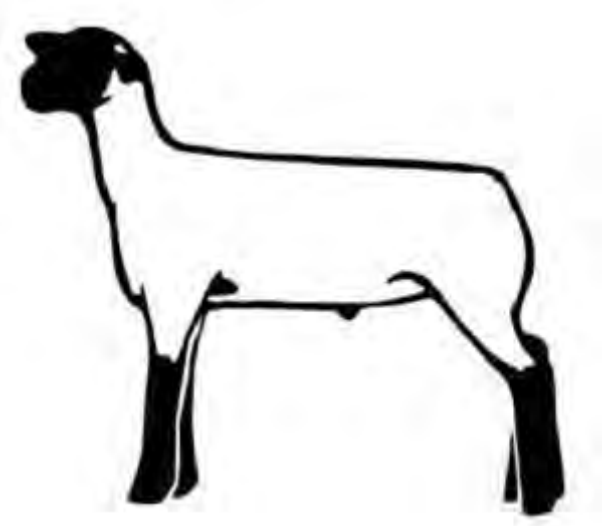
LIVESTOCK ACHIEVEMENT PROGRAM
FRESNO COUNTY 4-H

Sheep Study Guide
Levels 1, 2, 3, 4 & 5



Revised January 2020

Guidelines for a 4-H Sheep Breeding or Market Lamb Project

1. Complete and submit to project leader an APR (Annual Project Report) or any other forms that the project leader requires, such as a completed 4-H record book.

2. Participate in a Fairs and Exposition Branch approved Quality Assurance and Ethics Awareness training course. Visit *www.yqca.org* for more information.

3. Be sure to review the rules outlined in your county fair premium/website if you plan on participating at the county fair. Regulations may vary with each fair and county.

4. Review the timeframe of animal ownership and supervision for fair eligibility.

Opportunities of Lamb Projects

Sheep projects are excellent for 4-H members because lambs are trainable and young people can work with them easily. Advantages of sheep projects include:

1. Small initial investment

2. Quick turnover of return

3. Small space requirements

4. Training in selection, feeding and management.

5. Possibility of expanding project into a profitable livestock enterprise.

6. Understanding of animal needs and welfare.

Benefits to a 4-H Member

Selection in judging. From the time you select your lamb to the time of showing, you will be learning what characteristics to look for in a market lamb or breeding sheep.

Record keeping. Part of the requirement for a market lamb or sheep breeding project is record keeping. By keeping records, you will learn costs of feed and equipment, profit and loss, and hopefully establish a bank account for your education or future business.

Nutrition. You will learn the nutritional requirements of sheep and how to balance a ration.

Health. Learning about sheep diseases and parasites and their control is part of your training in project lessons.

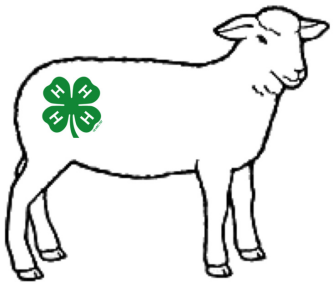
Quality assurance. Increase the awareness of the issues of animal well-being, quality assurance, and ethics.

Competition. You will benefit from learning to fit and show your project, and to win and lose graciously.

Ownership pride. Owning and caring for lambs gives you the feeling of pride and satisfaction.

Professional and social development. Having a market lamb or sheep breeding project will bring you into contact with successful sheep breeders and producers, project leaders, and other 4-H mentors.

Consumer awareness. Completing a livestock project will help you better understand how meat enters our food chain.



Additional Learning Experiences

1. Be on a livestock judging team.
2. Attend livestock project seminars.
3. Demonstrate fitting and showing.
4. Participate in a livestock achievement test.
5. Attend the State Fair.
6. Visit a sheep producer's operation.
7. Visit a feed mill.
8. Visit a local veterinarian.
9. Visit a packing plant.
10. Visit a store to study the different ways sheep products are marketed.

Subjects for a 4-H Club Talk

- Why I chose a market lamb or sheep project
- Why I chose a sheep breeding project
- What I learned from my sheep project
- How wool is used in our everyday lives
- The importance of the sheep industry
- Sheep diseases and prevention/treatment
- How to prepare a sheep for show day
- Animal well-being and care
- Quality assurance and food safety

Teamwork for the Common Goal

The purpose of all project work is to enhance the education, experience, and development of young people, a purpose that is not realized without the involvement of several people working as a team. The successful completion of a sheep project depends upon the combined efforts of parents, experts, 4-H leaders, and you. All have responsibilities.

To Parents

How much your child learns in their 4-H sheep project depends on the kind of support and encouragement you give. Much of your time will be spent helping your child obtain the resources needed to complete the project. You may offer other assistance when necessary, but you should never interfere with your child's opportunity to learn by doing. Be available to listen to his or her needs and concerns, and offer praise whenever possible. Stress the value of doings one's own work, and help your child realize how much they have learned from that work. To most children, a sense of accomplishment is usually more important than a ribbon or trophy.

It is also inappropriate for a professional to own, care for, or groom the project animal. 4-H members should own their project animals under their care. Also keep in mind that most projects (especially those involving animals) will require several adjustments at home and some investments to be successful. For this project, separate pens, a shelter, and some room for exercise will be needed, as well as facilities for feeding the project animal and materials for keeping records. It may be necessary to purchase special feed supplements and special grooming and showing equipment.

Remember, your child's success in this and all projects depends to a large extent on the encouragement, support, and involvement that only you can give.

To the 4-H Advisor

As people directly concerned with youth development, it is the responsibility of every 4-H advisor and agent to help each member who wants a sheep project (and has the financing and suitable facilities) to secure one. Keep in mind that people like you, in such positions, have exceptional influence with youth, and your encouragement and help can not only lead to completed projects but contribute as well to the development of responsible citizens.

To the Member

After you have made the decision to enroll in a sheep project, it is important that you know what type of animal you are looking for, how to feed it, diseases it may have, management practices, and many other important concepts.

By teaching you these matters through information and experience, this project will make it possible for you to produce a high-quality and safe product- in other words, lamb that the consumer wants to buy. To have a successful project you must be willing to study and review the information contained in this handbook and apply it.

The 4-H member project books contain activities that enhance learning from the information gained in this handbook.

Glossary of Terms

Here are some common terms used by sheep producers when talking about sheep.

Antibiotics: a drug that kills bacteria and other germs.

Average Daily Gain (ADG): the amount of weight gained each day.

Biosecurity: management practices that are undertaken to prevent the introduction and spread of diseases.

Breed: a group of sheep with similar characteristics (color markings, size, quality of fleece, etc.) that are passed on to their offspring.

Breeder: the owner of the parents of a lamb when they are mated.

Castration: Removal of the testicles. Castrating is usually done between 2-6 weeks of age.

Concentrate: a feed that is high in nutrients and low in fibrous material. Examples are corn, oats and soybean meal.

Crossbred: a sheep or lamb whose parents are of different breeds.

Dipping: immersing the entire sheep in water containing an insecticide to kill ticks or lice.

Docking: the removal of the tail. Docking should be done when the lamb is only a few days old.

Drenching: treating sheep for internal parasites with an oral dose of a deworming medicine.

Ewe: female sheep of any age.

Fleece: the wool from one sheep. The wool in the fleece is supposed to cling together in one piece. The fleece from most sheep will weigh 7-8 pounds.

Flock: a group of sheep that are managed together. Sheep have inborn ability or desire to flock, or gather, together. This is also known as gregariousness.

Flushing: the practice of conditioning ewes before breeding by turning them to better pasture or feeding small amounts of grain. Flushing is done to increase the number of twin and triplet lambs that will be born.

Forage: a feed that is high in fibrous material and somewhat low in energy. Examples are hay, pasture and silage.

Gestation: the time from the date the ewe is mated with the ram until lambs are born, usually 143 to 152 days.

Grade: a sheep that has only one purebred parent and one scrub parent.

Incisors: front teeth.

Lamb: a young sheep, either male or female under 1 year of age.

Marbling: the fat within the muscle.

Meat type: breeds of sheep that are used primarily for the production of meat.

Mutton: the meat from sheep older than 12 months of age.

Parturition: the process of giving birth.

Polled: naturally hornless.

Purebred: an individual sheep whose parents are of the same breed. This animal could be eligible for registration by a breed association.

Ram: a male sheep of any age. Sometimes a ram may be called a buck.

Roughage: feed that is high in fiber, low in digestible nutrients, and low in energy (e.g., hay, straw, silage, pasture)

Scrub: a sheep whose ancestry is so mixed it does not resemble any particular breed or cross.

Scurs: small horn buttons attached to the skin.

Shearing: removing the wool from a sheep.

Shepherd: a person who cares for sheep.

Tagging: trimming or shearing the wool away from the tail or dock area.

Wether: a male sheep that has been castrated at an early age.

Yearling: a male or female sheep between 1 and 2 years of age.

Selection Glossary Terms: common terms used when evaluating the build and conformation of sheep.

Balance: a smooth and harmonious blending of body parts.

Breed character (breed type): combination of features that identify an animal with a breed such as conformation, color and head shape.

Buck-kneed: with knees bent slightly forward.

Calf-kneed: with knees bent slightly backward.

Capacity (internal volume): internal body dimensions.

Carcass: the dressed body of a slaughtered meat animal.

Condition: the degree of fatness in breeding animals.

Conventional: early maturing.

Cow-hocked: hocks closer together than feet, hocks bent in as viewed from the rear.

Dock: region where the tail was removed.

Early maturing: reaches high proportion of mature size quickly; opposite of late maturing.

Extended: longer and taller.

Femininity: possession of well-developed secondary female sex characteristics.

Finish: degree of fatness in meat animals.

Hindsaddle: the area of the lamb or carcass from the last rib back, includes loin, leg and rump.

Loin: the part between the last rib and the hip bones.

Low-set: having short legs.

Masculinity: possession of well-developed secondary male sex characteristics in the head, neck and shoulders.

Open shoulders: shoulder blades too far apart at the top.

Rangy: a very long body, opposite of compact.

Rugged: big, strong.

Rump: the area between the hip bones and the tail head.

Scale: size.

Sickle-hocked: a hock that has too small of an angle made by the leg above and below the hock, as viewed from the side.

Soundness: A. When an animal is free from disease and lacks structural defects that affect its usefulness; B. If there are no weak spots in the wool.

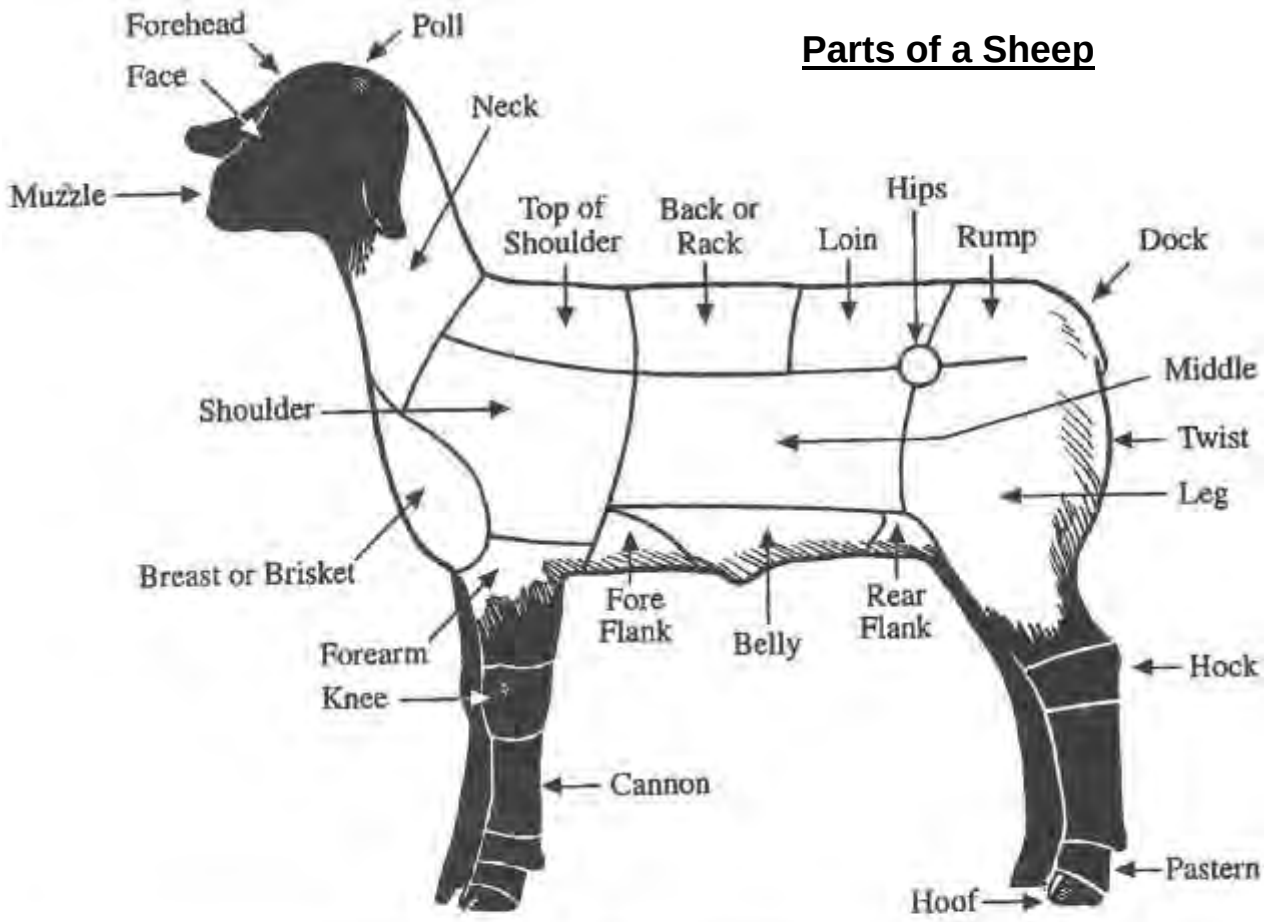
Structural correctness: free from any conformational abnormalities.

Stylish: attractive, possessing a pleasing conformation or way of movement.

Substance: amount of bone.

Wasty: A. Too much fat on a carcass; B. An animal that has a paunchy middle.

Parts of a Sheep



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Selecting a Market Lamb

When selecting market lambs, keep in mind the final objective: production of a lamb with a high quality, lean, muscular carcass that is ethically and economically produced. Most lambs are ready to be slaughtered when they weigh from 105-130 pounds and have from .1 to .2 inches of external body fat. The fat thickness range ensures that carcass quality is adequate, with minimal amounts of excess fat trim. The final weight achieved when lambs are finished will vary depending on breed, frame size and nutrition. Be sure to check the weight limits in a current copy of the fair handbook if you plan to exhibit a market lamb at a fair, such as the Fresno Fair. The weight limits can vary from fair to fair and from year to year.

A common fault in selecting market lambs is to select lambs that are of an extreme in a particular trait. Single trait selection for any type of livestock can quickly lead to decreased usefulness when other traits are measured. Therefore, lambs should be selected that are "well rounded" or complete. These lambs would be above average in all respects, rather than exceptional in one trait and below average in all others.

What is a complete lamb? A complete lamb is one that is above average in muscling, of adequate frame size to have economical gains and finish at a market acceptable weight and is structurally correct.

When evaluating a young lamb to predict future muscle thickness, you need to keep in mind carcass economics. The highest priced cuts from a lamb come from the hind saddle or from the last rib back. Your lamb should show that it has depth and width through the loin, fullness and length through the rump, with a full, muscular leg and stifle. The forearm area of lambs and fullness behind the shoulders are good indicators of future muscle development. A lamb is born with all the muscle fibers it will ever have, feeding and exercising will not make a lamb into something it is not genetically capable of being.

Frame size in lambs is used to predict growth potential and to predict size (weight) when properly finished. Lambs should be from average to large in frame size, for their breed, for economical gains. Very small and very large frame size lambs should be avoided, as they often finish at weights that are not market acceptable. Frame size is often thought of as just height, when actually it includes body length and body capacity. Frame size can be compared to a rectangular box, with height, length and total volume all making an equal contribution. Lambs should be long in the hind saddle (loin and rump) region.

Structural correctness refers to several traits. Your lambs should have sound mouths, (not parrot mouthed-lower jaw is too short) normal eyes, and be free of any

abnormalities. Feet and leg placement should be square with normal width and straightness. Furthermore, lambs should have strong pasterns and no foot problems.

Balance or eye appeal is also desirable in your lambs. Eye appeal is very subjective but generally lambs should be level in the top line, straight and square over the rump, and not have extreme coarseness through the shoulder, neck and brisket area.

When buying your lambs, make sure they are within a manageable weight range. They need to be at least two months old and heavy enough to attain their finished weight by fair time. Most lambs will gain from .5 to .75 pounds per day. However, do not make the mistake of buying lambs that are too heavy. Lambs that are held at maintenance too long get stale appearing. Ideally, your lambs should be within a weight range that will allow for normal growth to reach market weight by fair time.

Handle the lamb for length and levelness of rump, and uniformity of width. Length of rump is the length from the hip bone to the pin bone. Width and fullness of rump is critical. The loin, rump and leg combined to make up the hindsaddle, the higher valued retail cuts found in the lamb carcass.

Determine the size of the leg and amount and firmness of inside and outside muscling. This is accomplished by joining the fingertips of both hands, on the inside of the leg. Put the hands as far up in the rear flank and twist as possible. Reach high on the rear leg for fullness and dimension of the leg muscle, not just the lower leg. Reach around and see how close your thumbs come to touching. The leg should be firm and heavily muscled, and the muscle should extend toward the hock. Placing your right knee into the animals left flank will also help to prevent movement of the lamb while handling the leg.

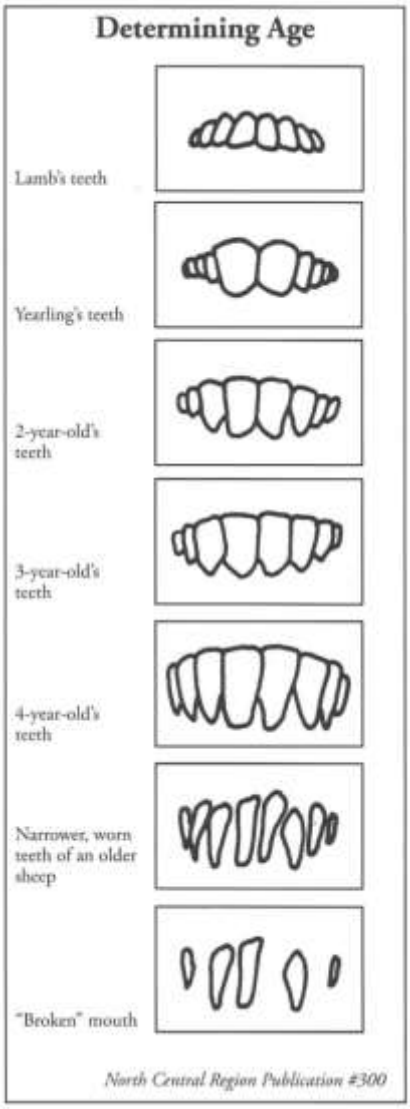
A final measurement that can be taken is length of top. Place your thumb in the middle of the lambs shoulder (between the neck and rack). Stretch the hand (from your thumb to the small finger) and do this repeatedly down the lambs topline to the dock.

Breeding Animals

In selecting breeding animals, consider the requirements to meet your needs. Set goals for the market you intend to produce, and then select breeding sheep to meet that goal. You might be trying to produce elite breeding stock for purebred operations, or perhaps to produce competitive wether lambs for exhibition, or perhaps to produce market lambs for direct marketing to consumers. Heredity and environment will affect the animals' ability to meet these requirements.

When selecting breeding animals for your flock, define your objectives. Know what you want to do with your 4-H breeding sheep before you start buying animals. Ideal breeding sheep should be structurally correct (check the mouth for age and soundness, the testicles of rams to make sure they are correct in size and development), have adequate frame size and weight for their age, be in good body condition, and have correct breed and sex characteristics.

Sheep can be approximately aged by the number of permanent incisors on their lower jaw. Lambs have eight temporary incisors. Once a lamb reaches about one year of age, the center teeth are replaced by two permanent ones. The sheep then gets two more permanent teeth each year (one on each side of the center) until they reach four years of age. At age four, the sheep have all their permanent incisors.



Marketing and Selling Sheep and Meat (Level 5)

Sale of Sheep and Lambs

Whether a 4-H member raises a single lamb or has a small flock of sheep, he or she should know the options for marketing and selling those animals. Knowing what type, age, size, breed, and condition-level of sheep and lambs is most desirable will help to create more profitable options at sale time.

- In many California counties, 4-H members can exhibit and sell their market lamb at the local county fair. Members should research the entry requirements for their local fair.
- Breeding, market-ready, and feeder lambs can be sold at local livestock auctions that are held regularly throughout the state.
- High quality breeding sheep, both registered and unregistered, as well as high quality feeder lambs may be sold private treaty, online, or at consignment sales throughout the state and beyond.

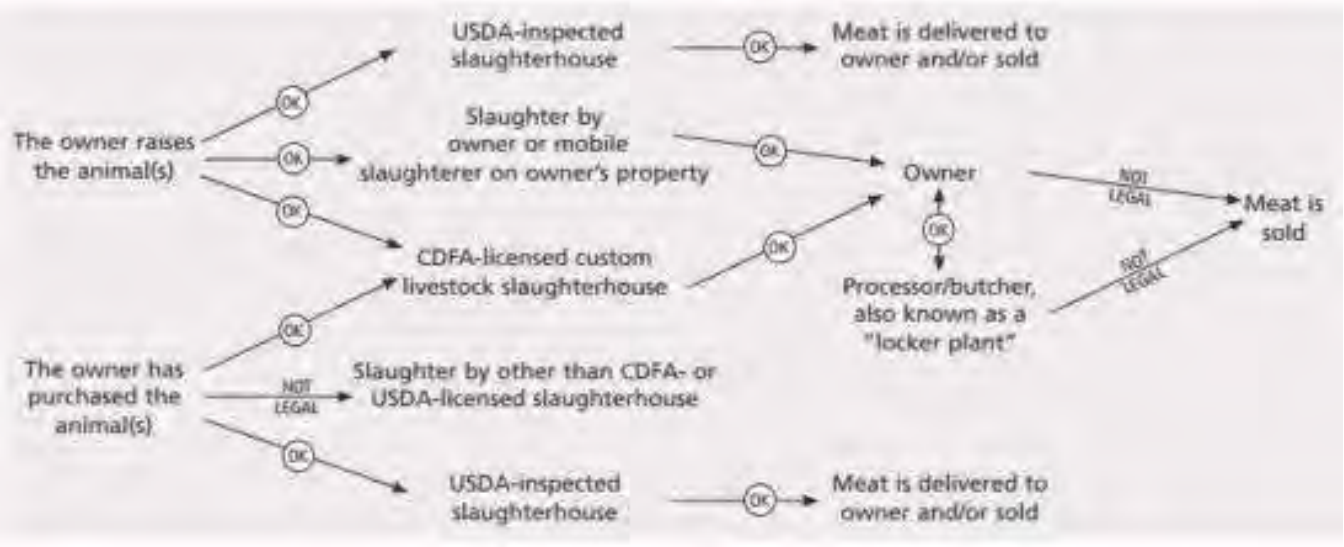
Sale of Locally Grown Meat

Even though lambs are raised to produce meat, there are requirements and laws that regulate the sale of that meat. Livestock (cattle, sheep, goats, pigs) must be harvested (slaughtered) at a USDA facility and cut & wrapped at a USDA facility in order to be sold to the public. There are various labeling, handling, and storage requirements that must be followed when selling meat. Farmers markets are another outlet for selling meat, but the meat must be processed, labeled and stored following USDA and CDFA guidelines specific to farmers market sales. Information regarding USDA and CDFA slaughter facilities and guidelines can be found online at:

http://ucanr.edu/sites/CESonomaAgOmbuds/Selling_Meat/ [1]

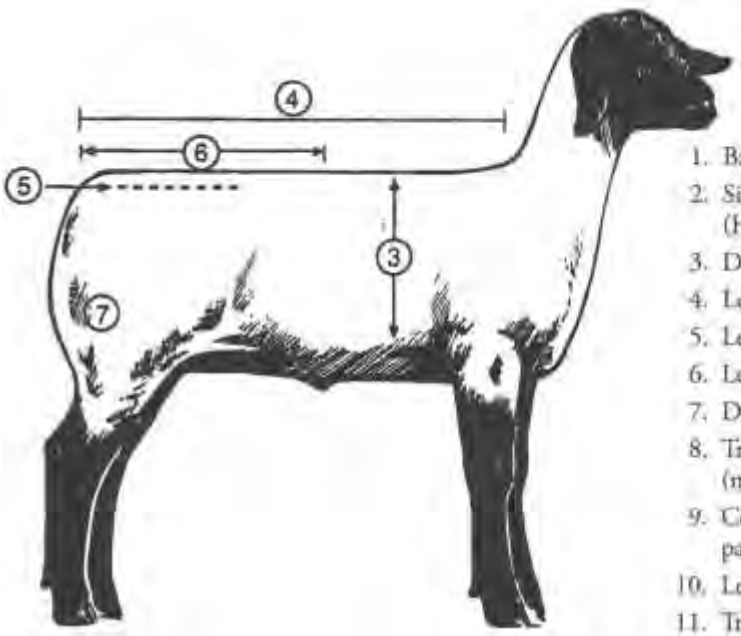
[1] http://ucanr.edu/sites/CESonomaAgOmbuds/Selling_Meat/

The County Agricultural Commissioner and the local University of California Cooperative Extension are also good resources for local, state, and federal regulations regarding the sale of meat. Because the laws change, sellers should make sure that the information they obtain is current and up to date. See the diagram below to understand where and how livestock must be harvested and processed in order to be eligible for retail sale in California.



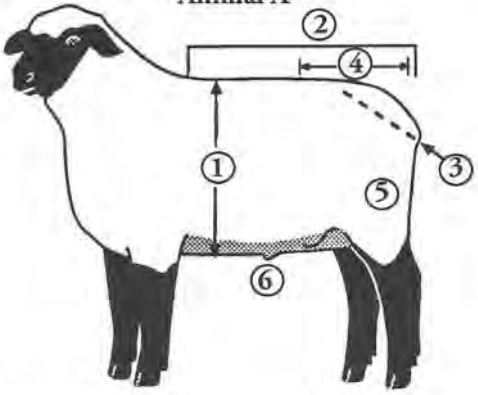
Evaluating Sheep

In evaluating sheep, it is helpful to study pictures of ideal animals and visit a fair and watch how a market and breeding class is placed.



1. Balance
2. Size and scale (Height, length and width)
3. Depth of body
4. Length of body
5. Levelness of rump
6. Length of hindsaddle
7. Depth and fullness of leg
8. Trimness of middle (market lamb)
9. Correctness of feet, legs and pasterns
10. Length of head and neck
11. Trimness of breast

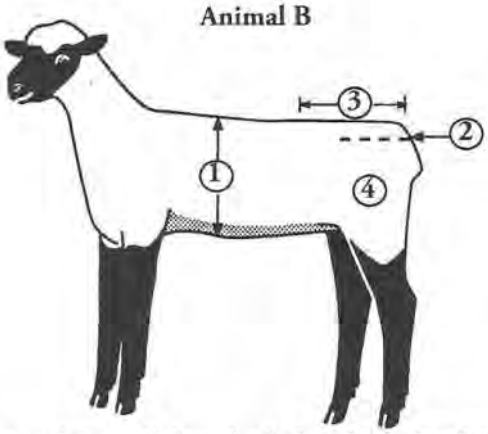
Animal A



Animal A is shorter bodied and too fat.

1. Excessive depth of body
2. Shorter-bodied
3. Steep-rumped
4. Shorter hindsaddle
5. Is light-muscled and fat through leg
6. Wasty-middled

Animal B



Animal B is tall, long bodied and trim but lacks balance, thickness and muscle.

1. Shallow-bodied (tight hearted)
2. Shorter-rumped
3. Shorter hindsaddle
4. Flat, narrow, shallow leg that is light muscled

Sheep Terms

Favorable	Criticism
Size	
Large framed	Small framed
Upstanding	Low fronted
Tall fronted	Deep plated
Tall at the point of shoulders	
Elevated	
Balance	
Angular front end design	Heavy fronted
Smooth shouldered	Coarse shouldered
Level down top line	Weak topped
Straight in its lines	Slopes out hip
Level hipped	
Capacity	
Wide chested	Narrow chested
Spring of rib	Flat ribbed
Depth of body	Shallow bodied
Muscle	
Thick topped	Narrow topped
Stout hipped	Pinched at the dock
Width from stile to stifle	Flat through the inner and outer portions of leg

Lamb Slaughtering and Carcass Evaluation

As a 4-H member involved in the Sheep Project, you are a part of the livestock industry. The livestock industry provides a product to the consumer. In the case of sheep, you provide meat, wool, or any of the many by-products of sheep. If you have a breeding animal, you are providing future food and fiber for the consumer. Everyone involved in the livestock industry has a responsibility to provide a safe, wholesome product to the consumer and to treat their livestock in a responsible, humane way from birth through slaughter.

In order to sell meat to someone who did not raise the animal, slaughtering and processing of the animal must be done in a United States Department of Agriculture (***USDA***) inspected facility. It's important that the animals are handled quietly and correctly to ensure the well-being of the animal and to keep from damaging the meat of the animal. The animal must be inspected while in motion and at rest, and for any signs of disease that would make the animals unfit for humans to eat.

After the live inspection, the animals are slaughtered following the Humane Methods of Slaughter Act of 1978 which includes stunning the animal which makes it unconscious; hanging the animal by its rear legs (shackling); bleeding out of the animal; removing the pelt (skin & wool), feet, and head; removing the internal organs; trimming of any bruises or foreign material such as bits of skin or wool (at this point, the carcass is considered "dressed"); inspection of the carcass by a USDA inspector; weighing of the carcass; washing of the carcass; spraying of the carcass with lactic acid to prevent bacteria or other contamination; stamping of the carcass with the USDA stamp; and rapid chilling to 44.6 degrees Fahrenheit. By following these steps, a packing plant (slaughter facility) can ensure that the meat it processes is safe for the consumer.[2]

Carcass evaluation is an important part of determining the success of lamb production. The goal of a market lamb project is to produce a wholesome, high-quality carcass that is trim and has a high degree of ***cutability*** (the amount of red meat in a carcass). A carcass with high cutability would have a high percentage of meat compared to fat. ***Yield grades*** are used to evaluate the cutability or amount of red meat in a carcass (Yield grade 1,2,3,4,5, with Yield grade 1 having the most meat and least fat.) The yield grade is mainly based on the amount of external fat on a carcass, measured at the 12th to 13th rib, above the loin eye muscle. The ideal fat thickness is 0.12-0.25 inches, about the thickness of an eraser on the end of a pencil.

[2] California State University of Fresno, Meats Lab 2018

In addition to a yield grade, a carcass receives a ***quality grade*** when it is evaluated. A quality grade predicts tenderness, juiciness, and flavor based mainly on muscling and fat distribution. The USDA quality grades for lambs are Prime, Choice, Good, and Utility. Sheep producers strive to produce Prime or Choice graded carcasses.

Dressing percentage is the weight of the dressed carcass divided by the live weight of the animal multiplied by 100. For example, if a live lamb weighing 135 pounds, has a dressed carcass weight of 70 pounds, the dressing percentage would be 70/135 = .51x100=51%. The average dressing percentage for lambs is 52%.

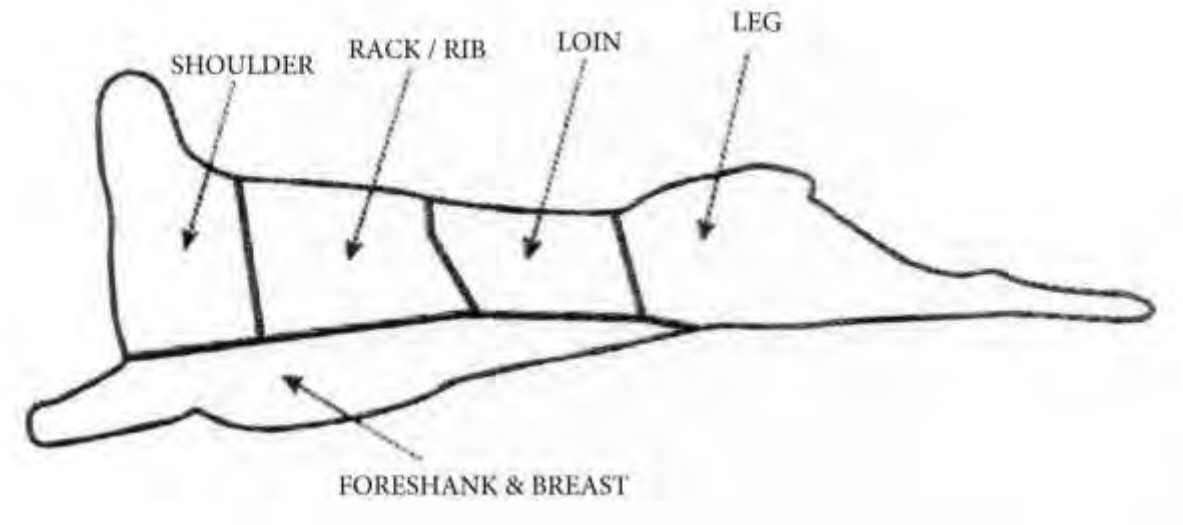
Finish refers to the thickness and distribution of external fat directly over the top of the two loin eye muscles at the center of the longissimus muscle. Fat helps to keep the carcass from drying out and provides flavor and juiciness to the meat.

Measurement of the ***loin eye area*** is taken between the 12th and 13th rib. The loin eye area can be used to indicate the amount of muscle in the carcass. The average size of the loin eye of a lamb is 2.7 square inches.

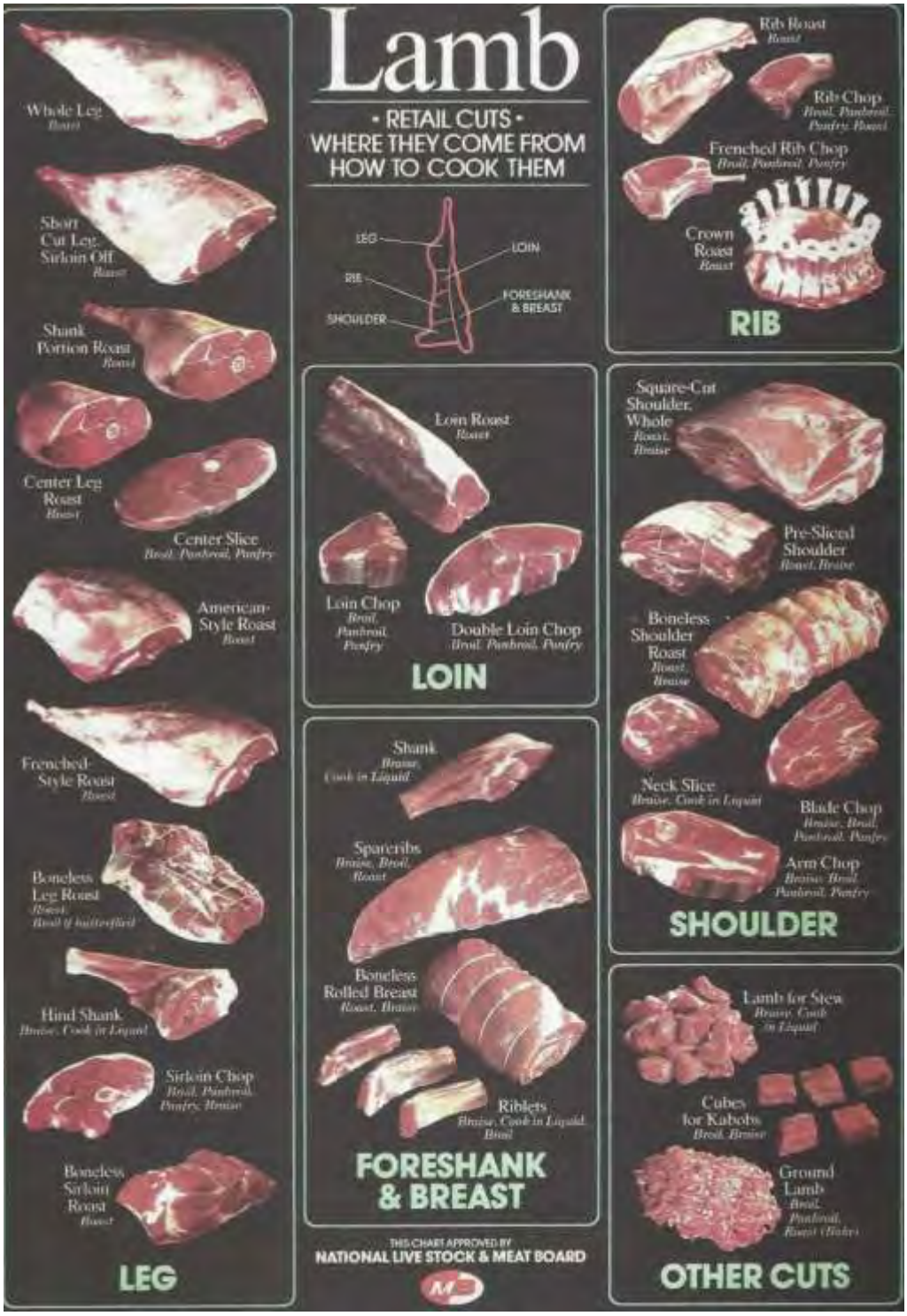
For more information on lamb slaughter and carcass evaluation, see Sheep Resource Handbook, Chapter 6, written by the Ohio State University Cooperative Extension, available for purchase at the Fresno County 4-H Office.

Carcass Parts

Whole Sale Cuts: broken into 5 parts of the lamb carcass



Retail Cuts: Each wholesale cut is broken down into smaller retail cuts and is what you would find in the grocery store.



Additional notes regarding lamb carcasses:

- Over 95% of all lambs in the United States grade Choice or Prime
- Average dressed carcass weight in the United States is about 70 pounds.
- Average dressing percentage for lambs in the U.S. is about 50% for unshorn lambs and about 53% for shorn lambs. Dressing percentage is determined by dividing the chilled carcass weight by live weight then multiplying by 100.

Sheep By-Products

Additional products can be made from lamb carcasses, including:

Candles

Medicines

Coating for Pills

Surgical Sutures

Clothing

Yarn

Pelts

Carpets & Rugs

Lanolin Products

Leather Goods

Photographic Film

Cosmetics

Sheep Breeds

There are more than 35 breeds of sheep in the United States, most of which are of British or European origin or crosses of these. Classification of these breeds can be made in many ways including wool type, face color or productive function.

Meat Breeds: the meat-type breeds used as terminal sires. (The offspring of a terminal sire goes to market. They are not kept for breeding purposes.) They are known for size, growth rate, carcass merit and ease of lambing. The meat breeds are:

Cheviot

Hampshire

Oxford

Shropshire

Southdown

Suffolk

Dorper


Suffolk

Commercial Breeds: these are white-faced breeds of fine, medium or long wool types or crosses of these types. These breeds are highly prolific and have superior mothering abilities. The ewe breeds are:

Corridale

Finn Sheep

Merino

Rambouillet

Targhee


Corriedale

Dual Purpose Breeds: is a breed that can either be a meat or commercial breed. In our region the Dorset is considered a dual purpose breed.

You will probably want to select a lamb that is a ram breed since they are considered meat-type breeds. Suffolk and Hampshire-sired lambs are good selections- they have superior growth rate, muscling, scale and trimness. Dorset-sired lambs also exhibit these traits but usually mature earlier and do not exhibit the length and scale of Suffolks and Hampshires.

Border Cheviot

Finn Sheep

Columbia

Hampshire

Corriedale

Lincoln

Dorset

Merino

Montadale

Romney

Oxford

Shropshire

Polypay

Southdown

Rambouillet

Suffolk

Targhee````

Dorper

Breed Associations

Now that you are aware of some of the breeds, you can find out more information by contacting the breed association that maintains registration and performance records by breed.

SHEEP FEEDS & FEEDING (Level 3, 4, & 5)

Members should be able to read and understand the information on a feed label/tag and be able to identify if the feed is considered a starter, finisher, or maintenance feed. Feed tags provide important information about the nutrients and ingredients contained in a feed. All commercially prepared feed must include a label or tag. It's important to understand the information contained on a feed tag in order to be sure you're providing your animal with the proper nutrition for its needs. Livestock feeds are classified as concentrates, complete feeds, or supplements.

Concentrate –Concentrates are high in energy or Total Digestible Nutrients and low in fiber. Corn, oats, and barley are examples of concentrates.[3]

Complete Feed –Complete feeds are those products that contain all of the nutrients that are required by your animal. [4]

Supplement –Supplements are products that are added or mixed into feed. They supply additional nutrients that your animal may need to grow and perform at its best. Supplements are usually added in small, specified amounts and are not fed as the total ration.

Reading a Feed Label/Tag (Level 3, 4, & 5)

Feed companies are required to provide certain information on every bag or package of product sold. The information is always listed on the label in the order it appears below.

Product Name and Brand Name Purpose of Feed – lists the species and animal class for which the feed is intended

Purpose of Medication and Active Drug Ingredients – if a drug is present in the feed, the word "medicated" must appear below the name of the feed with a statement and purpose of the medication, followed by a listing of the active drug ingredients and the amount of drug in the product. (The medication included in commercial sheep feeds is for prevention of parasites, such as coccidia, and is not subject to the strict antibiotic laws that are in place for livestock.)[5]

Guaranteed Analysis – gives information on the nutrients in the feed including the minimum percentages of 1) crude protein, 2) fat, and 3) fiber as well as 4) the minimum and maximum percentage of calcium, 5) the minimum percentage of phosphorus, 6) the minimum and maximum percentage of salt, and 7) the minimum Vitamin A in International Units (IU) per pound. This information is always listed on the feed tag in the same order as listed above. Additional guarantees may be included for other trace minerals, vitamins, specialty ingredients, or other nutrients depending on the product or species being fed.

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[3]Sheep Resource Handbook, Ohio State University Extension, 2011, pp. 49-65
[4] Sheep Resource Handbook, Ohio State University Extension, 2011, pp. 49-65
[5] https://beef.unl.edu/veterinary-feed-directive-questions-and-answers

Ingredient Statement – lists the ingredients in order starting with the ingredient that makes up the biggest proportion of the feed down to the ingredient that makes up the smallest proportion of the feed.

Feeding Instructions – include information on how much of the feed should be fed per day. If the feed is medicated and has a withdrawal time, a "warning" or precautionary statement is included as well.

Manufacturer Information – includes the name and address of the company that made or distributed the feed.

Net Weight Statement – tells how many pounds or kilograms of feed are in each bag.

SHEEP NUTRITION (Level 3, 4, & 5)

Sheep need certain nutrients every day in order to stay healthy and grow. The nutrients needed are: Water, Energy, Protein, Minerals and Vitamins.

Water is the most important nutrient. It helps the body function properly. On average, sheep drink about 1.0-1.5 gallons of water for each 4 pounds of dry matter consumed. (Sheep Production Handbook, 2015 Edition, Vol 8, page 806). Water should be fresh, clean, and cool to encourage sheep to drink. Energy includes carbohydrates and fats.

Energy helps sheep grow and maintain their body condition. It also helps in lamb development during pregnancy. Grain, such as corn, barley, wheat, and oats are high in energy.

Protein helps to build muscle (meat) and helps with growth. Starter feeds for sheep are generally 18-24% protein and 3-5% fat compared to finishing feeds (or Start to Finish feeds) which are generally 16-18% protein, 2.0-3.5% fat; replacement ewe lamb feeds are generally similar to finishing feeds with a higher fat content (3-5%) and also have ammonium chloride added for urinary tract health. (Source: feed labels from Purina, Associated Feeds, High Noon)

Minerals help to build strong bones and teeth and are needed to make blood, muscle, and nerves. Some necessary minerals for sheep include salt, calcium, and phosphorus. Trace minerals are those that are needed in a small amount. Commercial show lamb feeds contain the proper amount of minerals but sheep on pasture or rangeland should be supplemented with mineral blocks or sheep salt.

Vitamins help the body to function properly. Commercial show lamb feeds contain the proper amount of vitamins. Alfalfa hay and green grass are also good sources of vitamins.

"Feed Analysis: It's All About Energy", http://extension.psu.edu/animals/camelids/nutrition/feed-analysis-its-all-about-energy 4 "Feed Analysis: It's All About Energy", http://extension.psu.edu/animals/camelids/nutrition/feed-analysis-its-all-about-energy 5 Beef Resource Handbook, The Ohio State University, 2011, 2001, 7.13,7-16

SHEEP DIGESTION (Level 3, 4, & 5)

Cattle, sheep, and goats are examples of ruminant animals.
A ruminant is described as "an animal that has four stomach compartments :

1) rumen 2)reticulum 3) omasum 4) abomasum

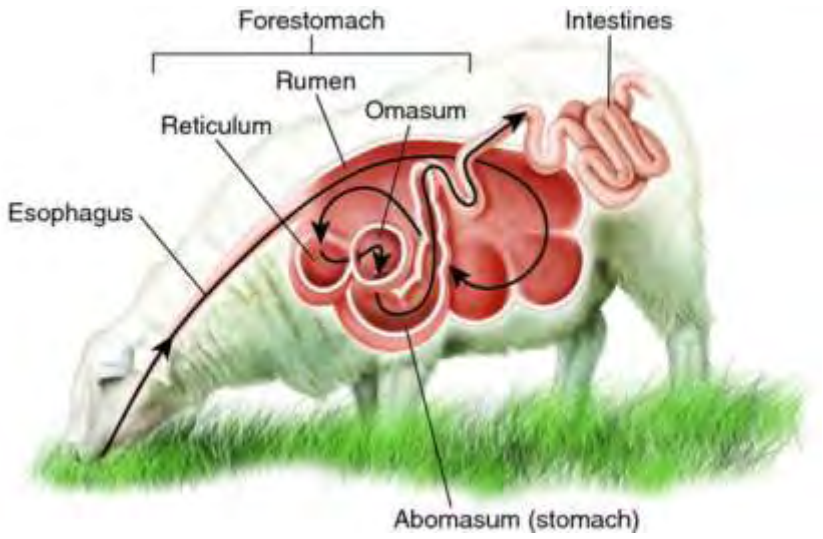

Image from: https://australiansheepenterprise.weebly.com/digestive-system.html

Ruminants, such as sheep, are able to digest large amounts of grass, hay, other roughages and low-quality feeds and transform that feed into muscle (meat) or milk.

Because of their specialized digestive system, ruminants can make use of feeds that other animals and humans cannot digest. Ruminants swallow roughage before it has been completely chewed. The partially chewed food travels down the esophagus and enters the ***rumen***. Bacteria and other microbes found inside the rumen help to break down roughage and release the nutrients found in the feed. Later, the animal will regurgitate the food (the "cud") and continue to chew. The ***reticulum***, which is a part of the rumen, helps the animal digest feed by allowing it to be regurgitated so the animal can chew its "cud" before it is swallowed again. Chewing the cud helps the animal to further digest the food. The ***omasum*** helps in digestion by further breaking down the feed and squeezing the water out of it. The ***abomasum*** produces digestive juices that help further break down the food into usable nutrients and move it to the small intestine and then into the large intestine. The abomasum works much like a human's stomach. Lambs and other ruminants are born with a small rumen because the milk they drink is digested in the abomasum.

Young ruminants

At birth, the lamb's rumen and reticulum are not yet functional. As lambs begin to nibble on dry feeds, these two compartments become innoculated with microorganisms. As the microbes multiply and begin to digest feed, they stimulate the growth and development of the rumen and reticulum. The lamb's rumen and reticulum are usually functional by the time the lamb is 50 to 60 days old.

Because lambs are not born with a functioning rumen, supplemental feeds, such as creep feed, need to be highly digestible. Creep rations typically consist of feedstuffs that have been cracked, rolled, ground, or pelleted. Cracked corn and soybean meal are common ingredients in creep feed. Creep feeding enhances development of the rumen in the young lamb. In fact, the rumen in creep-fed lambs will develop quicker than the rumen in lambs that are fed strictly a forage diet.

(sources: http://www.sheep101.info/cud.html
http://livestocktrail.illinois.edu/sheepnet/questionDisplay.cfm?ContentID=3114)

Suggested Bio-Security Practices for Sheep (Level 5)

Biosecurity is defined as a series of management procedures and practices designed to prevent or greatly reduce the risk of introducing new infectious agents (diseases) to a farm. Biosecurity practices include monitoring and evaluation of animals for early detection of disease, screening and testing incoming animals, and some sort of quarantine or isolation procedure for newly purchased or returning animals. Good biosecurity practices help keep animals healthy and more productive as well as provide food products that are wholesome and high in quality.[6]

Several ways to prevent the introduction of infectious agents include:

- Separate from the flock newly purchased animals for 30-60 days.
- When visiting other farms or ranches, auctions, livestock shows, etc., thoroughly clean your clothes and shoes when you get home to avoid bringing disease organisms back to your property.
- Try to keep visitors and other animals out of your pens and pastures to avoid the introduction of disease organisms.

4-H members who exhibit animals at shows and fairs should use the following biosecurity practices before, during, and after the fair to keep show animals and the rest of the herd healthy:

- Only exhibit healthy animals; do not take sick animals to a show.
- Before you leave for the show and again before you return home, clean and disinfect all equipment including feeding, cleaning, and grooming equipment (feeders, buckets, pitchforks, wheelbarrows, clippers, brushes), as well as the trailer/truck used to haul your animal(s).
- Clean your animals before leaving home and again before you return home.
- Report any health concerns to the veterinarian at the fair.
- Avoid nose-to-nose contact of animals.
- Avoid sharing equipment unless it is disinfected between use on different animals.
- Avoid sharing water troughs with other animals.
- Minimize animal stress by keeping them cool and comfortable.
- If you are caring for animals at home as well as at the fair, change your clothes and shoes and wash your hands thoroughly before/after doing home chores.
- Dispose of all bedding and unused feed at the fair; do not bring it home.
- When you have returned home, separate show animals from the rest of the flock for 30 days and watch for signs of illness.[7] & [8]

[6] https://extension.psu.edu/biosecurity-fundamentals
[7] http://cebutte.ucanr.edu/files/43144.pdf
[8] https://www.bah.state.mn.us/media/Biosecurity-for-Exhibitors.pdf

Check with your 4-H leader or other knowledgeable livestock person, your Cooperative Extension agent, or your veterinarian for local disease outbreaks that may be a threat to your animals.

Resource

All information in this study guide, unless otherwise noted, has been taken from the *Sheep Resource Handbook for Market and Breeding Projects*, by The Ohio State University Extension. A complete copy of this manual is available for purchase at the County 4-H Office for $29.