62	707	74	1,127	86	1,648
38.5	183	50.5	401	62.5	722	74.5	1,147	86.5	1,672
39	190	51	412	63	737	75	1,167	87	1,697
39.5	197	51.5	424	63.5	753	75.5	1,186	87.5	1,721
40	205	52	436	64	770	76	1,205	88	1,745
40.5	212	52.5	448	64.5	786	76.5	1,226	88.5	1,770
41	220	53	460	65	802	77	1,247	89	1,796
41.5	228	53.5	472	65.5	818	77.5	1,267	89.5	1,821

### Part Identification



**Part  
Identification****Identify the following beef animal parts.**

1 \_\_\_\_\_ 14 \_\_\_\_\_ 27 \_\_\_\_\_

2 \_\_\_\_\_ 16 \_\_\_\_\_ 29 \_\_\_\_\_

4 \_\_\_\_\_ 18 \_\_\_\_\_ 31 \_\_\_\_\_

5 \_\_\_\_\_ 19 \_\_\_\_\_ 32 \_\_\_\_\_

9 \_\_\_\_\_ 21 \_\_\_\_\_ 33 \_\_\_\_\_

11 \_\_\_\_\_ 24 \_\_\_\_\_ 34 \_\_\_\_\_

12 \_\_\_\_\_ 25 \_\_\_\_\_

**Identify the following meat cut areas.**

A \_\_\_\_\_ F \_\_\_\_\_

D \_\_\_\_\_ I \_\_\_\_\_

E \_\_\_\_\_

## Transportation Regulations

When you transport your livestock, you must carry a **Livestock Manifest** completed according to the regulations. Make sure that you complete this manifest before the vehicle leaves your property whenever you transport any livestock.

The owner of the livestock or his agent must complete the manifest with the following information

- date the livestock is transported
- name and address of the owner of the livestock
- consignee's name and address
- number of livestock
- color of the livestock
- kind of livestock
- the proper description and location of the brand and other marks of ownership on each head of livestock
- sign the manifest

The operator of the vehicle transporting the livestock or the driver of the livestock must complete the manifest with the following information

- name and address of the person who is operating the vehicle or driver of the livestock
- licence number of the vehicle used to transport the livestock
- transportation charges, if any
- sign the manifest.

Livestock manifest books are available from your leader, local brand inspector or market.

## The Use of Agricultural and Veterinary Chemicals

More and more farm chemicals are being labelled in metric units (mL, cc). The use of “cc” will be discontinued and cm will replace it. Items such as vaccines and oral medications will be applied directly at rates given as

millilitres (mL), milligrams (mg), or grams per kilogram (kg) bodyweight

Concentrated products such as horticultural, crop and pasture sprays will require dilution as

mL/L or mL/100 L  
or L/100 L

g/L or g/100 L  
or kg/100 L

Application will be as mL/ha, L/ha, mL/m and so forth. Standard prepacked products (to avoid weighing from bulk supplies) will eventually be labelled as one pack for a certain number of litres (L) instead of one pack for 100 gallons. Animal remedies will rely on dosage rates based on live bodyweight in: millilitres per kilogram (mL/kg). Only experience will enable you to estimate live bodyweight in metric units. You will have to compare your estimates with actual measurements, for example at stockyards. Some animal remedies, will be simply on a per animal basis and will not require knowledge of live bodyweight. Think metric and read all labels and instructions carefully.

If you use tranquilizers read the **label** to find out what the withdrawal regulations are.

**Unit Two****You And Your Beef Project****Roll Call**

How did you choose your 4-H beef project animal?

**More About Selection**

Learn to recognize the characteristics which will combine to make an ideal feeder calf. Consider these

- frame size
- length, width and height
- muscling
- trimness
- age and weight
- temperament and disposition
- health
- price

**Frame Size**

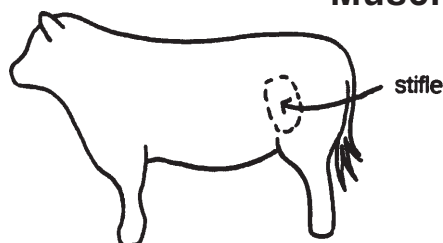
A feeder calf must have the physical ability to reach the desired weight of 455 to 555 kgs in a reasonable amount of time. The animal must reach this weight without carrying excess fat or waste. The frame of an animal is its skeleton. If a calf has a very small frame, its frame size will never increase to a larger size. A large framed calf, if properly fed, will grow to be a large framed cow or steer.

You cannot see the actual skeleton of an animal. The frame size is indicated by the length, width and height of the animal. As a rule, do not choose a small framed calf as it is likely to be overfinished by Achievement Day. A very large framed calf is likely to be underfinished, lacking adequate muscling and finish.

**Length, Width and Height**

Ideally, select a calf which is

- long in body
- even in width from front to rear
- tall and deep bodied

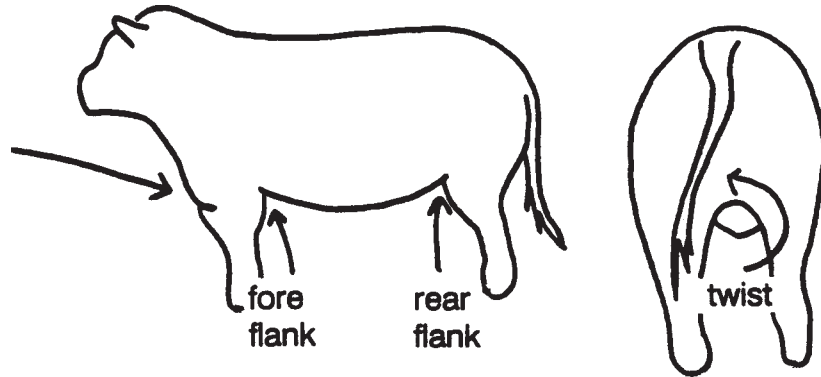
**Muscling**

Look at the way the calf stands. If the rear feet are placed close together, the calf likely lacks muscling. Look for thickness through the centre of the round, as this is where you find the more expensive cuts of meat. When you view the animal from the rear, it should be widest through the stifle region.



**Trimness**

Choose a calf which is trim, especially through the brisket, flank and twist. If your calf has excess flesh in these areas now, then it will never be a profitable animal. Mature looking calves tend to be wasty when they are finished because they begin to deposit fat earlier than a trim animal.



**Age and Weight**

It is very important when you are selecting animals that you know their age and weight. Both of these calves have received the same care.

	<b>Calf #1</b>	<b>Calf #2</b>
Born	February 15	April 1
Weight on November 1	250 kg	273 kg

Which of these two calves has been the most productive so far?

Why?

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Calf #2 gained weight at a much faster rate than calf #1. Calf #2 will likely continue with a higher growth rate.

**Temperament and Disposition**

Choose a calf which you will be able to handle. Smaller is not always better. A wild and nervous calf is not likely to gain weight as fast as a more gentle and calm calf.

Some things to look for and avoid are

- Eyes - wild, fiery, scared
- Legs - fidgety, tramps, kicks
- Stance - charging, shaking, cowering

Look for a calf which is calm and comfortable around people and other animals.

## Health

Look for a healthy calf. You should be familiar with the characteristics of a healthy animal

- alert
- good appetite
- active
- shiny, smooth hair coat
- neither too fat nor too thin
- bright, clear eyes
- drinks water provided
- pleasant breath
- normal manure and urine
- no evidence of disease or parasites

## Price

You need to know the current market value of animals similar to the one you want to purchase. Prices change constantly and it is up to you to know what is happening.

Where might you find the current market prices?

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Remember that the price you pay for your calf is just the first of many expenses. You will also have to pay for halters, brushes, pails, feed, veterinary and health supplies and transportation.

At the end of the year, you will add all of your expenses to the price you paid for your calf. You want your total expenses to be less than the price you receive for selling your calf in order to make a profit. Therefore, you should keep your expenses to a minimum.

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## Where to Buy: Auctions vs. Private Sales

Beef calves can be purchased many places. Calves may be purchased either from an auction mart or from a private seller.

Private producers are the most common source for 4-H calves. There are several reasons for this. On the farm, you can see the conditions under which the calf has been raised. You can compare calves of similar ages and breeds and choose the one you think is most desirable. Because the breeder or owner has raised the calf, he or she can tell you about the parentage, health and care of the animal.

Find out about these characteristics

- warble treatments
- dehorning
- castration
- vaccinations
- weaning
- implants and hormones

Find out what the calf has been fed. Look at the performance records of the parents if they are available.

If you plan to purchase at an auction, arrive early. Bidding takes place very quickly and you need time to examine the animals before they go into the ring.

Go out and have a look at the calves that are being offered for sale. Write down the numbers of the calves which interest you. Decide what the animal is worth and write this price down next to the number. Put marks beside the most desirable animals on your list. By doing this, you will not pay too much for your calf. Don't get caught up in the auction and bid just to buy. Remember what you want and what you are willing to pay. Prices vary from year to year and week to week. Adjust your expected prices to suit the market conditions.

At an auction, your expectations for quality and health should be the same as if you were buying from a private producer.

Where will you purchase your calf?

Why?

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**Activity:**

**A Selection Plan**

On this page, create a selection plan for your next 4-H calf. If you have not yet selected your calf for this year, use this plan when you are “shopping” for your calf. If you have already selected your calf, create the plan which you think you should use for next year.

Thing to consider	Why is it important?	Check
_____	_____ _____ _____	_____
_____	_____ _____ _____	_____
_____	_____ _____ _____	_____
_____	_____ _____ _____	_____
_____	_____ _____ _____	_____
_____	_____ _____ _____	_____
_____	_____ _____ _____	_____



**Unit Three**

**Digestion In The Beef Animal**

**Roll Call**

Name an animal.

Is this animal ruminant or monogastric?

Now, name as many ruminant and monogastric animals as you can.

Ruminant

Monogastric

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Let's Compare**

A good way of learning how the digestive system of the beef animal works is to compare it with that of the human.

How does your diet differ from that of your heifer or steer?

Your diet

Heifer or steer's diet

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Because your diet is so different from that of the beef animal, it is logical that your digestive system would be very different from that of the beef animal.

How is your stomach like the beef animal's stomach?

\_\_\_\_\_

\_\_\_\_\_

How is your stomach different from the beef animal's stomach?

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The information on the next few pages will help you answer these questions.

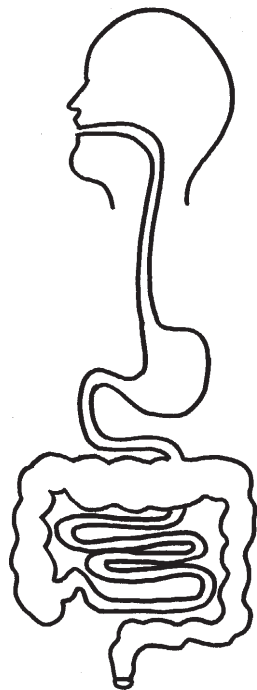


**Activity: Let's Compare**

Draw a line from the labels in the centre of the page to the diagrams on either side. On the right is the digestive system of the beef animal and on the left is your digestive system.

**The Human**

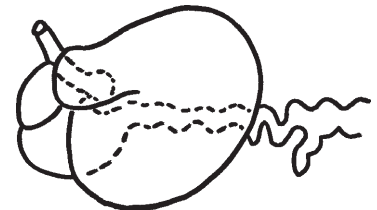
You have a monogastric (single stomach) digestive system.



**The Beef Animal**

The beef animal has a ruminant (four compartment stomach) digestive system.

- mouth •
- esophagus •
- stomach •
- rumen •
- reticulum •
- omasum •
- abomasum •
- small intestine •
- large intestine •
- anus •



**Let's Compare**

We have looked at the parts of the digestive system, and already know about the role each part plays in digestion. Now let's learn some more.

<b>Digestive Compartment</b>	<b>Volume as a % of the total digestive tract</b>				
	<b>Cattle</b>	<b>Sheep</b>	<b>Horse</b>	<b>Pig</b>	<b>Man</b>
Total stomach (%)	70.8	66.6	8.6	29.2	18.8
Small intestine (%)	18.5	20.5	30.2	33.3	62.4
Cecum (%)	2.8	2.6	15.9	5.6	
Large intestine (%)	7.9	10.3	45.3	32.9	28.8
<b>Total capacity</b>	<b>356.0</b>	<b>44.0</b>	<b>211.0</b>	<b>28.0</b>	<b>6.0</b>

From this information, there are several interesting things to note

- Look at the stomach as a total percentage of the digestive tract in the ruminant animals - cattle and sheep. Their stomachs make up a large part of their digestive system. The stomachs of the monogastrics - horse, pig and man - make up a much smaller percentage of the digestive system.
- Look at the percentage occupied by the stomach in the ruminants - cattle and sheep. Look at the total capacity of the digestive system. Figure out the capacity of the ruminant stomachs - 252 litres in the cow and 29.3 litres in the sheep. Those are tremendous capacities, especially when you consider them in relation to the size of the animal.
- Note the percentage of the total digestive tract which is occupied by the large and the small intestines in comparison between the ruminants and the non-ruminants.
- The horse has a large cecum, the ruminants have a smaller one, and the human has no cecum. The cecum is a small part of the large intestine and aids slightly in digestion.
- Note that the animals which use their food for growth, fat and muscle production, and reproduction have more capacity than man, who uses his food primarily for maintenance and energy.

These are all very interesting and important points, especially for understanding how the different types of animals can utilize such different feeds.

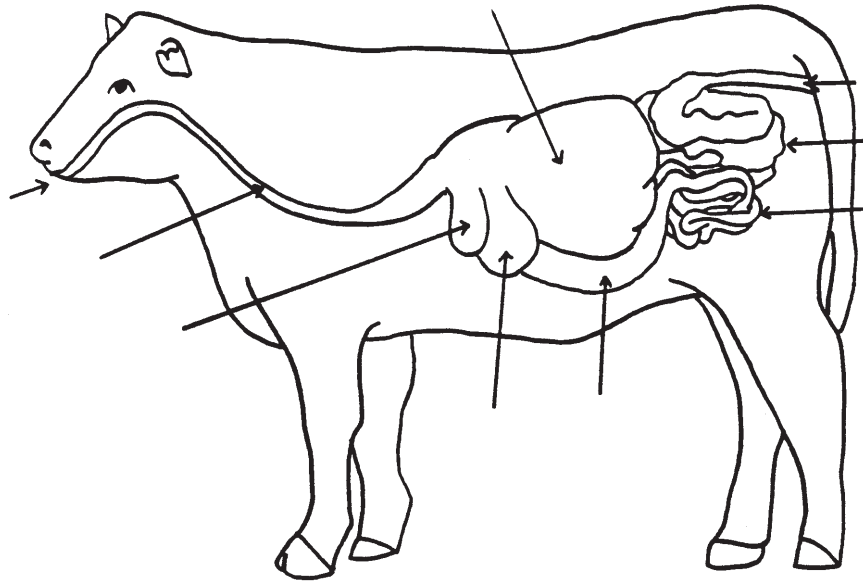




**Activity:**

**“Label It!”**

On the diagram below, label all of the parts of the beef digestive system.





**Activity: Let's Review**

In the blanks, put the number and the letter which correspond to the description and function of the part of the ruminant digestive system.

Part of the digestive system	Description	Function
Mouth		
Esophagus		
Rumen		
Reticulum		
Omasum		
Abomasum		
Small intestine		
Large intestine		
Anus		

**Description**

- 1 - body opening through which food enters
- 2 - wider, shorter tube
- 3 - very similar to the human stomach
- 4 - compartment with many folds or "leaves" in the lining
- 5 - long, narrow, coiled tube
- 6 - large compartment referred to as the "paunch"
- 7 - compartment lined with many "honeycomb-like" projections
- 8 - body opening through which the material exits
- 9 - long muscular tube

**Function**

- A - adds digestive juices
- B - allows the food to enter the body
- C - tunnels food from the mouth to the stomach
- D - allows the undigested materials to leave the body
- E - place where the microbes begin to attack the food
- F - absorbs water and adds mucus to help materials move
- G - moves finer material on to next stomach, regurgitates coarser materials
- H - more juices added to help digest the material
- I - contractions squeeze out fluid and grind food



**Unit Four**

**Nutrient Requirements Of Beef**

**Roll Call**

Name a nutrient.

Name a feed item which is a good source of this nutrient.

From the answers to the roll call in your club, complete this chart. Once your roll call is finished, work together with other members to add as many items as you can think of.

Nutrient	Good Sources of This Nutrient	

**What is Essential?**

There are five nutrients which are essential for the beef animal. An essential nutrient is one which performs a special function in the body. Therefore, it must be available in the body if the animal is to live and function.

The essential nutrients are

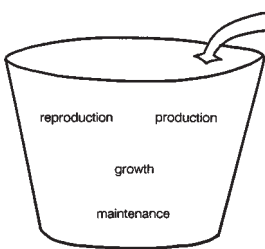
- Water
- Protein
- Energy
- Vitamins
- Minerals

Researchers have determined that these nutrients are essential by feeding diets deficient or lacking in the specific nutrient and noting the results. They then correct the problem by adding the nutrient which was missing.

## How much of a nutrient is required?

Animals have different requirements for nutrients depending upon their body activities. We can divide the animals into the following groups. Match the animal to the appropriate group.

Maintenance	*	*	the growing calf
Maintenance plus reproduction	*	*	the lactating cow and the fattening steer
Maintenance plus growth	*	*	the bull after breeding season is complete
Maintenance plus production	*	*	the pregnant cow



The normal body functioning or maintenance requirements of the animal must be met first. Only then can reproduction, growth or production occur.

Remember, the bottom of the bucket must be filled before you can begin to fill the top.

There are other factors which affect the amount of each nutrient the animal needs. Some of these are

- environment
  - temperature
  - room for exercise
  - stress
- breed
- age
- sex

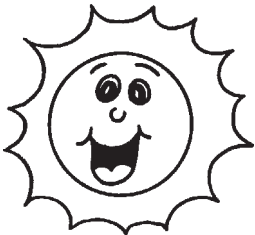
## Vitamins for Beef

This chart provides a summary of information on the vitamins beef cattle require. After reading through the chart, answer the questions on the next page.

Vitamin	Source	Importance
A	<ul style="list-style-type: none"> <li>• added to diet</li> <li>• green forages</li> </ul>	<ul style="list-style-type: none"> <li>• most important vitamin for cattle</li> <li>• needed for vision, bone development, healthy skin and tissue, reproduction</li> <li>• content in feed declines as feed ages</li> <li>• forages contain carotenes which the body uses to make vitamin A</li> <li>• stored in the body up to six months</li> </ul>
B	<ul style="list-style-type: none"> <li>• made in rumen</li> </ul>	<ul style="list-style-type: none"> <li>• there are many B vitamins (riboflavin, thiamine, niacin and so on)</li> <li>• not stored in the body, water soluble</li> </ul>
C	<ul style="list-style-type: none"> <li>• made in body</li> </ul>	<ul style="list-style-type: none"> <li>• not stored in the body, water soluble</li> <li>• man can not make his own</li> </ul>
D	<ul style="list-style-type: none"> <li>• sunshine</li> <li>• uncured forages</li> </ul>	<ul style="list-style-type: none"> <li>• need for strong bones and growth</li> <li>• animals kept inside and fed silage may need Vit. D supplements</li> <li>• stored in the body, fat soluble</li> </ul>
E	<ul style="list-style-type: none"> <li>• green forages</li> <li>• whole grains</li> </ul>	<ul style="list-style-type: none"> <li>• works with selenium in muscle action</li> <li>• stored in the body, fat soluble</li> </ul>
K	<ul style="list-style-type: none"> <li>• green forages</li> <li>• made in rumen</li> </ul>	<ul style="list-style-type: none"> <li>• needed for blood clotting</li> <li>• mouldy sweet clover restricts K action</li> <li>• stored in the body, fat soluble</li> </ul>



**Activities: "Which Vitamin(s)..."**



- \_\_\_\_\_ is made by the beef animal but not by the human?
- \_\_\_\_\_ is the sunshine vitamin?
- \_\_\_\_\_ is most often deficient?
- \_\_\_\_\_ would be supplied if you fed leafy, green forages?
- \_\_\_\_\_ works together with selenium to cause muscle action?
- \_\_\_\_\_ is made in the rumen?
- \_\_\_\_\_ is needed for good vision?
- \_\_\_\_\_ is needed for strong bones?
- \_\_\_\_\_ is deficient if your animal bleeds heavily from a minor wound?
- \_\_\_\_\_ is not stored in the body?

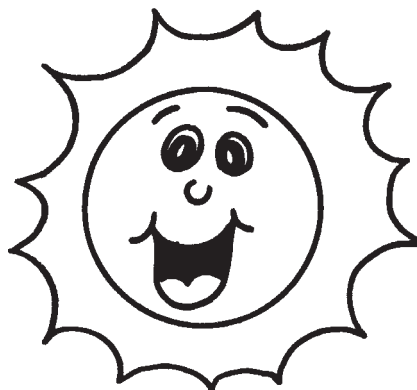
**Minerals for Beef**

Unscramble the letters to name the minerals.

**Macrominerals**

There are seven macrominerals known to be essential to the beef animal. These minerals are required in fairly large amounts.

- MIDOUS \_\_\_\_\_
- LINORCHE \_\_\_\_\_
- CAMCULI \_\_\_\_\_
- RUPHOSSOPH \_\_\_\_\_
- MEMIGAUNS \_\_\_\_\_
- MATPISOSUY \_\_\_\_\_
- FULRUS \_\_\_\_\_



### Microminerals

There are many microminerals known to be essential to the beef animal. Microminerals are those minerals required in very small or trace amounts.

NEDIOI \_\_\_\_\_

LATBOC \_\_\_\_\_

NOIR \_\_\_\_\_

GEMANSENA \_\_\_\_\_

CIZN \_\_\_\_\_

LUMISENE \_\_\_\_\_

PORPEC \_\_\_\_\_

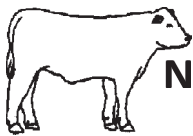
DYNMULEBOM \_\_\_\_\_

What is the difference between macrominerals and microminerals?

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**NOTE:**

Although the microminerals are required in smaller amounts than the macrominerals, they are NOT any less important.



