

S H E E P : *From the Animal's Point of View*

4

SUBJECT OVERVIEW AND BACKGROUND INFORMATION

Prevention is the best solution to fighting diseases in sheep. Unlike wild sheep, domesticated sheep have no choice in their environment. Hence, it is important for caretakers to keep the sheep's enclosure clean and as free as possible from harmful bacteria and viruses. Caretakers may also choose to vaccinate their sheep against common diseases such as tetanus and enterotoxemia.

However, vaccination is not the solution to all sheep diseases. **Parasite control** is also very important. Diseases can also be prevented through proper nutrition. Many diseases are caused by **nutrient deficiencies** or **excesses** of certain feeds.

Though sheep are susceptible to many diseases and illnesses, youth can take an active role in preventing disease by simply monitoring their sheep on a daily basis.

Once youth understand what to expect from a healthy sheep in terms of its behavior and physical characteristics, they can recognize abnormal symptoms and non-vocal signals that sheep exhibit if they become ill.

The content in this curriculum is designed to introduce youth to sheep behavior, needs and care. Additional emphases include life skills and positive youth development. This is not a guide to raising sheep for market or exhibition.

Sheep Disease



MARTIN H. SMITH, Cooperative Extension Youth Curriculum Development Specialist, University of California, Davis; **CHERYL L. MEEHAN**, Staff Research Associate, UC Davis; **JUSTINE M. MA**, Program Representative, UC Davis; **NAO HISAKAWA**, Student Assistant, Veterinary Medicine Extension, UC Davis; **H. STEVE DASHER**, 4-H Youth and Community Development Advisor, UC Cooperative Extension, San Diego County; **JOE D. CAMARILLO**, 4-H Youth and Community Development Advisor, UCCE, Madera County; and UC Davis Undergraduate Curriculum Development Teams.

Partially funded through a grant from the Wells Fargo Foundation.

Concepts and Vocabulary

- **Direct contact:** Physical contact between an ill person or animal and a healthy person or animal.
- **Disease:** An abnormal condition that affects the normal function and health of an organism, harming the health of that organism.
- **Disease prevention:** Taking the necessary steps to prevent humans and/or animals from getting sick.
- **Disease transmission:** The transfer of a disease from one person or animal to another.
- **Germ:** A microorganism that has the potential to cause diseases.
- **Health care monitoring:** Close observation of an animal's health, behavior, and activity every day to determine what is normal or abnormal about that animal.
- **Illness:** The condition of being unhealthy or in poor health.
- **Indirect contact:** Contact between an uninfected person or animal and the already-contaminated surface of an inanimate object (e.g., the food in a food bowl or a kitchen table top).
- **Preventive health care:** The process of maintaining the health of humans and animals by taking actions to protect them from catching an illness or disease.

Life Skills

Communication, contributions to group effort, cooperation, critical thinking, decision making, disease prevention, keeping records, problem solving, sharing, teamwork

Subject Links

Science, Language Arts

Overview of Activities

This section's first activity is *How Fast Can Germs Spread?*

In this activity, youth will be exposed to the concept of the dissemination of diseases and germs. Through the spread of bits of colored glitter to several youth in a short period of time, it mimics the alarmingly fast rate at which a germ can be disseminated. This activity both shows youth a common characteristic of contagious diseases and stresses the significance of the practice of good hygiene. When the youth wash their hands after the activity, they can see clearly that the glitter (or "germ") has been removed.

In the second activity, *Is My Sheep Sick?*, youth will be given the opportunity to experience and learn when, why, and how sheep can get sick. Youth will pretend that they are sheep as they play a modified version of "Musical Chairs." The names of different sheep diseases will be read out loud, and the youth will determine whether, based on their health condition as sheep, they can withstand the diseases. If not, they will be sent to the veterinary clinic where they will learn how to get better and how to inhibit the progress of their disease.

In the third activity, *My Sheep's Health*, youth will be separated into small groups. Each group will be given five daily journal entries related to a particular sheep, and they will be asked to observe and record important health facts. After reviewing all five journal entries, each group will be given a list of sheep disease descriptions. Based on their notes, the groups will come up with suggested diagnoses for their sheep and will give reasons to support their conclusion. Some groups may find more than one disease that share similar symptoms and thereby learn that they cannot always identify an illness on their own and that professional veterinary care is important. Disease symptoms can be ambiguous, and it is important that a livestock owner be ready to consult a professional when necessary to find out what might be affecting an animal's health.

REFERENCES

- Glenn, J., et al. 1997. Animal care series: Sheep care practices. University of California Cooperative Extension. www.vetmed.ucdavis.edu/vetext/INF-SH_CarePrax.pdf.
- Jordan, R. M. 2008. Sheep diseases. University of Minnesota Extension. www.extension.umn.edu/distribution/livestocksystems/DI1877.html.
- Neary, M. 2009. Parasite control in sheep while grazing. Purdue University. <http://ag.ansc.purdue.edu/sheep/articles/grazeparasite.html>.

FACTS ABOUT SHEEP

DISEASE

Basic Facts

- Sheep are timid social animals that normally live in flocks. They are very sensitive to sudden environmental changes. The addition of a new sheep to a flock or the removal of a sheep can cause stress on the other sheep in the flock.
- The best way to address illnesses is through prevention. The caretaker should emphasize proper sanitation and regular veterinary care. It is also important that the caretaker become familiar with the sheep's everyday non-vocal cues so he or she will be able to recognize abnormal behaviors when they arise.
- Proper nutrition is essential for sheep health. Sheep that are fed a balanced diet are less susceptible to disease. There are also a few diseases can result when sheep feed on an improper diet; for example, acidosis can result if a sheep eats too much grain.
- Be observant of your sheep. If something does not look right or if the sheep's behavior is different from normal, consult a veterinarian.
- Vaccinate your sheep! Vaccinations are important for the prevention of some diseases.

Various Sheep Diseases

- **Acidosis:** Acidosis, sometimes called **grain overload**, is caused when a sheep eats too much grain. Sheep with acidosis will be dehydrated and irritable and will lose muscular coordination. Visible signs of the condition include diarrhea and an enlarged abdomen. It is important to treat acidosis immediately; if untreated, it can cause death. The way to prevent acidosis is to maintain proper feed management.
- **Club Lamb Fungus:** Club lamb fungus is known by a variety of names, including woolrot, lumpy wool, sheep ringworm, and sheep dermatophytosis. It most commonly affects show lambs, is transmitted by direct and indirect contact, and is contagious both to other animals and to humans. The fungus that causes the disease is highly resilient. Under dark, moist conditions it can persist in the environment, independent of an animal host, for several years! Prevention is the best option when it comes to club lamb fungus. Although it will heal on its own within 2 to 4 months, there are no antifungal medications available for use on sheep.
- **Enterotoxemia, or Overeating Disease:** This common, costly disease is caused by toxins produced by bacteria that are naturally present inside the intestines of a normal, healthy sheep. However, certain conditions such as overeating or an abrupt change in a sheep's diet can trigger rapid bacterial

growth, with the resulting production and release of lethal amounts of toxins. These toxins are absorbed by the sheep's intestinal system, causing death soon thereafter. Proper feed management and vaccination can help prevent this disease.

- **Footrot:** This highly contagious bacterial disease can spread quickly and often affects many animals. If not treated promptly, infected animals quickly become lame and lose weight. Footrot can be detected by its strong odor and by the appearance of lesions on the hooves. Once treated, a sheep can be released back into the herd, but it is critical that the sheep's hooves be completely healed first in order to prevent the infection cycle from starting again.
- **Polioencephalomalacia (PEM):** This is a central nervous system disorder caused by an animal's inability to utilize thiamin (Vitamin B1) due to an improper diet—often a high-grain diet or a diet high in certain plant materials. This disorder usually occurs in animals that are being fed a high concentrate diet, but it can also occur in pasture-raised sheep. Symptoms can include visual impairment or blindness. Sheep with PEM are called “star gazers” because they arch their necks backwards and stare skyward. Treatment with thiamin injections can reverse PEM completely if done early enough. Without treatment, PEM will cause death.

- **Scrapie, or Transmissible Spongiform Encephalopathy (TSE):** This is a fatal degenerative disease that affects the sheep's central nervous system. Scrapie is caused by a virus that is transmitted from one sheep to another, but it is most commonly spread from a mother to her young. It is critical that any infected sheep be immediately isolated from the herd. Common signs and symptoms include changes in a sheep's behavior, tremors, rubbing against objects such as fences, and loss of muscular coordination.
- **Tetanus, or Lockjaw:** This is a common, fatal disease that is caused by a soil-dwelling bacterium. Sheep become infected through open wounds commonly caused by tail docking, castration, shearing, or ear tagging. Common symptoms include muscle stiffness and spasms, bloat, panic, loss of coordination, and the inability to eat and drink. Tetanus can be prevented through a proper vaccination protocol that includes an annual booster.

REFERENCES

- Amundson, S., et al. 2007. Polioencephalomalacia. Purdue University. <http://ag.ansc.purdue.edu/sheep/ansc442/Semprojs/2002/neurological/polio.htm>.
- Cobb, R. 2007. Practical animal behavior. University of Illinois. <http://classes.aces.uiuc.edu/AnSci103/behavior.html>.
- Department of Primary Industries. 2009. Footrot in sheep: 1. Disease facts. www.dpi.vic.gov.au.
- Glenn, J., et al. 1997. Animal care series: Sheep care practices. University of California Cooperative Extension. www.vetmed.ucdavis.edu/vetext/INF-SH_CarePrax.pdf.
- New Mexico State University. 2010. Enterotoxemia (overeating disease). Sheep Production and Management. www.cahe.nmsu.edu/sheep/sheep_health/enterotoxemia.html.
- Newman, R. 2010. Livestock health: Tetanus in sheep and goats. Queensland Government. www2.dpi.qld.gov.au/sheep/8584.html.
- Schoenian, S. 2000. Enterotoxemia in lambs. Small Ruminant Info Sheet. University of Maryland. www.sheepandgoat.com.
- Turton, J. 2001. Prevent disease in goats and sheep. Department of Agriculture in cooperation with ARC-Onderstepoort Veterinary Institute. www.nda.agric.za.
- United States Department of Agriculture. 2009. Scrapie. Animal and Plant Health Inspection Service. www.aphis.usda.gov.
- Walker, B. 2006. Grain poisoning of cattle and sheep. NSW DPI Prime Facts. www.dpi.nsw.gov.au.

ACTIVITY 1

How Fast Can Germs Spread?

BACKGROUND INFORMATION

Germs are tiny organisms that can cause disease. They are generally spread by **direct contact** (e.g., touching) with an infected organism (e.g., an animal or human) or **indirect contact** with an object (e.g., a food dish or water trough) that was previously used by an infected animal. Most germs are spread through the air via sneezes or coughs, and they can also be spread through sweat, saliva, and blood. Germs are everywhere. They can adhere to objects (e.g., doorknobs, money) and body parts (e.g., hands), and can be spread when a human or animal touches something that has been contaminated—even when two people shake hands. This is why good sanitation (e.g., hand washing) is important in **disease prevention**.

Time Required

25 to 40 minutes

Concepts and Vocabulary

Disease prevention, disease transmission, direct contact, germs, indirect contact

Life Skills

Communication, cooperation, disease prevention, problem solving, sharing

Subject Links

Language Arts

State Content Standards

Language Arts

- Third Grade:
 - » Speaking Applications – 2.3
- Fourth Grade:
 - » Listening and Speaking Strategies – 1.7, 1.8
- Fifth Grade:
 - » Listening and Speaking Strategies – 1.5
- Sixth Grade:
 - » Listening and Speaking Strategies – 1.5
 - » Speaking Applications – 2.5a, 2.5b

Materials Needed

(* = *Materials provided in curriculum*)

- Glitter (3-4 different colors are recommended)
- * *Sheep Cards*
- Vacuum or broom (recommended, for cleanup at the end)
- Pens or pencils; markers
- Flip chart paper

Getting Ready

- Prepare enough *Sheep Cards* so the volunteer and each youth can have a card.
- Sprinkle one color of glitter in different places in the room on the floor.
- Sprinkle another color of glitter on a few of the chairs where the youth will be sitting.
- **Volunteer ONLY:** Put a third color of glitter on your right hand without letting anyone else notice. Do this only after you have passed the sheep cards out to the youth.

OPENING QUESTIONS

1. **What are some ways you can tell if you are sick?** Ask the youth to share their ideas verbally or to write their thoughts and ideas on the paper provided.
2. **What are some ways you might be able to tell if a sheep is sick?** Ask the youth to share their ideas verbally or to write their thoughts and ideas on the paper provided.
3. **What do you know about different ways you can get sick? What do you know about different ways a sheep might get sick?** Ask the youth to share their ideas verbally or to write their thoughts and ideas on the paper provided.
4. **What are some ways you think diseases can be spread from one human to another? From one sheep to another?** Ask the youth to share their ideas verbally or to write their thoughts and ideas on the paper provided.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a *Sheep Card*.
 - » **Volunteer tip:** Discuss the rules for this game: Have everyone pretend to be the sheep on the *Sheep Card* they have. The volunteer and the youth will move around the room shaking hands with other “sheep” and introducing themselves by their name, their breed, and the facts about themselves that they find on their sheep card. The goal at this point is to shake hands with several other “sheep,” but not with everyone. In addition, you can learn something interesting about a few other sheep breeds.
2. Once the rules have been explained, the “Volunteer Sheep” will start the game by introducing himself or herself to one “youth sheep,” and the activity will proceed from there.

SHARING, PROCESSING, AND GENERALIZING

Follow the lines of thinking developed by the youth as they share and compare their thoughts and observations; if necessary, use more targeted questions as prompts to get to particular points. Specific questions might include:

1. **What did you learn about different breeds of sheep?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
2. **What do you know about disease or illness prevention?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
3. **Please look at your hands. What do you notice about them? Please explain.** Ask the youth to try to associate the glitter with germs. Ask them to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
4. **Please look at your feet and clothes. What do you notice about them? Please explain.** Ask the youth try to associate the glitter with germs. Ask them to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
5. **Share your sense of what happened during the activity. What did you learn about spreading germs? Where did the germs come from? Does anyone know how you got the germs?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
6. **How might this relate to getting sick or staying well? What did you learn about becoming sick?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.

At the end of discussion, have the youth wash their hands with soap to get rid of the glitter “germs.”

CONCEPTS AND TERMS

At this point, volunteers need to make sure that the concepts and terms **direct contact, disease prevention, disease transmission, germs,** and **indirect contact** have been introduced to or discovered by the youth. (**Note:** The goal is to get the youth to develop concepts like this through their exploration and to have them define the terms using their own words.)

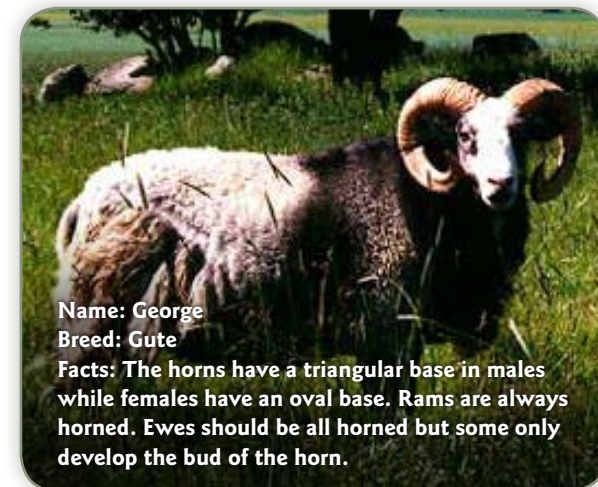
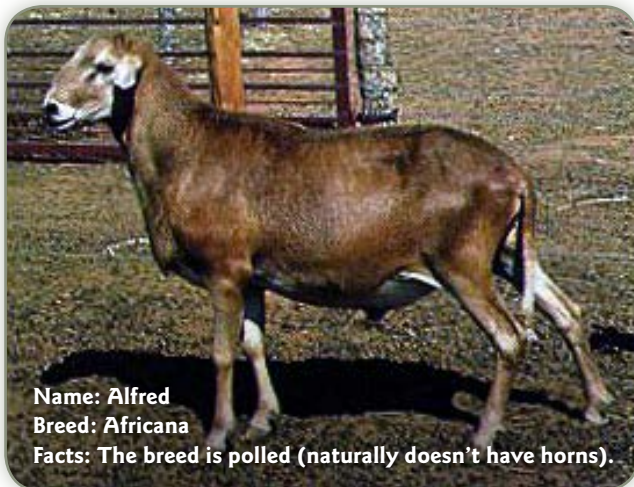
CONCEPT APPLICATION

1. Ask the youth to think of things they could do at home (e.g., washing their hands, wiping down counter tops, cleaning door handles) that would help reduce the risk of contracting and spreading diseases.
2. Ask youth to consider ways to reduce the risk that their 4-H project animal or pet will contract or spread diseases (e.g., clean food and water bowls).

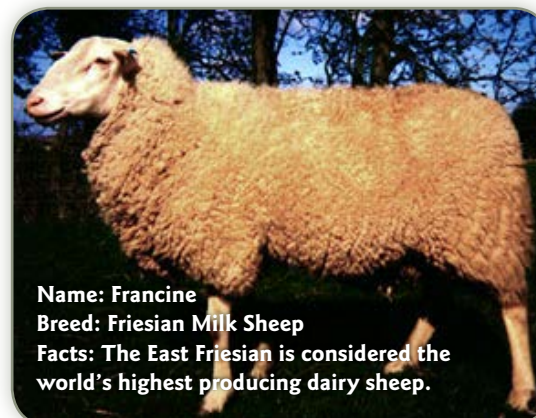
REFERENCES

- Breeds of livestock: Sheep (*Ovis aries*).
www.ansi.okstate.edu/breeds/sheep/.
- Hodgdon, D. R. 1919. Elementary general science. New York: Hinds, Hayde, & Eldredge, Inc. Pp. 321–323. <http://books.google.com/books?id=kLEXAAAIAAJ&pg=PA321&dq=germs,+prevention+of+disease#PPA319,M1>.
- National Center for Health Education. 2005. Disease prevention and immunization. www.nche.org/ParentsDisease.pdf.

Sheep Cards



Name: Davis
Breed: California Red
Facts: In Davis CA, this breed was created by crossing the Tunis and Barbados sheep.

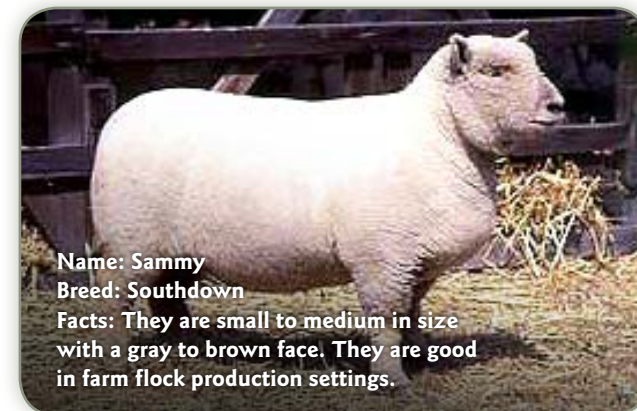
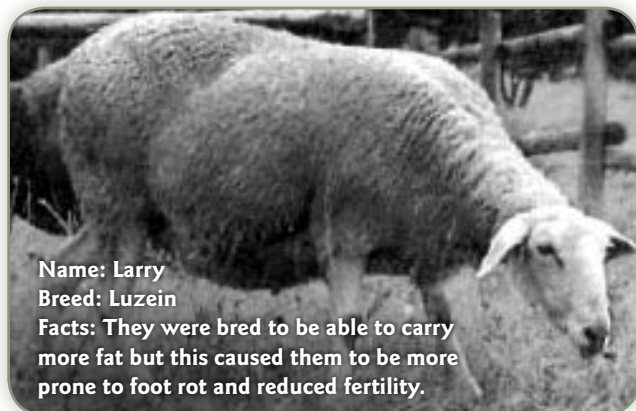
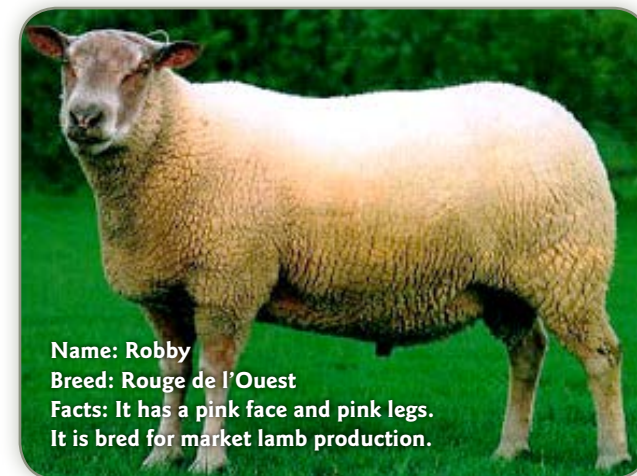
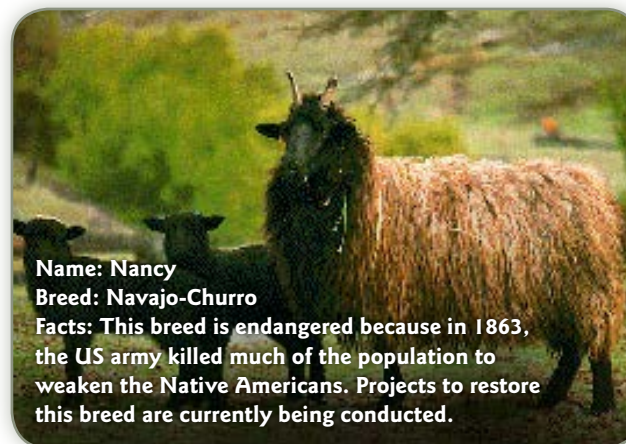
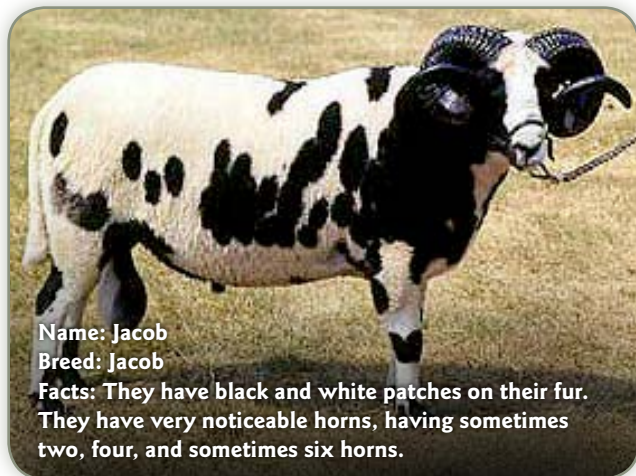


Name: Francine
Breed: Friesian Milk Sheep
Facts: The East Friesian is considered the world's highest producing dairy sheep.



Name: Francine
Breed: Ile-de-France
Facts: This is a large and bulky sheep. There is no wool on the face and lower legs.

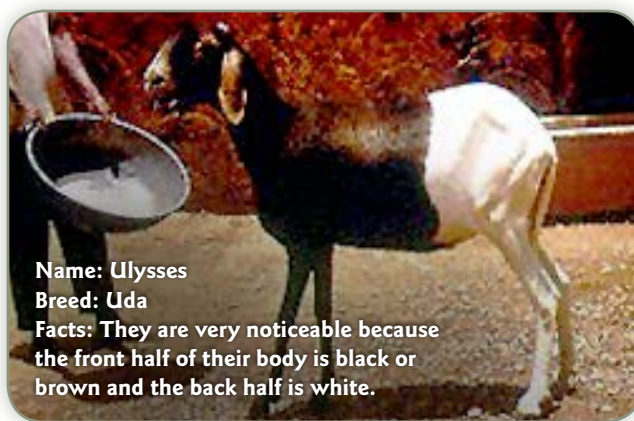
Sheep Cards, continued



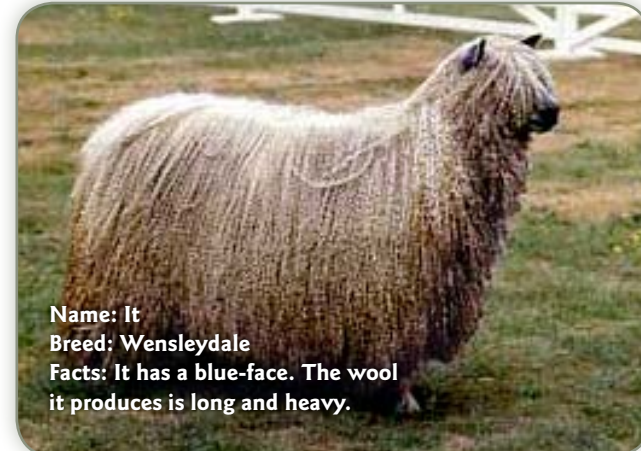
Sheep Cards, continued



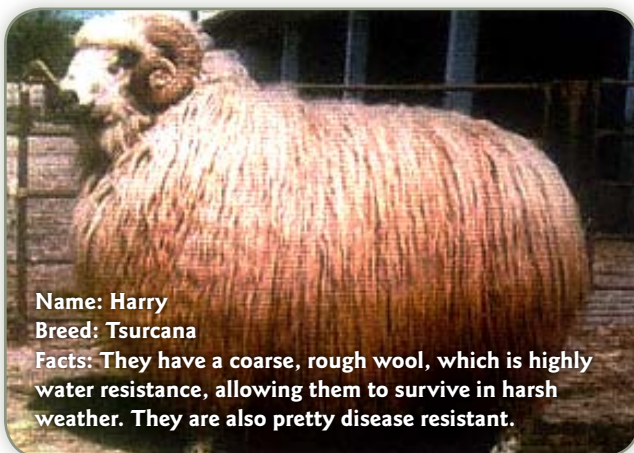
Name: Sally
Breed: Spiegel
Facts: They have dark eye spots, which looks like they are wearing spectacles. What is unique about them is that after shearing, the wool remains white even over dark spots.



Name: Ulysses
Breed: Uda
Facts: They are very noticeable because the front half of their body is black or brown and the back half is white.



Name: It
Breed: Wensleydale
Facts: It has a blue-face. The wool it produces is long and heavy.



Name: Harry
Breed: Tsurcana
Facts: They have a coarse, rough wool, which is highly water resistance, allowing them to survive in harsh weather. They are also pretty disease resistant.

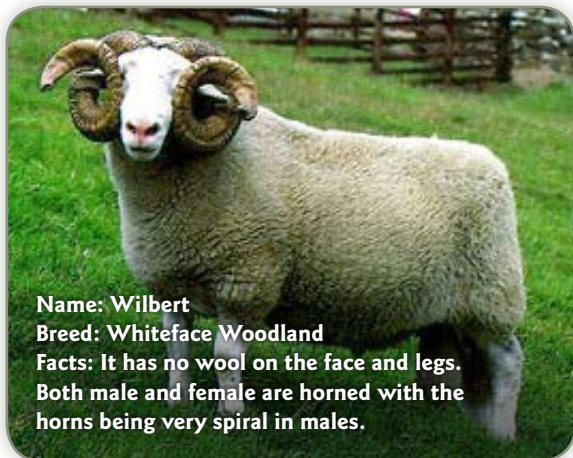


Name: Vicky
Breed: Van Rooy
Facts: This is a white sheep that has bristly hair. There is wool between the hairs, which gives it protection against the cold.



Name: Carlos
Breed: Xalda
Facts: This is an endangered sheep. In 1980, only 800 pure reproductive females remained.

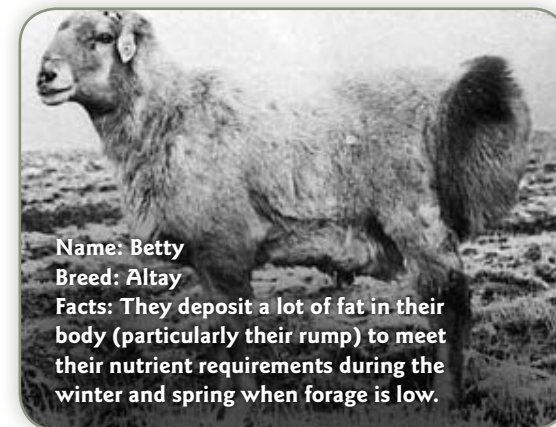
Sheep Cards, continued



Name: Wilbert
Breed: Whiteface Woodland
Facts: It has no wool on the face and legs. Both male and female are horned with the horns being very spiral in males.



Name: Tammy
Breed: Tong
Facts: The wool it produces is called carpet wool. They can put fat in their tails.



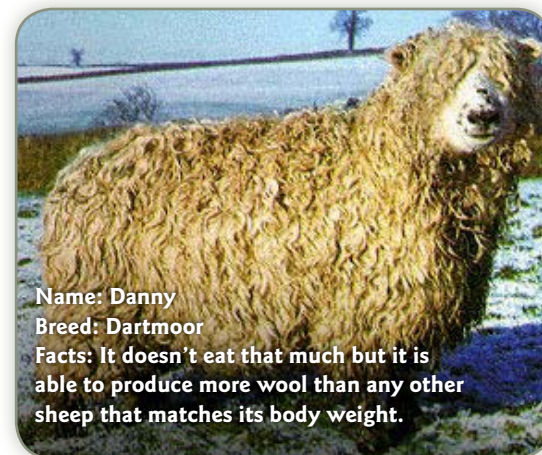
Name: Betty
Breed: Altay
Facts: They deposit a lot of fat in their body (particularly their rump) to meet their nutrient requirements during the winter and spring when forage is low.



Name: Blackie
Breed: Black Welsh Mountain Sheep
Facts: The wool is very fine, soft and dense which makes the fleece a specialty. Since the wool is black, it doesn't need to be dyed.



Name: Kelly
Breed: Cotswold
Facts: The fleece can easily mat if not maintained and kept clean. The fleece on the back of the animal doesn't offer that much protection for the sheep during cold rains.



Name: Danny
Breed: Dartmoor
Facts: It doesn't eat that much but it is able to produce more wool than any other sheep that matches its body weight.

ACTIVITY 2

Is My Sheep Sick?

BACKGROUND INFORMATION

It is sometimes hard to determine whether or not a sheep is sick. You might not even know that your sheep is sick until it is too late to do anything to help. It is very easy to overlook small signs that your sheep is sick unless you closely observe your sheep. Any small changes to your sheep's behavior or appearance might indicate a need for veterinary care.

When you notice anything wrong with your sheep, conduct a thorough evaluation of its environment (e.g., housing), its diet, and its history (e.g., age, medical records, origin). Because the origin of a disease is not always easy to identify, the more information you can provide your veterinarian, the better. With this approach, you will help ensure that your sheep receives the proper treatment and has the best chance for a full recovery.

Time Required

40 to 60 minutes

Concepts and Vocabulary

Preventive Health Care

Life Skills

Critical thinking, decision making, disease prevention, keeping records, problem solving, sharing

Subject Links

Language Arts

State Content Standards

Language Arts

- Fourth Grade:
 - » Listening and Speaking Strategies – 1.7, 1.8
- Fifth Grade:

- » Listening and Speaking Strategies – 1.5
- Sixth Grade:
 - » Listening and Speaking Strategies – 1.5
 - » Speaking Applications – 2.5a, 2.5b

Suggested Groupings

Individuals or pairs

Materials Needed

(* = *Materials provided in curriculum*)

- Seven tables with 3 to 5 chairs each (enough chairs to accommodate the entire group; one chair per child)
- One CD player or cassette player; one music CD or tape
- One six-sided die
- * *Sheep Characteristic cards*
- * *Sheep Illness cards*
- * *Veterinary Procedure cards*
- * *Health Care Log* (Concept Application)
- Three (3) containers (e.g., large bowls or paper bags)
- Flip chart paper
- Markers
- Tape

Getting Ready

- Organize the tables (with chairs) around the room so the youth can move freely between them.
- Using a piece of paper and a marker, randomly assign a number (1 through 6) to each of the tables.
- Place a seventh table off to the side of the room (in a corner or against the wall) and label it “Veterinary Hospital.”

- Copy enough *Sheep Characteristic cards* so each youth can have one card. Cut out the cards and place them in one container.
- Cut out the *Sheep Illness cards* and place them in a second container.
- Make at least two copies of the *Veterinary Procedures cards*. Cut the cards out and place them in a third container on the “Veterinary Hospital” table.

OPENING QUESTIONS

Working in small groups, ask the youth the following:

1. **What are some things that humans can do to avoid getting sick?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
2. **How can some of the things listed in the previous question also be applied to sheep to help them remain healthy?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.

PROCEDURE (EXPERIENCING)

1. Have each individual or pair choose one *Sheep Characteristic card* at random from the container. This card will represent their sheep for this activity.
2. Explain to the youth that they are going to play a modified game of “Musical Chairs.” They are to move around the room and in between the tables while the music is playing; when the music stops, they are to find a chair and sit down.
3. The volunteer then rolls the die and announces the number (1 through 6) that has been rolled.

4. The volunteer now draws one *Sheep Illness card* out of the bowl. He or she explains to the youth that one of the sheep at that numbered table has this illness, and some of the others may contract the disease, depending on their sheep's health and environmental conditions.
5. The volunteer reads the information on the *Sheep Illness card* that he or she has drawn. Each youth at that numbered table reads his or her *Sheep Characteristic card* and determines whether or not their sheep will contract the disease. Those youth whose sheep contract this illness must relocate to the Veterinary Hospital table; those youth whose sheep do not become ill remain at the table and play the next round of "Musical Chairs."
6. At the Veterinary Hospital table, each youth draws one *Veterinary Procedure card* prior to the start of the next round. If the card contains the appropriate information to cure their sheep, the youth place the card back into the container and return to their table to play the next round; if not, they place their card back into the container and then draw another *Veterinary Procedure card* at the end of the next round.
7. Continue playing the game until the volunteer has used all of the *Sheep Illness cards*.
8. Repeat the game if you like.

SHARING, PROCESSING, AND GENERALIZING

Review with the youth all the sheep illnesses that have just been introduced to see what they remember and understand. Then follow the lines of thinking developed through general

thoughts, observations, and questions raised by the youth; if necessary, use more targeted questions as prompts to get to particular points. Specific questions might include:

1. **What did you learn about sheep illnesses from this activity? Please explain.** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
2. **What were some common factors that caused the spread of disease?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
3. **What are some things a person could do to slow down or stop diseases from spreading?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
4. **If your friend were getting a sheep, what are some things you would tell him or her that would help them keep their sheep healthy and happy?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.

CONCEPTS AND TERMS

At this point, volunteers need to make sure that the concept of the **preventive health care** has been introduced to or discovered by the youth. (**Note:** The goal is to get the youth to discover concepts and terms like this on their own. It helps if they can define terms and concepts using their own words.)

CONCEPT APPLICATION

For youth who own their own sheep, develop a health care log that includes:

1. A checklist for adequate housing (e.g., proper temperature; sanitation).
2. Dietary monitoring (e.g., type of food, amount of food, feeding schedule).
3. Observations of sheep behavior.
4. Observations of sheep appearance.
5. Veterinary updates (e.g., dates of check-ups, dates of vaccines).

Ask the youth to discuss their health care log with each other and to share ideas.

For youth who do not own sheep, have them develop a health care log for another household pet that they may own.

REFERENCES

- Bagley, C. V. 1998. Udder diseases of sheep. Utah State University Extension. <http://extension.usu.edu/files/agpubs/sheep17.htm>.
- Jordan, R. M. 2008. Sheep diseases. University of Minnesota Extension. www.extension.umn.edu/distribution/livestocksystems/DI1877.html.
- Pipestone Vet. 2010. Vitamin E and/or selenium deficiency (white muscle disease or stiff lamb disease). Pipestone Veterinary Clinic. www.pipevet.com/articles/White_Muscle_Disease.htm.
- Schoenian, S. 2010. Sheep 201: A beginner's guide to raising sheep. www.sheep101.info/201/diseasesa-z.html.
- Swartz, H. A. 2008. Nutritional Effects on Sheep Health. Lincoln University Cooperative Extension. www.case-agworld.com/cAw.LU.nutr.html.

Sheep Characteristics Cards

Sheep Name: Dixie
Age: Young sheep
Exposure: Exposure to affected sheep
Environment: Dirty
Feed: Appropriate feed
Stress: High stress level

Sheep Name: Jazz
Age: Young sheep
Exposure: No exposure to affected sheep
Environment: Dirty
Feed: Appropriate feed
Stress: High stress level

Sheep Name: Jacob
Age: Older sheep
Exposure: Exposure to affected sheep
Environment: Dirty
Feed: Appropriate feed
Stress: High stress level

Sheep Name: Brutus
Age: Older sheep
Exposure: Exposure to affected sheep
Environment: Dirty
Feed: Appropriate feed
Stress: Low stress level

Sheep Name: Ranger
Age: Young sheep
Exposure: Exposure to affected sheep
Environment: Clean
Feed: Appropriate feed
Stress: Low stress level

Sheep Name: Elvis
Age: Young sheep
Exposure: No exposure to affected sheep
Environment: Clean
Feed: Appropriate feed
Stress: Low stress level

Sheep Name: Fairy
Age: Young sheep
Exposure: Exposure to affected sheep
Environment: Clean
Feed: Inappropriate feed
Stress: Low stress level

Sheep Name: Jean
Age: Young sheep
Exposure: No exposure to affected sheep
Environment: Clean
Feed: Inappropriate feed
Stress: Low stress level

Sheep Name: Rainbow
Age: Young sheep
Exposure: Exposure to affected sheep
Environment: Dirty
Feed: Inappropriate feed
Stress: Low stress level

Sheep Name: Buddy
Age: Young sheep
Exposure: Exposure to affected sheep
Environment: Clean
Feed: Appropriate feed
Stress: High stress level

Sheep Name: Snowy
Age: Young sheep
Exposure: No exposure to affected sheep
Environment: Clean
Feed: Appropriate feed
Stress: High stress level

Sheep Name: Aster
Age: Older sheep
Exposure: Exposure to affected sheep
Environment: Clean
Feed: Appropriate feed
Stress: High stress level

Sheep Name: Gypsy
Age: Young sheep
Exposure: No exposure to affected sheep
Environment: Clean
Feed: Inappropriate feed
Stress: High stress level

Sheep Name: Wooly
Age: Young sheep
Exposure: Exposure to affected sheep
Environment: Dirty
Feed: Inappropriate feed
Stress: High stress level

Sheep Name: Walter
Age: Young sheep
Exposure: No exposure to affected sheep
Environment: Dirty
Feed: Inappropriate feed
Stress: High stress level

Sheep Name: Honey
Age: Young sheep
Exposure: No exposure to affected sheep
Environment: Dirty
Feed: Inappropriate feed
Stress: Low stress level

Sheep Name: Vega
Age: Older sheep
Exposure: Exposure to affected sheep
Environment: Dirty
Feed: Inappropriate feed
Stress: Low stress level

Sheep Name: Dante
Age: Older sheep
Exposure: Exposure to affected sheep
Environment: Clean
Feed: Appropriate feed
Stress: Low stress level

Sheep Name: Hudson
Age: Young sheep
Exposure: Exposure to affected sheep
Environment: Dirty
Feed: Appropriate feed
Stress: Low stress level

Sheep Name: Marcus
Age: Young sheep
Exposure: No exposure to affected sheep
Environment: Dirty
Feed: Appropriate feed
Stress: Low stress level

Sheep Name: Spot
Age: Older sheep
Exposure: No exposure to affected sheep
Environment: Dirty
Feed: Inappropriate feed
Stress: Low stress level

Sheep Name: Netty
Age: Older sheep
Exposure: Exposure to affected sheep
Environment: Dirty
Feed: Inappropriate feed
Stress: High stress level

Sheep Name: Duke
Age: Young sheep
Exposure: Exposure to affected sheep
Environment: Clean
Feed: Inappropriate feed
Stress: High stress level

Sheep Name: Daisy
Age: Older sheep
Exposure: No exposure to affected sheep
Environment: Clean
Feed: Appropriate feed
Stress: High stress level

Sheep Characteristics Cards

Sheep Name: Max
Age: Older sheep
Exposure: Exposure to affected sheep
Environment: Clean
Feed: Inappropriate feed
Stress: High stress level

Sheep Name: Isabel
Age: Older sheep
Exposure: No exposure to affected sheep
Environment: Dirty
Feed: Appropriate feed
Stress: High stress level

Sheep Name: Polo
Age: Older sheep
Exposure: No exposure to affected sheep
Environment: Clean
Feed: Appropriate feed
Stress: Low stress level

Sheep Name: Honey
Age: Older sheep
Exposure: No exposure to affected sheep
Environment: Clean
Feed: Inappropriate feed
Stress: Low stress level

Sheep Name: Twinkle
Age: Older sheep
Exposure: Exposure to affected sheep
Environment: Clean
Feed: Inappropriate feed
Stress: Low stress level

Sheep Name: Lady
Age: Older sheep
Exposure: No exposure to affected sheep
Environment: Dirty
Feed: Appropriate feed
Stress: Low stress level

Sheep Name: Buttercup
Age: Older sheep
Exposure: No exposure to affected sheep
Environment: Clean
Feed: Inappropriate feed
Stress: High stress level

Sheep Name: Dawn
Age: Older sheep
Exposure: No exposure to affected sheep
Environment: Dirty
Feed: Inappropriate feed
Stress: High stress level

Sheep Illness Cards

Scrapie (Transmissible Spongiform Encephalopathy)—This is a fatal degenerative disease of the central nervous system. This disease is contagious, so sheep that are exposed to other affected sheep must proceed to the Veterinary Table.

Polioencephalomalacia (cerebrocortical necrosis)—This is a disturbance of the central nervous system that is caused by high grain and thiaminases/sulfur diets. It can be fatal if not treated within 48 hours. Sheep with inappropriate feed must proceed to the Veterinary Table.

Tetanus (Lockjaw)—This fatal disease is caused by bacteria transmitted through open wounds. Young sheep with a dirty environment must proceed to the Veterinary Table.

Ovine Progressive Pneumonia—This is a lung infection that causes the sheep to slowly deteriorate. Older sheep and sheep that are exposed to affected sheep must proceed to the Veterinary Table.

Acidosis—This disease is caused by eating too much grain which poisons the sheep by having too much acid in the body. Sheep with inappropriate feed must proceed to the Veterinary Table.

Footrot—This is caused by bacteria that infects/inflames the sheep's feet, causing limping or absence of walking. Sheep with a dirty environment must proceed to the Veterinary Table.

Enterotoxemia (Overeating Disease)—A sheep has this disease if there is an overgrowth of bacteria due to eating large amounts of high energy feeds that can result in acute death. Sheep with inappropriate feed must proceed to the Veterinary Table.

Foot and Mouth Disease—A highly contagious viral disease. Sheep that are exposed to affected sheep must proceed to the Veterinary Table.

White Muscle Disease—This disease is caused by a lack of selenium and/or Vitamin E in their diet. Young sheep with inappropriate feed must proceed to the Veterinary Table.

Lamb Scours—This bacterial disease affect young lambs. Young sheep with a dirty environment and lots of stress must proceed to the Veterinary Table.

Veterinary Procedure Cards - suggestion: print on a thick colored paper

<p>The vet explains what you need to change about your sheep's hygiene and cleanliness of their housing area and in addition gives you the proper medication. You comply and your sheep is cured.</p>	<p>The vet explains what you need to change about your diet and gives you the proper medication. You do not comply and so your sheep is cured temporarily but gets sick again.</p>	<p>The vet explains to you how to better regulate your sheep's cage temperature and gives you the proper medication. You do not comply and so your sheep is cured temporarily but gets sick again.</p>
<p>The vet explains to you what you need to do to maintain a low stress level for your sheep and gives you the proper medication. You comply and your sheep is cured.</p>	<p>The vet explains what you need to change about your sheep's hygiene and cleanliness of their housing area and gives you the proper medication. You do not comply and so your sheep is cured temporarily but gets sick again.</p>	<p>The vet gives you the proper medication and you follow all of his advice perfectly so your sheep is cured quickly.</p>
<p>The vet explains to you how to better regulate your sheep's housing temperature and gives you the proper medication. You comply and your sheep is cured.</p>	<p>The vet explains to you what you need to do to maintain a low stress level for your sheep and gives you the proper medication. You do not comply and so your sheep is cured temporarily but gets sick again.</p>	<p>The vet explains what you need to change about your diet and gives you the proper medication and you comply and this cures your sheep.</p>



ACTIVITY 3

Raising a Healthy Sheep

BACKGROUND INFORMATION

A well-balanced diet and a clean environment are essential to keeping healthy, whether you are a person or a sheep. If something is wrong with the food you eat or if you are in a contaminated environment, the likelihood increases that you will get sick. Unlike humans, domesticated animals do not have control over their diet or environment. Therefore it is especially important for you to be a knowledgeable and observant caretaker of your animals. For sheep, it is extremely important to provide fresh, clean feed and to maintain a clean, well-kept environment in order to prevent **illness and disease**. Also, close daily observation of your sheep's behavior and activity is important because it will help you recognize what behavior and characteristics are normal for your sheep, and that will help you notice when anything abnormal happens.

Time Required

45 to 60 minutes

Concepts and Vocabulary

Disease, illness, health care monitoring

Life Skills

Teamwork, contributions to group effort, sharing, cooperation, communication, keeping records, critical thinking, problem solving, decision making

Subject Links

Science, Language Arts

State Content Standards

Science

- Third Grade:
 - » Investigation and Experimentation - 5e
- Sixth Grade:
 - » Investigation and Experimentation - 7d

Language Arts

- Third Grade:
 - » Reading Comprehension – 2.2, 2.6
- Fourth Grade
 - » Reading Comprehension – 2.3
 - » Listening and Speaking Strategies – 1.7
- Fifth Grade:
 - » Reading Comprehension – 2.3, 2.4
 - » Listening and Speaking Strategies – 1.5
- Sixth Grade:
 - » Listening and Speaking Strategies – 1.5
 - » Speaking Applications – 2.5b

Suggested Groupings

Five small groups

Materials Needed

(* = Materials provided in curriculum)

- * *Health Assessment Journals* (for five sheep)
- * *Sheep Disease Information*
- * *Health Assessment Summary*
- * *Health Assessment Report*
- Flip chart paper
- Markers or other writing instruments

Getting Ready

- Divide the youth into small groups of 3 to 5.
- Provide each group with a supply of flip chart paper and markers, pencils, or pens.
- Prepare one set of *Health Assessment Journals* for each group (one set = five journal entries for a particular sheep).
- Make one copy of the *Health Assessment Summary* for each group.
- Make enough copies of the *Sheep Disease Information* so each group has a set.
 - » **Note:** Distribute the *Sheep Disease Information* worksheet at the end of the activity.
- Make enough copies of the *Health Assessment Report* for each individual (Concept Application).

OPENING QUESTIONS

1. **What are some ways you can tell if someone is sick? What are some signs or symptoms that you might notice? Please describe.** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
2. **What do you know about ways you get sick? What do you know about ways animals get sick?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
3. **Animals cannot speak, so they cannot tell us if they are not feeling well. What are some signs or symptoms that would help you to determine if an animal is sick? Please explain.** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.

PROCEDURE (EXPERIENCING)

- **Volunteer Tip:** Set up the following scenario for the youth: Each group represents the owners of a particular sheep (a different sheep for each group; provided by the Volunteer). Each group is given pre-printed daily journal entries that tell what observations they have made of their sheep for a particular day. Their job is to read the journal entries and look for important changes in their sheep's health or behavior that might suggest a health concern.
- **Volunteer Tip:** Provide each group the journal entries *one entry at a time and in order* (Day 1 first, Day 2, second, etc.). Do not give them the next day's entry until they have completed their work on the entry from the previous day.

1. Each group of sheep owners is given Journal Entry 1 from their *Health Assessment Journals*. Have each group read their journal entry and record important facts from the journal entry on the *Health Assessment Summary*.
2. Once the groups have finished recording and organizing the information from Journal Entry 1, take Journal Entry 1 away and provide them with Journal Entry 2. Again, ask them to read their journal entry and record important facts from the journal entry on the *Health Assessment Summary*.
3. Continue this process for Journal Entries 3, 4, and 5.
4. At this point, pass out copies of the *Sheep Disease Descriptions* and have each group review their *Health Assessment Summary* and determine which disease(s) their sheep might have. Have them write their suggested diagnosis and the evidence that led them to this conclusion on their *Health Assessment Summary*. This is the information that they would provide to their veterinarian.

SHARING, PROCESSING, AND GENERALIZING

Ask each group to share with everyone the results from their *Health Assessment Summary* and their suspected diagnosis. Follow the lines of thinking developed through the general thoughts, observations, and questions raised by the youth; if necessary, use more targeted questions as prompts to get to particular points. Specific questions might include:

- **When you were reading the journal entries, at what point did you begin thinking that it would be important to seek the care of a veterinarian?** Ask the youth to reference their

Health Assessment Summaries and share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.

- » **Volunteer Tip:** If youth are having difficulty with this question, please redistribute the journal entries for reference. **What do you think might happen if you were to wait too long to seek veterinary care?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
- **What might some of the consequences be if you don't monitor your sheep's health on a daily basis?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
- **Based on your own understanding, what are good signs to watch for that indicate that a sheep is healthy?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.

Check the suspected diagnosis from each group with the answer key provided below. If there are any discrepancies, talk with the youth about how they came up with their diagnosis and then see if they can come up with a new conclusion based on their own thoughts and ideas.

SHEEP DISEASE DIAGNOSIS KEY

- Daisy - Scrapie
- Rock - Footrot
- Elle - Acidosis
- Frankie - Stress
- Annette - Normal

CONCEPTS AND TERMS

At this point, volunteers need to ensure that the concept of **health care monitoring** has been introduced to or discovered by the youth. (**Note:** The goal is to get youth to develop concepts through their own exploration and get them to define terms using their own words.)

CONCEPT APPLICATION

- **Youth who own sheep:** Have the youth write daily observations of their own real sheep on the *Health Assessment Report*. Have each youth share his or her entries with the rest of the youth on a regular basis.
- **Youth who do not own sheep:** Have the youth use the *Health Assessment Report* for a different type of domesticated animal (e.g., a dog or cat) that they might have at home or a that a friend or neighbor might have. Have each youth share these entries with other youth and compare their entries with those of the sheep. How are the assessments similar? How do they differ?

REFERENCES

- Glenn, J., et al. 1997. Animal care series: Sheep care practices. University of California Cooperative Extension. www.vetmed.ucdavis.edu/vetext/INF-SH_CarePrax.pdf.
- Department of Primary Industries. 2009. Footrot in sheep: 1. Disease facts. Department of Primary Industries, Victoria, Australia. www.dpi.vic.gov.au/agriculture/pests-diseases-and-weeds/animal-diseases/sheep/footrot/ag0445-footrot-in-sheep-1.-disease-facts.
- Newman, R. 2010. Livestock health: Tetanus in sheep and goats. Queensland Government, Australia. www2.dpi.qld.gov.au/sheep/8584.html.
- Walker, B. 2006. Grain Poisoning of cattle and sheep. NSW DPI Prime Facts, New South Wales, Australia. www.dpi.nsw.gov.au/agriculture/livestock/sheep/health/other/grain-poisoning-cattle-sheep.
- Amundson, S., et al. 2007. Polioencephalomalacia. Purdue University. <http://ag.ansc.purdue.edu/sheep/ansc442/Semprojs/2002/neurological/polio.htm>.
- Schoenian, S. 2000. Enterotoxemia in lambs. Small ruminant info sheet. University of Maryland.
- New Mexico State University. 2010. Enterotoxemia (overeating disease). Sheep production and management. www.cahe.nmsu.edu/sheep/sheep_health/enterotoxemia.html.
- Turton, J. 2001. Prevent disease in goats and sheep. Department of Agriculture, in cooperation with ARC-Onderstepoort Veterinary Institute. www.nda.agric.za/docs/goatdisease/disease.htm.
- United States Department of Agriculture. 2009. Scrapie. Animal and Plant Health Inspection Service. www.aphis.usda.gov/lpa/pubs/fsheet_fa_notice/fs_ahscrapie.html.

HEALTH ASSESSMENT JOURNALS

Journal A, Entry 1: Today was a sunny and warm day. When checking on the sheep, I noticed Daisy walking around more than usual. I checked her feeder and noticed that she had eaten everything. While cleaning out the barn, I kept an eye on Daisy. The whole time I was cleaning, she didn't relax at all and was constantly wandering around. She is usually very mellow so it was odd to see her very skittish. As I approached to take a closer look at her, she led the rest of the herd in the opposite direction from me. For curiosity's sake, I counted the number of steps she took in 10 minutes, and counted 80 steps.

Journal A, Entry 2: Today was a gloomy day with gray skies and lots of clouds. Daisy still seemed very restless. She wasn't interacting with the other sheep, keeping a few feet distance from them. I counted the number of steps she took in 10 minutes and counted 92 steps. When I approached her, she was more reactive to my presence than usual, doing a sheep-like hop away from me. She didn't stop until she reached the outer fence. There, she started to rub her head and body against the fence. It looked like she was bored so I gave her a 2-liter soda bottle toy with some hay inside for her to play with.



JOURNAL A

Sheep Name: Daisy

Sex: Female

Age: 3 years

Journal A, Entry 3: It had been raining lightly on and off for the last few hours when I came to feed the sheep, and I saw the toy on the ground. It looks like Daisy and other sheep weren't interested in it. I spotted Daisy at the outer fence, rubbing her head and body against it a few times. She then started to scratch her wool, occasionally pulling some of it out and nibbling at her feet. She still seemed nervous, walking around for a few minutes and then stopping to scratch. I was curious about her behavior and wanted to see her closely but she wouldn't let me get close enough to examine her. When I did approach her, her entire body shook for a few seconds before she ran away. Today, I counted 112 steps in 10 minutes! Luckily, her appetite is still normal. The other sheep seemed to ignore her and left her alone.

Journal A, Entry 4: The sun came back today, and it was mildly warm outside. Usually Daisy loves sunbathing outside, but today she decided not to come out of her shed. She would take a step out of the shed for a few seconds but then rush back in. Although Daisy's appetite had been normal for the past few days, it looks like she lost a little weight. The rubbing, scratching, and biting continued, and she is still as skittish as ever. She just won't lie down even when under the shed. I thought my presence made her skittish so I stood far away from her. Even though I was far away, she never relaxed. She continuously paced around the shed. In 10 minutes, Daisy took 127 steps.

Journal A, Entry 5: Today was another nice day. When I checked on Daisy, she looked really pathetic. After all the rubbing, scratching, and biting she had done for the past few days, she had worn out her wool, leaving patches of bare skin all over her body. At first I thought the other sheep were leaving her alone, but just now I realized that they were actually avoiding her. She stayed in the shade all day. When I went out to check on her again, I noticed that her entire body was shaking, and she wasn't moving at all. When I came close to her, she didn't seem to notice I was there.

Journal B, Entry 1: Earlier today the sun was out, and Rock was running around in the grass like his usual self, happy to finally see the sun. When observing him, I saw him butt heads with another ram his age. Rock stumbled backwards a little but immediately got up and bounced away. Later in the day, it started to drizzle. There were muddy areas in Rock's enclosure as well as small puddles in the grass. He was still extremely playful, running around in the rain. The other sheep in his pen didn't move much but remained standing. The mud in some areas was so deep that the hooves of some sheep were completely buried in mud. I tried to remove the mud from the pen but it was useless, so I just refilled the water and food. Rock ran back to the pen and ate his food happily.

Journal B, Entry 2: The sun was out today but Rock seemed less energetic. When other rams approached to butt heads with him, he would get up and play for a little bit but would sit back down as if he was tired. When I approached the herd, the entire herd except for Rock quickly ran away. Rock, on the other hand, took his time to follow the herd. It looked as if he was trying to avoid being on his feet. His energetic bounce was absent today, and he was acting like an old, tired sheep. As soon as he was a safe distance from me, he immediately lay down. In the pen, I noticed some food left in Rock's feeder. That is odd because it is usually completely empty.



JOURNAL B

Sheep Name: Rock

Sex: Male

Age: 1 year

Journal B, Entry 3: Today was a humid, overcast day with a cool breeze. When I went outside to see Rock, he was lying down among the other sheep. When I approached the herd, all the other sheep scurried to their feet and scattered away, but Rock stumbled onto his knees and took a few seconds before getting up on his feet. He was the last to reach the herd. I took a few steps away so the sheep could be at ease. Rock's friends playfully rammed him in the head, but Rock ignored their invitation and lay back down. While the other sheep were grazing on the grass, Rock remained on the ground, not even attempting to get up and eat.

Journal B, Entry 4: Today the sky was filled with rain clouds and looked like it might rain at any moment. When I went out to the pen, Rock seemed very hesitant to get on his feet. It was clear that he wanted to scurry away from me when I approached, but he seemed to want to avoid getting up on his feet. He struggled on his knees and did a crawl-like movement but fell down. This was the closest I have been to Rock in a long time, as he is usually quite skittish when I am nearby. When I was near him, I noticed a very strong smell that was not normal. I wondered if it was from the food in Rock's feeder because it looked old and untouched. But when I got closer, the smell was definitely coming from Rock.

Journal B, Entry 5: It started to rain today. The enclosure was very wet and parts in the enclosure were extremely muddy. When I approached Rock, he just looked up at me and "baaed" weakly. He didn't even attempt to get up. When I took a closer look at him, I noticed that he lost some weight. The wool on his knees was worn out and the skin underneath started to look raw.

Journal C, Entry 1: When I came to check up on Elle today, she was eating and lying down as usual. She seemed content and very relaxed. Her eyes and nose were clear and had no discharge. Her fleece was thick and consistent without any dry patches. She later started walking around her enclosure. Her gait seemed normal and was without a limp. She also seemed to have a good temperament. Even though she is very alert about her surroundings, she is still very happy to see me, especially when I started feeding her grain. I gave her some fresh grain and she happily ate it.

Journal C, Entry 2: When I arrived at the barn to get some grain, I realized I had run out of it. I ended up having to feed Elle hay until I got another order of grain. Elle did not like the hay as much as the grain and didn't eat as much as she normally does. Her gait was normal when she went up to the feeder. She nudged the hay with her nose and walked away to bathe in the sun. Her eyes and nose were free of discharge.



JOURNAL C

Sheep Name: Elle

Sex: Female

Age: 4 years

Journal C, Entry 3: Today we had rain, which was very unusual. I noticed that Elle hadn't eaten very much since I changed her feed yesterday. I checked her eyes and nose. Her eyes looked a little dull but there were no major abnormalities such as discharge. I checked her fleece and it was still thick and consistent. The last thing I checked was whether she was coughing or sneezing, but I observed neither. Maybe she really dislikes the hay. Hopefully the shipment of grain comes in soon.

Journal C, Entry 4: Today was a beautiful sunny day. My order of grain finally came in today so I was able to feed it to the sheep. Because Elle did not eat much the past two days, I fed her more grain than normal. Elle was very excited when she saw the grain. She consumed a lot of grain in a small amount of time and then lay down to ruminate her food. Her gait was normal, and she was free of discharge in her eyes and nose. She seemed her normal self once again.

Journal C, Entry 5: The weather was acting very odd today, for it started to drizzle. When I brought Elle grain, she seemed surprisingly uninterested in it. When I poured the grain into her feeder, she did not eat any of it. She seemed very lazy and was not eager to stand up. When I looked closely at Elle, I noticed that her stomach was very big and closer to the ground than normal. I also saw piles of loose stool in the enclosure. Elle's eyes looked droopy. When I got closer to her, she tried to stand up but stumbled back to the ground. Her wool was still normal.

Journal D, Entry 1: My dad brought a new ewe home a few days ago. I was a little worried about how Frankie and the other sheep would adjust to the new addition. When I went to check on Frankie today, I noticed that his wool was patchy and some areas were dry and raw. Even when he was in the shade lying down, his breathing rate was faster than normal. I decided to measure his breathing rate and recorded 35 breaths per minute. This was a little higher than the average 20 breaths per minute. He seemed more skittish than before. Normally, he would let me approach him until I was about 6 ft. away, but today he ran away when I approached 15 ft. The new ewe sheep seems to be adjusting well and gets along well with the other ewe, but does not get too close to Frankie. His stool in the enclosure looked fine: round and hard.

Journal D, Entry 2: Frankie's wool was still patchy today when I checked on him. Fortunately there were some areas of his coat that looked like it was growing back. While he was standing in the shade, I recorded his breathing rate at 30 breaths per minute. Then I heard a funny sound coming from Frankie and noticed him moving his jaws side to side as if he was grinding his teeth. His eyes and nose looked normal. I checked on the new ewe, and she seemed more comfortable now, slowly moving closer to Frankie.



JOURNAL D

Sheep Name: Frankie

Sex: Male

Age: 3 years

Journal D, Entry 3: Today when I looked at Frankie's coat, I was happy to see that the raw spots on his skin were being left alone; there were no new raw or bare areas in his wool. His eyes and nose were clear. Frankie was lying down in the sun ruminating. I measured his breathing rate and recorded 26 breaths per minute. I didn't hear the grinding sound from him today, and overall he seemed more relaxed. When observing the two other sheep, I noticed them peacefully ruminating in the sun.

Journal D, Entry 4: As I approached Frankie today, he didn't seem to mind that I was only a few feet away from him. I measured his breathing rate and recorded 23 breaths per minute. His eyes and nose were clear. When I got within 5 feet away from him, he got up and just stood there. I was able to measure his breathing rate again and recorded 26 breaths per minute. He seemed more like his normal self, happily eating grass and ruminating in the sun.

Journal D, Entry 5: Frankie was walking around the enclosure when I came to check on him. His gait was normal without any limps, and his coat looked like it was filling in. There were no new raw areas in his wool. His eyes and nose were still clear. When I was about 5 feet away from him, he walked away a few steps and then stood still. I recorded his breathing rate and measured 23 breaths per minute. It looked like he had eaten all his food and water so I refilled them again.

Journal E, Entry 1: It has been very hot these past few weeks, with the temperature much higher than a sheep's ideal temperature of 60°F. Annette and her fellow ewes have been staying close to the shed because the shed has misters, fans, and shade that keep them cool. They eat the grass near the shed but happily eat the fresh grain I pour into their feeder every day. They do drink water, but most of their water comes from the grass they eat. I visited them today in the shed and measured Annette's breathing rate from about 15 feet away. It was 22 breaths per minute, a good average respiration rate for sheep in their ideal 60°F temperature. When I was about 6 feet away from her, she stood up and walked away from me.

Journal E, Entry 2: It was a surprisingly cooler day outside, and I noticed that Annette and her fellow sheep decided to take this opportunity to walk out onto the pasture. I found Annette lying on the grass and ruminating while two other ewes were grazing on the grass. Her breathing rate was a little higher than average at 28 breaths per minute. Her increased respiration rate could be due to her being out in the sun or walking before she lay down on the grass.



JOURNAL E

Sheep Name: Annette

Sex: Female

Age: 8 months

Journal E, Entry 3: It seemed as though the sheep spent the entire night out in the pasture near a big tree, because when I came to check on them, all three of them were walking back toward the shed where I was standing. While cleaning the shed, I used a rake to pile up the sheep droppings. I noticed the droppings were normal, round in shape and moist but hard enough to maintain the round shape. I noticed a small muddy area where a water bucket got knocked over so I cleaned it up. The sheep watched me curiously from a safe distance outside the shed as I cleaned.

Journal E, Entry 4: When I went out to the shed, I was surprised to see Annette lying under the sun. It was another hot day, and the other two sheep were back in the shade. Annette's breathing was faster than usual at 30 breaths per minute. Her eyes and nose were clear and her wool looked normal. I did not notice anything peculiar such as shivering or grinding of the teeth. I was curious as to why she preferred to be out in the heat rather than under the shade, but she seemed to be enjoying the sun.

Journal E, Entry 5: I decided to bring my dog out with me today when I checked on the sheep. When Annette saw the dog, she immediately rose to her feet and scurried about 19 feet away from the dog and me. Then she just stood there and watched the dog. I noticed no abnormalities with Annette while observing her from a distance. Then I realized that my dog was scaring Annette into the sun, so I decide to leave. When I was a good distance away from the shade, Annette went back into the shade and lay back down.

SHEEP DISEASE INFORMATION

Acidosis (as-i-doh-sis): Acidosis is caused by overeating grain in animals that do not usually eat grain or that are overly hungry. The process of digesting grain releases high levels of acid in sheep, which causes them discomfort. This usually occurs 6 to 12 hours after they eat the grain. Sheep that experience acidosis will be

- Dehydrated
- Irritable
- Dull
- Lacking in coordination
- Larger than normal in the abdomen (stomach area), so the abdomen hangs closer to the ground than usual.
- Diarrhetic

It is important to treat acidosis right away, because the sheep will die if left untreated. To help alleviate the sheep's discomfort, you need to empty the rumen of grain or feed the sheep something that balances the acidity in the stomach. The best prevention measure is to control the amount of grain the sheep eats.

Enterotoxemia (overeating disease) (en-tuh-roh-tok-see-mee-uh): This is caused by the toxins produced by the bacteria that naturally live inside the sheep's intestines. This disease can occur if a sheep eats too much of high-energy foods or grains, if there is a sudden change in feed, if irregular feeding occurs, or if overcrowding occurs at the feeding area. Overeating

causes the bacteria in the intestines to increase in number, which causes an increase in the amount of toxins produced in the intestines. The toxins are absorbed quickly by the sheep's intestinal system and can cause many problems, including the possibility of death. Some animals that are found dead do not show any symptoms. However, if symptoms do appear, they may include

- Distressed behavior
- Grinding teeth
- Twitching
- Convulsions
- Abdominal pain
- Diarrhea
- Foam from the mouth

To prevent enterotoxemia, you need to regulate the sheep's diet. There is also a vaccine to help prevent this from occurring.

Footrot: This occurs when two types of bacteria that are found in soil, the presence of feces, and infected animals come together. If not treated promptly, sheep infected with footrot may

- Limp, due to inflamed hooves
- Completely stop walking on their feet and either walk on their knees or fail to walk at all

- Decrease their food intake
- Have poor milk and/or fiber production
- Have abnormally shaped hooves

Footrot can be detected by its strong odor and by looking at the hooves. Once treated, the sheep can be released back into the herd but it is critical that you make sure that the sheep's hooves have completely healed so the infection does not start all over again. Prevention is the best method; make sure all sheep are free of the disease and make sure that feces and muddy areas are cleaned up promptly.

Polioencephalomalacia (PEM): This is caused by eating too much thiamin and sulfur, both of which occur in a high-grain diet. PEM disturbs the central nervous system and swells the brain of the infected animal. The infected sheep has symptoms such as

- Blindness
- Disorientation
- Tilting of the head upward (looks like it is stargazing)
- Loss of appetite
- Decreased intake of water

Even though the temperature and respiration rate of affected animals remains normal, the heart rate could be slowed down. If treated within 48 hours, the chance of recovery is high.

Scrapie (Transmissible Spongiform Encephalopathy [TSE]) (skrey-pee): This is a fatal disease that deteriorates the sheep's central nervous system. Scrapie is caused by viruses transmitted from one sheep to another, so it is critical that you isolate any infected sheep right away. If your sheep is affected with Scrapie, symptoms include

- Restlessness
- Increase in locomotion (moving around a lot)
- Itching and rubbing its body against objects such as fences
- Nervousness and high sensitivity to slight changes in its surroundings, such as changes in sound and light
- Pulling out of its own wool due to stress

As the disease progresses, the sheep will begin to lose coordination and often stumble. This disease is fatal. The only way to know for sure that the sheep has Scrapie is to perform a necropsy or dissect the dead animal and identify signs of the disease in the brain and the spinal cord.

Stress: Stress in sheep is caused by many different things because they are prey animals and do not have much defense against predators. Some signs of stress include

- Panting/increased respiration
- Increased chances of getting sick
- Restlessness
- Nervousness
- Teeth grinding
- Slower growth
- Bad fleece
- Increased skittishness

Unfortunately, stress can sometimes be caused by routine check ups and transportation. In these cases, the sheep should be treated as gently as possible and handlers should do everything possible to minimize stress for the animals.

Tetanus (Lockjaw) (tet-n-uhs): This is caused by bacteria found in the soil. The spores of the bacteria travel into the sheep

through open wounds such as those resulting from tail docking, shearing (shaving off the wool), and ear tagging. Sheep infected with tetanus have muscle contractions and eventually die from physical exhaustion as a result. At the beginning of the disease, infected sheep show symptoms such as

- Ears and tails standing straight up
- Inflexible legs that cause difficulty in walking
- Exaggerated reactions to changes in noise and light
- Stiff muscles
- Spasms
- Difficulty eating and drinking
- Bloating

As the disease progresses, the sheep may become unable to walk at all, unable to stand up, and their jaw may lock into one position. This disease is fatal, so prevention is very important. Along with vaccination, it is essential that you use clean needles and other equipment when doing any medical procedures.

HEALTH ASSESSMENT SUMMARY

Sheep Name: _____

Breed: _____

Gender: _____ Age: _____

General Symptoms

Is there anything you notice that you should be concerned about?

Journal Entry 1: _____

Journal Entry 2: _____

Journal Entry 3: _____

Journal Entry 4: _____

Journal Entry 5: _____

Suspected Diagnosis: *(Use the Sheep Disease Descriptions)*

Observations

1. Explain which symptoms from the journal helped you indicate a problem, and why. _____

2. What other observations do you think might be important?

3. Why do you think recording daily observations of your sheep would be helpful in monitoring your sheep's health?

HEALTH ASSESSMENT REPORT

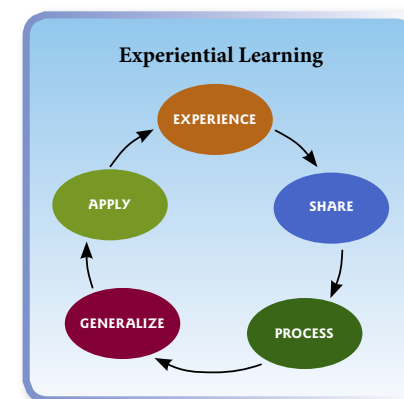
Day	Activity	Behavior	Housing	Other (specify):	Other:	Other:
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						

GLOSSARY

- **Balanced diet:** Eating the right types of food in the right amounts to maintain a healthy body.
- **Basic nutrients:** Substances that help maintain a healthy body. These include carbohydrates, proteins, vitamins and minerals.
- **Care:** Having concern for someone or something, which leads to tending or overseeing that person or thing.
- **Direct contact:** Physical contact between an ill person or animal and a healthy person or animal.
- **Disease:** An abnormal condition that affects the normal function and health of an organism, decreasing the health of that organism.
- **Disease prevention:** Taking the necessary steps to prevent humans and/or animals from getting sick.
- **Disease transmission:** To transfer a disease from one person or animal to another.
- **Environmental needs of humans and sheep:** The things that both humans and sheep need in their home or living area to help them survive and live comfortably.
- **Essential nutrients:** Nutrients that humans and animals must have to live and function properly.
- **Extensive systems:** Systems that don't constrain animals and allow them to perform their natural foraging behavior.
- **Facial recognition:** The ability to identify and remember a face or several faces.
- **Flight zone:** A buffer zone around an animal. Animals will move away from anything they perceive as a threat within the flight zone.
- **Flock (noun)/Flocking (verb):** A group of animals that stay together and feed together.
- **Flocking instinct:** The natural instinct of a group of animals to stick together and follow the actions of the leader of the group.
- **Germ:** A microorganism that has the potential to cause diseases.
- **Health care monitoring:** Closely observing an animal's health, behavior and activity everyday to determine what is normal or abnormal about your animal.
- **Herding:** The act of gathering and keeping a group of animals together.
- **Herding strategies:** Different techniques that ranchers use to gather and control a group of animals.
- **Illness:** Being unhealthy or in poor health.
- **Indirect contact:** When an uninfected person or animal touches the contaminated surface (e.g., table top) of an inanimate object (e.g., food dish).
- **Intensive systems:** Systems where animals are confined to a smaller area of land and where feeding is more controlled.
- **Life stages of sheep:** Sheep are categorized in different stages of development or life stages. Sheep at each life stage have different nutritional requirements to grow and stay healthy.
- **Predator:** An animal that hunts and eats other animals in order to survive.
- **Preventive health care:** The act of maintaining the health of humans and animals by preventing them from catching an illness or disease.
- **Prey:** Animals that are considered food by other animals.
- **Responsibility:** Being accountable for one's actions or behaviors.

APPENDIX

The activities in this curriculum were designed around inquiry and experiential learning. Inquiry is a learner-centered approach in which individuals are problem solvers investigating questions through active engagement, observing and manipulating objects and phenomena, and acquiring or discovering knowledge. Experiential learning (EL) is a foundational educational strategy used in 4-H. In it, the learner has an experience phase of engagement in an activity, a reflection phase in which observations and reactions are shared and discussed, and an application phase in which new knowledge and skills are applied to a real-life setting. In 4-H, an EL model that uses a five-step learning cycle is most commonly used. These five steps—Experiencing, Sharing, Processing, Generalizing, and Application—are part of a recurring process that helps build learner understanding over time.



For more information on inquiry, EL, and the five-step learning cycle, please visit the University of California Science, Technology, and Environmental Literacy Workgroup's Experiential Learning website, <http://www.experientiallearning.ucdavis.edu/default.shtml>.

FOR MORE INFORMATION

To order or obtain ANR publications and other products, visit the ANR Communication Services online catalog at <http://anrcatalog.ucanr.edu> or phone 1-800-994-8849. You can also place orders by mail or FAX, or request a printed catalog of our products from

University of California
Agriculture and Natural Resources
Communication Services
1301 S. 46th Street
Building 478 - MC 3580
Richmond, CA 94804-4600

Telephone 1-800-994-8849
510-665-2195
FAX 510-665-3427
E-mail: anrcatalog@ucanr.edu

© 2014 The Regents of the University of California
Division of Agriculture and Natural Resources.

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the written permission of the publisher and the authors.

Publication 8477
ISBN-13: 978-1-60107-791-2

The University of California Division of Agriculture & Natural Resources (ANR) prohibits discrimination against or harassment of any person participating in any of ANR's programs or activities on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (which includes pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), genetic information (including family medical history), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services (as defined by

the Uniformed Services Employment and Reemployment Rights Act of 1994: service in the uniformed services includes membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services) or any person in any of its programs or activities.

University policy also prohibits retaliation against any employee or person participating in any of ANR's programs or activities for bringing a complaint of discrimination or harassment pursuant to this policy. This policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University's equal employment opportunity policies may be directed to Linda Marie Manton, Affirmative Action Contact, University of California, Davis, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1318. **For information about ordering this publication, telephone 1-800-994-8849. For assistance in downloading this publication, telephone 530-750-1225.**

To simplify information, trade names of products have been used. No endorsement of named or illustrated products is intended, nor is criticism implied of similar products that are not mentioned or illustrated.

An electronic copy of this publication can be found at the ANR Communication Services catalog website, <http://anrcatalog.ucanr.edu>.



This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Human and Community—Youth Development, Lynn Schmitt-McQuitty.

web-4/14-WJC/RW