

4-H Market Beef Planning Guide

Mark Wahlberg*

This Planning Guide gives you the information you need to estimate the finished weight of a feeder calf, whether it is a steer or heifer. From additional information you provide, a required daily gain is calculated, and a planned feeding program can be developed to reach the proper finished weight at the time of your show.

I. Number of Days to Feed

Date of Your Show _____

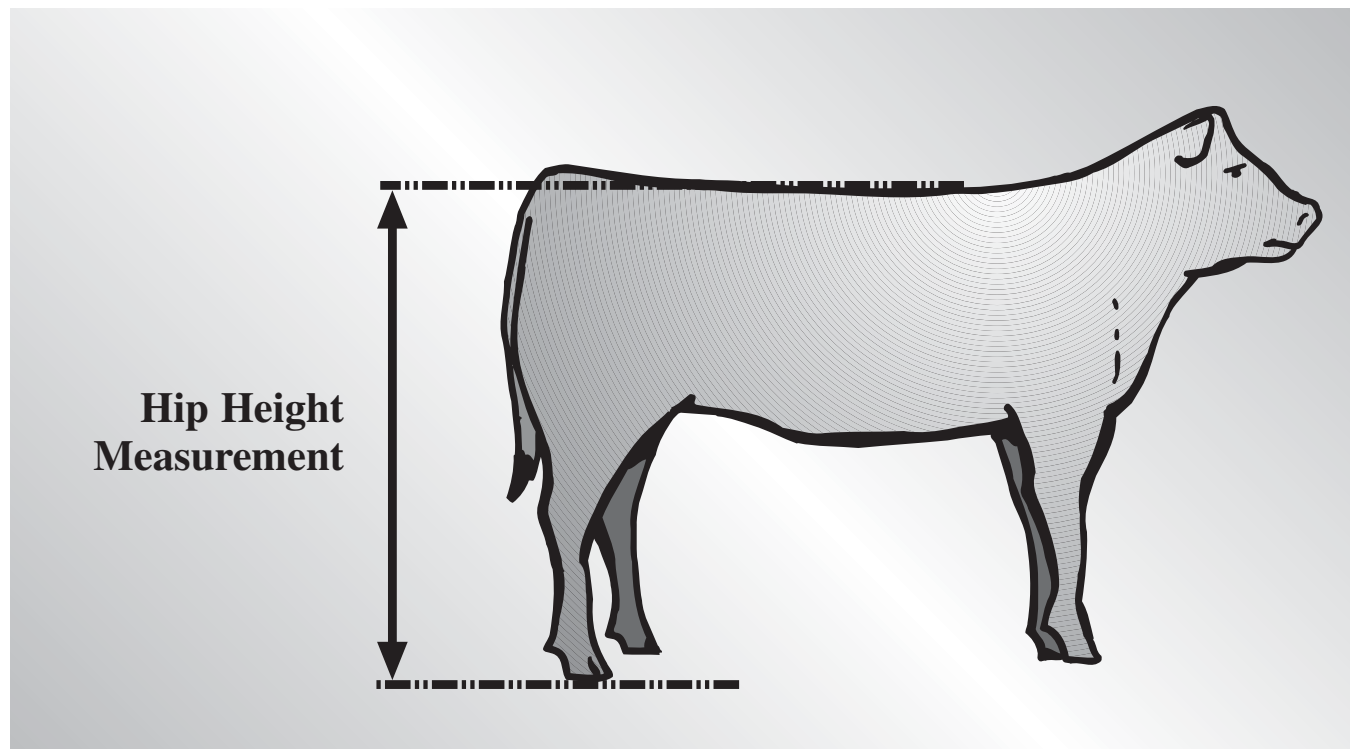
Date of Starting Weight of Calf _____

Number of Days Calf is on Feed _____

II. Estimating Finished Weight

Frame Score is a determination of a calf's height in relation to his age. It is closely associated with mature size. Young calves that are quite tall will mature at a later age and a larger size than those calves that are not so tall. You determine Frame Score in this way:

- A. Measure the height of the calf in inches over the hip. Because the way the calf stands can affect this measurement, make sure he is standing with his feet under the corners of his body, the head is up in a normal position, and the back is nearly level. See the illustration.



*Extension Animal Scientist, 4-H, Virginia Tech

B. Look on table 1A or 1B for the Frame Score of your calf. Find the age of your calf on the left side. Read across until you find the hip height measurement. Now follow that column up to the top to find the Frame Score of your calf.

Note that there are different tables for steers and for heifers!

Table 1A. Frame Score of Steers from Hip Height and Age in Months

Age in Months	Frame Score								
	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	55.0	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

$$\text{Frame Score} = -11.548 + 0.4878 (\text{Height}) - 0.0289 (\text{Days of Age}) + 0.00001947 (\text{Days of Age})^2 + 0.0000334 (\text{Height}) (\text{Days of Age})$$

Table 1B. Frame Score of Heifers from Hip Height and Age in Months

Age in Months	Frame Score								
	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	45.5	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	41.0	43.0	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

$$\text{Frame Score} = -11.7086 + 0.4723 (\text{Height}) - 0.0239 (\text{Days of Age}) + 0.0000146 (\text{Days of Age})^2 + 0.0000759 (\text{Height}) (\text{Days of Age})$$

C. Now that you know the Frame Score of your calf you can convert this to estimated finished weight. This is shown on the following chart.

Table 2. Frame Score and Expected Finished Weight of Cattle

Frame Score	Steers	Heifers
	Lb	Lb
1	882	750
2	955	812
3	1030	875
4	1103	937
5	1175	999
6	1250	1063
7	1323	1125
8	1396	1186
9	1471	1250

This is an estimated weight to be used as a guide. Actual weight may be more if you use an aggressive implant such as Revalor-S or -H or Synovex-Plus. It may be less if you feed a high-grain diet beginning when the calf is just weaned. However, actual finished weight should not vary more than 75 pounds from the estimate derived from this process.

III. Required Rate of Gain

A. Calculate Pounds of Gain Needed

Estimated Finished Weight
(from table in Section II C) _____

Starting Weight
(from Section I) _____

Weight Gain Needed _____
(Est. Finish Weight – Starting Weight)

B. Calculated Average Daily Gain to Reach Estimated Finished Weight

Weight Gain Needed /
Days Calf Is on Feed = _____

Example:

450 pounds of weight gain needed / 150 days on feed = 3.0 pounds per day

IV. Feeding To Get the Needed Gain

The nutrition contained in the ration is what makes cattle gain. The two most critical nutrients are energy and protein. In feeds, we often use TDN as a measure of energy. It stands for Total Digestible Nutrients, and a higher value means more energy. Crude Protein is the measure of protein in feeds. Protein is needed at high enough levels to fully utilize the energy in the ration. Thus, a higher TDN ration needs to have a higher crude protein level.

Cattle need a minimum amount of roughage (hay, silage, or other high-fiber feed) in order to maintain normal digestive system function. This should amount to at least 10% to 15% of the total dry diet. Amount of energy determines how fast a calf will gain weight, and grain is a source of lots of energy. Hay, pasture, and silage do not have a high level of energy.

Cattle will eat 2% to 2 1/2% of their body weight in dry feed each day. For example, a 1,000 pound market steer or heifer will eat from 20 to 25 pounds of dry feed daily. This is total feed, including hay.

Here are a few feed mixtures for growing or finishing market cattle.

High-Energy Ration – For Maximum Rate of Gain

- 1/2% of body weight as hay (3-5 pounds of hay per head per day)
- 1 1/2 to 2 pounds of soybean meal per head per day
- Rest of the mixture is shelled corn (Whole shelled or coarsely cracked)

This ration will provide around 80% TDN and 13% crude protein

Medium-Energy Ration – For Growing Lighter Cattle or Finishing at a Slower Rate

- 1% of body weight as hay (6 to 12 pounds of hay per head per day)
- 1 to 1 1/2 pounds of soybean meal per head per day
- Rest of the mixture is shelled corn

A mixture of 60% corn and 40% oats can be used in place of all the corn in this mixture

This ration provides around 72% TDN and 13% crude protein

Grains used should be at least coarsely cracked, and whole grains are better than grains that are finely ground.

Below are some guideline values for amount of feed intake and rate of gain for cattle at different weights that will finish at different endpoints. These are to be used as a guide only. Feed intake represents all that an animal can eat in a day. However, that changes with age – yearlings eat 10% to 15% more feed than calves of the same body weight. This higher feed intake will result in up to 1/2 pound higher daily weight gain. In this guide it is assumed that cattle are implanted with one of the approved growth enhancing products. If they are not, gain will be about 10% lower.

Estimated Daily Gain and Amount of Dry Feed Consumed when Given a High-Energy Ration (See above for example ration)

Finished Weight	Current Weight						
	600	700	800	900	1000	1100	1200
1000 Pounds	2.6	2.8	3.0	2.8	2.5		
1150 Pounds	3.0	3.0	3.2	3.4	3.0	2.9	
1300 Pounds	3.3	3.3	3.4	3.5	3.8	3.5	3.3
	16.5	18.0	20.5	25.5	26.0	27.0	27.5

The upper value in this table is expected Average Daily Gain of the animal. The bottom value is total intake of dry feed (including hay) when given all it wants to eat.

Estimated Daily Gain and Amount of Dry Feed Consumed when Given a Medium Energy Ration (See above for example ration)

Finished Weight	Current Weight						
	600	700	800	900	1000	1100	1200
1000 Pounds	2.2	2.2	2.1	2.1	2.0		
1150 Pounds	2.5	2.5	2.5	3.0	2.8	2.2	
1300 Pounds	2.7	2.7	2.7	3.3	3.3	2.8	2.8
	16.5	18.5	20.5	25.0	25.5	24.5	28.5

The upper value in this table is expected Average Daily Gain of the animal. The bottom value is total intake of dry feed (including hay) when given all it wants to eat.

V. Other Factors to Consider

As was discussed earlier, hip height and age when put together determine Frame Score. From Frame Score, the expected finished weight of a calf can be estimated. When we know the beginning weight and amount of time, then the required rate of gain can be calculated, and a feeding program to achieve this goal can be formulated.

The other vital factors to consider in addition to Frame Score are Degree of Muscling and Balance. Muscling is evaluated as thickness in relation to size. Calves for market-beef projects need to be especially thick and heavily muscled, and not narrow and flat. See the diagram below for illustrations of the variation in degree of muscling.

Balance is evaluated from the side view and refers to the way in which all the parts of the animal blend together. A well-balanced animal holds its head up, has a strong and level top and hip, and walks freely and easily. Calves that are especially low-headed, very short striding, or are noticeably broken in their top should not be selected for market-beef projects. See the silhouette on page 1 of this publication for a well-balanced animal.

