

INTRODUCTION

This manual has been developed as a study guide for the Florida State Fair Dairy Skillathon which is part of the Champion Youth Program. The topic for this year's Skillathon is **Products and Marketing**.

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

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

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

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

Juniors (age 8-10 as of September 1, 2024)

By-Products,
Milk Classes & Milk Products

Intermediates (age 11-13 as of September 1, 2024)

all of the above plus...
Milk Grades,
Product Grades &
Cookery

Seniors (age 14 and over as of September 1, 2024)

all of the above plus...
Federal Milk Orders/Milk Pricing
Quality Assurance
Shelf Life
Skeletal Anatomy

GOOD LUCK!

Products and Marketing***

Youth livestock projects focus on the selection, raising, showing and often selling of animals. By virtue of their participation in livestock projects, youth become part of an industry that provides food and fiber for the world. The steps involved in the movement of animals and animal products from producer to consumer are known as *processing and marketing*. Tremendous changes have occurred in recent years in the ways animal products are harvested and marketed but the fundamentals remain the same. Price is dependent on *supply and demand*. We can impact supply through improved management and efficiencies, but demand is more difficult to affect. In order to maintain a stable market for animal products, consumers must have confidence in the **wholesomeness and quality** of what they are buying. That means the products must be safe, nutritious and tasty. Many livestock organizations have implemented promotion programs to increase market share, improve prices and increase export markets. The Dairy Checkoff is an example of such a program. Read about it <https://www.usdairy.com/about-us/dmi>

Marketing may be as simple as receiving a set price per pound or may involve a pricing system known as 'Value Based Marketing'. **Value based pricing systems** account for quality and apply deductions or bonuses as products deviate from an accepted *baseline*. This should ultimately improve the quality of products offered to consumers, therefore boosting consumer confidence. Animal products may be marketed at auctions, by direct sales, contracts or electronically with the use of computers and satellite technology. Regardless of the marketing method, the seller is trying to receive the highest *price* while the buyer is trying to receive the greatest *value* (high quality and reasonable price).

Dairy Cattle Products and Marketing***

The primary products of the dairy industry are milk and milk products. There are seasonal trends in both milk production and milk consumption that sometimes do not match up. Price incentives and promotion programs have helped to bring these two factors in line. Who hasn't seen the milk mustache, the got milk?® logo? Undeniably Dairy? <https://www.idfa.org/news/new-undeniably-dairy-campaign-highlights-all-that-s-good-about-dairy>

The dairy checkoff works with local and state organization across the country, including **Florida Dairy Farmers** (FDF), to increase sales of dairy products through digital and social media, partnerships with community organizations and universities, consumer events and editorial outreach. The Dairy Council of Florida, a component of FDF, works with dietitians, doctors, nurses, school service professionals and educators to provide science based information on the benefits of dairy products. Visit <http://www.floridamilk.com/> to learn more.

In addition, other dairy organizations such as US Dairy Export Council®, Innovation Center for US Dairy®, and the National Milk Processor Education Program manage strategic initiatives to protect and promote the reputation of dairy products, producers and the industry.

The 4 major ways milk is used/sold are: fluid milk, soft products, hard cheeses, and butter or powder products. About 85% of the milk produced in the United States is sold through farmer marketing cooperatives.

The dairy industry also produces large numbers of beef on dairy crosses. Since the widespread use of sexed semen on top quality dairy cows to producer heifers, dairy farmers are now able to breed their lower quality cows to beef sires to produce crossbred calves for the beef market. The majority of these animals are finished in feedlots and harvested for high quality beef. In addition, one should not ignore the salvage value of cull cows since this source of red meat sometimes has major impacts on supply and pricing. Ground beef products make up almost 50% of total U.S. beef consumption and cull dairy cows are a vital source.

Animal By-Products

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Animal by-products are anything of economic value other than the carcass that comes from animals during harvest and processing. They are classified as edible or inedible for humans. There may be some disagreement about what is edible but we can all agree that there are many uses for what is left after the carcass is rolled into the cooler. In developing countries by-products may become jewelry, religious implements, tools, fuel, construction material, fly swatters, or musical instruments. In developed countries, advances in technology have created many products from non-animal sources (synthetics) which compete with animal by-products, thus reducing their value. Still, by-products represent multibillion dollar industries in the United States and other developed countries. An added benefit of changing inedible parts of carcasses into useful products is that the decaying materials don't pile up and cause environmental problems. **Rendering** is the term for reducing or melting down animal tissues by heat and the rendering industry refers to itself as the "original recyclers". The creativity of meat processors in finding uses for by-products has led to the saying "the packer uses everything but the moo".

<https://www.farmcreditofvirginias.com/blog/everything-moo-products-cattle>

Edible by-products

Raw Material

Brains, Kidneys, Heart, Liver, Testicles
Spleen, Sweetbreads, Tongue
Oxtails
Cheek and head trimmings
Beef extract
Blood
Fats
Intestines
Esophagus
Bones
ice cream and jellied food products

Principal Use

Variety Meats

Soup stock
Sausage ingredient
Soups and bouillon
Sausage component
Shortening (candies, chewing gum)
Sausage casings
Sausage ingredient
Gelatin for confectioneries (marshmallows),

Inedible by-products

Raw Material

Hides

Processed by-product

Leather
Glue
Hair

Principal Use

various leather goods
paper boxes, sandpaper, plywood, sizing
Felts, plaster binder, upholstery, brushes, insulation
Industrial oils, lubricants, soap, glycerin
Insecticides, weed killers, rubber, cosmetics, antifreeze, nitroglycerine, plastics, cellophane, floor wax, waterproofing agents, cement, crayons, chalk, matches, putty, linoleum
Livestock and poultry feeds
Glue, hardening steel, refining sugar, buttons, bone china
Animal feed, fertilizer, porcelain enamel, water filters
Fine lubricants
Leather preparations
Medicines
Pet foods
Livestock and fish feeds
Leather preparations, textile sizing
Livestock, pet and poultry feeds

Fats

Inedible tallow

Bones

Tankage
Dry bone

Bone meal

Feet

Neatsfoot stock
Neatsfoot oil

Glands

Pharmaceuticals

Lungs

Blood

Blood meal
Blood albumen
Meat meal

Viscera and meat scraps

Milk Classification

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The Agricultural Marketing Agreement of 1937 says that all milk should be classified in accordance with the form in which or the purpose for which it is used. There are four classifications of milk. A detailed list can be found at:

<https://mymarketnews.ams.usda.gov/mars-faqs/what-are-milk-classes-under-federal-milk-order-system>

Class I	Fluid Milk: whole milk, skim milk, buttermilk, and flavored milk drinks (egg nog) and Sterilized Products (UHT Packaged).
Class II	Cream Products: Ice Cream, Sour Cream, Milk Shake Mix, Yogurt, Cottage & Ricotta Cheese, Custards, Puddings, Batter Mixes, candy, soup, bakery products
Class III	Hard cheese other than for cottage cheese, spreadable cheese, cream cheese, butteroil
Class IV	Butter, Dry Milk Products, Evaporated or Sweetened Condensed Milk.

Fluid Milk Descriptions

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Milk contains about 87% water and 13% solids, including fat, fat-soluble vitamins (A & D), protein, carbohydrates, water-soluble vitamins (riboflavin), and minerals (calcium). It is pasteurized to destroy disease producing bacteria and extend the shelf life.

Whole Milk	Whole milk, the richest tasting, is usually homogenized and fortified with vitamin D. It contains a minimum of 3.25% fat and 8.25% milk solids not fat (MSNF).
Reduced Fat Milk	Reduced Fat milk has some of the fat removed until it contains 2% fat and 8.25% MSNF, Vitamin A in milk is lost when the fat is removed so it is replaced to meet government standards. The addition of vitamin D is common, but optional.
Lowfat Milk	Lowfat Fat milk has some of the fat removed until it only contains 1% fat and 8.25% MSNF, Vitamin A in milk is lost when the fat is removed so it is replaced to meet government standards. The addition of vitamin D is common but optional.
Skim Milk	(nonfat milk) has a less rich flavor and consistency containing less than 0.5 % fat. It contains 8.25% MSNF, and must be fortified with vitamin A. The addition of vitamin D is common but optional.
Flavored Milks	Flavored milks are made by adding sweeteners and flavorings such as strawberry, chocolate syrup, or other flavors of pasteurized whole or low-fat milk. Flavored milks have more calories than regular milk.
Buttermilk	All commercially sold buttermilk is cultured. This means that a safe lactic acid producing bacterial culture is added to freshly pasteurized skim or lowfat milk to produce a sour flavor. It is much thicker than skim milk and is higher in sodium than other milk.
Acidophilus-Cultured Milk	A bacterial culture is added to pasteurized milk and then cooled to prevent fermentation. There is no change in flavor and this milk is used for patients on antibiotics to help restore beneficial gut microbes.
Lactase-treated Milk	Often marketed as “Lactaid”, the enzyme lactase is added to the milk to help lactose-intolerant patients digest the lactose, the primary

carbohydrate in milk.

A2/A2 Milk Milk contains protein in various forms. Two common forms of casein are A1 and A2. Some consumers have trouble digesting the A1 protein. Many farmers are utilizing genetic technology to breed cows that produce milk with only the A2 protein to meet growing consumer demand.

Evaporated Milk Evaporated milk is prepared by heating homogenized whole milk under a vacuum to remove half its water, sealing it in cans, and thermally processing it. When evaporated milk is mixed with an equal amount of water, its nutritive value is about the same as whole milk. Evaporated skim milk is also available.

Sweetened Condensed Milk This concentrated canned milk is prepared similarly to evaporated milk but has at least 40 percent sugar by weight added. It is often used in candy and dessert recipes.

Dairy Product Grades

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Grades are based on nationally uniform standards. Sellers can request grading services to show that the product meets specific grade or contract requirements. This can also demonstrate a product with good keeping quality. Buyers can request grading to determine that products have uniform high quality. Sellers and buyers must request services, and pay a fee for the cost of the services. All dairy products offered for sale to the Federal Government under the dairy price support program or sanctioned under such programs are inspected by AMS dairy graders.

Product	U.S. Grades	Quality factors
Butter	AA, A, B (retail & wholesale)	flavor, body, color
Cheddar cheese	AA, A, B, C (only AA for retail)	AA = consistently fine flavor
Instant nonfat dry milk Regular nonfat dry milk Dry buttermilk	U.S. Extra Grade shield U.S. Standard Grade shield	sweet flavor, pleasant flavor, natural color, satisfactory solubility excess moisture or scorched particles
Dry whey	U.S. Extra U.S. Standard	sweet flavor, appearance, milk fat, and moisture

There is a USDA program for official quality approval for products that do not have a grading system in place. These products may carry the "Quality Approved" rating based on the USDA inspection. The product must be wholesome and measure up to a specific level of quality to earn the rating. <https://www.ams.usda.gov/sites/default/files/media/AMSProductLabelFactsheet.pdf>

Milk Grades

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Production of high quality milk is the goal of every dairy farm. Several methods are used to assess milk quality. Somatic cell count and standard plate count are required for the federal grading system. <https://dairy-cattle.extension.org/how-milk-quality-is-assessed/>

Grade A Milk

Grade A milk is acceptable for *fluid use*. The Pasteurized Milk Ordinance (PMO) regulates the standards for production of Grade A Milk relative to temperature, bacterial count, somatic cell

count and chemicals. Inspections of dairy farms are made regularly to make sure there are no violations of the standards. The permit to sell Grade A milk may be suspended if violations are found that are not corrected. Standards include: cooled to 40 degrees Fahrenheit or less and held there until processing, $\leq 100,000$ bacterial count per ml. before mixing with other producers' milk and $\leq 300,000$ after mixing and before pasteurization, $\leq 750,000$ somatic cells/mL. (SCC) and no antibiotics present. These are minimum standards but many processors and retailers required even higher quality and lower levels of bacteria and somatic cells. Since dairy products are regularly exported, the effective limit on SCC is 400,000 cells/mL to meet standards of other countries.

Grade B Milk

Grade B Milk is acceptable to be used for *manufacturing dairy products* but not to be used for fluid milk consumption. States have the option of adopting USDA standards but plants that do not meet the standards cannot sell products to the Commodity Credit Corporation under milk price support programs. The requirements for producing Grade B milk are not as strict as those for Grade A milk. If a farm exceeds a somatic cell count of one million cells per milliliter for two of the last four consecutive samples, it will be placed on probation until the problem is corrected. If not corrected within the probationary period the milk will not be accepted at the plant.

Meat Cookery

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Methods of cooking meat include dry heat or moist heat. Dry heat cookery methods improve flavor of meat through crust formation and caramelization but increase chewiness and decrease tenderness because of protein hardening. Moist heat cookery methods increase the tenderness of meat cuts that are comprised of muscles containing large amounts of connective tissue. Cookery under moist conditions for long periods at relatively low temperatures generates steam that then converts the collagen in connective tissue into gelatin. Methods should be selected based on initial tenderness of the cut, desired quality characteristics of the resulting product, available cooking facilities/equipment, and the amount of time available for preparation.

Dry Heat

Dry Heat methods of cooking are suitable for tender cuts of meat or less tender cuts which have been marinated. Use cuts low in collagen and elastin.

Roasting - This method of cooking is recommended for larger cuts of meat. Meat is seasoned and placed in an open roasting pan with a cooking thermometer placed in the center to determine degree of doneness.

Broiling - This method is most suitable for tender, usually thin cuts of meat. Less tender cuts may also be broiled when marinated. Meat is directly exposed to the source of heat from above or from both sides at the same time. It involves high heat and produces a distinct caramelized flavor.

Grilling - This method is actually a method of broiling. Meat can be grilled on a grid or rack over coals, heated ceramic briquettes or an open fire.

Pan-Broiling - This method is faster and more convenient than oven broiling for cooking thinner steaks or chops. It involves conduction of heat by direct contact of the meat with hot metal. Fat drippings are poured off as they accumulate.

Pan-Frying - This method differs from pan-broiling in that a small amount of fat is added first, or allowed to accumulate during cooking. Pan-frying is for ground meat, small or thin cuts of meat.

Stir-Frying - This method is similar to pan-frying except that the food is stirred almost continuously. Cooking is done with high heat, using small or thin pieces of meat.

Deep-Fat Frying - This method is cooking meat immersed in fat. This method is only used with very tender meat.

Microwave Cookery - High frequency electrical energy causes molecules inside the product to vibrate creating friction and heat without heating the surrounding air. The rapid speed of microwave cooking makes it ideal for frozen cuts in institutions and restaurants. Consumers complain that microwaved meat is inferior in flavor.

Moist Heat

Moist Heat methods of cooking are suitable for less tender cuts of meat. Moist heat cooking helps to reduce surface drying in those cuts requiring prolonged cooking times. With moist heat cookery, meat may lose some water-soluble nutrients into the cooking liquid. However, if the cooking liquids are consumed, as in stews or soups, nutrients are transferred and not totally lost. Meat should never be boiled because high temperatures toughen protein.

Braising - In some regions of the country the term “fricasee” is used interchangeably with braising. The surface of the meat is seasoned, covered with flour and browned. Afterward the meat is placed in a covered pan with a small amount of liquid and cooked at low temperatures to soften the connective tissue and yield a more tender product.

Stewing – Small pieces of lean meat can be browned on the surface then covered with liquid and gently simmered in a covered pan until tender. Care should be taken not to let the temperature of the liquid exceed 195°F, because boiling toughens meat protein.

Simmering - Involves cooking in water at low temperatures (180°F) like stewing except more water is used and the meat is usually not browned first.

Pressure Cooking – Cooking under pressure produces steam which aids in softening connective tissue. Pieces of meat may be browned then cooked with a small amount of water in a special vented pressure cooker.

Poaching - Cook in a liquid that is not actually bubbling at 165 to 180 degrees. It is usually used to cook delicate foods such as fish and eggs. It takes one third less time than roasting. Poaching helps keep shrinkage of the meat to a minimum.

Meat Facts ***

100g Roasted	Calories (g)	Fat (g)	Sat'd Fatty Acids (g)	Protein (g)	Iron (mg)
Beef	216	9.9	3.79	29.58	2.9
Chicken	190	7.41	2.04	28.93	1.21
Goat	108	2.58	.79	29	3.3
Lamb	206	9.52	3.4	28.22	2.05
Pork	212	9.66	3.41	29.27	1.1
Rabbit (stewed)	206	8.41	2.51	30.38	2.37

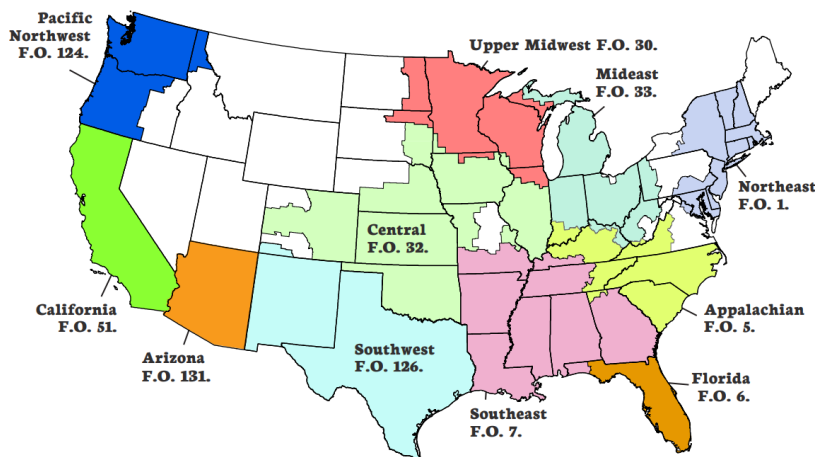
Federal Milk Marketing Orders

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The Federal Milk Marketing Order system was set up in the 1930's when milk producers had no alternatives to selling their milk to local processors and were often subject to unfair buying practices by milk dealers or processors. The Federal Milk Marketing Orders were designed to level the playing field by returning some market power to producers. A milk marketing order which covers only Grade A milk (about 95 percent of milk production) is a geographically defined fluid milk area. Within each area, milk sold in the milk marketing order is "pooled" to generate a uniform average price, called the blend price. There are currently eleven Federal Milk Marketing Orders in the United States: Pacific Northwest, Arizona, Southwest, Central, Upper Midwest, Southeast, Mideast, Florida, Appalachian, Northeast and California.

<https://www.ams.usda.gov/rules-regulations/moa/dairy>

11 Federal Milk Marketing Order Areas



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On Farm Milk Pricing

Different classes of milk are marketed for different prices under the Agricultural Marketing Agreement Act of 1937. Milk used in fluid products that is placed in Class I will receive the highest price. The current method of pricing is based on fat content. Dairywomen in the near future may see pricing systems based on solid components including fat, protein and lactose.

Milk is sold in federal milk marketing order markets from the farm in the following manner:

Order Price is set: example. \$21.00 per hundred weight.

Base of pricing structure is 3.5% milk fat.

Milk fat differential is \$0.30 (30 cents) for every .1% (tenth) difference, up or down.

Class I Skim Milk Price: Average of Advanced Class III + Class IV Milk Prices + \$0.74

This formula was changed in the 2018 farm bill to better help dairy farmers and processors manage their price risk, in a controversial move that was expected to be revenue neutral (the \$0.74 adjuster was based on historical analysis). However, this method may soon revert back to the previous method of using the "higher-of" Class III or Class IV Advanced Skim Milk Price, as was recently announced in a USDA initial recommended decision of a Federal Milk Marketing Order Hearing.

Example 1:

1000 lbs. Milk 3.5% Milk Fat
1000 lbs. of Milk divided by 100 multiplied by \$21.00 will give you the price.
(1000/100) x \$17.50 = \$210.00

Example 2:

1000 lbs. Milk 4.5% Milk Fat
Milk Fat Differential is 1% (or 10 tenths): 10 tenths x 30 cents = \$3.00 The Milk Fat Differential is above the base of 3.5% therefore you add the \$3.00 to the base price.
(1000/100) x (\$21.00 + \$3) = \$213.00

Example 3:

1000 lbs. Milk 3.0% Milk Fat
Milk Fat Differential is .5% (or 5 tenths): 5 tenths x 0 cents = \$1.50
(1000/100) x (\$21.00 - \$1.50) = \$195.00

<https://www.ams.usda.gov/mnreports/dymadvancedprices.pdf>

FARMERS ASSURING RESPONSIBLE MANAGEMENT F.A.R.M.

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Launched in 2009, the FARM Program was created by the National Milk Producers Federation in partnership with Dairy Management, Inc. The program helps ensure the success of the entire dairy industry by demonstrating U.S. dairy farmers are committed to producing high quality, safe milk with integrity.

The FARM Program focuses on five program areas – [Animal Care](#), [Antibiotic Stewardship](#), [Biosecurity](#), [Environmental Stewardship](#) and [Workforce Development](#).

Each program area provides participants with resources such as science-based standards, verifications, metrics and other tools that can be leveraged to improve best management practices in each respective pillar.

FARM Animal Care Program standards are revised every three years to reflect the most current science and best management practices within the dairy industry. Standards, rationale and accountability measures are reviewed and revised by the FARM Animal Care Task Force and National Milk Producers Federation Animal Health and Well-Being Committee with input from industry stakeholder groups including farmers, animal scientists and veterinarians. [The National Milk Producers Federation Board of Directors](#) provides final approval on version standards. FARM is currently evaluating dairies with FARM Animal Care Version 5.

Judging and Scoring milk and cheese

Flavor is key to acceptance and is affected by production and processing practices. Flavors of milk and cheese may be caused by the genetic makeup of the cow, feeds consumed by the cow, bacteriological action, chemical changes and absorption of foreign flavors after the milk is drawn. Some off flavors you may encounter are: bitter, cooked, flat (watery), garlic/onion, high acid, metallic, rancid, or salty. Visit the following web site to read more about judging standards: <https://www.ams.usda.gov/sites/default/files/media/Judging%20and%20Scoring%20Milk%20and%20Cheese%2C%20Farmers%27%20Bulletin%20No.%20202259%2C%20USDA.pdf>

Shelf Life and Sell By Date

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What types of food are dated?

Open dating is found primarily on perishable foods such as meat, poultry, eggs and dairy products. "Closed" or "coded" dating might appear on shelf-stable products such as cans and boxes of food.

<https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/food-labeling/food-product-dating/food-product-dating>

Types of Dates

- A **"Sell-By"** date tells the store how long to display the product for sale. You should buy the product before the date expires.
- A **"Best if Used By (or Before)"** date is recommended for best flavor or quality. It is not a purchase or safety date.
- A **"Use-By"** date is the last date recommended for the use of the product while at peak quality. The date has been determined by the manufacturer of the product.
- **"Closed or coded dates"** are packing numbers for use by the manufacturer.

Safety After Date Expires

Foods can develop an off odor, flavor or appearance due to spoilage bacteria. If a food has developed such characteristics, you should not use it for quality reasons.

If foods are mishandled, however, foodborne bacteria can grow and cause foodborne illness — before or after the date on the package. For example, if milk is taken out of the refrigerator and left out several hours, it might not be safe if used thereafter, even if the date hasn't expired.

What does the "Sell By" date on the milk carton mean? The "Sell By" date means that the product should remain fresh up to that date when unopened and properly stored. Dairy products are very perishable. For best quality, you should use the product before the expiration or "Sell By" date. The number of times the product has been opened and resealed and the amount of time left out of the refrigerator during each use impacts how long it will last. Also, drinking straight from the container affects perishability as bacteria from your mouth may cause the product to spoil faster.

Average shelf life at 40°F is ten days. Note rapid decrease in shelf life occurs at higher temperature. Storage temperature of milk and milk products has a direct relationship to keeping quality or shelf life. Florida law requires that milk and milk products be stored at 45°F or lower until sold to consumers. For best protection, store at 33°F to 44°F. Besides temperature, age of the product affects keeping quality. Proper rotation in the dairy case is very important. Proper rotation plus storage below cooling level in a display use equals good products for the consumer.

Storage temperatures and shelf life time:

30 to 40 °F	24 to 10 days
40 to 45 °F	5 days
45 to 50 °F	2 days
50 to 60 °F	1 day
60 °F and up	½ days

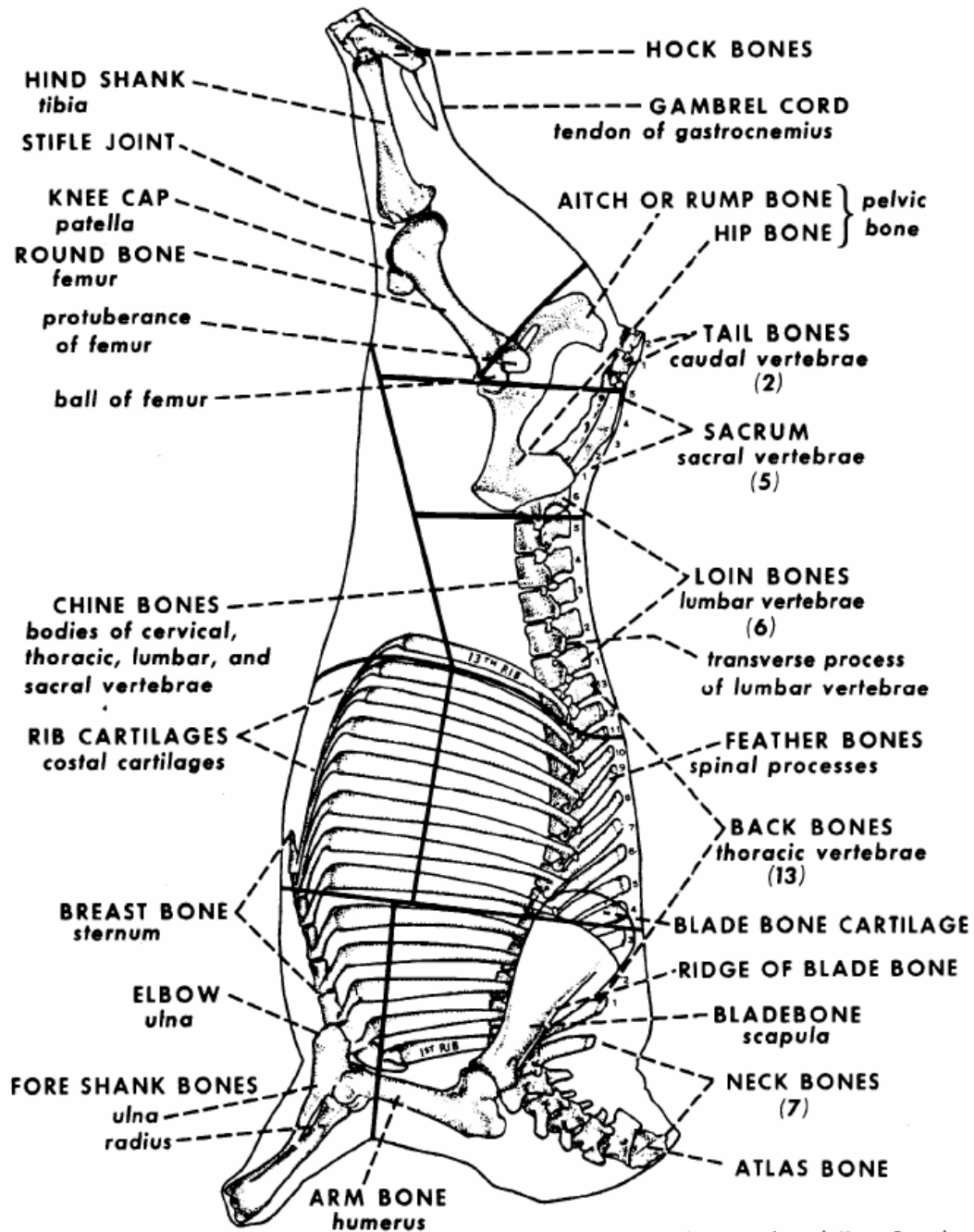
Beef Skeletal Anatomy

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When fabricating the carcass into wholesale and retail cuts, skeletal anatomy provides the framework and landmarks for each of the cuts. Identification of bone-in retail cuts is much simpler when you have a good grasp of the bones associated with each region of the carcass.

BEEF SKELETAL CHART

Location, Structure and Names of Bones



Courtesy of National Livestock and Meat Board