# Kansas 4-H Sheep Leader Notebook

*Level III*

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Advancing in the Sheep Project by Reaching Goals
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• To set goals for their sheep project
• To explore various areas for sheep projects

ABOUT THEMSELVES:
• Understanding the importance of overcoming barriers

Materials Needed:
• Flip chart and markers or chalkboard and chalk
• Sheep Member Guide and Annual Report (MG 37)
• Activity Sheet 1, Barriers to Reaching My Goals (Two copies)

ACTIVITY TIME NEEDED: 40 MINUTES

ACTIVITY
As you become older, you can branch out into a variety of areas related to the sheep project. This lesson is prepared to guide members into different areas of interest through a goal-setting process.

Some lesson suggestions might be:

• Sheep Judging with Oral Reasons
• Castrating, Docking, Hoof Trimming
• Common Sheep Diseases
• Determining Age of Sheep
• Condition Scaring
• Lamb Market Trends

GOAL SETTING
After having had time to see all the topics that can be addressed when raising sheep, it is time to make some goals for the year.

Let’s think about possible barriers that might prevent us from reaching our goals.

BARRIERS
It is important to know how to cope with and eliminate barriers that might stop you from reaching your goals. Some major barriers to reaching goals can include time, money, resources, knowledge, or ability.

Leader Notes:
List these on the board.
Ask the members what different things they would like to learn about sheep.
Hand out Sheep Member Guide and Annual Report, MG 37.
In groups of two or three members, fill out question 1 on Activity Sheet 1.
**Leader Notes**

In groups of two or three members, fill out question 2 on Activity Sheet 1.

**ACTIVITY**

When you have completed question 1, fill out your Sheep Member Guide and Annual Report, for MAP STEPS 1-3.

The best way to deal with barriers is to design strategies of how you will overcome the barrier.

For each step that you’ve listed on your Sheep Member Guide and Annual Report, identify a barrier that you think could possibly prevent you from reaching your goal.

Now identify with two or three group members some ways of overcoming those barriers in question 3.

For question 4, identify what you think will be the biggest personal barrier you will encounter this year and how you plan to overcome it.

Now, using your Sheep Member Guide and Annual Report, complete MAP STEPS 4-7. Use a second copy of Activity Sheet 1, “Barriers to Reaching Goals,” to analyze your second major goal.

**DIALOGUE FOR CRITICAL THINKING:**

*Share:*
1. What is a barrier to reaching goals that has to do with time?
2. What is a barrier to reaching goals that has to do with money?

*Process:*
3. Why is it important to know possible barriers that might prevent you from reaching your goals?
4. How will you overcome barriers that prevent you from reaching your goals?

*Generalize:*
5. What frustrations occurred when you discussed barriers? Why?
6. How do you deal with the frustrations that result from working with barriers?

*Apply:*
7. What are some barriers that you may face in the future?

**GOING FURTHER:**
- Teach this goal-setting process to other 4-H members or groups.
REFERENCES:

Author:
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed By:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
ADVANCING IN THE SHEEP PROJECT BY REACHING GOALS
SHEEP, LEVEL III
Activity Sheet 1, Barriers to Reaching My Goals

1. **BARRIER**: What might be a barrier to reaching a goal that could include?
   - time: ___________________________________________________________________
   - money: _________________________________________________________________
   - resources: ______________________________________________________________
   - knowledge: ______________________________________________________________
   - ability: __________________________________________________________________
   - other barriers: ____________________________________________________________

2. **OVERCOMING BARRIERS**: What are some barriers that you might encounter when reaching your goals?
   For MAP STEP 2
   Barrier 1: _______________________________________________________________
   Barrier 2: _______________________________________________________________
   Barrier 3: _______________________________________________________________
   Barrier 4: _______________________________________________________________
   Barrier 5: _______________________________________________________________

3. **STRATEGIES FOR OVERCOMING BARRIERS**: How will you overcome the barriers that might prevent you from reaching your goal?
   For MAP STEP 2
   Strategy 1: __________________________________________________________________
   Strategy 2: __________________________________________________________________
   Strategy 3: __________________________________________________________________
   Strategy 4: __________________________________________________________________
   Strategy 5: __________________________________________________________________

4. **YOUR PERSONAL BARRIER**: What do you think will be your biggest barrier to overcome during the next year for this project and how do you plan to overcome it?
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

6–Sheep, Level III
Ethical Sheep Fitting and Showing
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
- Materials and equipment needed to fit their lamb
- How fitting techniques depend on breed or lamb type

ABOUT THEMSELVES:
- Their feelings about ethical principles

Materials Needed:
- Lambs with different types of wool
- clippers
- curry comb
- wool card
- Activity Sheet 2, Ethical/Unethical Showing Practices
- Member Handout 1, Kansas 4-H Sheep Showmanship Score Card

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

How you prepare sheep for the show ring is determined by the kind of animal (market lamb or breeding sheep) and the breed of sheep being shown. The purpose is to enhance the appearance and welfare of the sheep so that it looks and feels the best it can. A healthy comfortable animal will look best!

MARKET LAMBS:
Market lambs are generally shown slick shorn. That includes every part of the lamb above the knees and hocks, even the head. An electric clipper with a 23 or 24 tooth comb does a nice job. If a lamb has a lot of wool, it may be easier to shear it first with a 13 tooth comb. The more teeth on the comb, the closer the wool is trimmed. You want as little as possible left on the lamb at the time of the show. A wooly lamb will feel soft to the judges hand. The judge will prefer a lamb that feels firm and muscular. Also, washing the lamb the morning of the show will make the hide a little tighter, giving the lamb a firmer handle. The judge will not appreciate getting wet, so allow enough time for the lamb to dry. It also helps to spray lambs with a fly repellant as any sheep in short fleece is vulnerable to fly strike.

Leader Notes

Review Level I & II lessons on washing and fitting before doing this lesson.
1. Leader or parent should bring several breed magazines for the 4-Hers to see how their breed(s) is fit at the major shows.
2. If possible, have the most experienced member, or an outside "expert" give a demonstration to the entire group.
3. This discussion is designed to take what you have already learned from the level I and II lessons on fitting, washing and preparing your lamb for show, and expand on them. Also included are a few helpful hints for each breed or type of lamb to help the member exhibit the lamb to its greatest advantage.

Distribute Member Handout 1, Kansas 4-H Sheep Showmanship Score Card, and discuss.
BREEDING SHEEP:
SOUTHDOWNS:
Southdowns are fit and shown in much the same manner as market lambs. A Southdown should be slick shorn from head to rump. A small amount of wool can be left over the rump, dock and rear leg. With the hand shears, blend in the rump, make the dock square and accent the legs to enhance their muscular shape.

WOOL BREEDS:
When fitting wool breeds, there are some subtle differences in technique and equipment as compared to fitting meat breeds. Some additional equipment includes a stiff-bristle brush and a 13-tooth rake comb (for a 3 inch Shearmaster). The experienced fitter should curry the fleece before cutting out the lamb. This saves carding time before the outer fleece is removed. The 13-tooth comb easily cuts through the dense fleeces of wool breeds. After cutting out, the fleece length could vary from 1 to 4 inches over the entire body.

Unlike the meat breeds, you must leave at least 1 to 1 1/2 inches of wool along the sides so the judge can evaluate the fleece for variability. Also, you must leave wool on the lower rib unlike the meat breeds where the belly is slick shorn.

Most of the shaping can be done with the shearmaster during the process of cutting out. Then, work the fleece with a wet, stiff-bristled brush. This makes it easier to cut. Use the wool card and hand shears to put the desired finish on the fleece. There are different wool cards for meat breeds and wool breeds. A card with fewer teeth can more easily penetrate a dense fleece. Rub down the fleece with a towel and warm, soapy water. This cleans the fleece and pulls out loose ends for the final trimming.

The shaping of the rear leg is slightly different from the meat breeds. Cut the wool way down in the hock area and give the outer leg a larger, fuller appearance. In some cases, (Columbias & Corriedales) the legs are washed up to the brisket or flank, but it isn’t necessary. The face and ears should also be washed.

Because of the variability in fleece length on different parts of the body, you will have variation in color. Dirt penetrates the outer part of the fleece giving it a gray appearance. The closer you get to the skin, the less dirt, hence the wool is yellowish. Just from an eye appeal standpoint, it looks best if the sheep is all one color. Rubbing the fleece with a damp towel helps spread the dirt evenly. Fill a small bucket half full with water and add some dirty wool to it. Mix it up until you have a greasy mud/water solution. Use a stiff-bristle brush to rub this mixture on to the fleece. This gives the entire fleece a natural coloring. A spray bottle can also be used to apply this mixture to the fleece. It may take several applications to achieve the desired effect.

8–Sheep, Level III
Most people don’t blanket wool breeds anymore. However, it’s still okay.

**MEAT BREEDS:**
If you do a good job of cutting out, it shouldn’t take much work to prepare the lamb for show. After washing the lamb, allow it to dry. Remember, the wool should be a little damp so it will cut evenly and pack together. But, if it’s too wet it may cut too easily, and look choppy. If the lamb gets too dry, wet it with a spray bottle.

With the lamb up on the trimming stand, go over the wool with a curry comb. This will make carding much easier. Next, card the wool thoroughly. If a lamb has a lot more wool than needed, a shearmaster (preferably with a 13-tooth comb) can be used to trim off the excess. It is faster than using the hand shears, but if you take too much off, you can’t put it back on. By slick shearing the belly and part way up the front and rear legs, you can make the lamb look taller. If any wool is trimmed with the electric clipper, you must re-card the lamb before trimming with the hand shears. Also, pick any straw or debris out of the fleece before trimming as these may dull or damage the blades. Trim the lamb as described in the level 1 lesson. When finished, stand back and observe the lamb from a distance. If the lamb doesn’t look quite right, card it up and trim it over again. It may be a good idea to look at pictures of your breed from a magazine. How does your breed look at the major shows and sales? Try to make your lambs look like those. Also, try to observe the older members and open class sheep. Compare your fit job to theirs.

Length, especially in the loin, is an important quality in breeding sheep. The loin is measured from the last rib to the point of the hip bone. Find these areas on your lamb. You can make your lamb look longer lained by trimming just a little extra wool off the area from the 2nd to last rib to just past the point of the hip.

Anywhere on the body where a patch of hair or wool sticks out should be trimmed to give it a smooth appearance. Several breeds have wool on their heads or down on their legs. These areas should be carded and trimmed. Many breeds have preferred styles for these areas. Consult a breed magazine for tips.

If you have a black faced breed, such as Suffolk or Hampshire, a product called purple show oil can make your lamb more eye appealing. Use a rag to rub a little of the oil on the face, ears and legs to make them shine.

Dr. Jeff Goodwin, University of Idaho, Extension 4-H and Youth Specialist, lists criteria or questions to ask to determine if a fitting or showing practice is ethical or unethical:

1. Does it violate the federal drug and food (FDA) law? Have you fed or given any antibiotics or given your lamb any medicine that has a withdrawal time before it can be processed for food?
Use Activity Sheet 2, Ethical/Unethical Showing Practices, as a sample to discuss ethical and unethical practices.

ACTIVITY

2. Is it a fraudulent misrepresentation of the animal?

3. Does it compromise the welfare of the animal? Most fitting and showing practices can be evaluated based on these three questions. If there is still a concern, use a fourth question:

4. Does the practice have anything to do with real world agriculture? Ninety-nine percent of the practices in question can be sorted right or wrong by the use of these four questions.

DIALOGUE FOR CRITICAL THINKING:

Share:
1. What was the hardest aspect of fitting your lamb? Easiest?

2. What have you done before to fit your lamb for show?

Process:
3. Why do market lambs and breedings lambs differ in their fitting?

4. What are the questions to ask to help determine if a fitting or showing practice is right or wrong?

Generalize:
5. How do you decide if something is right or wrong?

Apply:
6. How will you act differently in the future as a result of this discussion? Why?

GOING FURTHER:
7. Attend a purebred livestock show and witness the fitting techniques used.

REFERENCES:
Washing Your Lamb—Level I
Basic Fitting—Level II
Wes Limesand, Shepherd, North Dakota State University Sheep Unit
“Line in the Sand” video by Dr. Jeff Goodwin, University of Idaho
<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Leader Notes</th>
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**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry,  
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Sheep Design Team
100 Points Possible

A. Appearance of Lamb

1. Cleanliness
   a. Wool clean and free of foreign matter.
   b. Flanks, face, nose, ears, feet and legs clean.

2. Trimming
   a. The final decision on length of fleece is left to the individual show.
      Fleece should be slick shorn on market lambs.
   b. Fleece of breeding ewes trimmed to a length of 3/8- to 3/4-inch or,
      in the case of a wool breed, a length which is appropriate for the
      standard of that breed.
   c. Back, side and legs of breeding sheep may be trimmed to empha-
      size the merits of that breed, depending on individual breed charac-
      teristics.
   d. Feet trimmed so that lamb walks and stands naturally and correctly.

B. Showing Lamb

1. Posing and Changing Position
   a. Lamb kept well posed at all times but showman not engaged in
      undue fussing or maneuvering.
   b. Lamb shows evidence of training as indicated by responsiveness to
      handling.
   c. Lamb shown from front when judge is viewing it from rear or left
      side; otherwise lamb shown from left side. Show officials should
      request movement of exhibits accordingly.
   d. Exhibitor shows while standing or in a half-kneeling (one knee on
      ground) position except when moving lamb to a new position.
   e. Lamb led only from left side with left hand under jaw and right
      hand to help control lamb if necessary.
   f. Reasonable distance from next animal maintained at all times.
   g. Proper to let lamb relax but not out of position when lamb is not
      visible to judge.
KANSAS 4–H

ETHICAL SHEEP FITTING AND SHOWING
SHEEP, LEVEL III
Member Handout 1, Kansas 4-H Sheep Showmanship Score Card

h. Lamb braced by grasping under the chin with both hands, pulling downward and applying backward pressure or braced with knee to cause lamb to hold its back rigid but straight while being handled. All four feet should be firmly on the ground.

2. Cooperation With Judge 15
   a. Awareness of position of judge maintained but not made obvious.
   b. Body not permitted to obstruct view of judge.
   c. Lamb maneuvered into position for benefit of judge’s inspection.

C. Appearance of Lamb Perfect Score 20 Points

1. Appearance 10
   a. Showman well-groomed and clothes clean and neat.
   b. Suggested that no headgear be worn in class.
   c. Extremes in color and fit not appropriate. Full length jeans in subdued, solid colors are appropriate.
   d. Official shirt (or blouse) provided by show management is considered appropriate as well as any shirt of subdued, solid color.

2. Merits 10
   a. Brings lamb into ring promptly.
   b. Responsive to judge’s and ringmaster’s requests.
   c. Works quickly but not abruptly.
   d. Recognizes and corrects faults of lamb quickly.
   e. Not distracted by persons and things outside ring.
   f. Shows animal, not self.
   g. Does not leave ring until released by ring official.
   h. Displays a courteous and sportsmanlike attitude while at the show.
   i. Prepared to give prompt answers to questions related to the 4-H sheep project.
   j. Upon instruction of the ringman or judge, to move lamb to new position, priority is to get to that position and set up the lamb.

D. Following are Reasons for Disqualification
   1. Use of artificial coloring.
   2. Lifting front feet from the ground when bracing.

13–Sheep, Level III
### Activity Sheet 2, Ethical/Unethical Showing Practices

Check the appropriate box

<table>
<thead>
<tr>
<th>Ethical</th>
<th>Unethical</th>
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<tbody>
<tr>
<td></td>
<td>1. Polishing or cleaning the hooves of a lamb.</td>
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<td>2. Using powder to minimize the effect of black fiber.</td>
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<td>3. Injection of an anti-inflammatory agent to help a crippled animal walk at a show.</td>
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<td>4. Giving a lamb a diuretic to meet a maximum weight requirement.</td>
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<td>5. Scheduling a daily feeding around a sheep weigh-in.</td>
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<td>6. Placing ice bags on a lamb to make it feel firmer at a show.</td>
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<td>7. Severe restriction of feed and water for several days to meet a maximum weight requirement.</td>
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<td>10. Injection of an antibiotic.</td>
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<td>11. Holding the front feet of a lamb off the ground to force it to brace and feel firmer.</td>
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<td>12. Slapping or hitting a lamb on the dock to get it to brace.</td>
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Sheep Judging with Oral Reasons

Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• The definition of oral reasons
• Terminology used in sheep reasons
• How to take notes during a judging class
• How to write a set of reasons

ABOUT THEMSELVES:
• How to develop written and verbal communication skills
• How to improve organization skills
• Ways to develop and build self confidence

Materials Needed:
• Member Handout 2, Reasons Terminology for Market Lambs
• Member Handout 3, Reasons Terminology for Breeding Lambs
• Member Handout 4, Oral Reasons Notes Guide
• Member Handout 5, Oral Reasons Outline
• Judging notebooks and placing cards
• Several classes of sheep or slides of sheep (4 per class)

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Judging contests and oral reasons teach members to make decisions and defend those decisions. It will improve their public speaking ability as well as increase self confidence. In addition, learning to effectively and accurately evaluate livestock will aid them in selecting their own breeding stock and show lambs.

For example, if describing a heavy muscled, long bodied lamb, you might say “he was a thicker topped lamb that carried more muscle down his top

Leader Notes
Second and third year members can begin learning to write and give reasons on sheep classes. This will improve their overall ability to judge sheep. Note: Young members need to be encouraged to write and read a short set of reasons, but not pressured to memorize and give long sets of reasons.

In a previous lesson, we learned what to look for when judging lambs. This lesson goes into a little more detail on what to look for when judging sheep than the previous lesson. The terminology will help you express your reasons.

Wherever possible, show illustrations or give examples of good vs. poor animals.
Pass out Member Handout 2, Reasons Terminology for Market Lambs, and discuss the terms.

Pass out Member Handout 3, Reasons Terminology for Breeding Lambs.

SHEEP JUDGING WITH ORAL REASONS

and through his hind saddle. When viewed from behind, he showed me more natural thickness and muscle shape through his leg.” Or, if describing a lean lamb, you might say “he was a trimmer made lamb that was leaner down his top, and carried less waste and condition across his ribs and through his middle.”

As you remember, we judge market lambs on what we think their carcass quality would be. When you give reasons, you want to talk about differences in muscle and fat between the lambs. In another lesson, we’ll talk about adding some carcass and slaughter terminology to the reasons.

JUDGING BREEDING STOCK:
In a previous lesson, we talked about some important traits of breeding sheep. We’ll divide the terminology into several categories.

For example, when describing a ewe lamb that is big framed, and appears to be later maturing, you might say “she showed me the most elevation at the shoulder, the most extension from end to end, was longer necked, was longer and more youthful appearing about her head and stood on more length of cannon (bone between the hoof and knee) indicating to me that she is later maturing and should continue to grow and be the largest ewe at maturity.”

The industry wants lambs that are big and will continue to grow and be large at maturity as opposed to lambs that do most of their growth early, and don’t get very big at maturity. Lambs that have short legs, short necks, and short stubby faces may not grow very large.

For example, when describing a level topped, good footed lamb, you might say “she was straighter and strongest down her top, carried out squarer over her dock and set down more correctly on her feet and legs.”

For example, when describing a big bodied, thick made ram, you might say “he was a higher volumed ram that showed me more width across his top, was bolder sprung and carried more depth and expansion through his chest floor.”

For example, when describing a structurally correct, up-headed, long bodied ewe, you might say “she caught my eye as the most complete, best balanced ewe in the class. A proud fronted ewe that was more fault free on her feet and legs...”

BREED CHARACTER:
Each breed has a certain appearance that is considered ideal, and it is different for every breed. There are too many breeds to go through each one. Members should become familiar with how the more common breeds are supposed to look. This includes such things as face and leg color, horned or polled, the presence or absence of wool on the face and the size and shape of the head and ears.

16–Sheep, Level III
Here are some examples:

Suffolk should be black about the points (head, ears and legs) and have a long pendulous ear.

Hampshires should have a complete wool cap on the forehead, and have some wool on the lower leg.

Columbias should not have black or brown on the face, ears or nose.

**FLEECE:**
Some breeds have wool on the forehead and cheeks. If there is too much wool around the eyes, it may impair vision and that is undesirable. In black faced breeds, the fleece should be free from black fibers.

For wool breeds, the fleece should be fine, dense, uniform and have a long staple length. More fleece qualities are discussed in the lesson on wool and wool judging.

Taking notes for oral reasons is very important. You need to develop a system that works best for you. You may have your own abbreviations and notations that will help you remember the class later on. At the top of the page, write the name of the class and how you placed it. Organize the rest of the page so you have three large blocks for notes about each pair (best to 2nd best, 2nd to 3rd, and 3rd to 4th). Along the right side, you may leave a small column for grants (advantages of the lower placing lambs over the lamb above them). And at the very bottom, leave a small space to sum up the 4th place lamb and conclude the reasons. The sooner you decide on a placing, the more time you have to take notes. The more time you have, the more extensive your notes can be. Write down the obvious, most important things first. As time allows, write down the less important or more subtle differences. It’s also a good idea to write down descriptive terms (color, breed) of the lambs to help you remember the class.

Giving oral reasons can make you nervous at first, but it gets easier every time you do it. In no time, giving reasons will become easy. When giving reasons, speak clearly, be honest, and be confident. Giving reasons is simply telling the official why you placed the lambs the way you did. Always start by telling the name of the class and your placing. Then say the reasons you placed the top lamb over the 2nd best lamb. Try to say the most important things first (such as size and structure) and the minor differences last. Then say any advantages the 2nd place lamb had over the first lamb (grants). Repeat this for the middle and bottom pairs. End the reasons by mentioning any positive qualities of the last place lamb and some general reasons why it wasn’t as good as the other lambs. A good, complete set of reasons should last about two minutes. Try to give the reasons without looking at your notes. Try not to say the exact same thing
Leader Notes

ACTIVITY

for each pair. Use a variety of terms, but be accurate. As long as you give your honest opinions, you’ll do well.

As you get more practice, you can use a wider variety of terms and add in transition words/phrases to give your reasons a nice smooth flow. If you are unsure what a term means, you better not use it. If you sound like you don’t know what you are talking about, or you say things that aren’t true, you won’t get a very good score.

DIALOGUE FOR CRITICAL THINKING:
Share:
1. What process of taking notes and organizing thoughts do you use to defend your placing?
2. What was the most difficult or easiest when preparing your reasons?

Process:
3. What skills/knowledge do you need to take notes and prepare a set of reasons? (parts of animals, etc.)
4. What is the significance of being able to explain and defend a decision?

Generalize:
5. What did you learn about your ability to organize thoughts?
6. How will this reasoning process help you make other decisions?

Apply:
7. How do you think this process of judging, notetaking, and giving an oral defense will help you in the future?

GOING FURTHER:
1. Participate in sheep judging practices.
2. Participate in livestock judging contests.
3. Observe experienced members giving oral reasons.

REFERENCES:
Live Animal Carcass Evaluation And Selection Manual, Boggs and Merkel
4-H Livestock Judging Guide (S92)
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### SHEEP JUDGING WITH ORAL REASONS

#### SHEEP, LEVEL III

Member Handout #2, Reasons Terminology for Market Lambs

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<tr>
<th>Desirable</th>
<th>Undesirable</th>
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<tbody>
<tr>
<td><strong>General Appearance</strong></td>
<td></td>
</tr>
<tr>
<td>nicer balanced</td>
<td>poorly balanced</td>
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<tr>
<td>meatier, more muscular, heavier muscled</td>
<td>light-muscled</td>
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<td>straight lined</td>
<td>loose-framed</td>
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<td>firmer handling</td>
<td>soft-handling</td>
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<td>smoother made</td>
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<td>more powerfully made</td>
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<td>longer bodied</td>
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<td>bigger framed</td>
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<td>nicer profiling</td>
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<td><strong>Head, Neck, Breast, Chest</strong></td>
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<tr>
<td>neater</td>
<td>coarse</td>
</tr>
<tr>
<td>trimmer front end</td>
<td>wrinkled about the neck</td>
</tr>
<tr>
<td>wider chest</td>
<td>ewe-necked</td>
</tr>
<tr>
<td>longer neck</td>
<td>heavy-fronted</td>
</tr>
<tr>
<td>taller fronted</td>
<td>narrow-chested</td>
</tr>
<tr>
<td><strong>Shoulders</strong></td>
<td></td>
</tr>
<tr>
<td>heavier muscled forearm</td>
<td>coarse-shouldered</td>
</tr>
<tr>
<td>smoother shoulder</td>
<td>open-shouldered</td>
</tr>
<tr>
<td>neater, tighter shoulder</td>
<td>weak behind the shoulders</td>
</tr>
<tr>
<td><strong>Back, Loin, Ribs</strong></td>
<td></td>
</tr>
<tr>
<td>thicker back or loin</td>
<td>narrow made</td>
</tr>
<tr>
<td>stronger back or loin</td>
<td>narrow down the top</td>
</tr>
<tr>
<td>more muscular loin</td>
<td>shallow loin</td>
</tr>
<tr>
<td>meatier down the top</td>
<td>easier in the back</td>
</tr>
<tr>
<td>stronger top</td>
<td>weak top</td>
</tr>
<tr>
<td>more natural thickness</td>
<td>shallow-ribbed</td>
</tr>
<tr>
<td>deeper loin edge</td>
<td>flat-ribbed</td>
</tr>
<tr>
<td>more spring of rib</td>
<td>shallow-loomed</td>
</tr>
<tr>
<td>deeper ribbed</td>
<td>short-loomed</td>
</tr>
<tr>
<td>more muscular turn over the loin</td>
<td>short hindsaddle</td>
</tr>
<tr>
<td>fresher, more muscular top</td>
<td></td>
</tr>
<tr>
<td>meatier rack</td>
<td></td>
</tr>
<tr>
<td>longer hindsaddle</td>
<td></td>
</tr>
<tr>
<td>longer from the last rib back</td>
<td></td>
</tr>
<tr>
<td>firmer handling down his top</td>
<td></td>
</tr>
<tr>
<td><strong>Middle</strong></td>
<td></td>
</tr>
<tr>
<td>trimmer or neater middle</td>
<td></td>
</tr>
<tr>
<td>cleaner through middle</td>
<td></td>
</tr>
<tr>
<td>tighter middled</td>
<td></td>
</tr>
<tr>
<td>wider at the rump or dock</td>
<td></td>
</tr>
<tr>
<td>squarer at the rump or dock</td>
<td></td>
</tr>
<tr>
<td>more nearly level rump</td>
<td></td>
</tr>
<tr>
<td>longer rump</td>
<td></td>
</tr>
<tr>
<td><strong>Rump and Dock</strong></td>
<td></td>
</tr>
<tr>
<td>wider at the rump or dock</td>
<td>pinched at the dock</td>
</tr>
<tr>
<td>squarer at the rump or dock</td>
<td>droopy rumped</td>
</tr>
<tr>
<td>more nearly level rump</td>
<td>short rump/dock</td>
</tr>
<tr>
<td>longer rump</td>
<td>tapers at rump</td>
</tr>
<tr>
<td><strong>Leg</strong></td>
<td></td>
</tr>
<tr>
<td>meatier, more muscular leg</td>
<td>light-muscled</td>
</tr>
<tr>
<td>heavier leg</td>
<td>flat leg</td>
</tr>
<tr>
<td>thicker leg</td>
<td>soft leg</td>
</tr>
<tr>
<td>plumper, more bulging leg</td>
<td>short leg</td>
</tr>
<tr>
<td>firmer leg</td>
<td>narrow, shallow</td>
</tr>
<tr>
<td>meatier through the stifle</td>
<td>short, narrow stifle</td>
</tr>
<tr>
<td>deeper leg</td>
<td>fuller leg</td>
</tr>
<tr>
<td><strong>Finish</strong></td>
<td></td>
</tr>
<tr>
<td>more desirable degree of finish</td>
<td>thin, bare</td>
</tr>
<tr>
<td>firmer handling</td>
<td>soft handle</td>
</tr>
<tr>
<td>harder down his top</td>
<td>soft handling lamb</td>
</tr>
<tr>
<td>more correctly finished</td>
<td></td>
</tr>
<tr>
<td>more uniform finish</td>
<td></td>
</tr>
<tr>
<td>trimmer</td>
<td></td>
</tr>
<tr>
<td><strong>Carcass Merit</strong></td>
<td></td>
</tr>
<tr>
<td>meatier or heavier muscled carcass</td>
<td></td>
</tr>
<tr>
<td>more correctly finished carcass</td>
<td></td>
</tr>
<tr>
<td>higher percent of hindsaddle</td>
<td></td>
</tr>
<tr>
<td>longer, trimmer carcass</td>
<td></td>
</tr>
<tr>
<td>higher percentage of salable lean</td>
<td></td>
</tr>
<tr>
<td>higher percent of preferred cuts</td>
<td></td>
</tr>
<tr>
<td>more desirable yield grade</td>
<td></td>
</tr>
<tr>
<td>hang a carcass with more product from the last rib back</td>
<td></td>
</tr>
<tr>
<td>will have more rack, loin and leg</td>
<td></td>
</tr>
</tbody>
</table>
### General Appearance

<table>
<thead>
<tr>
<th>Desirable</th>
<th>Undesirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>longer, stretchier</td>
<td>short-coupled</td>
</tr>
<tr>
<td>growthier, bigger</td>
<td>narrow-made</td>
</tr>
<tr>
<td>larger framed</td>
<td>shallow-bodied</td>
</tr>
<tr>
<td>more size and scale</td>
<td>small-framed</td>
</tr>
<tr>
<td>nicer balanced</td>
<td>low-set</td>
</tr>
<tr>
<td>more structurally correct</td>
<td>conventional patterened</td>
</tr>
<tr>
<td>more rugged, heavier boned</td>
<td>poorly balanced</td>
</tr>
<tr>
<td>thicker made</td>
<td>plain</td>
</tr>
<tr>
<td>heavier muscled</td>
<td>light muscled</td>
</tr>
<tr>
<td>straight lined</td>
<td></td>
</tr>
<tr>
<td>more capacious (larger volumed)</td>
<td></td>
</tr>
</tbody>
</table>

### Head and Neck

<table>
<thead>
<tr>
<th>Desirable</th>
<th>Undesirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>more (breed) character</td>
<td>lacks breed character</td>
</tr>
<tr>
<td>more open faced</td>
<td>lacks femininity</td>
</tr>
<tr>
<td>more femininity</td>
<td>plain-headed</td>
</tr>
<tr>
<td>freer from wool on his/her ears</td>
<td>wool blind, wooly headed</td>
</tr>
<tr>
<td>trimmer fronted</td>
<td>off in the mouth</td>
</tr>
<tr>
<td>longer necked</td>
<td>coarse, plain, ewe-necked</td>
</tr>
</tbody>
</table>

### Shoulder, Ribs, Middle

<table>
<thead>
<tr>
<th>Desirable</th>
<th>Undesirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>more muscular shoulder</td>
<td>open-shouldered</td>
</tr>
<tr>
<td>neater, tighter shoulder</td>
<td>coarse-shouldered</td>
</tr>
<tr>
<td>wider chested</td>
<td>constricted in the heart</td>
</tr>
<tr>
<td>more capacious</td>
<td>narrow chest</td>
</tr>
<tr>
<td>roomier middle</td>
<td>tight forerib</td>
</tr>
<tr>
<td>bolder sprung</td>
<td>flat-riberib</td>
</tr>
<tr>
<td>bolder spring of rib</td>
<td>shallow-riberib</td>
</tr>
<tr>
<td>deeper ribbed</td>
<td></td>
</tr>
<tr>
<td>deeper bodied</td>
<td></td>
</tr>
</tbody>
</table>

### Leg and Twist

<table>
<thead>
<tr>
<th>Desirable</th>
<th>Undesirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>meatier, more muscular leg</td>
<td>light-muscled leg</td>
</tr>
<tr>
<td>heavier leg</td>
<td>flat leg</td>
</tr>
<tr>
<td>thicker leg</td>
<td>short leg</td>
</tr>
<tr>
<td>longer</td>
<td>narrow, shallow leg</td>
</tr>
<tr>
<td>deeper and thicker through his/her lower leg</td>
<td>round and tight in his/her muscle structure</td>
</tr>
</tbody>
</table>

### Back, Loin, Rump

<table>
<thead>
<tr>
<th>Desirable</th>
<th>Undesirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>thicker back or loin</td>
<td>shallow-loined</td>
</tr>
<tr>
<td>longer loined</td>
<td>narrow down the top</td>
</tr>
<tr>
<td>stronger back or loin</td>
<td>short-loined</td>
</tr>
<tr>
<td>straighter topped</td>
<td>easy in the back</td>
</tr>
<tr>
<td>more muscular loin</td>
<td>weak top</td>
</tr>
<tr>
<td>stronger top</td>
<td>pinched at the dock</td>
</tr>
<tr>
<td>more natural thickness</td>
<td>droopy-rumped</td>
</tr>
<tr>
<td>wider at the rump and/or dock</td>
<td>short rump</td>
</tr>
<tr>
<td>meatier at the dock</td>
<td>tapers over the rump</td>
</tr>
<tr>
<td>more nearly level rump</td>
<td>longer rump</td>
</tr>
</tbody>
</table>

### Underpinning

<table>
<thead>
<tr>
<th>Desirable</th>
<th>Undesirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>squarer placed legs</td>
<td>stands bowlegged behind</td>
</tr>
<tr>
<td>more correct in the set of legs</td>
<td>cow-hocked</td>
</tr>
<tr>
<td>stands out wider in front or behind</td>
<td>weak pasterns</td>
</tr>
<tr>
<td>stands more correctly on all four legs</td>
<td>stands close</td>
</tr>
<tr>
<td>more substance of bone</td>
<td>too much set to the hock</td>
</tr>
<tr>
<td>more rugged bone, heavier bone</td>
<td>posty-legged</td>
</tr>
<tr>
<td>stronger pasterns</td>
<td>knock-kneed</td>
</tr>
<tr>
<td></td>
<td>fine-boned</td>
</tr>
<tr>
<td></td>
<td>sickle-hocked</td>
</tr>
<tr>
<td></td>
<td>buck-kneed</td>
</tr>
</tbody>
</table>

### Fleece

<table>
<thead>
<tr>
<th>Desirable</th>
<th>Undesirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>denser, tighter</td>
<td>open fleece</td>
</tr>
<tr>
<td>more uniform grading fleece</td>
<td>cottony fleece</td>
</tr>
<tr>
<td>heavier shearing fleece</td>
<td>lacks character</td>
</tr>
<tr>
<td>longer staple</td>
<td>contains black fiber</td>
</tr>
<tr>
<td>more character about the fleece</td>
<td>short staple</td>
</tr>
<tr>
<td>freer from black fiber</td>
<td>lacks uniformity</td>
</tr>
</tbody>
</table>
SHEEP JUDGING WITH ORAL REASONS
SHEEP, LEVEL III
Member Handout #4, Oral Reasons Notes Guide

Class Name ______________________________________

Placing _________________________________________

<table>
<thead>
<tr>
<th>Compare</th>
<th>Grant</th>
<th>Criticize</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22–Sheep, Level III
I. Introduction
   “I placed this class of class name 4-3-2-1.”

II. Top Pair Paragraph
   A. Introductory Sentence
   B. Top Sentence
   C. Furthermore Sentence
   D. In Addition Sentence
   E. Grant Sentence
   F. Criticize Sentence

III. Middle Pair Paragraph
   A. Introductory Sentence
   B. Top Sentence
   C. Furthermore Sentence
   D. In Addition Sentence
   E. Grant Sentence
   F. Criticize Sentence

IV. Bottom Pair Paragraph
   A. Introductory Sentence
   B. Top Sentence
   C. Furthermore Sentence
   D. In Addition Sentence
   E. Grant Sentence
   F. Criticize Sentence

V. Bottom Individual Paragraph
Condition Scoring
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• Recognize varying conditions of lambs
• Proper degree of condition for the stage of growth of the lamb

ABOUT THEMSELVES:
• How to evaluate a situation with varying factors

Materials Needed:
• Member Handout #6, “Loin Region Parts”
• Member Handout #7, “Sheep Condition Scoring”
• Transparency of Member Handout #7, “Sheep Condition Scoring” (optional)
• Group of ewes of varying condition
• Pictures of different sheep to score (optional)

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Body condition scoring is a simple but useful procedure which can help producers make decisions concerning ewe flock nutrition and optimizing performance. Body condition score is a subjective measure of the degree of muscle and fat cover on a ewe.

Scoring is done by using the hand to feel the muscle and fat around the vertebrae in the loin region.

The vertebrae have, in addition to the central spinal column, a spinous process (vertical) and two transverse (horizontal) processes. Feel for the spine in the center of the ewes back, behind the last rib and ahead of the hip bone. Also, feel for the tips of the transverse processes.

Condition scores range from 0 to 5 with 0 being the thinnest and 5 representing the fattest. Typically, over 90% of the flock will fall within the scores 2, 3 or 4 and 70 to 80% will be 3 or 4. For more distinction, half scores (2.5 and 3.5) may be added for those sheep who fall between 2 and 3, or 3 and 4. Sometimes scores are given in tenths (2.6, 3.4, 3.8 etc.), if a high degree of accuracy is desired. Such distinction may not be necessary as ewes with condition scores of 2 to 4 will generally be productive and may not require a special ration.

Leader Notes
This lesson would work the best with sheep to practice on. If this is not possible try to obtain slides or pictures of sheep with varying conditions.

Pass out Member Handout #6, “Loin Region Parts” and point out the different parts to focus on when scoring sheep.

Pass out Member Handout #7, “Sheep Condition Scoring” and point out the differences in each condition. Possibly make a transparency of handout and review it on an overhead.

25–Sheep, Level III
A guideline for determining condition score is as follows:

**Condition Zero**
- spine prominent and sharp
- no fat cover
- wasted muscle structure
- transverse processes protrude

Sheep is extremely thin, unthrifty and weak. Skeletal features are very prominent. Eyes appear sunken and ewe may separate herself from the flock.

**Condition One**
- spinous process prominent and sharp
- no fat cover
- transverse process easily felt

Sheep is unthrifty and thin, but agile. Skeletal structures prominent but no apparent muscle loss. Has strength to remain with the flock.

**Condition Two**
- spinous process prominent but smooth
- slight fat cover
- muscle fullness
- transverse processes rounded, but felt with pressure

Sheep is thin, but strong and thrifty with no apparent muscle loss. No evidence of fat, but skeletal features do not protrude.

**Condition Three**
- spinous process rounded and smooth
- some fat cover
- muscle fullness
- transverse processes felt with hard pressure

Sheep is thrifty, with evidence of fat over the shoulder, on the fore rib and across the tail head.

**Condition Four**
- spinous process only evident as a line
- considerable fat cover
- transverse processes can not be felt

Moderate fat deposits give the sheep a smooth appearance. Firm fat deposits become evident in the chest and over the tail head.

**Condition Five**
- spinous process not detectable
- transverse processes not detectable

Sheep is excessively fat. Excess fat lacks firmness. Sheep appears uncomfortable.

Now that we know how to condition score sheep, how do we determine what the appropriate condition score should be? There are several opinions on this. Desired condition score may vary depending on the environ-
ment, the price of feed, the value of lamb and wool and the stage of production.

Most producers realize when their sheep are too thin; however, many don’t realize when their sheep are too fat. If your sheep have too much condition then you are wasting money by feeding too much.

Here are some general guidelines for ewe condition, concerning the stage of production. At breeding time, ewes should be condition 2 or 3 but on an increasing plane of nutrition. Throughout gestation, ewes should range from 3 to 4. At the end of gestation, the ewe should be on a stable plane of nutrition. She will require more nutrients for her rapidly developing fetus. If a ewe loses weight at this time, she may be vulnerable to ketosis. On the other hand, if you feed them too much, it could cause higher birth weights. During lactation, ewes will likely lose weight even when on a high plane of nutrition as they will (or should) be putting all the nutrition into milk for their lambs. After weaning, and before breeding, is a time known as the dry period (or maintenance). The ewe isn’t producing anything so it’s okay for her to be thin. During this stage, it is seldom economical to supplement the ewe so she’ll gain weight. By the end of the dry period, the ewe should be at least condition 2, but she should have been able to regain her weight loss by grazing.

No matter how much emphasis you place on condition scores, you should at least be able to identify three groups of sheep within your flock. Those that are too thin should be separated and fed to gain weight. Those that are too fat should be separated and fed to lose weight. Those that are just right should be kept on the same nutritional plane.

DIALOGUE FOR CRITICAL THINKING:
Share:
1. What was the hardest thing to recognize when scoring sheep? Easiest?
2. Was it easier or harder to recognize the condition score of sheep after you practiced with a few?

Process:
3. What is the most important thing to look for when assigning a score?
4. Why is body condition scoring necessary? What changes could you make to change the score?

Generalize:
5. What other projects consider condition important? Why?
6. What problems are encountered when you use visual appraisal alone to determine condition of a product?
ACTIVITY

Apply:
7. What other factors can be used to evaluate products? When and how?

GOING FURTHER:
1. Visit a locker plant and see the difference of fat on sheep with varying body condition scores.

REFERENCES:
SID Sheep Production Handbook

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
Feel for the spine in the center of the sheep’s back behind the last rib and anterior to the hipbone.

Feel for the tips of the Transverse process.
CONDITION SCORING
SHEEP, LEVEL III
Member Handout #7, Sheep Condition Scoring

**Body Condition Zero**

- **Spine**—prominent and sharp
- No fat cover
- Wasted muscle structure
- Transverse processes protrude
- Fingers press under Transverse process with ease

Sheep is extremely thin, unthrifty and weak. Skeletal features very prominent, e.g. backbone, shoulder blades and ribs. Wasted muscle tissue evident. Eye socket is prominent and sunken. May be humped back and isolates self from flock.

**Body Condition One**

- **Spine**—prominent but smooth
- No fat cover
- Transverse processes protrude
- Fingers press under with ease

Sheep is extremely thin, unthrifty but agile. Skeletal features are prominent with no fat cover. No apparent muscle tissue degeneration. Has strength to remain with flock.

**Body Condition Two**

- **Spine**—prominent but smooth
- Slight fat cover
- Muscle fullness
- Transverse processes rounded
- Fingers go under with pressure

Sheep is thin but strong and thrifty with no apparent muscle structure wasting. No evident fat cover over the backbone, rump and ribs, but skeletal features do not protrude.

**Body Condition Three**

- **Spine**—prominent but smooth
- Muscle development full
- Transverse process rounded but smooth
- Need hard finger pressure to find Transverse process end

Sheep are thrifty with evidence of limited fat deposits in fore rib, over top of shoulder, backbone, and tail head. Hipbone remains visible.

**Body Condition Four**

- **Spine**—prominent but smooth
- Fat cover considerable but firm
- Transverse process cannot be felt

Moderate fat deposits give the sheep a smooth external appearance over the shoulder, back, rump and fore rib. Hip bone is not visible. Firm fat deposition becomes evident in brisket and around tail head.

**Body Condition Five**

- **Spine**—prominent but smooth
- Transverse process not detectable

Sheep are extremely fat with the excess detectable over the shoulder, backbone, rump and fore rib. Excess fat deposits in brisket, flank, and tail head regions lack firmness. Sheep appear uncomfortable and reluctant to move about. Quality fleeces are generally found.
Ram Breeding Soundness Evaluation
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• The four major parts of a breeding soundness evaluation
• Characteristics of high and low quality semen

ABOUT THEMSELVES:
• Importance of evaluation
• Their consumer skills

Materials Needed:
• Activity Sheet #3, “Male Ovine Reproductive Tract”
• Leader Key—Male Ovine Reproductive Tract
• Activity Sheet #4, “BSE Quiz”
• Leader Key—BSE Quiz
• An intact ram or diagram of the ram’s reproductive tract to display during the discussion.
• Flip chart and markers

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY
The ram is generally the most important (valuable) sheep in the flock. After all, he is responsible for half the genetics of the next lamb crop. His increased importance stems from the fact that a single ram can be mated to a large number of ewes. The exact number of ewes depends on the size and terrain of the breeding pasture, the age of the ram and several other characteristics. When using ram lambs as sires, a ratio of 15—25 ewes per ram is often used. Mature rams can be mated to 30, 40 or even more ewes. A ram should be exceptional in terms of exemplifying the characteristics you desire and he must be highly efficient in terms of his reproductive capacity.

In most cases, it would not be economically feasible to perform a reproductive exam on all your ewes, as each ewe only makes up a small portion of the next lamb crop. It is; however, relatively simple and generally cost effective to put your ram(s) through a breeding soundness examination. Most veterinarians routinely perform this exam.

There are 4 parts to a ram breeding soundness examination. The first part is a physical evaluation of the ram’s body condition and structure. Rams should be in good shape at the start of the breeding season, as they will likely lose weight (up to 12% of their body weight) during mating. If a
Pass out Activity Sheet #3, “Male Reproductive Tract” and have members fill in the blanks to review anatomy.

List good semen characteristics on a flip chart.

Pass out Activity Sheet #4, “BSE Quiz.” Let members work in pairs to review knowledge learned.

A breeding soundness examination is the first step in managing rams for optimum breeding performance. Selecting the most fertile ram may not only improve the percent lamb crop, but also allow a larger ewe to ram ratio reducing the ram cost.

**DIALOGUE FOR CRITICAL THINKING:**
**Share:**
1. Have you ever had a non-productive ram? How did you know?

*32–Sheep, Level III*
ACTIVITY

2. Have you ever conducted or helped with a ram breeding soundness evaluation? What happened?

Process:
3. Why do you think a breeding soundness evaluation is necessary?
4. Why is the ram referred to as the most valuable sheep in the flock?
5. What are some desirable ram semen characteristics?
6. Are there any parts of the evaluation that could be ignored? Why or why not?

Generalize:
7. When buying other things, should you conduct a type of evaluation? What should you evaluate? Why?
8. What does the adage “Buyer Beware” mean to you?

Apply:
9. What are some resources you can use to evaluate future purchases?

GOING FURTHER:
1. Observe a veterinarian conducting a BSE.
2. Attend a production ram sale that uses BSEs.
3. Contact someone to talk on consumer fraud.

REFERENCES:
Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
RAM BREEDING SOUNDNESS EVALUATION
SHEEP, LEVEL III
Activity Sheet #3, Male Ovine Reproductive Tract
RAM BREEDING SOUNDNESS EVALUATION
SHEEP, LEVEL III
Leader Key—Male Ovine Reproductive Tract
1. List the 4 parts of the breeding soundness examination.
   (1) _______________________________________________
   (2) _______________________________________________
   (3) _______________________________________________
   (4) _______________________________________________

2. Why is the ram’s reproductive ability so important?

3. If you had 500 ewes, approximately how many mature rams would you need for breeding?______________
   If you were using only ram lambs how many? ______________

4. Why is the physical structure of the ram important?

5. How would you determine if a ram had a high degree of mating desire?

6. Of the following 10 characteristics, circle the ones which would indicate a “good” semen sample.
   A) 1.5 billion sperm cells         B) 80% live, normal sperm
   C) pH of 7.3                      D) 2.1 billion sperm cells
   E) 83% motility                  F) 20% motility
   G) 15% abnormalities             H) 43% abnormalities
   I) 33% live normal sperm         J) pH of 6.8
RAM BREEDING SOUNDNESS EVALUATION
SHEEP, LEVEL III
Leader Key—BSE Quiz

1. List the 4 parts of the breeding soundness examination.
   (1) ________________________________  
   (2) ________________________________  
   (3) ________________________________  
   (4) ________________________________  

2. Why is the ram’s reproductive ability so important? 
   Reproduction is the ram’s function in the flock. Without good reproductive 
   ability, lambing will be low, and profits will be lost.

3. If you had 500 ewes, approximately how 
   many mature rams would you need for breeding? ________________
   If you were using only ram lambs how many? ________________

4. Why is the physical structure of the ram important? 
   To continue breeding all ewes the ram must be in top physical condition. He 
   must cover a lot of ground and be sound as a lame ram cannot breed.

5. How would you determine if a ram had a high degree of mating desire?
   Observe the behavior of the ram with the ewes. If he actively and aggressively 
   seeks out ewes, then he has an acceptable level of mating desire.

6. Of the following 10 characteristics, circle the ones which would indicate 
   a “good” semen sample.

   A) 1.5 billion sperm cells   B) 80% live, normal sperm 
   C) pH of 7.3               D) 2.1 billion sperm cells 
   E) 83% motility           F) 20% motility 
   G) 15% abnormalities      H) 43% abnormalities 
   I) 33% live normal sperm  J) pH of 6.8
The Ruminant Digestive System

Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• Examples of ruminants and non-ruminants
• The four compartments of the ruminant stomach
• The basic parts and functions of the ruminant digestive system

ABOUT THEMSELVES:
• The process of digestion
• The differences between monogastric and ruminant digestion

Materials Needed:
• Member Handout #8, “Ruminant and Monogastric Digestive Tracts”
• Member Handout #9, “Parts of the Ruminant Stomach”
• Chalkboard and chalk (optional)

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

When you feed your lamb, the feed is used for energy and converted to meat. This takes place through the lamb’s digestive system. The main purpose is to convert feed to energy for maintenance, growth and activity.

Farm animals have two distinct types of digestive systems.

1. Ruminant

2. Simple or monogastric

Cud-chewing animals such as sheep, cattle and goats have a ruminant system. Ruminants have a stomach with four compartments. Non-ruminants have simple stomachs and include man, horses, swine, poultry, cats and dogs.

The ruminant digestive system has several advantages over the non-ruminant digestive system. The ruminant digestive tract is larger, allowing ruminants to eat larger quantities of roughage (hay, grass, silage). The digestive tract (aided by bacteria in the rumen) is also more efficient in utilizing crude fiber. Likewise, monogastric animals are not as efficient in utilizing the nutrients found in roughage and other high fiber feedstuffs.
Let’s look at the ruminant digestive system.

The digestive tract performs five major functions:

1. food intake
2. storage
3. digestion
4. absorption
5. elimination of waste

The functions take place within the digestive tract. It is sort of like a hollow, tube-like assembly line, except instead of building something, this tract takes it apart. Each feedstuff is broken down into smaller parts until it can be used or eliminated. The digestive process prepares food for absorption and use by the lamb’s body. Enzymes break the feed down into simple compounds.

The organs that make up the digestive tract can be sorted into two categories.

1. Alimentary canal—The canal is a continuous tube extending from the lips to the anus. The digestive process occurs within the alimentary canal. The walls of the canal are covered with involuntary muscles which mix the feed with digestive juices and move it along the tract. The parts of the canal are the mouth, pharynx, esophagus, stomach, small intestine, cecum, large intestine and anus.

2. Accessory organs—While not actually a part of the tube, these organs provide several functions which aid in the digestive process. Included in this category are the teeth, tongue, salivary glands, liver and pancreas.

Let’s discuss the parts of the alimentary canal.

**Mouth**—The mouth is the first part of the alimentary canal. Its functions are food intake and mastication (chewing). Here, saliva is mixed with food to moisten it for easy swallowing and to begin digestion.

**Pharynx**—The pharynx is the membrane that directs food to the esophagus and keeps it out of the respiratory tract.

**Esophagus**—The esophagus is a long muscular tube allowing food to move from the pharynx to the stomach.

**Stomach**—We often hear that ruminants have four stomachs. Actually, it’s just one stomach with four compartments. These four compartments...
make it easier for sheep to digest large amounts of feed (both roughage and concentrate).

The first stomach compartment is the rumen or paunch. It is a large compartment where feed is stored. The stored feed is regurgitated as cud and rechewed. The rumen reticulum is a fermentation chamber that hosts a large microbial population.

The reticulum is known as the honeycomb. It is also the hardware stomach as foreign materials which may injure the digestive tract are trapped here if swallowed. Feed is agitated, fermented and digestion begins.

The third part is the omasum or manyplies. Here, food is ground into smaller particles and liquid is removed.

The fourth compartment is the abomasum or true stomach. Digestive juices are produced here. This is similar to the non-ruminant stomach.

**Small intestine**—Food is further digested and absorbed by the blood. The liver secretes bile into the small intestine to neutralize acidity and allow enzyme action to take place.

**Large intestine**—Non-absorbed material passes into the large intestine where digestion and absorption continue.

**Anus**—All non-digested materials are eliminated from the canal and excreted out the anus.

Let’s discuss the accessory organs. The teeth chew and grind the food into small particles and the tongue rolls and turns the food as it is being chewed. The salivary gland secretes saliva to moisten the food for swallowing. The liver secretes bile and the pancreas secretes pancreatic juices into the small intestine to neutralize acidity and aid in digestion.

Normally, about four days are required for food to pass through the digestive tract of ruminants. The usual time in each part is:

rumen/reticulum—61 hours

omasum—8 hours

abomasum—3 hours

small intestine—7 hours

large intestine—8 hours

Water passes through the system and is absorbed more quickly than food. Some grains are easily digested and pass through the system more quickly than harder-to-digest roughage, such as hay.
### Leader Notes

**ACTIVITY**

Not all the feed your lamb eats is absorbed and used for maintenance, growth or production. Only the nutrients that pass through the walls of the alimentary canal are used. Some of the feed leaves the body undigested. Several factors, including feed composition, feed intake and animal differences, affect the digestibility of a feedstuff.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**  
1. What was the easiest part of the digestive system to understand?  
   Most difficult? Why?

**Process:**  
2. Discuss the five functions of the digestive system. What problems would occur if each function was omitted one at a time?

3. What are the advantages/disadvantages of the ruminant digestive system?

**Generalize:**  
4. What conclusions can be made about a monogastric digestive system? (Efficiency?, Capacity?, Problems?)

5. How does understanding the digestive system assist you in maintaining efficiency in your livestock projects?

**Apply:**  
6. How important is it to understand the digestive system if you are deciding to feed lambs in a feedlot or on pasture?

**GOING FURTHER:**  
1. Make a drawing of the ruminant stomach.

2. Give an illustrated talk on the ruminant digestive system.

3. Visit a research area and observe the digestive tract in action.

4. Study which feeds are more digestible than others.

5. Visit a feed mill and ask about digestibility of feeds.

**REFERENCES:**  
Kansas 4-H Beef Leader Notebook (LN-1), 2nd ed.

**Author:**  
Jeremy Geske, Former Extension Assistant, Kansas State University  
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

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Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University  
Sheep Design Team

*42–Sheep, Level III*
THE RUMINANT DIGESTIVE SYSTEM
SHEEP, LEVEL III
Member Handout #8, Ruminant and Monogastric Digestive Tracts

RUMINANT DIGESTIVE TRACT

MONOGASTRIC DIGESTIVE TRACT
THE RUMINANT DIGESTIVE SYSTEM
SHEEP, LEVEL III
Member Handout #9, Parts of the Ruminant Stomach

Parts of the Ruminant Stomach

1. Rumen
   - Functions as a storage area for food
   - Aids in the breakdown of coarse particles through bacterial action

2. Reticulum (honeycomb)
   - Honeycomb-like walls retain foreign materials that could injure the digestive system
   - Also called the hardware stomach
   - Functions are similar to the rumen

3. Omasum
   - Liquid is removed from the feed by muscle contractions
   - Breaks up coarse particles in feed

4. Abomasum (true stomach)
   - Digestive juices that are needed to break down food are secreted
   - These include: hydrochloric acid, pepsin, renin and lipase
Balancing Sheep Rations
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• The proper nutrition sheep need at varying stages of growth and maintenance
• What nutrients different feeds contain
• How to balance a ration to meet nutrient requirements

ABOUT THEMSELVES:
• Value or need for adjustments in everyday living situations

Materials Needed:
• Member Handout #10, “Nutritional Requirements of Sheep”
• Member Handout #11, “Nutrient Content of Feedstuffs”
• Member Handout #12, “Ration Balancing Example”
• Transparency of Member Handout #12 (optional)
• Activity Sheet #5, “Ration Balancing Worksheet”
• Calculator
• Pencils and overhead projector or flip chart and markers

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Many sheep rations are premixed at the feed mill due to the equipment and technology available for more precise mixing and balancing of antibiotics and other feed additives. However, it is important to understand how this process works. It is often more economical for larger producers to raise the feed and balance their own rations.

Creep feeding is a method of providing supplemental feed for lambs prior to weaning. The value of creep feeding depends on the operation. It is an essential part of intensive production systems, while it may only be used periodically in other situations. Lambs dropped and raised in dry lot will make their most efficient gains during the first 100—120 days of life. Here are some situations when creep feeding is generally advantageous.
• When lambs are weaned early (less than 60 days old), they should be started on creep prior to weaning. Therefore, creep feeding is important for early weaning and accelerated lambing programs.
• Fall and winter born lambs should be started on creep unless pasture conditions allow for rapid growth without supplementation.
• Twin and triplet lambs born late in the lambing season may be creep fed to catch the older lambs.

Leader Notes

Leaders must allow extra preparation time to work through the examples. Alternatives would be to invite a professional nutritionist to your meeting or conduct the lesson at a local feed mill where a computer would be used to input all of the data and balance and mix the ration.
• Creep feeding in range operations only during conditions of drought, when supplementation will allow lambs to be sold as market lambs instead of feeders.

Lambs should be started on creep about ten days after birth. Although they won’t consume a significant amount, it gets their digestive system adjusted and forms the habit of eating grains. Regardless of the production program, creep feeding will not be economical unless the feeding system and ration allow for adequate intake of feed. If the lambs don’t eat enough to grow, then there is no benefit from creep feeding.

Palatability is the most important quality of the ration for young lambs. A ration containing soybean meal, corn, alfalfa and molasses is very palatable and provides the necessary protein and energy for growth. As the lambs get older, pelleting the ration may increase intake and improve the handling qualities of the ration, but it also costs more.

Creep rations do not have to be complex. A creep ration must be palatable, provide the nutrients required by the lambs (particularly energy and protein), and it should be economical. Creep rations should contain at least 15% protein. Many producers start the lambs on 18–21% protein, gradually decreasing to 15—17% as the lambs get older. Antibiotics should also be included in the creep ration. Most creep rations contain about 15—20% roughage and 80—85% concentrate (grain). Rations should contain about 70% TDN, .7% calcium and .35% phosphorus. It is very important to maintain the calcium to phosphorus ratio of 2:1. A trace mineral salt mixture formulated for sheep should be added at .5% of the ration. Many rations include five percent molasses for increased palatability. Vitamin A and a small amount of vitamin E are generally added as well.

Several factors must be considered before a feeder can determine an optimal feeding program for his lambs.
• the desired performance level
• the kind of lamb
• the available ingredients (& costs)
• nutrient levels of the feedstuffs
• feed additives
• physical characteristics of the feed and ingredients
• method of feeding

Let’s discuss each of these considerations. The optimal level of performance for most feeder situations is maximum growth. If finishing lambs on pasture, less than maximum may be desired. In the latter case, profit is determined by low input costs rather than fast, efficient growth.

The kind of lamb along with the desired performance level affects the nutritional requirements. The age, size and genetic make-up may influence requirements. The NRC Nutritional Requirements of Sheep has
Next, consider the source of the ingredients of the ration. Sheep rations are generally formulated by first selecting an energy source. Corn, milo or barley could be used as the total grain portion of a lamb ration. Wheat and oats are other common ingredients; however, they are mixed with corn, milo or barley. Cost is usually the major concern when selecting a grain energy source. Cottonseed meal and soybean meal are two excellent supplemental protein sources for lamb rations. Once again, cost is the major consideration. Many different roughages can be included in lamb rations. The choice depends on cost and availability. Alfalfa is a popular ingredient. If the roughage makes up more than 20% of the ration, the energy value becomes more important. If the roughage makes up only a small portion of the ration, physical characteristics appear more important than energy content.

The NRC tables can be used as guidelines to determine nutrient levels required by the sheep as well as the nutrient content of feedstuffs. Many producers have a sample of the ration analyzed to see if it actually does meet the lambs needs.

Feed additives have no nutritional value, but they can improve efficiency and growth. If used improperly, they can adversely affect performance and increase production costs. Feed additives include antibiotics like Aureomycin as well as performance enhancers such as Lasalocid (Bovatec).

Each ingredient may have different mixing and handling ingredients that need to be considered. For example, molasses or fat may reduce dust and decrease ingredient separation. The size and texture of some roughages may prevent them from effectively being used in self feeders.

The method of feeding is also a consideration. Self feeders allow for more efficient use of labor. The size of the operation can be increased as you don’t need bunk space for all the lambs at once. In hand feeding operations, the feeder has more control over feed consumption.

**DIALOGUE FOR CRITICAL THINKING:**

Share:

1. What was the most difficult thing to do when balancing a ration?
   
   Easiest?

2. How does it feel to know that you will feed your lamb exactly what it needs?
Leader Notes

ACTIVITY

Process:
3. What would happen if you fed your lamb the same ration all the time?

4. Why do different lambs require different rations?

5. Give examples of recommended times to creep feed. What is the advantage in each of these situations that dictate creep feeding?

Generalize:
6. How do you make adjustments in your other projects to meet new needs or to avoid problems?

Apply:
7. How can you apply what you learned about making adjustments and changes to new situations?

GOING FURTHER:
1. Visit a feed store and view the different types of feed and what purpose they have.

2. Develop rations for different types of sheep.

3. Check the ration that is being fed at home and make sure that it is meeting the lamb’s needs.

REFERENCES:
SID Sheep Production Handbook
NRC Nutrient Requirements of Sheep
Kansas 4-H Beef Leader Notebook (LN-1), 2nd ed.

Author:
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James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

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Sheep Design Team
### BALANCING SHEEP RATIONS

**SHEEP, LEVEL III**

Member Handout #10, Nutrient Requirements of Sheep

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<th>CP, lb</th>
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<td>3.3</td>
<td>2.5</td>
<td>0.51</td>
<td>8.6</td>
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<td>110</td>
<td>0.94</td>
<td>3.7</td>
<td>2.8</td>
<td>0.53</td>
<td>9.4</td>
<td>4.8</td>
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<td>132</td>
<td>0.77</td>
<td>3.7</td>
<td>2.8</td>
<td>0.53</td>
<td>8.2</td>
<td>4.5</td>
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*49–Sheep, Level III*
<table>
<thead>
<tr>
<th></th>
<th>Dry Matter (percent)</th>
<th>Crude Protein (percent)</th>
<th>TDN² (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roughages</strong></td>
<td></td>
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<tr>
<td>Fescue hay</td>
<td>88.5</td>
<td>10.5</td>
<td>54</td>
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<tr>
<td>Brome hay</td>
<td>90.0</td>
<td>10.3</td>
<td>55</td>
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<tr>
<td>Alfalfa hay</td>
<td>89.2</td>
<td>17.1</td>
<td>58</td>
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<tr>
<td>Prairie hay</td>
<td>92.0</td>
<td>5.8</td>
<td>51</td>
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<tr>
<td><strong>Concentrates</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Corn, shelled</td>
<td>86.5</td>
<td>9.9</td>
<td>91</td>
</tr>
<tr>
<td>Barley</td>
<td>88.1</td>
<td>13.3</td>
<td>81</td>
</tr>
<tr>
<td>Oats</td>
<td>89.5</td>
<td>13.5</td>
<td>77</td>
</tr>
<tr>
<td>Grain sorghum (Milo)</td>
<td>87.0</td>
<td>10.1</td>
<td>84</td>
</tr>
<tr>
<td>Molasses, cane</td>
<td>76.0</td>
<td>5.0</td>
<td>75</td>
</tr>
<tr>
<td><strong>Protein Supplements</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cottonseed meal</td>
<td>92.5</td>
<td>44.3</td>
<td>74</td>
</tr>
<tr>
<td>44% Soybean meal</td>
<td>89.0</td>
<td>51.5</td>
<td>81</td>
</tr>
<tr>
<td>49% Soybean meal</td>
<td>89.8</td>
<td>56.7</td>
<td>84</td>
</tr>
<tr>
<td><strong>Mineral Supplements</strong></td>
<td></td>
<td>Calcium (percent)</td>
<td>Phosphorus (percent)</td>
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<tr>
<td>Ground limestone</td>
<td>98.0</td>
<td>34.0</td>
<td>.02</td>
</tr>
<tr>
<td>Dicalcium phosphate</td>
<td>96.0</td>
<td>22.0</td>
<td>18.65</td>
</tr>
</tbody>
</table>


²Expressed on a dry matter basis
Part of balancing rations is combining ingredients to get the desired nutrient level. One method of determining how much of each ingredient to add is the “Pearson Square” method.

If we look at the NRC tables, we see that 88 pound lambs with the potential for rapid growth will eat 3.3 lbs. of dry matter per day. Of that, they need 2.5 lbs. of TDN and .51 lbs. of crude protein. We won’t worry about the other nutrients at the moment. We can convert protein and energy requirements to percent by dividing by total pounds of dry matter. The lambs need 76% TDN and 15.5% crude protein.

Let’s say we have corn and soybean meal for ingredients. We check the NRC tables to find that corn has 87% TDN and 10.1% protein on a 100% dry matter basis. The soybean meal has 85% TDN and 47.7% crude protein. As you can see, both feeds have more than enough TDN, so protein is our concern.

Let’s set up the Pearson Square. Put the percent protein of the feedstuffs along the left side and the desired percent (requirement) in the middle.

\[
\begin{array}{c|c}
\text{corn} & 10.1 \\
soybean & 47.7 \\
\end{array}
\]

Calculate the differences diagonally \((15.5 - 10.1 = 5.4) \ (47.7 - 15.5 = 32.2)\) and total the differences. Divide each difference by the total to get the percent of each feed.

\[
\begin{array}{c|c|c}
\text{corn} & 10.1 & 32.2 \\
& & / 37.6 = 85.6\% \text{ corn} \\
soybean & 47.7 & 5.4 \\
& & / 37.6 = 14.4\% \text{ soybean meal} \\
\end{array}
\]

Let’s use the same requirements but substitute barley for corn. The NRC table tells us that barley has 86% TDN and 13.5% crude protein.

\[
\begin{array}{c|c}
\text{barley} & 13.5 \\
soybean & 47.7 \\
\end{array}
\]

Calculate the differences diagonally \((15.5 - 13.5 = 2.0) \ (47.7 - 15.5 = 32.2)\) and total the differences. Divide each difference by the total to get the percent of each feed.

\[
\begin{array}{c|c|c}
\text{barley} & 13.5 & 32.2 \\
& & / 34.2 = 94.2\% \text{ barley} \\
soybean & 47.7 & 2.0 \\
& & / 34.2 = 5.8\% \text{ soybean meal} \\
\end{array}
\]

Now let’s see if we can meet the protein requirement with barley and alfalfa. Alfalfa has 17% crude protein.

\[
\begin{array}{c|c}
\text{barley} & 13.5 \\
\text{alfalfa} & 17.0 \\
\end{array}
\]

Calculate the differences diagonally \((15.5 - 13.5 = 2.0) \ (15.5 - 17.0 = -1.5)\) and total the differences. Divide each difference by the total to get the percent of each feed.

\[
\begin{array}{c|c|c}
\text{barley} & 13.5 & 1.5 \\
& & / 3.5 = 42.9\% \text{ barley} \\
\text{alfalfa} & 17.0 & 2.0 \\
& & / 3.5 = 57.1\% \text{ alfalfa} \\
\end{array}
\]
We’ve met the protein requirement, but does it meet the TDN requirement?

Alfalfa has 56% TDN.

\[
\text{Alfalfa at } 56\% \times 0.571 = 32\% \\
+ \text{ barley at } 86\% \times 0.429 = 36.9\% \\
\text{That mixture only provides about } 69\% \text{ TDN and the requirement is } 76\%, \text{ so we are deficient in energy.}
\]

Balancing rations is a lot more complicated than this, but this should give you an idea of how to start. Practice the Pearson Square method with different feed ingredients and different requirements.
### BALANCING SHEEP RATIONS

**SHEEP, LEVEL III**

*Activity Sheet #5, Ration Balancing Worksheet*

**SHEEP DESCRIPTION (w/stage of reproduction cycle):**

**NUTRITIONAL REQUIREMENTS:** Crude Protein: ___________________________  TDN: ___________________________

**RECOMMENDED DAILY DRY MATTER INTAKE:**

<table>
<thead>
<tr>
<th>FEEDS</th>
<th>LB. FED DAILY</th>
<th>% DM</th>
<th>LB. DM DAILY</th>
<th>% PROTEIN</th>
<th>LB. PROTEIN DAILY</th>
<th>% TDN</th>
<th>LB. TDN DAILY</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(b)</td>
<td>(c=AXB)</td>
<td>(d)</td>
<td>(cx)</td>
<td>(e)</td>
<td>(cx)</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>2.</td>
<td></td>
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<td>3.</td>
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<tr>
<td>4.</td>
<td></td>
<td></td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTALS</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
</tr>
</tbody>
</table>

**NUTRIENT CONCENTRATION IN RATION DRY MATTER:**

\[\text{% PROTEIN} = \frac{\text{LB. PROTEIN DAILY}}{\text{LB. DM DAILY}} \times 100 = \text{__________%}\]

\[\text{% TDN} = \frac{\text{LB. TDN DAILY}}{\text{LB. DM DAILY}} \times 100 = \text{__________%}\]
Ewe’s Production Cycle
Sheep, Level III

What Members Will Learn...

ABOUT THE PROJECT:
• Ewe production cycle
• Nutritional needs of a ewe

ABOUT THEMSELVES:
• Nutritional needs and changes during their life span

Materials Needed:
• Member Handout #13, “Ewe Year”
• Activity Sheet #6, “Ewe Weight Change”
• Leader Key—Ewe Weight Change

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

When determining the nutritional and management needs of the ewe flock, the ewe’s stage of production should be considered. In other words, what is the ewe doing for you, the producer, which might require special care.

Let’s consider a typical year, represented in the form of a circle.

Month 1 represents the month your breeding season begins. The reproductive cycle of the ewe is approximately 17 days. Since not all ewes become pregnant on the first cycle, a breeding season is typically at least two cycles long (about 34 days). Some breeding seasons may be longer. At this time the ewe is ovulating and conceiving. Nutrition is important to insure satisfactory ovulation rates. Actually, nutrition may be more important just prior to the breeding season, but that will be discussed later.

The gestation length of the ewe is about 148 days or just under 5 months. During this time, the ewe is carrying and supporting a developing fetus and may be gaining weight. Most of this period isn’t too critical except for the last month and a half. During the last third of gestation, the fetus is undergoing most of its development as it prepares for birth. Ewes not getting enough feed at this time may suffer from pregnancy toxemia (ketosis). The last part of gestation and throughout the lambing season is the most important time in terms of the care and attention required by the ewe flock.

Leader Notes

Pass out Member Handout #13, “Ewe Year” and discuss the cycle of production.
EWE’S PRODUCTION CYCLE

Leader Notes

ACTIVITY

Logically, the lambing season will typically be about the same length as the breeding season. Once a ewe gives birth, lactation (milking) begins. The ewe’s highest nutritional needs occur during lactation. She needs nutrients to maintain herself and produce milk for her rapidly growing lamb(s). Ewes raising multiple lambs require even more nutrients. The length of lactation varies depending on the operation. It may last anywhere from 2 to 4 months. Ewes will typically lose weight during lactation.

After weaning, and before the next lambing season, is a time known as the dry period. During this time the ewe isn’t doing much of anything except growing wool. Her nutritional and care requirements are the lowest at this time. Basically, they can be left alone to graze and will do just fine. The last two weeks of the dry period, (prior to the next breeding season) the ewe must gain the weight lost during lactation. In a procedure known as “flushing,” the ewes are put on a higher plane of nutrition, either being fed some grain or being moved to a fresh pasture. Increasing the plane of nutrition may increase the ovulation rate. Increased ovulation rates can lead to a higher lamb crop percentage and more potential for profit. The length of the dry period is 2 to 4 months, depending upon the length of lactation.

The diagram on Activity Sheet, Ewe Weight Change, illustrates the typical change in weight during the year for a 160 pound ewe giving birth to and raising twins.

DIALOGUE FOR CRITICAL THINKING:

Share:
1. What did you already know about the ewe’s production cycle?

2. What new things did you learn?

Process:
3. Why are the three months including late gestation and lactation so critical in terms of nutrition?

4. When are the ewe’s highest nutritional needs? Lowest? Why?

Generalize:
5. Do you think there are certain times of the year when you need more nutrition? When? Why?

Apply:
6. How do the nutritional needs of various family members change? Outline nutritional needs from birth to senior citizen.

GOING FURTHER:

Pass out Activity Sheet #6 “Ewe Weight Change” and have them fill in the blanks provided.
REFERENCES:
SID Sheep Production Handbook

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
Shaded areas are critical periods for feed and care.
EWE’S PRODUCTION CYCLE
SHEEP, LEVEL III
Activity Sheet #6, Ewe Weight Change

Ewe weight change during the year for 160 pound ewe giving birth to and raising twins

Note: Changes expected for ewe raising a single lamb are approximately 2/3 of the above changes.

1. During what stage of production are the ewe’s nutritional needs their highest? And why?

2. Why is the last 1/3 of gestation so critical for the ewe flock?

3. The typical length of the ewe’s reproductive cycle is ______ days.
   • The gestation length is approximately _____ days.
   • Assuming that no lambs are born premature, calculate the expected due date of the first lambs if the breeding seasons starts on August 10. _______________
   • When could you expect the first lambs if the breeding season started on November 15? ___________

4. What is flushing? And why is it done?

5. Diagram the production cycle of your own flock. Include the actual months. Are there any differences from the example production diagram?
EWE’S PRODUCTION CYCLE
SHEEP, LEVEL III
Leader Key—Ewe Weight Change

Ewe weight change during the year for 160 pound ewe giving birth to and raising twins

+30
+20
+10
160 breeding
1 2 3 4 5 6 7 8 9 10 11 12 Months
–10
–20

Lambing
Gestation
Lactation
Weaning
Dry Period

Note: Changes expected for ewe raising a single lamb are approximately 2/3 of the above changes.

1. During what stage of production are the ewe’s nutritional needs their highest? And why?
   - Last 1/3 gestation—to prevent ketosis
   - Lactation—milk production for lambs

2. Why is the last 1/3 of gestation so critical for the ewe flock?
   - Rapid fetal growth increases nutritional demands of ewe

3. The typical length of the ewe’s reproductive cycle is _____ days.
   - The gestation length is approximately _____ days.
   - Assuming that no lambs are born premature, calculate the expected due date of the first lambs if the breeding season starts on August 10. ____________
   - When could you expect the first lambs if the breeding season started on November 15? ____________

4. What is flushing? And why is it done?
   - Increasing the nutritional level of ewe just prior to breeding with grain or fresh pasture. Flushing is done to increase ovulation rate in hopes of getting more multiple births to increase percent lamb crop and potential profit.

5. Diagram the production cycle of your own flock. Include the actual months. Are there any differences from the example production diagram?
KANSAS 4-H

Castrating, Docking, Hoof Trimming
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• Proper methods to castrate lambs and dock tails
• How to properly trim hooves

ABOUT THEMSELVES:
• Significance of sequence and order

Materials Needed:
• Castrating knife
• All-in-one castrator
• Emasculator
• Elastrator and elastrator band
• Burdizzo pinchers
• Electric docker
• Hoof trimmers
• Optional—pictures or video describing docking, castration and hoof trimming.
• If possible, live lambs for hoof trimming practice

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Docking, castration and hoof trimming are three management practices that every sheep producer needs to know. We are going to discuss the various methods of docking and castration and at the end we’ll practice trimming hooves.

Docking is a necessary practice as manure would cling to the tail and become a prime spot for fly attacks and infection. Castration is necessary to prevent unwanted matings. Also, for slaughter purposes, the packers prefer castrated males to intact males.

There are many acceptable methods for docking (de-tailing) and castration (removal of the testicles). The one you choose will probably be based on personal preference. If proper sanitation techniques are used, good results can be achieved with any of the recommended methods. If, however, tools are used improperly and strict sanitation is not followed, the results could be disastrous in terms of stress and even death loss of the lambs. Docking and castration ideally are accomplished before the lambs are two weeks old.

61–Sheep, Level III
ACTIVITY

A knife can be used for docking and castration. It should be sharp, and disinfected periodically throughout the procedure. Hold the knife on the tail at the desired point (leave the dock about one inch long) and pull through in one motion. To castrate, place the lamb in a sitting position, remove the end of the scrotum with the knife and pull the testicles out. Lambs can be ruptured if castrated improperly.

An emasculator can be used for docking. It has a crushing effect which may reduce bleeding.

The all-in-one castrator is a good tool. It has a scissor blade which may be used to cut off the tail and remove the end of the scrotum. It also has a grabbing, plier-like end which can be used to grasp the testicles and pull them out.

An elastrator can be used to apply heavy rubber bands to the tail and scrotum. The bands cut off circulation and the tail or scrotum will fall off in about two weeks. During warm weather or in areas where tetanus is a problem, the elastrator should not be used. The elastrator is very painful for about half an hour, but it is a completely bloodless method of docking and castration. When using the elastrator to castrate, make sure both testicles are on the outer side of the band.

The burdizzo may be used to castrate lambs. It is a heavy metal pincher that crushes the spermatic cord without breaking the skin of the scrotum. The cord should be worked to one side of the scrotum and pinched. Repeat for the other side. Do not attempt to pinch both cords at the same time. The pinched cord doesn’t allow blood into the testicle, which causes them to eventually shrink and disappear. This method is not always 100% effective if the burdizzo is not adjusted properly.

Trimming hooves is an important task in most sheep operations.

In some cases a sheep’s hooves will grow too long, causing difficulty in walking. This problem is easily corrected by trimming off excess hoof, much like trimming your fingernails when they get too long. Set the sheep over its dock. One at a time, examine each hoof for excess growth. Use the trimers to clean off any manure from the bottom of the hoof. This should give you a clear view of the hoof. Trim the outer hoof wall down until it appears slightly pink. If you cut too much off, it will bleed. Also, the points of the hooves should be snipped off.

For larger sheep, you may need some type of restraining chute or another person to hold the sheep while you trim the hooves.

DIALOGUE FOR CRITICAL THINKING:
Share:
1. What procedure was the hardest to understand? Easiest?
2. What method of castration do you use? Why?
ACTIVITY

Process:
3. Why is docking important?
4. Why do sheep need their hooves trimmed?
5. Which method of castration is most effective? Why?

Generalize:
6. How important are these management practices in other livestock projects?
7. What is the significance of doing things in sequence or a prescribed order?

Apply:
8. When and where will sequence and order be important in the future?

GOING FURTHER:
1. Observe a shepherd or veterinarian processing lambs.

REFERENCES:
Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
How Old are Your Sheep?

Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
- The growth of teeth on their sheep
- The method to determining sheep’s age

ABOUT THEMSELVES:
- The importance of dental hygiene

Materials Needed:
- Activity Sheet #7, Determining the Age of Sheep
- Leader Key—Determining the Age of Sheep
- Group of Sheep of Varying Ages

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

The age of a sheep may be important for a variety of management decisions. Many people mark the age (year of birth) on the ear tag. However, ear tags may fall out. If you decide to purchase some ewes, you should know how to check the ages. If the exact age of a sheep is not known, there is a relatively simple method for estimating it. A sheep’s age can be estimated by examining its mouth.

Sheep have no upper incisor teeth, only bottom incisors. Baby lambs have 4 pairs of small, temporary incisors. As the sheep ages, those teeth are replaced by permanent incisors.

As a general rule, sheep will get one pair of permanent incisors each year for 4 years. Sheep will not have more than 4 pairs of incisors. To determine the age of a young ewe, count the incisors and divide by two. After a little practice, it will be easy to tell the difference between permanent and temporary incisors. As a sheep ages past 4 years, the permanent incisors began to wear down and spread apart. Age can only be approximated at this stage. An experienced shepherd may be able to accurately estimate the age of old ewes by the varying degree of wear and spreading, but it takes a lot of practice. In very old ewes, some or all of the incisors may be missing.

Even in young sheep, age determination is not an exact science. Lambs usually get their “yearling” pair of incisors at 12-15 months of age, but this

Leader Notes
Read through the discussion and have members practice aging several sheep.

Ask the members if they can tell by looks alone how old a sheep is. Discuss the different growth rate of sheep (maybe use people as example) and that it is hard to tell how old they are simply by how big they are.

Pass out Activity Sheet #7, "Determining the Age of Sheep."
could vary by a couple months. As you can imagine, if a sheep only gets a permanent pair of incisors every 16 months, she could be over 5 years old and only have a four-year-old mouth. Also, some sheep may get two pairs of incisors at 14 months of age. There are exceptions to the rule, but it is the best available method for estimating the unknown age of a sheep.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. Is it hard to open the sheep’s mouth to see their teeth?
2. Did the sheep you “mouthed” have the correct number of teeth for it’s age? How do you know?

**Process:**
3. Why is it important to know a sheep’s age?
4. How else can you determine age? Is it very accurate? Why or why not?
5. Why might the number or condition of teeth not be accurate?

**Generalize:**
6. How might your teeth become damaged? What can you do to prevent damage to your teeth?
7. How do you decide when to go to the dentist?

**Apply:**
8. How do your teeth change as you get older?
9. What can you do to maintain healthy teeth throughout adulthood?

**GOING FURTHER:**
1. Conduct an experiment to show the wear on teeth due to sugar. If a member has lost a tooth recently place it in pop for a few days and see what happens. Put another in plain water and compare the results.
2. Visit a ranch and practice mouthing on old ewes or rams. See if the members can determine the correct age.
3. Have a dentist come and discuss why proper dental hygiene is so important.

**REFERENCES:**
SID Sheep Production Handbook

**Author:**
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

66–Sheep, Level III
HOW OLD ARE YOUR SHEEP?
SHEEP, LEVEL III
Activity Sheet 7, Determining the Age of Sheep

A. What is a more common term for determining the age of sheep?
____________________

B. Place a T (for True) or an F (for False) in each blank.

__ 1. A sheep’s age can be determined by looking at its upper jaw.

__ 2. An animal with two pairs of permanent incisors is probably 2 years old.

__ 3. Sheep replace one pair of temporary incisors with a pair of permanent incisors each year for 4 years.

__ 4. A “full mouth” has 5 pairs of permanent incisors.

__ 5. The upper jaw has no incisor teeth in the front.

__ 6. At 5 or 6 years of age, permanent teeth begin to wear down.

__ 7. “Gummers” are baby lambs.

__ 8. All of a lamb’s teeth are small.

C. Using “mouthing” techniques, how old are the following sheep?
HOW OLD ARE YOUR SHEEP?
SHEEP, LEVEL III
Leaders Key, Determining the Age of Sheep

A. What is a more common term for determining the age of sheep?
   mouthing

B. Place a T (for True) or an F (for False) in each blank.

   F  1. A sheep’s age can be determined by looking at its upper jaw.

   T  2. An animal with two pairs of permanent incisors is probably 2 years old.

   T  3. Sheep replace one pair of temporary incisors with a pair of permanent incisors each year for 4 years.

   F  4. A “full mouth” has 5 pairs of permanent incisors.

   T  5. The upper jaw has no incisor teeth in the front.

   T  6. At 5 or 6 years of age, permanent teeth begin to wear down.

   F  7. “Gummers” are baby lambs.

   T  8. All of a lamb’s teeth are small.

C. Using “mouthing” techniques, how old are the following sheep?

   2 years old
   lamb teeth
   4 years old
What Members Will Learn...

ABOUT THE PROJECT:
• How to identify a sick sheep
• Identify the symptoms of sheep diseases
• How to prevent common sheep diseases

ABOUT THEMSELVES:
• Preventive health practices are often most effective
• How the amount and kind of food affects your body

Materials Needed:
• Activity Sheet #8, Sheep Disease Worksheet
• Member Handout #14, Common Sheep Diseases
• Pictures illustrating normal vs. infected tissues/animals of as many of the diseases as possible.

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY
Prevention and control of diseases can be a critical task for many sheep producers. In this lesson, we will discuss some of the common ailments of sheep. We will talk about symptoms and possible treatments; however, the focus will be on prevention. The best cure for any sickness is to prevent it from happening in the first place.

Let’s start with the nutritional diseases. Starvation is the major cause of lamb death in the U.S. In some cases, a ewe may not allow a lamb to nurse, or maybe she doesn’t have enough milk for one or more of her lambs. In the case of multiple births, a less aggressive lamb may not get enough milk. A ewe might develop mastitis or sore mouth on her udder. In either case, it becomes too painful for her to allow her lamb to nurse. The best way to prevent starvation is to pay close attention to the young lambs. Make sure they are getting enough milk. If the ewe can’t take care of it, the lamb may have to be reared artificially. Check the udders of the ewes to make sure they are producing milk and that it is available to the lambs. As you observe the newborn lambs, any that appear weak or thin might be suffering from starvation.

White muscle (stiff lamb) disease is a degeneration of skeletal and cardiac muscle usually occurring from 3 to 8 weeks of age. Lambs appear stiff and often unable to stand or walk. It results when lambs are deficient in

Leader Notes
This lesson is intended for educational use only, not for the basis of diagnosis. When encountering any health management situation, consult your local veterinarian. To get members involved, divide into small groups or assign each member a disease or two a week before this lesson to research and report back to the group. Members can take notes on Activity Sheet #8, “Sheep Disease Worksheet.”
vitamin E and selenium. It can be treated with an injectable vitamin E-selenium solution. It is prevented by providing a selenium supplement in the ewes ration prior to lambing and during lactation. Do not overdose with selenium as toxicity may occur.

Water belly, or urinary calculi, can be a problem in young male sheep. Stones form a blockage in the urethra, in wethers and rams. It is caused by an improper calcium to phosphorous ratio. Symptoms include abdominal discomfort, kicking at the stomach, straining and frequent attempts at urination. The stones usually become lodged in the urethral process as it is the narrowest part of the urinary tract. If the stone is lodged there, that part can simply be snipped off. If the stones cannot be removed, death usually occurs. Blockage may result in rupture of the urethra or bladder. Urinary calculi can be prevented by maintaining the proper calcium to phosphorous ratio in the ration. Also, keep an adequate salt and water supply available. Urination on a regular basis will remove the stones before they become large enough to cause problems.

Acidosis (founder) usually occurs in sheep that have recently been switched to a high concentrate ration. This causes the rumen bacteria to die, and the acid/base relationship becomes imbalanced. Sheep suffer from discomfort, get depressed and may die. To treat the animal, the rumen must be emptied. Administering mineral oil, antacids and electrolytes may help. To prevent lactic acidosis, do not expose the sheep to large amounts of concentrates if they aren’t used to it. When changing rations, do so gradually, allowing the sheep’s stomach time to adjust.

Polio is a disease of the central nervous system. It usually occurs in feeder lambs on a high concentrate diet. It is caused by a thiamine deficiency. Symptoms include blindness, staggering, and depression as a result of brain deterioration. Treatment is a thiamine (vitamin B1) injection. To prevent polio, avoid feeding moldy concentrates and avoid rapid increases in the concentrate portion of the ration.

Sheep are ten times more susceptible to copper toxicity than cattle. It is closely associated with low molybdenum levels. Once the toxic level is reached, red blood cells are destroyed, resulting in death. Copper poisoning is prevented by monitoring the copper levels in the ration. Symptoms include the rapid onset of anemia, accelerated respiration, thirst and weakness. The skin and mucous membranes may become bright yellow.

Pregnancy toxemia (ketosis, twin lamb disease) is a metabolic disorder of overly thin or fat ewes in late gestation. It is caused by a diet deficient in energy (for multiple fetuses). Ewes will lag behind, grind their teeth and often go down. Treatment includes glucose intravenously or oral propylene glycol. It is easily prevented by providing the proper nutrition to ewes in late gestation. Excessive environmental stress may also increase the occurrence of ketosis.
**Activity**

When sheep are grazed on lush pastures, it may result in low magnesium levels; a disease called grass tetany. Symptoms include loss of appetite, stiff gait, staggering, twitching and convulsions. It can be treated with magnesium sulfide or magnesium oxide. To prevent grass tetany, make sure a mineral supplement with high magnesium levels is available when pastures are lush.

Hypocalcemia (milk fever) is the result of low calcium levels during lactation. Ewes are hyper-excitabale and may regurgitate food through the nostrils. It can be treated by administering calcium borogluconate. From a nutritional standpoint, be aware of the increased calcium demand put on the ewe by the nursing lambs.

Prussic acid (cyanide) poisoning occurs when sheep are grazing on sorghum or sudan hybrids during conditions of drought or frost. The result is death by asphyxiation. If detected early enough, sodium thiosulfate may neutralize cyanide. Prevent by avoiding exposure to drought or frost stressed sorghum or sudan hybrids.

Most of the nutritional diseases are the result of improper levels of some nutrient. Take the time to monitor the needs of your sheep. Be sure that your ration meets those needs and you shouldn’t have much trouble with nutritional diseases.

Enterotoxemia type C (bloody scours) and type D (overeating) are diseases of young lambs. Type C causes diarrhea, convulsions and abdominal pain. Type D is more likely to cause death. An injection of C&D + Tetanus (one to the ewe prior to lambing and a booster to the lamb) should prevent enterotoxemia and tetanus. The cause of enterotoxemia is a clostridial organism.

Tetanus (lockjaw) is another clostridial disease associated with docking and castration. Signs include stiffness and labored breathing. Prevent tetanus through cleanliness and vaccination with C&D + Tetanus. To prevent these and other clostridial diseases (black leg, malignant edema) a 7-way or 8-way vaccine can be used.

Navel ill is a bacterial infection of the navel. Bacteria, such as E. coli gain entrance to the abdominal cavity through the navel of newborn lambs. Proper sanitation will prevent this problem. Also, dipping or spraying the navel with an iodine solution will help prevent navel ill.

Scours (diarrhea) in young lambs may be caused by a variety of factors. Bacteria, such as E. coli, unsanitary conditions and changes in diet may be the leading causes. The major symptom is diarrhea, and this may lead to thin, weak lambs. Lambs with scours need to be rehydrated with liquids and electrolytes. A variety of things can be done to help prevent scours. Proper sanitation may do as much as anything. Some producers feed antibiotics (terramycin) or sulfas to pregnant ewes just prior to lambing.
Lambs must receive colostrum to aid their immune system in combating scours.

Several diseases may cause abortion in sheep including salmonellosis, leptospirosis and listeriosis. We will only discuss the three major abortificants. In the case of any abortions, it is imperative to remove the aborted fetuses so the pregnant ewes will not come in contact with them.

Enzootic abortion (EAE) is commonly vaccinated for. It is caused by a chlamydia organism that may also affect humans. Usually it will cause a large number of ewes to abort during late gestation. In addition to the vaccine, feeding aureomycin or terramycin during the entire gestation period may help prevent EAE.

Vibriosis (not the same as cattle vibriosis) is the other abortion disease that is commonly vaccinated for. It is caused by a camplyobacteria. Symptoms include abortions in late gestation and stillborn or weak lambs. It is usually controlled by vaccination prior to breeding. Always vaccinate new additions to the flock.

Toxoplasmosis is another common abortion disease of sheep. It is caused by a coccidial organism. It is carried by domestic cats and may be a human health risk as well. It is spread when cats excrete feces into the feed supply. It may be prevented by feeding rumensin and tetracycline. It helps to keep a constant cat population. Avoid introducing new cats to the established population and get rid of any feral cats. Try to keep cats away from the feed supply.

Blue tongue is caused by a virus and is transmitted by a biting insect. It causes a leakage in blood vessels resulting in swelling of the extremities (above the hooves, ears, etc.). Fever may be present as well as lesions on the lips and face. Lameness and loss of condition may result. It may cause sterility in rams. There is no treatment except easing the secondary symptoms. There are vaccinations available; however, there are several strains of the blue tongue organism, making prevention difficult.

Caseous lymphadenitis commonly affects old ewes. It is an infectious, contagious disease of the lymph system. Signs include boils and abscesses. Treat by lancing and draining the abscesses and cleaning them with iodine. Often, this disease is only diagnosed after slaughter.

Ovine progressive pneumonia (OPP) is another common disease of old ewes. It is a slowly developing disease caused by a retrovirus. It is often transmitted to nursing offspring who will develop symptoms later in life. The retrovirus damages lung tissue. Infected individuals often have a mild cough, nasal discharge and labored breathing as well as being thin and unthrifty. There is no treatment. Prevent it by not buying infected breeding stock. A blood test is available and infected sheep can be culled. In some cases, OPP does not cause enough economic loss to make it worth the effort to eradicate it.
Pneumonia is a common cause of baby lamb death. There are various bacterial and viral organisms that affect stressed lambs. Symptoms include coughing and abnormal breathing (rattling). Treatment options include sulfas, terramycin and penicillin. Prevention primarily involves management. Reduce as much of the stress on baby lambs as possible. Insure colostrum intake by newborn lambs.

If pneumonia is suspected, call a veterinarian for proper diagnosis and treatment. Prolonged coughing may cause rectal prolapse (protruding rectum) which is also associated with high concentrate feeding and short docking; both common in show lambs.

Mastitis (blue bag) may affect ewes during lactation. Bacteria infects the udder causing it to become hard, sore and swollen in conjunction with a high fever. Often, lambs won’t be allowed to nurse. A treatment (streptomycin) is available; however, infected ewes should be culled as part or all of their udder may be permanently damaged. Proper sanitation is the best preventative measure.

Foot rot is a highly contagious disease caused by the interaction of two bacteria (dichelobacter modosus and fusobacterium mecophorum) and the proper environmental conditions. It occurs in warm damp areas in the presence of foot injuries or untrimmed hooves. The most conspicuous symptom is lameness. Treatment is at least 90% trimming hooves. There are also foot baths available. Prevent foot rot by regularly trimming hooves and avoiding muddy conditions. A vaccine is available (Footvax) that may aid in prevention. At all costs avoid purchasing stock from a breeder known to have a problem with foot rot.

Ram epididymitis is a venereal disease caused by a brucella ovis organism. It causes hardening and scaring of the epididymis and testicles. This leads to poor conception rates and sterility. There is no treatment. It is generally spread through homosexual activity between rams. There is a blood test available. Rams should be tested annually. Infected individuals should be isolated immediately and culled.

There are many other diseases that can affect sheep. Some (sore mouth and club lamb fungus) are discussed in other lessons. When designing a disease prevention program, consider the possible economic loss and compare that to the cost of the preventative measure. It may not be economically feasible to try to prevent every single disease. Proper nutrition and sanitation will greatly reduce many health risks. Consult your local veterinarian when designing a health program for your sheep.

**DIALOGUE FOR CRITICAL THINKING:**
**Share:**
1. Have your sheep contracted any diseases? Which ones? What did you do to remedy it?
<table>
<thead>
<tr>
<th>Leader Notes</th>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. What is the easiest thing that YOU can do to keep your sheep healthy?</td>
<td></td>
</tr>
</tbody>
</table>

**Process:**
3. Are nutritional diseases preventable? How?
4. What is the first thing to do if you notice your lamb is not healthy? Then what?

**Generalize:**
5. Are other livestock prone to these diseases?
6. Are there sheep diseases that you can contract?

**Apply:**
7. What can you do to maintain your own good health?

**GOING FURTHER:**
1. Visit a veterinarian’s office and watch treatment of diseases.

**REFERENCES:**
SID Sheep Production Handbook

**Author:**
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**
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Sheep Design Team
# COMMON SHEEP DISEASES

**SHEEP, LEVEL III**

Activity Sheet #8, Sheep Disease Worksheet

<table>
<thead>
<tr>
<th>Disease</th>
<th>Prevention</th>
<th>Symptoms</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

77–Sheep, Level III
## COMMON SHEEP DISEASES
### SHEEP, LEVEL III
Member Handout #14, Common Sheep Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>Prevention</th>
<th>Symptoms</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Muscle (Stiff lamb)</td>
<td>Vitamin E and selenium supplement in ewe ration</td>
<td>3- to 8-week old lambs are stiff and unable to walk</td>
<td>Inject selenium solution</td>
</tr>
<tr>
<td>Water Belly (urinary calculi)</td>
<td>Maintain proper calcium to phosphorus ratio in ration</td>
<td>abdominal pain, kicking at stomach, straining and frequent attempts to urinate (wethers and rams)</td>
<td>Remove stones from urethra</td>
</tr>
<tr>
<td>Acidosis (founder)</td>
<td>Adjust ration to high levels of concentrates gradually</td>
<td>discomfort, depression, death</td>
<td>Empty rumen by giving mineral oil, antacids, or electrolytes</td>
</tr>
<tr>
<td>Pregnancy toxemia (ketosis, twin lamb disease)</td>
<td>proper energy level ration for ewes in late gestation, minimize environmental stress</td>
<td>Ewes lag behind, grind teeth, go down</td>
<td>Intravenous glucose, oral propylene glycol</td>
</tr>
<tr>
<td>Grass tetany</td>
<td>High magnesium supplement when pastures are lush</td>
<td>Loss of appetite, stiff gait, staggering, twitching, convulsions</td>
<td>magnesium sulfide or oxide</td>
</tr>
<tr>
<td>Hypocalcemia (milk fever)</td>
<td>Be aware of increased calcium needs by nursing ewes</td>
<td>ewes are hyperexcitable, may regurgitate food through nostrils</td>
<td>calcium borogluconate</td>
</tr>
<tr>
<td>Prussic acid poisoning (cyanide)</td>
<td>Do not graze or feed drought or frost stressed sorghum or sudan hybrids</td>
<td>death or going down immediately after grazing</td>
<td>sodium thiosulfate</td>
</tr>
<tr>
<td>Enterotoxemia Type C (bloody scours) Type D (overeating)</td>
<td>Injection of C &amp; D to ewe prior to lambing and to lamb</td>
<td>Type C—diarrhea, convulsions Type D—death</td>
<td>antitoxin</td>
</tr>
<tr>
<td>Scours (diarrhea)</td>
<td>Proper sanitation—feed antibiotics or sulfas to pregnant ewes prior to lambing Colostrum fed to lamb</td>
<td>diarrhea, thin weak lambs</td>
<td>Rehydrate with liquids and electrolytes</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Reduce stress on newborn lambs, ensure colostrum intake</td>
<td>coughing, abnormal breathing (rattling)</td>
<td>Sulfas, Terramycin, Penicillin</td>
</tr>
<tr>
<td>Mastitis (blue bag)</td>
<td>Cull ewes, proper sanitation</td>
<td>Hard, swollen, sore udder Fever</td>
<td>Streptomycin</td>
</tr>
</tbody>
</table>
Calculating Percent Lamb Crop
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• The definition of percent lambing crop
• How to calculate percent lambing crop

ABOUT THEMSELVES:
• The value of formulas and ratios
• Importance of evaluation

Materials Needed:
• Activity Sheet #9, Percent Lamb Crop Formula
• Calculator
• Flip chart and markers

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

You may have heard many sheep producers talking about their lamb crop percentage. Just what are they talking about?

Reproductive efficiency often determines the profit or loss of a sheep operation. An accurate measure of reproductive efficiency is lamb crop percentage.

In most, but not all, sheep operations, the producer strives for as high a lamb crop percentage as possible. Other operations try to optimize lamb crop percentage. In other words, they take environment and the milking ability of the ewes into consideration. They want as many lambs as the ewes are capable of raising. The optimum may be as low as 100% or higher than 200% depending on the environment and type of ewe.

In simplest terms, lamb crop percentage can be calculated by dividing the number of lambs born by the number of ewes exposed to rams and multiplying by 100. Example: 30 lambs born / 20 ewes exposed × 100 = 150% lamb crop. Does this really tell us much about reproductive efficiency? It doesn’t tell us how many lambs died before reaching market age, or how many open ewes we had. When determining efficiency, open ewes need to be considered as we are feeding these ewes and they aren’t producing anything to pay for themselves. The lambs of other ewes must make up for them.

A more accurate method of calculating lamb crop percentage is as follows: number of live lambs (lambs born—lamb death loss) / number of
ewes exposed × 100. Let’s consider that same flock with 30 lambs born. Let’s say 5 lambs died shortly after birth. The new lamb crop percentage would be \((30–5 = 25) / (20) \times 100 = 125\%\) lamb crop. Although it doesn’t sound as good as telling someone you had a 150\% lamb crop, it is probably a more accurate account of your efficiency.

Some producers also calculate \% lamb crop weaned by dividing the number of weaned lambs by the number of ewes exposed and multiplying by 100.

1. If you had 40 ewes and they raised 70 lambs, what is your percent lamb crop? Ans: \(70 / 40 = 175\%\)

2. If those ewes only raised 50 lambs, what is your percent lamb crop? Ans: \(50 / 40 = 125\%\)

3. If your ewe flock had 4 sets of triplets, 26 sets of twins and 13 singles, what is your percent lamb crop? Ans: \(12 + 52 + 13 / 43 = 179\%\)

4. Referring to question 3, assume that 7 lambs died at birth and what is your percent lamb crop? Ans: \(70 / 43 = 162.8\%\)

5. Calculate the percent lamb crop for your own flock from this year.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. What was the most difficult part of the lamb crop percentage formula?

**Process:**
2. Why is it important to know your \% lamb crop?

3. Why do you often have over 100\% lamb crop?

**Generalize:**
4. What are some other formulas or ratios that you use often?

5. What other areas of your life do think you should evaluate every year?

**Apply:**
6. How and when will you use evaluations in the future?

**REFERENCES:**

**Author:**
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

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Sheep Design Team

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80–Sheep, Level III
CALCULATING PERCENT LAMB CROP
SHEEP, LEVEL III
Activity Sheet # 9, Percent Lamb Crop Formula

Number of Lambs Born ...............................................................

Subtract Death Loss of Lambs .....................................................

A. TOTAL NUMBER OF LAMBS WEANED ..................................

B. TOTAL NUMBER OF EWES EXPOSED ..................................

A. TOTAL NUMBER OF LAMBS WEANED  X 100 = ________% LAMB CROP
B. TOTAL NUMBER OF EWES EXPOSED
Production Record Keeping
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• Ewe production records
• How to determine average daily gain and adjusted weaning and market weights

ABOUT THEMSELVES:
• Importance of record keeping in their lives
• Role of computers in record keeping

Materials Needed:
• Activity Sheet #10, Flock Production (2 pages)
• Activity Sheet #11, Ewe Production Record (P-1074) (2 pages)
• Leader Key, Flock Production

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Record keeping is an extremely important part of any successful sheep operation. In addition to production records, such as weight gains and lambing record, financial records are a must. The successful sheep operator needs to record all income generated by the sheep flock as well as any sheep related expenses. By doing this, the producer can determine profitability as well as find areas where expenses could be cut. In earlier lessons, we talked about basic record keeping of income and expenses and sheep identification. Therefore, we’ll concentrate this lesson on production records.

We keep records on those traits which we deem valuable, such as weight or fleece weight. Those records aid us in selection. Hopefully, the records will help us improve the genetics of our flock.

Production starts at birth, consequently, most record keeping systems are geared around lambing time. The type and amount of records kept depends on the operation. Let’s review an example of the type of records that might be kept.

The first column is for lambing date or birth date. The second is for ewe identification. If you plan on registering the lambs, you’ll need sire and dam ID as well as birth date, sex and birth type (single, twin, triplet). The
This information, plus lambing information, can be recorded on the standard Ewe Production Record (P-1074).

You could add an adjusted weaning weight column to your form or use ewe production record.

If fleece quality is important to the operation, those records would be kept at shearing time. You might choose to record traits such as fleece weight or wool grade.

In most sheep operations, lambs are sold based on weight. Therefore heavier lambs and ewes and rams that produce heavier lambs are more valuable. In addition, faster gaining lambs are more efficient, thereby increasing the chance for profitability. When selecting replacements, you also need to use visual evaluation as some important traits aren’t kept in the record book such as structural correctness or breed character. Using either visual evaluation or records alone when selecting replacements leaves too much room for error and may slow your progress.

If one lamb is older than another when weighed, how do we accurately compare these weights? Simply calculate a corrected weight. For example, we might wean our lambs at approximately 90 days of age. Generally, all lambs are weaned at once. Since not all were born on the same day, there will be a discrepancy in ages. If we weigh the lambs and don’t correct the weights to a common age, the older lambs would have an unfair advantage. Since we recorded the lambs birth date and the date which they were weaned (weighed), we can figure out exactly how many days old each lamb is. Next take the lamb’s weaning weight and subtract the birth weight. This gives us the weight gained from birth to weaning. Divide the weight gain by the days of age to get pre-weaning average daily gain. Multiply pre-weaning average daily gain by 90 and add the birth weight back in to get the corrected 90-day weight. If you do this for all the lambs, you can compare their weights on an equal basis.

Let’s work a problem from the sample record sheet. We’ll calculate lamb 95-01’s corrected 90-day weaning weight. She was born on February 5th and weaned on May 2nd, making her 86 days old. Her weaning weight (98 lbs) minus her birth weight (10 lbs) equals 88 pounds. Eighty-eight divided by 86 equals 1.02 lbs/day (pre-weaning average daily gain). Multiply 1.02 by 90 and add 10 (birth weight) to get the corrected 90-day weight of 101.8 pounds.

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ACTIVITY

Post-weaning average daily gain can be calculated by figuring the age in days at the end of the feeding period (when weighed) and subtract 90. Then take the end weight and subtract the corrected 90-day weight to get post-wean weight gain. Divide the weight difference by the age difference to get post-wean average daily gain.

Let’s use our sample lamb 95-01 again. February 5th to June 5th is 120 days. One hundred twenty minus 90 equals 30 days. End weight of 130 lbs. minus adjusted 90-day weight of 102 lbs equals 28 lbs. Twenty-eight divided by 30 equals .93 lbs/day post-wean average daily gain.

A corrected end weight could also be calculated in the same manner as the corrected weaning weight. Not all producers record birth weight. Since differences in birth weight are usually very small, many producers don’t bother to adjust for it. Also, weights could be adjusted for sex of lamb as males tend to be heavier (in many cases, males and females are not compared to each other anyway). Weights can be adjusted for how the lamb was reared (single, twin, triplet). Single lambs tend to be heavier at weaning as they have no competition for mother’s milk. Weights could also be adjusted for age of dam. Very old ewes and first time lambers may not milk as well as mature two- to five-year-old ewes.

Keep in mind that the more records you keep and the more intensive your operation, the more accurate you will be; however, it also means more time and labor. Each producer needs to compare the relative value of accuracy with the cost of attaining that accuracy. Every situation is different. Each operator must find a system that works best for him/her.

In another lesson, we’ll discuss more complex uses for records such as performance testing, ratios and expected progeny differences (EPDs).

DIALOGUE FOR CRITICAL THINKING:

Share:
1. What type of flock production records do you keep? Why?

2. What calculations were the most difficult? Why?

Process:
3. What is the significance of average daily gain?

4. Why are adjusted weights important?

5. Why are production records important?

Generalize:
6. What other records do you keep? Why?

Apply:
7. How will the use of computers assist you in record keeping in the future?
GOING FURTHER:
1. Check out or visit various computerized record keeping systems.

REFERENCES:
Authors:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
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Sheep Design Team
# PRODUCTION RECORD KEEPING
## SHEEP, LEVEL III
### Activity Sheet #10, Flock Production

### Barn Book Data 1995

<table>
<thead>
<tr>
<th>Date</th>
<th>ewe ID</th>
<th>lamb #</th>
<th>sex</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2/5</td>
<td>91-15</td>
<td>F</td>
<td>aggressive lambs, ewe is good milker</td>
</tr>
<tr>
<td>2.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>F</td>
<td>&quot;</td>
</tr>
<tr>
<td>3.</td>
<td>&quot;</td>
<td>93-01</td>
<td>M</td>
<td>lamb has inverted eye lids, assisted birth</td>
</tr>
<tr>
<td>4.</td>
<td>2/7</td>
<td>89-04</td>
<td>F</td>
<td>good lambs</td>
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<tr>
<td>5.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>M</td>
<td>&quot;</td>
</tr>
<tr>
<td>6.</td>
<td>&quot;</td>
<td>91-11</td>
<td>M</td>
<td>ewe won’t let lambs nurse</td>
</tr>
<tr>
<td>7.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>lamb died</td>
</tr>
<tr>
<td>8.</td>
<td>2/8</td>
<td>90-13</td>
<td>M</td>
<td>lamb’s twin was born dead</td>
</tr>
<tr>
<td>9.</td>
<td>2/10</td>
<td>91-07</td>
<td>F</td>
<td>good lambs</td>
</tr>
<tr>
<td>10.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>M</td>
<td>&quot;</td>
</tr>
<tr>
<td>11.</td>
<td>2/13</td>
<td>92-12</td>
<td>F</td>
<td>ewe doesn’t have enough milk</td>
</tr>
<tr>
<td>12.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>M</td>
<td>95-11 &amp; 95-12 bottle raised</td>
</tr>
<tr>
<td>13.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>M</td>
<td>&quot;</td>
</tr>
<tr>
<td>14.</td>
<td>2/15</td>
<td>92-04</td>
<td>F</td>
<td>good lambs</td>
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<tr>
<td>15.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>lamb died</td>
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### Weight Data for 1995 Lambs

<table>
<thead>
<tr>
<th>Birth wt</th>
<th>wean wt</th>
<th>wean date</th>
<th>end wt</th>
<th>end date</th>
<th>sire ID</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>10</td>
<td>98</td>
<td>5/2</td>
<td>130</td>
<td>6/5 KSU “Big Bucks”</td>
</tr>
<tr>
<td>2.</td>
<td>9</td>
<td>95</td>
<td>&quot;</td>
<td>129</td>
<td>&quot;</td>
</tr>
<tr>
<td>3.</td>
<td>18</td>
<td>111</td>
<td>&quot;</td>
<td>147</td>
<td>&quot;</td>
</tr>
<tr>
<td>4.</td>
<td>8</td>
<td>88</td>
<td>&quot;</td>
<td>120</td>
<td>&quot; Roberts “27B”</td>
</tr>
<tr>
<td>5.</td>
<td>11</td>
<td>94</td>
<td>&quot;</td>
<td>128</td>
<td>&quot;</td>
</tr>
<tr>
<td>6.</td>
<td>13</td>
<td>72</td>
<td>&quot;</td>
<td>113</td>
<td>&quot; KSU “Big Bucks”</td>
</tr>
<tr>
<td>7.</td>
<td>13</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8.</td>
<td>10</td>
<td>90</td>
<td>5/2</td>
<td>124</td>
<td>6/5 KSU “Big Bucks”</td>
</tr>
<tr>
<td>9.</td>
<td>12</td>
<td>84</td>
<td>&quot;</td>
<td>118</td>
<td>&quot;</td>
</tr>
<tr>
<td>10.</td>
<td>14</td>
<td>88</td>
<td>&quot;</td>
<td>121</td>
<td>&quot;</td>
</tr>
<tr>
<td>11.</td>
<td>6</td>
<td>75</td>
<td>&quot;</td>
<td>125</td>
<td>&quot; Roberts “27B”</td>
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<tr>
<td>12.</td>
<td>8</td>
<td>70</td>
<td>&quot;</td>
<td>110</td>
<td>&quot;</td>
</tr>
<tr>
<td>13.</td>
<td>6</td>
<td>70</td>
<td>&quot;</td>
<td>104</td>
<td>&quot;</td>
</tr>
<tr>
<td>14.</td>
<td>14</td>
<td>102</td>
<td>&quot;</td>
<td>143</td>
<td>&quot; KSU “Big Bucks”</td>
</tr>
<tr>
<td>15.</td>
<td>12</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

---

87–Sheep, Level III
Use the sample record sheet to answer the following questions.

1. Which of the following can be determined using the information on this record sheet (assuming all the sheep in the flock are listed)?

   Y  N  Corrected weaning weight
   Y  N  Corrected end weight
   Y  N  Pre-weaning average daily gain
   Y  N  Post-wean average daily gain
   Y  N  Lamb crop percentage
   Y  N  Which ewe weaned the most total pounds of lamb
   Y  N  How many ewes raised twins
   Y  N  Mean post-wean average daily gain of the offspring of KSU “Big Bucks”
   Y  N  Lamb death loss percentage
   Y  N  Which ewe had the heaviest fleece weight
   Y  N  Ewes that should be culled for poor mothering ability
   Y  N  Lambs that should be culled for structural defects or poor breed character
   Y  N  The average birth weight of the offspring of “Roberts 27B”

2. Calculate the lamb crop percentage (assuming no open ewes or ewe death loss prior to lambing). (If necessary, review the lesson on calculating lamb crop percentage).

3. Which ram lamb had the highest post-wean average daily gain?

4. Rank the ewe lambs in order (highest to lowest) for corrected 90-day weight.

5. Which of the two sires produced offspring with a higher average corrected end (120 day) weight?
PRODUCTION RECORD KEEPING
SHEEP, LEVEL III
Leader Key, Flock Production (continued)

Use the sample record sheet to answer the following questions.

1. Which of the following can be determined using the information on this record sheet (assuming all the sheep in the flock are listed)?
   - [Y] Corrected weaning weight
   - [Y] Corrected end weight
   - [Y] Pre-weaning average daily gain
   - [Y] Post-wean average daily gain
   - [Y] Lamb crop percentage
   - [Y] Which ewe weaned the most total pounds of lamb
   - [Y] How many ewes raised twins
   - [Y] Mean post-wean average daily gain of the offspring of KSU “Big Bucks”
   - [Y] Lamb death loss percentage
   - [N] Which ewe had the heaviest fleece weight
   - [N] Ewes that should be culled for poor mothering ability
   - [Y] Lambs that should be culled for structural defects or poor breed character
   - [Y] The average birth weight of the offspring of “Roberts 27B”

2. Calculate the lamb crop percentage (assuming no open ewes or ewe death loss prior to lambing). (If necessary, review the lesson on calculating lamb crop percentage).
   \[
   \frac{13}{8} \times 100 = 163\%\]

3. Which ram lamb had the highest post-wean average daily gain?
   95-06

4. Rank the ewe lambs in order (highest to lowest) for corrected 90-day weight.
   1. 95-13 (118.2)
   2. 95-01 (101.8)
   3. 95-02 (99.0)
   4. 95-04 (93.7)
   5. 95-08 (92.0)
   6. 95-10 (85.6)

5. Which of the two sires produced offspring with a higher average corrected end (120 day) weight?
   KSU “Big Bucks”
**PRODUCTION RECORD KEEPING**

**SHEEP, LEVEL III**

Activity Sheet 11, “Ewe Production Record”

---

**Ewe Flock Number ___________________**  

**Registration Number ___________________**  

**P-1074**

---

### INFORMATION ON EWE

<table>
<thead>
<tr>
<th>SIRE</th>
<th>BIRTH DATE</th>
<th>BIRTH WEIGHT</th>
<th>FLOCK NUMBER</th>
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</table>

<table>
<thead>
<tr>
<th>DAM</th>
<th>WEANING DATE</th>
<th>WEANING WEIGHT</th>
<th>REG. NO.</th>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>TYPE BIRTH</th>
<th>120 DAY WEIGHT</th>
<th>YRL. WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Shearing Date**

**Fleece Weight**

---

### LAMBING RECORD

<table>
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<tr>
<th>Year</th>
<th>Flock #</th>
<th>Reg. #</th>
<th>Sire #</th>
<th>Birth Date</th>
<th>Birth type</th>
<th>Birth Weight</th>
<th>Sex</th>
<th>How Reared</th>
<th>Days of Age &amp; Date Weighed</th>
<th>Actual Weaning Weight</th>
<th>'120 day adjusted weight</th>
<th>'Sale Wt.</th>
<th>Yrl. Wt.</th>
<th>Creep Fed</th>
<th>Carcass Info.</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

---

*Use separate “Ewe Production Record” for each ewe in the purebred or commercial phase of the sheep project. You may insert additional copies of this form in your 4-H Sheep Record if the ewe remains in the flock for more than 5 years. This form should be kept current with each year the ewe remains in the project.

'Adjusted weight (explained on next page or back of record)

'Secondary weight for replacements (next page or back of record)
1. If the lamb is not kept as replacement stock, circle weight and record that weight. Replacement stock should be weighed when approximately 1 year of age and that weight recorded.

2. Adjusted weights are used to standardize weights of lambs. A ram lamb is expected to weigh more than a wether lamb or a ewe lamb. Also, a 3- to 6-year-old ewe is considered in her prime and is expected to supply more milk than a yearling ewe or a ewe over 6. Single lambs have access to more milk and should weigh more at weaning than a lamb raised as a twin. A conversion table is show on the right.

### ADJUSTMENT FACTORS

Multiply 120-day corrected weight by the appropriate factor.

<table>
<thead>
<tr>
<th>Age of Dam</th>
<th>3 to 6 yrs. old</th>
<th>2 yrs. old or over 6 yrs. old</th>
<th>1 yr. 0</th>
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<tbody>
<tr>
<td><strong>Ewe Lamb</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>1.00</td>
<td>1.09</td>
<td>1.22</td>
</tr>
<tr>
<td>Twin—raised as twin</td>
<td>1.11</td>
<td>1.20</td>
<td>1.33</td>
</tr>
<tr>
<td>Twin—raised as single</td>
<td>1.05</td>
<td>1.14</td>
<td>1.28</td>
</tr>
<tr>
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<td>1.22</td>
<td>1.33</td>
<td>1.46</td>
</tr>
<tr>
<td>Triplet—raised as twin</td>
<td>1.17</td>
<td>1.28</td>
<td>1.42</td>
</tr>
<tr>
<td>Triplet—raised as single</td>
<td>1.11</td>
<td>1.21</td>
<td>1.36</td>
</tr>
<tr>
<td><strong>Wether</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>.97</td>
<td>1.06</td>
<td>1.19</td>
</tr>
<tr>
<td>Twin—raised as twin</td>
<td>1.08</td>
<td>1.17</td>
<td>1.30</td>
</tr>
<tr>
<td>Twin—raised as single</td>
<td>1.02</td>
<td>1.11</td>
<td>1.25</td>
</tr>
<tr>
<td>Triplet—raised as triplet</td>
<td>1.19</td>
<td>1.30</td>
<td>1.43</td>
</tr>
<tr>
<td>Triplet—raised as twin</td>
<td>1.14</td>
<td>1.25</td>
<td>1.39</td>
</tr>
<tr>
<td>Triplet—raised as single</td>
<td>1.08</td>
<td>1.18</td>
<td>1.33</td>
</tr>
<tr>
<td><strong>Ram Lamb</strong></td>
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<td></td>
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<tr>
<td>Single</td>
<td>.89</td>
<td>.98</td>
<td>1.11</td>
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<td>Twin—raised as twin</td>
<td>1.00</td>
<td>1.09</td>
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<td>Twin—raised as single</td>
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<td>1.35</td>
</tr>
<tr>
<td>Triplet—raised as twin</td>
<td>1.06</td>
<td>1.17</td>
<td>1.31</td>
</tr>
<tr>
<td>Triplet—raised as single</td>
<td>1.00</td>
<td>1.10</td>
<td>1.25</td>
</tr>
</tbody>
</table>

Example: To find the adjusted 120-day weight of a twin-born and reared ram lamb from a 2-year-old ewe that weighed 90 pounds at 110 days of age, make the following calculations:

\[
\frac{90 \text{ lbs}}{110 \text{ days of age}} = \frac{.82 \text{ lbs} \times 120}{98 \text{ lbs} \times 1.09} \text{ (adjustment factor)} = 107 \text{ lbs}
\]

The adjusted 120-day weight of the lamb would be 107 lbs.
Flock Handling Facilities and Equipment

Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
- How much space is needed per lamb when building
- The ideal facilities and what each should include

ABOUT THEMSELVES:
- Prior planning is essential for efficiency

Materials Needed:
- Member Handout #15, Small Flock Layout
- Member Handout #16, Flock Layout for up to 300 Ewes
- Member Handout #17, Footbaths
- Member Handout #18, Sheep Squeezes
- Member Handout #19, Headgate and Sheep Chair
- Member Handout #20, Blocking Stand
- Member Handout #21, Weigh Crate

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

In a previous lesson, we discussed some basics about sheep handling and equipment, mostly concerning space requirements. In this exercise, we’ll discuss working facilities in a little more detail, as well as look at some example illustrations of facilities, and some specific handling equipment. Keep in mind that the cost of building new facilities is usually very high; therefore, most producers are forced to adapt their existing facilities into something that works for them.

Nearly all effective and efficient sheep handling set ups have a few things in common. The system should have a directional flow, as sheep move through each part until they exit, having been treated, sorted or weighed. Sheep are gathered into holding pens, moved into smaller crowding pens and forced into a treatment chute. Sheep move single file through the chute and pass through a sorting gate where they are separated into two or more sorting pens. The system should be designed to keep the sheep moving forward on their own power with a minimum of prodding or shouting. This decreases the labor and stress for the owner and reduces the chance of injury to the sheep.
The gathering pen should allow five to six square feet per ewe (three to four per lamb) in the flock. If the pen is too large, too much time will be spent chasing the sheep back and forth. If the pen is too small, crowding can lead to injury. The pen should be located to allow easy access from all outlying pastures or lots. The shape is also important. Sharp corners should be avoided as sheep tend to huddle in them rather than keep moving. Rectangular pens tend to work better than square ones. Gathering pens are usually fairly large; therefore, for efficiency sake, many operators have multiple uses for this area when not working or sorting sheep. Fences and gates should be open (as opposed to solid) to allow light into the pen and reduce shadows.

Fences should be high enough to discourage jumping (as this may cause broken legs). Fence height depends on the size and temperament of your sheep. Some larger framed breeds may require fences that are four or even five feet high. There is nothing more frustrating than chasing a single sheep that has escaped the pen and disrupted your sorting.

The crowding or forcing pen is the most neglected, over-looked part of most facilities. It is vital for efficiently moving sheep into the chute. A poorly designed forcing pen is worse than none at all. Walls (fences and gates) should be solid, giving the sheep the idea that the only way out is through the chute. Most producers allow a four inch gap at the bottom to allow movement of air water and manure out of the pen. For small flocks, a semi-circular pen with a swinging gate to force the sheep into the chute works well.

The chute should allow the sheep to move through in single file, and be narrow enough that the sheep can’t turn around. Sorting gates are strategically placed along the chute (especially at the end) to allow sheep to be sorted into different pens. Chutes with adjustable sides (for width) allow lambs (or smaller sheep) to be worked just as efficiently as larger sheep.

The sorting gate(s) is the most important moving gate in the entire system. It should be easy to use, quick, safe and effective. It must be lightweight, durable and securely hinged. It should move freely and not have pointed edges.

Some chutes have rope operated drop gates which can be lowered into the chute to stop the flow of sheep. Other chutes may have spring-loaded, one-way gates that allow sheep to push their way forward but not back up.

The sorting pens should allow the same square feet per head as the gathering pen; however, they don’t need to be as large because you’ll likely have only a small portion of the flock in each one. In these, or any other pens for that matter, gates work best when located in the corners.

In some operations, an elevated loading dock (permanent or portable) is attached to the end of the working chute or a separate forcing pen. This
ACTIVITY

allows sheep to be loaded into trucks or elevated trailers without lifting. An elevated dock or ramp may also be needed for forcing sheep into dipping vats.

Scales for obtaining weights are a necessity for most sheep operations. In most cases, the treatment chute has a section where the scale can be placed. You need to design a small crate that will hold one sheep at a time on the scale. The crate should allow the lamb to enter one end and out the other without disrupting the flow.

In some cases, a head gate or squeeze chute may be placed at the end of the treatment chute for cases when sheep need to be restrained. There are several designs available. Any of the devices should be safe for both owner and sheep as well as effectively restrain the sheep and provide access for the producer to treat the sheep. Some sheep squeeze devices tilt the sheep on its side. Others such as sheep chairs or cradles flip the sheep on to their dock or upside down. They need to be designed to fit the physical size of the sheep in your operation.

Some operations have footbaths for preventing and treating foot rot. The bath is built to hold a liquid chemical solution (zinc sulfate, etc.) and should fit inside the working chute. It should be six to eight inches deep. Sheep do not like standing in or walking through water, so the bath must be placed where it allows the sheep no other place to walk. Preferably, the bath should be removable so the sheep won’t smell it every time they use the chute, as it could make them reluctant to move through the working system.

Small portable chutes may be designed for shearing time. The chute should have solid walls except where the shearer is located. The shearer should be able to reach over and pull the sheep out of the chute and into the shearing position in one smooth motion. Many sheep shearsers have their own such chute, or they may be able to help you design one convenient for them.

Many operations utilize sheep blocking stands. Mostly they are used for fitting sheep for shows. However, they may be used to restrain sheep for other purposes. Some rams may be too large to shear the conventional way so they are shorn standing on a sheep stand. Sheep stands are generally made of metal. Some stands are a permanent height while others use hydraulic jacks to adjust the height of the sheep. These are more expensive. However, less work is needed to lift the sheep on to the stand.

DIALOGUE FOR CRITICAL THINKING:

Share:
1. Which part of the handling equipment was most confusing?
2. Have you ever worked sheep without the proper facilities? Describe the facilities and what happened.
**Leader Notes**

**ACTIVITY**

**Process:**
3. What part do you think even the most basic facilities need? Why?

4. Why should gates be located at the corners of the pens rather than in the middle of the fence?

5. Why are corners avoided when designing gathering and crowding pens?

6. How does a properly set up facility save money for the producer?

**Generalize:**
7. In what other projects have you had to design or plan something before you started? Did it eventually save you time? How?

**Apply:**
8. What are the advantages of long-term planning?

9. How will long-term planning or goal setting affect your efficiency?

**GOING FURTHER:**
1. Visit an equipment manufacture and see how equipment is designed and produced.

2. Visit a sheep farm and view their facilities and have the owner explain why it is designed the way it is.

**REFERENCES:**
SID Sheep Production Handbook
Sheep Housing and Equipment Handbook, Midwest Plan Service

**Author:**
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
A simple layout for small flocks. Gathering pen holds 60+ ewes. Treat/sort chute holds 3+ ewes. Preferably, expand by lengthening treat/sort chute from 9 feet to 18 feet or 27 feet. Setup will then handle 200+ ewes. Sort pens 1 and 2 will need to be lengthened, and a “pre-gathering” pen added to hold the larger flock. Approximately 24 × 50 feet.
A possible simple layout for small flocks. Gathering pen holds 60+ ewes. Treatment chute holds 3+ ewes. Simply by lengthening treatment chute from 9 feet to 18 feet or 27 feet, twice as long, setup will handle 20+ ewes. By adding the extra pre-gathering pen (as illustrated) and increasing length of sort pens, setup will handle 300+ ewes.
FLOCK HANDLING FACILITIES AND EQUIPMENT
SHEEP, LEVEL III
Member Handout #17, Footbaths

WOOD FOOTBATH

![Wood Footbath Diagram]

Cutting List

<table>
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<th>Item No.</th>
<th>Description</th>
<th>Item No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>A 1</td>
<td>2 x 12 x 16' - 0&quot;</td>
<td>F 3</td>
<td>2 x 4 x 6' - 0&quot;</td>
</tr>
<tr>
<td>B 2</td>
<td>2 x 6 x 11 1/2&quot;</td>
<td>G 12</td>
<td>2 x 4 x 4&quot;</td>
</tr>
<tr>
<td>C 6</td>
<td>2 x 4 x 3' - 7&quot;</td>
<td>H 2</td>
<td>3/4&quot; x 24 ext. plywood</td>
</tr>
<tr>
<td>D 6</td>
<td>2 x 4 x 3' - 3&quot;</td>
<td>I 2</td>
<td>1 x 6 x 16' - 0&quot;</td>
</tr>
<tr>
<td>E 2</td>
<td>1 x 8 x 16' - 0&quot;</td>
<td>J 6</td>
<td>4&quot; strap hinges</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K 12</td>
<td>3/8&quot; x 3 1/2&quot; bolts</td>
</tr>
</tbody>
</table>

CONCRETE FOOTBATH SURROUNDING WATERER

![Concrete Footbath Diagram]

Top View

Section

Water Trough

4"

4"

Section
FLOCK HANDLING FACILITIES AND EQUIPMENT

SHEEP, LEVEL III

Member Handout #18, Sheep Squeezes

TILTING SQUEEZES

All pipes are standard size.

All joints are welded.

Panels and floor are 1/2" Ext. Plywood, fastened with 1/4" carriage bolts. Use 5/16" machine bolts in 3/8" holes.

Floor 18 1/2" × 56 3/4"

Back Panel 12" × 51 1/4"

Back Panel 21 1/2" × 51 1/2"

Detail C

Top Panel 8" × 49"

Front 16" 7 1/2"

7 1/2" 3/4" Pipe 123" long

16" 44" Wooden Support Strip

End 36" 4" Steel Angle Frame

Four 1/4" × 1" × 5" Drilled 3/8"

Squeeze Panel

All 1/2" Pipe Except as Noted

100–Sheep, Level III
FLOCK HANDLING FACILITIES AND EQUIPMENT
SHEEP, LEVEL III
Member Handout #19, Headgate and Sheep Chair

HEADGATE

SHEEP CHAIR

Side View

All joints welded.
### Item Description

**A** 1” × 1/8” square tubing  
**B** 1/4” × 1 1/2” × 4 1/2” strap, Brace B to A  
**C** fasten chain stop to this loop  
**D** pass chain over sheep’s head and through this loop  
**E** hook chain on peg  
**F** 1/4” × 40” rod

---

**Head Rest Detail**

**Front View of Blocking Stand**

**Side View**

---

See Detail for Head Rest  
1” Square Tubing  

1” × 1/4” Flat Iron, remove bolt to fold up legs  

Flat Iron Mesh welded to Angle Iron  

1/4” × 1 1/2” × 4 1/2” Angle Iron  

Welded iron loop to angle iron to hold and pivot 1” flat iron brace  

Drill hole in flat iron to pivot and hold brace in position  

Head Rest adjustment  
Weld rod to top of bolt.  
Nut welded to 1 1/2” square tubing
FLOCK HANDLING FACILITIES AND EQUIPMENT
SHEEP, LEVEL III
Member Handout #21, Weigh Crate

Cutting Diagram
1/2" Exterior Plywood
Cut hinge and latch blocks from waste.

Ledgers and Wales
Rip from a dressed 2 x 4

Bill of Materials

<table>
<thead>
<tr>
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Detail of Clamp
(4 Required)

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SHEEP, LEVEL III
Member Handout #21, Weigh Crate

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What Members Will Learn . . .

ABOUT THE PROJECT:
- Three types of sheep operations
- Value of companion grazing

ABOUT THEMSELVES:
- Value of working together for a common purpose
- Benefits of complimentary jobs or careers

Materials Needed:
- Activity Sheet #12, Management Quiz
- Notepad, marker, easel

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Sheep operations can be classified into 3 major types; farm flock, Southwest range and Northwest range. Within each major type, there can be a variety of sub-types.

Let’s discuss the farm flock operation first. As you might expect, farm flocks are typically smaller than range flocks in terms of number of ewes. Sheep are kept in small pastures or lots, as well as grazed on croplands. In many farm flocks, the emphasis is on meat production and/or prolificacy, usually at the expense of wool production. Sheep are usually grazed for 5 to 8 months, and supplemented with hay and grain when grazing is unavailable. Lambing generally occurs in January, February, or March; if barns or sheds are available. In Kansas, several operations also lamb in the fall. Lambs are usually weaned at 50 to 70 days and creep fed to market weight. Shearing occurs generally just prior to lambing. Because the sheep are kept in a smaller area, there is a greater risk of disease; therefore, a good health program is essential. Farm flocks can be purebred, seedstock operations, commercial, crossbred operations or feeder lamb operations.

In Southwest range operations, sheep are generally kept in larger, fenced-in areas. Sheep are grazed all year, with very little supplementation. Often, sheep are grazed in companionship with cattle and goats. These operations raise replacement ewe lambs for farm flocks, produce a few market lambs, but mainly produce feeder lambs. The emphasis is on wool quality. The Southwest range ewe is a small-framed, fine-wooled, Ram-

Leader Notes

Have members describe various types of sheep operations. Make a list. Classify the list after the discussion.

Ask members for farm flock characteristics, then list on flip chart. Use information here to supplement what members list.

Ask members to list characteristics of Southwest range operations.
bouillet-type ewe. Little emphasis is placed on prolificacy. Lambs are born in the spring, usually in unattended pastures; as shed lambing is seldom economically feasible. Lambs aren’t weaned until they are ready to be shipped to market. Shearing occurs once per year, not necessarily prior to lambing. The health program is less intense than in farm flock operations.

The Northwest range operations have similar goals to the Southwest range operations with a few slight differences. They usually consist of large flocks grazed on mountain pastures. These operations utilize public lands for grazing. Wool quality is still emphasized in the ewe flock; however, the ewes are larger framed and more rugged than the Southwest range ewes, so their wool isn’t quite as fine. In these operations, the type of ram may be different depending on the production goals. If they are selling replacements, then wool quality would be important in the rams. However, many of these operations produce market lambs by using a terminal cross sire. Then, there would be more emphasis on meat production. Lambs are usually pastured along with the ewes. Lambing occurs in late spring in small pastures or sheds. These operations typically utilize herders to watch over the flock as they graze the large mountain pastures.

Any type of sheep operation might include companion grazing where pastures and range lands are utilized by a variety of animal species. Livestock and wildlife graze on the available forage. In most cases, a rancher doesn’t receive much from the wildlife that use his land. In some cases, where hunting rights are very valuable, deer may be managed in a grazing program. At least they are considered when the rancher plans the grazing routine for his livestock.

In many areas, producers are discovering the value of companion grazing. Companion grazing is when two or more species of livestock are simultaneously grazed on a pasture. If the two species are competitive (they eat the same plants), there is no added value. In most cases, the two species are complimentary. For companion grazing to be beneficial, the species must have a complimentary grazing relationship.

Let’s consider sheep and cattle as an example. Complimentary grazing is possible because:

a) Most range lands produce a wide variety of plant species.

b) Cattle and sheep prefer different forages:

1. Sheep prefer broad leaf plants
2. Cattle prefer grasses

c) Cattle and sheep get along and can live in harmony.

d) Cattle and sheep graze different topography.
ACTIVITY

If these conditions were not true, there would be no reason for companion grazing.

Sheep will do better when they graze alone. However, by utilizing companion grazing, the rancher gets more total production off a piece of land. Another reason sheep or goats are often used as companions for cattle is weed control. Sheep and goats will control weeds such as leafy spurge and keep the pastures cleaner.

DIALOGUE FOR CRITICAL THINKING:
Share:
1. What type of sheep operation do you have? Why?
2. What other types of sheep operations have you seen?

Process:
3. What is the purpose of each type of sheep operation?
4. What is companion grazing?

Generalize:
5. What are other complimentary situations that occur in nature?
6. How are jobs and careers used to compliment each other?

Apply:
7. What jobs and careers do you think will be needed in the future to enhance current vocations?

GOING FURTHER:
1. Visit various types of sheep operations.
2. Have a career management agency share views on complimentary careers.

REFERENCES:
Dr. Don Kirby, North Dakota State University

Authors:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
List one thing farm flock operations may have in common with Southwest range operations;  
1. ___________________________________________________________________

with Northwest range operations.  
1. ___________________________________________________________________

List 3 differences between farm flock operations and Southwest range operations;  
1. ___________________________________________________________________
2. ___________________________________________________________________
3. ___________________________________________________________________

with Northwest range operations.  
1. ___________________________________________________________________
2. ___________________________________________________________________
3. ___________________________________________________________________

List 3 things Southwest range operations may have in common with Northwest range operations.  
1. ___________________________________________________________________
2. ___________________________________________________________________
3. ___________________________________________________________________

List 2 unique qualities of the Northwest range operations.  
1. ___________________________________________________________________
2. ___________________________________________________________________

What are the advantages of companion grazing? ________________________________
__________________________________________________________________________

What types of sheep operations are found in Kansas? ____________________________
__________________________________________________________________________
Basic Genetic Concepts
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
- How traits are passed from parent to offspring
- How genes influence traits
- The number of chromosomes in a sheep

ABOUT THEMSELVES:
- How different factors play a part in a final decision
- Their own genetic make-up

Materials Needed:
- Activity Sheet #13, “Gene Matching”
- Leader Key—Gene Matching
- Member Handout #22, Inheritance Transfer
- Member Handout #23, Gene Expression

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

It is well known that how an animal looks and “performs” is partly due to how its parents looked and performed. However, it was not until the end of the 19th century that scientists began to understand how characteristics were passed from one generation to the next.

DNA (deoxyribonucleic acid) is the basic genetic material. DNA molecules are organized into chromosomes. Chromosomes come in pairs and are found in every cell of the body. Each cell contains the exact same set of chromosome pairs. Different species have different numbers of chromosomes. Sheep have 54 chromosomes (27 pairs).

Upon each chromosome, DNA segments are organized into genes. These genes are codes which dictate or influence all of the individuals characteristics (appearance and performance). Because chromosomes are in pairs, genes are also in pairs. The physical location of a gene on a chromosome is called the locus. The term “allele” means alternative forms of a gene. For example, the allele for tallness and the allele for shortness are alternative forms of the gene controlling the trait of height. These terms can be confusing as locus, gene, and allele are sometimes used interchangeably.

How then are these traits passed from parent to offspring? Normal body cells are called “diploid” meaning that they have a pair of each chromo-

Leader Notes
Start the lesson off by asking the question “What influences how tall you are, what color your eyes are, etc?” See if they understand that all things like this are inherited from their parents. Then pose the same question about animals. Why is it important to know this information?

Refer to Member Handout #22, "Inheritance Transfer," to show and explain terms.
When the sex cells (sperm and egg) are formed, they receive only one chromosome from each pair. Hence, they are called “haploid”. In sheep, the sperm cell and the egg cell each have 27 chromosomes. During fertilization (union of egg and sperm), the zygote (newly developed fetus or unborn lamb) receives 27 chromosomes from the ram and 27 from the ewe, giving it the full compliment of 54. In other words, half of the genetics of any lamb come from its sire and the other half come from the dam.

With that in mind, we can assume that a lamb should resemble the “average” of its parents. Let’s discuss some common terminology. Phenotype is the outward appearance of an animal. It includes traits that are easily measured (height, weight, etc.). An individual’s phenotype is the result of a combination of its genotype and the environment in which it is raised. Environment may have little effect on some traits and quite large effects on others. Genotype is the genetic make-up of the individual. It can be difficult to measure as it may be hard to separate the effects of environment.

How do these genes influence the expression of traits? As you remember chromosomes, and therefore genes, come in pairs. Many traits are controlled by a single pair of genes. That does not mean that the two alleles for a certain gene have to be the same. A lamb is considered “homozygous” for a certain trait if the two alleles making up the gene pair are the same. If the two alleles are not the same, the lamb is “heterozygous” for the trait.

This may be easier to understand if we go through some examples of gene representation. In the simplest cases, a trait may be controlled by a single gene pair, and there are only two alleles. We usually represent these alleles with capital or lower case letters. For example, at locus ‘A’ a lamb might have the alleles “AA”, “Aa”, or “aa”. Capital “A” represents one possible allele and lower case “a” represents the other possible allele. A homozygous lamb would be “AA” or “aa” and a heterozygous lamb would be “Aa”.

Sometimes, the presence of one allele may affect the expression of the other allele. If one allele is “dominant”, it will mask the expression of the other allele. Usually, the “dominant” allele is represented by the capital letter and the “recessive” allele is represented by the lower case letter. For example, let’s assume tall is dominant to short. In that case, lambs with “TT” or “Tt” alleles in their gene pair would be tall, and lambs with “tt” alleles would be short. In the case of dominance, the outward appearance of a lamb can not be used to determine the difference between homozygous dominant lambs and heterozygous lambs. In some cases, two alleles may be co-dominant to each other (alleles express themselves equally). Let’s assume that tall (T) and short (t) are co-dominant. “TT” lambs would be tall, “Tt” lambs would be medium and “tt” lambs would be short. In this case, the heterozygous lamb is the average of the two
homozygous types. In other cases, there may be incomplete dominance between alleles. In this case, one allele expresses itself to a greater extent than the other. The “TT” lamb might be 36 inches tall, the “Tt” lamb might be 34 inches tall and the “tt” lamb only 25 inches tall. In this case, there may only be a very slight difference between the homozygous dominant and the heterozygous lamb.

In many cases, there may be more than two alleles for any given gene. Also, many of the important traits in sheep are controlled by more than one pair of genes. These complexities and other genetic terminology will be discussed in other lessons.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. What was the hardest thing to understand about genes? Easiest?

**Process:**
2. What is the difference between homozygous and heterozygous?

3. How could two tall sheep have a short lamb?

**Generalize:**
4. Do you think you will look a lot like your parents? Why or why not?

5. When are some times in your life that many little factors influenced a major decision?

**Apply:**
6. How will the issues raised in this lesson be useful in the future?

**GOING FURTHER:**
1. Visit a lab and look at an actual strand of DNA.

**REFERENCES:**

SID Sheep Production Handbook
Genetics, a guide to basic concepts and problem solving. R.P. Nickerson.
1990.

**Author:**
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team

*111–Sheep, Level III*
Inheritance Transfer

**Female**

- Body Cell (diploid)

**Male**

- Body Cell (diploid)

**Sperm Cells** (haploid)

**Egg Cells** (haploid)

**Zygote** (fertilized egg = new fetus)
Single gene pairs, two alleles:

\[ \begin{align*} 
AA & \quad \text{Capital letter "A" = dominant} \\
aa & \quad \text{Lower case letter "a" = recessive} \\
Aa & \quad \text{Heterozygous}
\end{align*} \]

Example:

\[ T = \text{dominant gene for tall} \]
\[ t = \text{recessive gene for short} \]

Result of mating \( TT \times tt \)

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Genotypes</th>
<th>Phenotypes</th>
</tr>
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<tbody>
<tr>
<td>( T )</td>
<td>( t )</td>
<td>( TT )</td>
<td>Tall</td>
</tr>
<tr>
<td>( T )</td>
<td>( t )</td>
<td>( Tt )</td>
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All genotypes = \( Tt \)

All phenotypes = Tall

Mate \( Tt \times Tt \)

\[ \begin{align*} 
\text{Genotypes} & \quad \text{Phenotypes} & \text{If traits were co-dominant} \\
1 \quad TT & \quad \text{Tall} & \quad \text{Tall} \\
2 \quad Tt & \quad \text{Tall} & \quad \text{Medium} \\
1 \quad tt & \quad \text{Short} & \quad \text{Short}
\end{align*} \]
Match the terms to the most appropriate definition. (each answer used only once)

____ 1. Allele  
A. When a cell has a complete set of chromosome pairs.

____ 2. Chromosome  
B. The outward appearance of a lamb.

____ 3. Diploid  
C. When two alleles within a gene pair are identical.

____ 4. DNA  
D. Deoxyribonucleic acid, the basic genetic material.

____ 5. Dominance  
E. When two alleles within a gene pair are different.

____ 6. Genotype  
F. Sheep have 27 pairs of them.

____ 7. Heterozygous  
G. When one allele masks the effects of the other allele.

____ 8. Homozygous  
H. Alternative forms of a gene.

____ 9. Locus  
I. A specific physical location upon a chromosome.

____ 10. Phenotype  
J. The genetic make-up of an individual.
**BASIC GENETIC CONCEPTS**  
**SHEEP, LEVEL III**  
Leader Key—Gene Matching

Match the terms to the most appropriate definition. (each answer used only once)

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Mating Systems
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• The definition of a system
• The advantages of heterosis
• The different types of mating systems

ABOUT THEMSELVES:
• Organization skills
• How decision making is based on expected outcome

Materials Needed:
• Member Handout #24, “Terminal Crossbreeding Systems”
• Member Handout #25, “Rotational Crossbreeding Systems”
• Activity Sheet #14, “System Quiz”
• Leader Key, System Quiz
• Pencils

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Why are you raising sheep (wool production, meat production, etc.)? In other words, what is your goal? Next, choose a breed or breeds that excel in the area of your goal. Third, develop a selection program consistent with the goal. The final step is the definition of a mating system. This describes how the selected breeds or individuals will be paired during mating.

A mating system should be considered at two levels (breed and individual). For flocks that use more than one breed, the mating system will determine which breeds contribute to the ewe flock, and which are used as breeding rams. The mating system will define the manner in which the breeds are combined to produce the desired offspring (for example, replacement ewe lambs of one type and market lambs of another).

At the individual level, a mating system defines how individual rams and ewes will be paired during mating. Single sire mating is required for registered flocks; however, multiple-sire breeding pastures are common in commercial operations. In many cases, ewes are assigned at random to different rams.
Two general categories for mating systems include purebreeding and crossbreeding. Purebreeding refers to the mating of rams and ewes of a common genetic group (within a breed). The two basic reasons for purebreeding are:

1. Seedstock producer (registered sheep)
2. One breed is best adapted to the existing environment

If you choose to be a purebred producer, there are two types of mating systems you could use, inbreeding and outbreeding. Outbreeding is the mating of individuals less closely related than the average of the breed. The continual use of unrelated rams maintains the highest degree of genetic heterozygosity (aside from crossbreeding). As a result, performance tends to be higher. Also, increased heterozygosity may reduce the expression of genetic recessive defects. On the other hand, reduced homozygosity could, theoretically, lead to less uniformity in the offspring. Most purebred producers use an outbreeding system.

Inbreeding is the mating of closely related individuals. If a lambs sire and dam are related to each other, then it will be inbred. The degree of inbreeding depends on how closely the parents are related. Inbreeding results in the increased homozygosity of gene pairs. Theoretically, this would increase the uniformity of the offspring. Reasons why producers utilize inbreeding include, the detection of genetic defects or they can’t buy better breeding stock than what they produce themselves. Disadvantages of inbreeding are the increased likelihood that genetic defects will be expressed and inbreeding depression. Inbreeding depression is a reduction in performance due to reduced heterozygosity. Inbreeding depression has the greatest negative effect on reproductive performance. A less severe, and more commonly used form of inbreeding is linebreeding. When an individual is identified as being outstanding for some trait(s), an operator may wish to increase the amount of sheep in his flock with those bloodlines. He can accomplish this by continually using offspring or close relatives of the desired individual as breeding stock.

Most sheep producers (especially commercial producers) utilize some type of crossbreeding program. Crossbreeding is the mating of rams and ewes of different breeds. Crossbreeding results in increased heterozygosity, which in turn gives an increase in performance known as heterosis or hybrid vigor. Heterosis has the most positive effect on reproductive traits. Another reason for crossbreeding is to take advantage of the good qualities of two or more breeds.

A good crossbreeding program does not include the indiscriminate mixing of several breeds. It is instead, a systematic utilization of the available breed resources to produce the desired offspring. One form of crossbreeding is grading up. This is the repeated mating of ewes and their female offspring to rams of a single breed. After several generations, the sheep
will be indistinguishable from purebreds of the sire breed. This method is usually used when only rams of a particular breed are available; such as when a breed is first imported into the country. Sometimes, crossbreeding is used to develop new breeds. Once the crossbred lambs, with the desired percentage of each parent breed, are produced, they are managed as purebreds. Several breeds have been developed in the U.S. including the Columbia, Montadale, Polypay and Targhee. Most commercial producers; however, employ a systematic crossbreeding program.

There are many types of crossbreeding systems. The one to use depends on the requirements of your selection program. Most crossbreeding operations rely on purebred producers to supply replacement rams, and in some cases, replacement ewes as well.

Let’s look at some examples. A sheep producer wishes to emphasize wool quality in his ewe flock, but wants to sell high quality slaughter lambs as well. He might choose Rambouillet ewes for wool production, as well as adaptability and longevity. He then mates these ewes to Hampshire rams to produce larger framed, meatier crossbred lambs (compared to straight bred Rambouillet lambs). The Hampshire cross lambs would have lower wool quality than Rambouillet lambs; therefore, it would not fit the selection goal to keep them as replacements. All crossbred lambs are sent to slaughter and replacement ewes are purchased. This is an example of a two-breed terminal crossbreeding system. Terminal crossbreeding makes maximum use of heterosis (in the lamb) and complimentarity.

If the above producer did not want to purchase replacements, some of the top ewes could be bred to Rambouillet rams to produce his own replacements. Producing your own replacements does require more breeding pastures. In some cases, replacements can be purchased cheaper than they can be raised.

Let’s say another producer has similar goals, except she places more emphasis on growth and muscle than the first producer. She may also choose to mate Hampshire rams to Rambouillet ewes. However, she may choose to keep those crossbred ewe lambs as replacements. The 1/2 Hampshire, 1/2 Rambouillet ewes would have less wool quality, but be better suited to meat production. The crossbred ewes would then be mated to a terminal sire, such as a Suffolk. The three breed terminal crossbreeding system also takes advantage of maternal heterosis (crossbred ewes generally are more reproductively efficient and are better milkers than purebred ewes). The drawback is that you need yet another breeding pasture. The more breeds involved does require more labor and more intensive management. If too many breeds (more than three) are involved, you start to lose some of the benefit of heterosis. This producer must also purchase some purebred Rambouillet replacements, unless she wishes to add another breeding pasture and use Rambouillet rams too.

Pass out Member Handout #24, “Terminal Crossbreeding Systems” and review them as you move through discussion.
Rotational crossing is designed to maintain high levels of heterosis while allowing convenient replacement ewe production within the flock. Let’s look at an example where a producer is interested in meat production and out of season lambing. He may start with Dorset ewes and mate them to Hampshire rams. Some of the Dorset × Hampshire lambs will be kept as replacements and mated back to Dorset rams. In turn, Dorset sired ewes are mated to Hampshire rams, and so on. No purebred ewes are necessary, so there is no need to purchase replacements. Two breeding pastures are needed. The ewes in the flock will be a various mixture of Hampshire and Dorset. Since the percentage of each breed fluctuates, there is less use of complimentarity than in terminal crossbreeding systems.

A third breed could be added to the rotation. The producer might choose to add Rambouillet to improve wool quality and aid in out of season breeding. In this case, Dorset ewes would be mated to Hampshire rams. The 1/2 Hampshire, 1/2 Dorset ewes would be mated to Rambouillet rams. The 1/2 Rambouillet, 1/4 Hampshire, 1/4 Dorset ewes would be mated to Dorset rams. The 5/8 Dorset, 1/4 Rambouillet, 1/8 Hampshire ewes would be mated to Hampshire rams, and so on.

Some producers use a combination of rotational and terminal crossbreeding systems. The situation is basically the same as either the two- or three-breed rotation, except the poorest producing ewes (of all breed combinations) are mated to a terminal sire. The idea is that you wouldn’t keep replacements out of the poor producers anyway, so you might as well produce the best market lamb that you can. It does require an extra breeding pasture and more intensive selection procedures.

Some producers use variations of these systems; however, to get the most benefit from heterosis and complimentarity a system should be followed. Putting two or three breeds of rams in one pasture with all your ewes is not a system. Mating is random, and the desired offspring might not be produced. Simply purchasing a new breed of sire every three years is not a system either. All mating systems have advantages and disadvantages compared to other systems, choose one that fits your selection goals.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. Which system is the most difficult to understand? Easiest?
2. What type of mating system do you use? Why?

**Process:**
3. What should be the first step in selecting a mating system?
4. Name one advantage and one disadvantage of inbreeding. What is lost when inbreeding?
5. Why is it important to have a system and not just random breeding?
### ACTIVITY

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<td>6.</td>
<td>What happens if your livestock operation is not organized or systematic?</td>
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#### Generalize:

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<td>7.</td>
<td>What activities do you help with that require lots of organization?</td>
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<td>8.</td>
<td>How does organizing affect decision making?</td>
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#### Apply:

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<td>9.</td>
<td>What can you do different in the future to improve your organizational and decision making skills?</td>
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#### GOING FURTHER:

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<tr>
<td>1.</td>
<td>Visit with a sheep rancher and discuss their goals and how their mating systems accomplish those goals.</td>
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</table>

#### REFERENCES:

SID Sheep Production Handbook  
Dr. Linda Martin, Associate Professor, Animal Sciences and Industry, Kansas State University

**Author:**  
Jeremy Geske, Former Extension Assistant, Kansas State University  
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**  
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University  
Sheep Design Team
MATING SYSTEMS
SHEEP, LEVEL III
Member Handout #24, Terminal Crossbreeding Systems

TWO-BREED TERMINAL CROSSBREEDING SYSTEM

\[
\begin{array}{c}
\text{A}\text{ Rams} \\
\times \\
\downarrow \\
\text{AB} \\
(\text{All sold as market lambs})
\end{array}
\]

TWO-BREED TERMINAL CROSSBREEDING SYSTEM

\[
\begin{array}{c}
\text{A}\text{ Rams} \\
\times \\
\text{B}\text{ Ewes} \\
\downarrow \\
\text{AB} \\
\text{ Market Lambs} \\
\text{B Replacement Ewes} \\
\text{+ Surplus B Market Lambs}
\end{array}
\]

THREE-BREED TERMINAL CROSSBREEDING SYSTEM

\[
\begin{array}{c}
\text{B}\text{ Rams} \\
\times \\
\downarrow \\
\text{C}\text{ Ewes} \\
\text{A}\times\text{BC} \\
\text{ Market Lamb} \\
\text{B}\times\text{BC} \\
\text{ Market Lamb} \\
\text{Surplus BC Rams}
\end{array}
\]
MATING SYSTEMS
SHEEP, LEVEL III
Member Handout #25, Rotational Crossbreeding Systems

TWO-BREED ROTATIONAL CROSSBREEDING SYSTEM

Replacement Ewes

A Rams

B Rams

Replacement Ewes

THREE-BREED ROTATIONAL CROSSBREEDING SYSTEM

Replacement Ewes

A Rams

B Rams

C Rams

Replacement Ewes
1. List the four steps in developing a sheep breeding program.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

2. List two reasons for raising purebred sheep.

_______________________________________________________________________
_______________________________________________________________________

3. List two reasons for crossbreeding.

_______________________________________________________________________

4. What is inbreeding?

_______________________________________________________________________

5. How can the expression of genetic recessive defects be considered both an advantage and a disadvantage of inbreeding?

_______________________________________________________________________
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6. Choose 3 qualities (traits) you think are most important for a sheep operation (there are no wrong answers).

_______________________________________________________________________

7. If your selection goal is to produce sheep that excel in the three areas you listed above, choose two or three breeds that could be crossed to produce the desired hybrid lamb (explain your choices).

_______________________________________________________________________
_______________________________________________________________________
1. List the four steps in developing a sheep breeding program.

   1. **Develop selection goal—why are you raising sheep?**
   2. **Choose appropriate breeds**
   3. **Develop selection program consistent with goal**
   4. **Define a mating system**

2. List two reasons for raising purebred sheep.

   1. **Produce breeding stock**
   2. **Maintain uniformity of lambs**

3. List two reasons for crossbreeding.

   1. **Increase performance through hybrid vigor**
   2. **Take advantage of the good qualities of more than one breed**

4. What is inbreeding?

   **Mating of closely related animals**

5. How can the expression of genetic recessive defects be considered both an advantage and a disadvantage of inbreeding?

   **Advantages:**
   - Help detect genetic defects
   - Provide better breeding stock that aren’t available otherwise

   **Disadvantages:**
   - Increased likelihood that genetic defects will be expressed
   - Decreased reproductive performance

6. Choose 3 qualities (traits) you think are most important for a sheep operation (there are no wrong answers).

7. If your selection goal is to produce sheep that excel in the three areas you listed above, choose two or three breeds that could be crossed to produce the desired hybrid lamb (explain your choices).
Lamb Market Trends
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• At what times of the year the majority of lambs are marketed
• The cost of retailing a product
• The relationship of supply and demand

ABOUT THEMSELVES:
• Effect of supply and demand on their lives
• Importance of market trends

Materials Needed:
• Activity Sheet #15, “Lamb Trend Quiz”
• Leader Key—Lamb Trend Quiz
• Flip chart and markers

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

In Level II, we discussed various ways to market the products of a sheep operation. In this lesson, we’ll concentrate on trends in market lamb prices. We’ll also discuss the reasons the market changes as it does.

We could look at market trends in three ways. The first is the current market trend. In other words, has the market lamb price gone up, down or remained steady in the last week. This could be important if we have lambs ready to sell. If the price is increasing, you may want to hold the lambs to see how high the price gets. If the price is falling, you may want to sell before it falls even more. We can get these current trends by observing market reports in the newspaper, radio or television, or by attending local auctions.

Another way is to compare current lamb prices with prices from the same time last year. Several sheep industry publications can provide us with that information.

And finally, in this lesson, we’ll look at the cycle of market lamb prices over the course of a year. Let’s look at supply and demand and how the two interact to affect price.

Sheep and lambs are produced all over the U.S., although over 80 percent are produced in the 17 western states (excluding Alaska and Hawaii).

Leader Notes
Ask members to list where they got their market lamb price information. How often is it available? What is it based on?

List on flip chart, three ways to look at market price trends.
LAMB MARKET TRENDS

Leader Notes

ACTIVITY

Lamb production is seasonal due to the biological, seasonal reproductive habits of sheep. Spring lambing is common in mountain and midwestern plains states. In these areas, a large portion of the lambs are ready for market in September and October. In some states, such as Texas, California and even Kansas, fall lambing is more common, with lambs being marketed from March to July. The largest quantities of lamb imports enter the U.S. in late spring and early summer. The highest slaughter numbers occur in the fall (Sept. and Oct.) and spring (March).

Demand for lamb is both seasonal and geographic. Demand is highest in the spring and early summer, responding to holiday traditions and consumer taste preference for fresh, early spring lamb. Most lamb is consumed in the Atlantic and Pacific coast regions.

In general, the price changes inversely to the supply. When supply is up, prices go down and vice versa. Prices adjust to a level that will clear the market of all lamb produced. Lamb prices follow a fairly consistent seasonal pattern, reflecting short-run changes in supply and demand. Prices are generally lowest from August to November as that is when supply is greatest and demand is not very high. Prices start to rise in December and throughout the winter months as the holidays bring increased demand and the supply of fresh lambs is low. In March and early April, the supply is fairly high, but demand is also high, so prices continue to rise. Prices tend to peak in May as the supply of fresh spring lamb is low and consumers prefer fresh spring lamb. Prices start to drop at the end of May and continue to fall to the low point in the fall. The price drop is caused by increased supply. Lamb imports start to arrive in early summer, and some winter-born lambs are ready for market. By studying these market trends, we, as producers, can plan our production strategy to have lambs ready when prices and demand are high. Lamb prices are also affected by supply and price of other red meats.

The price of lamb at the supermarket (retail price) is quite a bit higher than the price producers receive for their lambs. Also, the trend of retail prices does not necessarily follow changes in wholesale price. There are several reasons that this price spread is so large. The first is shipping. Lambs are produced in the midwest and must be shipped to the coasts. Because of the small carcass size, the cost per pound of production (processing and packaging) is high. In addition, there are only a few major lamb processing plants; therefore, competition is lower. Less packer competition leads to lower prices for the producer and higher prices to the retailer.

DIALOGUE FOR CRITICAL THINKING:

Share:
1. What was the easiest part to understand about lamb trends?
2. What causes the large demand for lamb in the spring?
Process:
3. How can previous year’s prices help you to make a decision when to market your sheep?

4. What happens to the price of lambs when the supply of lambs goes up? When the supply goes down? Why?

Generalize:
5. Where else do you think supply and demand principles hold true?

6. How does geography affect the price of goods?

Apply:
7. How can you use market trends when purchasing products for your family?

GOING FURTHER:
1. Visit a retail store and ask the owner about wholesale and retail prices.

2. Attend a livestock auction and compare the prices to a previous auction.

REFERENCES:
Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
LAMB MARKET TRENDS
SHEEP, LEVEL III
Activity Sheet #15, Lamb Trend Quiz

1. What is the current price of market lambs (120 lbs) in your area?
_______________________________________________________________________

2. What two times of the year are market lamb numbers the highest, and why?
_______________________________________________________________________
_______________________________________________________________________

3. What time of the year is demand the highest?
_______________________________________________________________________

4. What time of the year are market lamb prices the highest, and why?
_______________________________________________________________________

5. Since lamb prices are almost always the highest from March to May, why don’t all producers adjust their operations to have lambs ready for market at that time?
_______________________________________________________________________

6. Why do prices often start to fall in June?
_______________________________________________________________________

7. List 3 reasons why there is such a difference between the price producers receive for their lambs and the price consumers pay for lamb at the supermarket.
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
LAMB MARKET TRENDS
SHEEP, LEVEL III
Leader's Key, Lamb Trend Quiz

1. What is the current price of market lambs (120 lbs) in your area?
   
   varies

2. What two times of the year are market lamb numbers the highest, and why?
   
   Fall (September and October) High Supply
   Spring (March) High Demand

3. What time of the year is demand the highest?
   
   Spring and Early Summer

4. What time of the year are market lamb prices the highest, and why?
   
   May. Supply is low and consumers want fresh spring lamb.

5. Since lamb prices are almost always the highest from March to May, why don’t all producers adjust their operations to have lambs ready for market at that time?
   
   Seasonal reproduction of sheep

6. Why do prices often start to fall in June?
   
   Increased supply with imports and lambs ready for market. Also summer is a low consumption time.

7. List 3 reasons why there is such a difference between the price producers receive for their lambs and the price consumers pay for lamb at the supermarket.
   
   Shipping
   Processing and packaging
   Low Packer Competition
Pelt Value, Quality and Wool Logos
Sheep, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:
• Two categories of lambskins
• Wool Logos

ABOUT THEMSELVES:
• The importance of wool in their lives
• The significance of logos

Materials Needed:
• Samples of wool products with logos
• Member Handout #26, Wool Logos
• Activity Sheet #16, Wool Products at Home
• Flip chart and markers

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Pelts are a very valuable product and are usually the major by-product of the lamb packing industry. American pelts or lambskins, are valued in the U.S. and worldwide because of their fine quality. They are the largest pelts as American lambs tend to be larger framed than sheep from other countries. The value of pelts fluctuates with consumer demand. Producers feel these changes in pelt values through changes in market lamb prices.

Lambskins can be classified into two categories according to end-use: shearing (wooled skins) and pulled (wool-free) skins. Wooled skins can be made into very fine coats, footwear and other accessories. Scarred or blemished pelts can be used as seat covers where the leather is concealed. Pulled skins are typically manufactured into garments, coats, purses and other accessories. Severely damaged or scarred skins are of low value for leather.

A way for producers to receive higher prices for their lambs is to take steps to improve the pelt quality of their lambs. Attention should be given to both the wool and the leather (skin). Impurities, contaminants and scars should be kept to a minimum. Due to the nature of the lamb marketing system, it takes a long term investment in quality for producers to develop a reputation for their pelts and receive higher prices. Pelt buyers impose
discounts for poor pelts on the packer. Those discounts, in one way or another, are passed on to producers and lamb feeders.

Management for improved pelt quality can be summarized in seven steps:

1. When branding is necessary, use scourable paint and avoid heavy application. When possible, use other forms of identification, such as ear tags.

2. Reduce shearing and vaccination scars. Vaccinate high on the neck.

3. Avoid grazing sheep in areas where they have access to burrs or needlegrass that may become matted in the wool and damage the skin.

4. Avoid holding the sheep in muddy areas.

5. Do not allow feed or hay to drop over the backs of sheep.

6. Use non-staining drenches and pour-on medications.

7. Control keds and ticks.

Sheep keds, commonly called sheep ticks, are parasites that feed on sheep by repeatedly piercing the skin causing a series of dark nodules in the skin. This is a defect known as “cockle” and severely reduces the value of the pelt. If keds become a problem, the entire flock should be treated as soon as possible.

Wool products are generally labeled with one of three types of wool logos:

A. American Wool Logo
   1. Product is at least 20% American Wool if blended with natural fibers
   2. Product is at least 30% American Wool if blended with manmade fibers

B. Woolmark
   1. Product contains 100% wool
   2. Internationally recognized symbol

C. Woolblend Mark
   1. Products contain at least 60% wool
   2. Product meets standards for performance and workmanship
ACTIVITY

3. Internationally recognized symbol

DIALOGUE FOR CRITICAL THINKING:

Share:
1. How many wool products did you find?

2. Which logo was the most common?

Process:
3. What are the categories of lambskins?

4. Why is it important for wool products to be labeled with a logo?

Generalize:
5. What is the significance of wool products in your life?

6. How and why do wool products (particularly clothing) have to be cared for differently?

Apply:
7. How will this discussion of wool products be useful to you in the future?

GOING FURTHER:
1. Visit a wool specialty store

2. Observe someone spinning wool or weaving wool products

REFERENCES:
SID Sheep Production Handbook

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James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

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Sheep Design Team
PELT VALUE, QUALITY AND WOOL LOGOS
SHEEP, LEVEL III
Member Handout #26, Wool Logos

The Woolmark

The American Wool Logo

The Woolblend Mark

136–Sheep, Level III
PELT VALUE, QUALITY AND WOOL LOGOS
SHEEP, LEVEL III
Activity Sheet #16, Wool Products at Home

Directions: All of us have wool in our homes. Make a list of all wool products in your house. Include everything that is more than half wool in the space below. You only need to write each item down once, even if you have more than one of them! After you have finished making your list, ask your mother or father to look at your list. They may know of something you missed.

<table>
<thead>
<tr>
<th>Name of Item</th>
<th>Is it 100% Wool?</th>
<th>Is it American Wool?</th>
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<tbody>
<tr>
<td>1.</td>
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<td>10.</td>
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Most of the wool things in our house are (clothing, blankets, rugs or something else).

PLEASE CIRCLE ONE OF THE ABOVE