

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

1

SUBJECT OVERVIEW AND
BACKGROUND INFORMATION

Our society is more **urban** than **rural**, and few of our population ever come into direct contact with farm livestock such as sheep. Most people have used a common product from sheep—wool—at some time in their lives, but there is much more to know about sheep than most people realize. Wild and domesticated sheep can be broken down into many species, and there are several breeds of domesticated sheep, such as Merino and Rambouillet. Domesticated sheep do not just provide us with wool—we also use them for milk, meat, hides, and much more.

Sheep can live in almost any environment, from deserts to meadows to snowy pastures. They are very social animals and are most comfortable within a flock. They are uneasy when outside of a flock, and they may exhibit some distress when new sheep are introduced to their flock. Research has shown that sheep have the ability to learn and remember the faces of other sheep through a process that is remarkably similar to the way humans form a memory of another person's face. When new sheep arrive in a flock, the rest of the flock regards them as strangers! Sheep are also very timid animals and are inclined to flee danger whenever a perceived threat comes within the **flight zone** of the flock.

What Does It Mean to Be a Sheep?



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.



UC DAVIS
VETERINARY MEDICINE



A flight zone can be looked at as an animal's, or in this case the flock's "personal space" where they do not feel threatened. This is why herding dogs have such an easy time maneuvering sheep. The dog only has to get close to the flock in order to get the sheep to move in the desired direction.

Learning about sheep and their behavior will help youth understand how interesting and complex these animals are. This understanding will make owning and raising a sheep much more rewarding and fun.

Concepts and Vocabulary

- **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.
- **Herding:** The act of gathering and keeping a group of animals together.

- **Herding strategies:** Different techniques that are used to gather and control a group of animals.
- **Predator:** An animal that hunts and eats other animals in order to survive.
- **Prey:** Animals that are considered food by other animals.

Life Skills

Communication, contributions to group effort, cooperation, critical thinking, decision making, planning/organizing, problem solving, sharing, teamwork

Subject Links

Science, Language Arts

Overview of Activities

The activities in this unit introduce youth to sheep, but do this from the "sheep's point of view." The first activity "Something about That Face Is Familiar . . .," focuses on sheep's facial recognition. Youth will be given pictures of a number of sheep faces and their goal is to use their memory to match the pictures. They will also compare the sheep faces and describe ways in which the faces are similar to and different from each other.

The second activity, "Taking Stock in the Flock," introduces flocking behavior of sheep. Sheep live in flocks as a

protective measure against predators. They also maintain a buffer zone around them, referred to as the **flight zone**, and they will move away from anything that they perceive as a threat within that zone. Youth will learn about sheep behavior by first observing flocking and flight zone pictures and then describing what they see.

They will apply what they have learned from the second activity during the third activity, "Can You Be a Sheep Herder?" Here, youth will alternate between being herders and sheep. With one group of youth as the herders and one group of youth as the sheep, the goal is to herd the sheep through a gate.

REFERENCES

- Grandin, T. 2005. Understanding flight zone and point of balance. Dr. Temple Grandin's Web Page. www.grandin.com/behaviour/principles/flight.zone.html.
- Schoenian, S. 2009. Sheep101.info website. www.sheep101.info/.
- Trivedi, B. P. 2001. Sheep are highly adept at recognizing faces, study shows. National Geographic Today. http://news.nationalgeographic.com/news/2001/11/1107_TVsheep.html.

FACTS ABOUT SHEEP

HISTORY AND DOMESTICATION

- The domestication of sheep dates back to 10,000 B.C., in Asia.
- Sheep provide wool, meat, and milk to humans; in return they receive protection, shelter, and feed and health management.

SHEEP!

- Sheep are **ruminants**. **Rumination**, or cud chewing, is the process by which animals with a four-part stomach will regurgitate and re-chew partially digested food. This process helps sheep and other ruminants to digest tough plant material for nutrients and energy.
- Sheep spend most of their time either ruminating or sleeping.
- On average, sheep graze 5 to 10 hours per day.
- Sheep sleep only 3 to 4 hours per day. Although they nap, off and on, for another 4 to 5 hours during the course of a day, they are awake and active approximately 16 hours of every 24-hour period.
- Most female sheep over 1 year in age can produce offspring.

- **Lamb:** A sheep that is less than 1 year of age that has not produced offspring.
- **Ewe:** A mature female sheep.
- **Ram or buck:** A mature male sheep.
- **Yearling:** An animal between 1 and 2 years of age that may or may not have produced offspring.
- There are hundreds of distinct sheep breeds worldwide and more than 35 in United States alone. They come in all different shapes, sizes, and colors.
- Domesticated sheep are differentiated by their economic use (meat, wool, or milk), the wool or hair they grow (fine wool, medium wool, coarse wool, or hair), and the color of their face (black, white, red, or mottled), as well as various production and physical characteristics.

BEHAVIOR

- Sheep have a very strong instinct to follow a lead sheep in their **flock**.
- Sheep are social animals and tend to form groups with other sheep. They typically stay together in groups of 4 or 5 while grazing.
- When many rams are together, a dominance hierarchy will develop.

- Sheep are seasonal breeders and are referred to as **short-light breeders**, meaning that they typically breed in the autumn under conditions of short days and cool temperatures.
- Sheep have five basic senses—vision, hearing, smell, taste, and touch—and each of these is important in their survival.

SIGHT

- Sheep have very good vision.
- The position of a sheep's eyes allows for wide peripheral vision (vision to the sides). Each eye has a potential field of view spanning about 145°.
- A sheep's range of binocular vision (using both eyes, looking forward) is much narrower—only 40° wide. They have no vision for the 2 to 3 cm immediately in front of their nose. After locating a threat in their peripheral vision, sheep will turn to examine it face-forward with binocular vision.
- Sheep have a blind spot to the rear about 70° wide, wider than a cow's blind spot.
- Sheep never leave straight tracks because they continually turn to look behind them.
- Sheep have color vision, but it is not as well developed as it is for humans.

- Sheep often react in fear when they see a color that they are not accustomed to (e.g., yellow rain gear).
- Sheep can recognize and remember individual sheep and humans by their faces, and are attracted to them on that basis. Studies have shown that individual sheep can remember at least 50 other individual sheep faces for more than 2 years!
- Sheep also have shown clear behavioral signs that they recognize pictures of individuals that are not present. They demonstrate this by vocalizing in response to their pictures of the missing sheeps' faces.
- Sheep remember flockmates for very long periods (years) after separation.

SMELL

- Sheep have a good sense of smell and will not eat moldy or musty feed.
- Smell is a major factor used by rams to locate ewes during breeding season.

- Smell is also vital to lamb identification by the **dam** (the lamb's mother).
- Sheep are very sensitive to the scents of predators.

HEARING

- Sheep have keen hearing and can direct their ears toward the source of a sound.

TASTE

- The sense of taste is not as important to sheep as is their sense of smell. However, they use taste to differentiate between different feeds.

TOUCH

- Most of a sheep's body is covered with wool or coarse hair, with the exception of the nose, lips, and mouth, which are used for feeling behavior. The skin under the wool is extremely sensitive, but is well protected.

REFERENCES

- Claeys, M. C., and S. B. Rogers. 2003. Sheep facts. North Carolina State University. www.cals.ncsu.edu/an_sci/extension/animal/4hyouth/sheep/sheepfacts.htm.
- Gill, W. 2004. Applied sheep behavior. Agricultural Extension Service: University of Tennessee. <http://animalscience.ag.utk.edu/sheep/pdf/AppliedSheepBehavior-WWG-2-04.pdf>.
- Highfield, R. 2001. Sheep are not just woolly thinkers. The Telegraph. www.telegraph.co.uk/science/science-news/4767415/Sheep-are-not-just-woolly-thinkers.html.
- Kendrick, K. M., A. E. Leigh, A. P. C. da Costa, and J. W. Peirce. 2001. Sheep don't forget a face. *Nature*, 414:165–166.
- Schoenian, S. 2009. Sheep101.info website. www.sheep101.info/.

ACTIVITY 1

Something about That Face Is Familiar...

BACKGROUND INFORMATION

When we meet a person for the first time, one strategy we use to remember the individual is to notice certain unique facial characteristics (e.g., eye color, nose shape, dimples). New research has shown that sheep have the ability to learn and remember the faces of other sheep. Brain imaging has revealed activity in places that are correlated to memory whenever one sheep is examining another sheep's face, a mechanism that is similar to the way humans remember and recognize other people's faces. Sheep are able to recognize and remember at least 50 individual faces for 600 to 800 days!

Time Required

30 to 40 minutes

Concepts and Vocabulary

Facial recognition

Life Skills

Contribution to group efforts, cooperation, critical thinking, decision making, problem solving, sharing, teamwork

Subject Links

Science,
Language Arts



State Content Standards

Science

- Third Grade:
 - » Investigation and Experimentation – 5e

Language Arts:

- Fourth Grade:
 - » Listening and Speaking Strategies – 1.7
- Fifth Grade:
 - » Listening and Speaking Strategies – 1.5
- Sixth Grade:
 - » Listening and Speaking Strategies – 1.5

Suggested Groupings

Small groups of 3 to 5 individuals

Materials Needed

(* = *Materials provided in curriculum*)

- * *Sheep Face Cards*
- Flip chart paper
- Colored markers or other writing instruments

Getting Ready

- Divide the youth into small groups of 3 to 5 individuals each.
- Provide enough flip chart paper for each group.
- Provide enough markers for each group.
- Make two copies of the *Sheep Face Cards*, preferably in color. Cut the cards out to make one complete set that has two cards for each sheep.

OPENING QUESTIONS

1. What are some of the physical features that we use to distinguish one person from another? Record your ideas on the flip chart paper provided or explain your thoughts verbally.
2. What are some physical features we might use to distinguish one animal from another? Record your ideas on the flip chart paper provided or explain your thoughts verbally.

PROCEDURE (EXPERIENCING)

1. Shuffle the *Sheep Face Cards* and place them face down on a table in a pattern of 7 columns and 4 rows.
 2. Play a game of “Memory Match,” where the small groups take turns turning over two cards each and trying to find a match. When a group finds a match, they take those two face cards off of the table and the play proceeds with the next group. If no match is found on a turn, the cards are flipped back to face down in the same place and play proceeds to the next group.
- » **Volunteer Tip:** The intent of this activity is not that one group “wins” and other groups “lose.” The intent is that groups work to recognize similarities and differences. Thus, it’s helpful and instructive if this activity is facilitated in a manner that “allows” each group to make approximately the same number of matches as other groups.

3. Have the youth come up with names for the sheep for which they find matches.
 - » **Volunteer Tip:** Do not write the names on the cards.
4. Have each group make observations and comparisons of the different sheep they have. What visual characteristics help the youth distinguish one sheep from another? What are the similarities between individual sheep? What are the differences? Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
5. Once steps 1 through 4 have been completed, the volunteer should collect all of the cards, shuffle them, and put them face-down on the table again in a 7 x 4 pattern. Instruct the youth to play “Memory Match” again, but this time using the information they have collected to find only “their” sheep. The youth will need to try to recognize their sheep based on the facial features they identified in step 4.
 - » **Volunteer Tip:** Have the youth try to recognize their sheep without referring to the observations and comparisons they have recorded. If they have trouble remembering those characteristics, though, let them use their notes.

SHARING, PROCESSING, AND GENERALIZING

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:

1. What were some of the cues you used to distinguish one sheep's face from another? Explain some of the differences you found between the sheep faces.
2. What challenges did you have in telling one sheep from another? Please explain.
3. Why do you think it might be important for individual sheep to recognize one another? Please explain.
4. Sheep grow anxious when unfamiliar sheep are introduced into their flock. What reasons can you think of that might cause this behavior? Explain.

CONCEPTS AND TERMS

At this point, volunteers need to make sure that the concept **facial recognition** has 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 terms using their own words.)

CONCEPT APPLICATION

Ask the youth each of the following:

1. If you raise sheep yourself, make and record observations of their physical features and behaviors. What do you see that is the same for the different sheep you have and what do you see that is different? Imagine that someone bought one of your sheep and that you had to go and separate it from the flock. What cues would you use to distinguish it from the other sheep in your flock? Explain your ideas on paper. You can use drawings to help in your explanations.
2. If you don't raise sheep and don't have access to someone else's sheep for observation, make observations of a pet you do have or of some other animals that you come across frequently. If you live in the city, observe your neighbor's dog, squirrels in the park, or pigeons on the rooftops. If you live in the country, you may see deer, turkey, rabbits, or any number of other animals. Choose one or more animals and make observations. Describe distinguishing characteristics of the animals, noting their physical features and behavior. Explain your thoughts on paper. You can also use drawings to help in your explanations.

REFERENCES

Trivedi, Bijal P. 2001. Sheep are highly adept at recognizing faces, study shows. National Geographic Today. http://news.nationalgeographic.com/news/2001/11/1107_TVsheep.html.

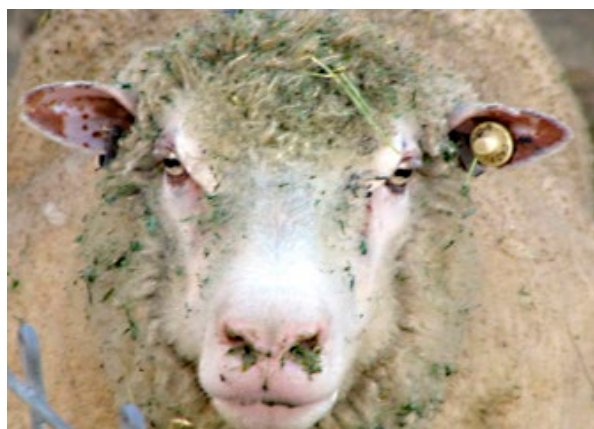


Sheep face cards. Print one-sided and cut out along dashed lines.





Sheep face cards. Print one-sided and cut out along dashed lines.



ACTIVITY 2

Taking Stock in the Flock

BACKGROUND INFORMATION

Sheep are most content living in the company of other sheep in a **flock**. Sheep become anxious when they are not within sight or smell of other sheep because they are **prey** animals and flocking is an effective protection strategy against **predators**. The tendency is for a flock to maintain a certain distance at all times from animals they perceive as a threat (e.g., humans, dogs, and other potential predators). This distance is known as the **flight zone**. If something that they perceive as dangerous enters the flight zone, the sheep will move away, or flee.

Time Required

20 to 30 minutes

Concepts and Vocabulary

Flight zone, flock, flocking instinct, predator, prey

Life Skills

Communication, critical thinking, decision making, problem solving, sharing, cooperation, teamwork

Subject Links

Science, Language Arts

State Content Standards

Science

- Third Grade:
 - » Investigation and Experimentation – 5e
- Fourth Grade:
 - » Investigation and Experimentation – 5c
- Sixth Grade:
 - » Investigation and Experimentation – 7d, 7e

Language Arts

- Fourth Grade:
 - » Listening and Speaking Strategies – 1.7
- Fifth Grade:
 - » Listening and Speaking Strategies – 1.5
- Sixth Grade:
 - » Listening and Speaking Strategies – 1.5

Suggested Groupings

Small groups of 3 to 5 individuals

Materials Needed

(* = *Materials provided in curriculum*)

- * *Flocking and Flight Zone Pictures*
- Flip chart paper
- Writing instruments (pencils, pens, or markers)

Getting Ready

- Divide the youth into small groups of 3 to 5 individuals.
- Provide each group with adequate amounts of flip chart paper and writing instruments.
- Make and cut out enough copies of the *Flocking and Flight Zone Pictures* for each group to have a set.

OPENING QUESTIONS

1. What type of situations are you most relaxed and comfortable in? Record your ideas on the flip chart paper provided or explain your thoughts verbally.
2. What types of situations make you nervous or even frightened? Record your ideas on the flip chart paper provided or explain your thoughts verbally.

PROCEDURE (EXPERIENCING)

1. Ask the youth to observe and compare the different photographs. Ask them to record their observations and comparisons verbally or to write their thoughts and ideas on the paper provided.
2. In particular, ask the youth to note and record any similarities or differences they see between the pictures. Have them share their ideas verbally or write their thoughts and ideas on the paper provided.
 - » **Volunteer Tip:** Some things the youth should notice are that the sheep are usually quite close together in a group, the distance between the flock and other animals/humans, and that the sheep are usually moving in the direction away from the other animals/humans.

SHARING, PROCESSING, AND GENERALIZING

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:

1. **Based on your observations, what do you think might be happening in the different pictures?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
2. **Why do you think the sheep are moving away from the dog?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
3. **Based on the photographs, how far away might the dog have to be in order for the sheep to be comfortable? What does this tell you about sheep?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

4. **What are some reasons you might give for why the sheep stay in a large group or flock?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

CONCEPTS AND TERMS

At this point, volunteers need to make sure that the concepts and terms **flight zone**, **flock**, **flocking instinct**, **prey**, and **predator** 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 terms using their own words.)

CONCEPT APPLICATION

Tell the youth each of the following:

1. If you raise sheep, observe them as a group or flock in an open area. Do they move as individuals, or as a group? Observe their movement for 10 to 15 minutes each day for a period of one week. Try observing them at different times of the day, too. Record your observations, compare, and discuss them.

2. If you do not raise sheep, try to observe other animals that live in a group. If you live in a city and can visit a park where there is water, you might find a flock of geese. Observe their movement. Record your observations, compare, and discuss them.

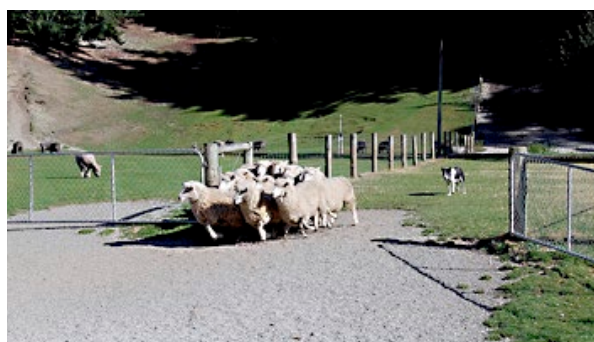
» **Volunteer Tip:** The application of some of the concepts in this activity—flocking and flight zone—will also be emphasized in Activity 3: *Can You Be a Sheep Herder?*

REFERENCES

- Grandin, Temple. 2005. Understanding flight zone and point of balance. Dr. Temple Grandin's Web Page. www.grandin.com/behaviour/principles/flight.zone.html.
- Endresen, Ottar. 2003. The herd instinct in sheep. SheepIsle. www.sheep-isle.dk/Ottar%20Endresen/the_herd_instinct_in_sheep.htm.
- Schoenian, S. 2010. Handling Sheep. Sheep101.info website. www.sheep101.info/201/handling.html.



Flocking and flight zone pictures. Print one-sided and cut out along dashed lines.



ACTIVITY 3

Can You Be a Sheep Herder?

BACKGROUND INFORMATION

Sheep are very social animals, living in groups for comfort and protection. Since sheep are very timid, it is easy to manipulate their movements. Sheep that are raised on large parcels of land are moved as a flock from one grazing area to another or to a sheltered area (e.g., a barn) through a process called **herding**. Herding is accomplished using dogs, people on foot, or people on horseback. Whenever a perceived threat comes within the flock's **flight zone**, the sheep flee in the opposite direction. This is how dogs and people maneuver sheep when they herd them. You only have to get close to the flock in order to move the sheep in a specific direction.

Time Required

40 to 60 minutes

Concepts and Vocabulary

Flight zone, flocking, herding, herding strategies

Life Skills

Communication, contributions to group effort, cooperation, critical thinking, decision making, planning/organizing, problem solving, sharing, teamwork

Subject Links

Science, Language Arts

State Content Standards

Science

- Third Grade:
 - » Investigation and Experimentation – 5e
- Fourth Grade:
 - » Investigation and Experimentation – 5c, 5d
- Sixth Grade:
 - » Investigation and Experimentation – 7d, 7e

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

Suggested Grouping

Small groups of approximately 3 to 4 individuals

- » **Volunteer Tip:** This activity works best when the total number of youth is at least 12 to 15.

Materials and Resources Needed

(* = *Materials provided in curriculum*)

- * *Sheep Sheets*
- * *Map with Grazing Area for Herders*
- * *Map with Grazing Area for Sheep*
- * *Facts on Sheep Behavior*
- A large open area (e.g., a playground or a multi-purpose room)

- 20 to 25 grocery-sized paper bags or, alternatively, a roll of masking tape (**Note:** See tip in the Getting Ready section, below.)
- Clock or watch with a second hand or timer
- Flip chart paper
- Writing instruments (pencils, pens, or markers)

Getting Ready

- Make enough *Sheep Sheets* for each group.
- Make just one copy of the *Sheep Sheets* card that is labeled “LEAD.”
- Make one copy of the *Map with Grazing Area for Herders* for each group.
- Make one copy of the *Map with Grazing Area for Sheep* for each group.
- Set up a “grazing area” for the “sheep.” (See *Map with Grazing Area for Herders* worksheet. Try to be as accurate as possible when recreating area shown in the map.)
 - » Mark off a large outer “fence.”
 - » Make sure to designate the “pond” areas.
 - » Designate where the “rock wall” and “trees” will be.
 - » Create an opening for the “gate.”
 - › **Volunteer Tip:** You can mark off the areas with either paper bags or tape. Paper bags are easier to clean up afterward.
- Make enough copies of the *Facts on Sheep Behavior* hand-out for each group.
- Make certain there are enough sheets of flip chart paper and enough writing instruments for each group.

PROCEDURE (EXPERIENCING)

Round 1

1. Randomly count off the small groups and follow that order through the remainder of the activity.
2. Designate one small group of 3 or 4 youth to be “herders.” All youth in the other groups can then form one large group and act as a “flock of sheep” for this round.
3. Give the herders group for this round the *Map with Grazing Area for Herders* worksheet. Have them use this worksheet to plan out how they are going to herd the sheep. Give them approximately 3 to 5 minutes to develop their plan.
4. Meanwhile, give each other small group a *Sheep Sheets* card and the *Map with Grazing Area for Sheep*. Give them approximately 3 to 5 minutes to review the sheets. Remember, all of the small groups who are not herders will work together as a “flock of sheep.”
5. One of the *Sheep Sheets* cards will have the word LEAD at the top. Hand this card to one of the youth who is a sheep for this round. All of the sheep should gather into their flock and the LEAD should identify himself/herself quietly to them. (**Note:** The herders should *not* be told who the LEAD sheep is.)
6. For the *Map with Grazing Area for Sheep*, make sure that the sheep understand the markers on the herding area. They should be aware of the markers for the ponds, the rock path, the outer fence, and the gate area. They should also know which areas are safe for sheep and which areas are not.

7. When the game starts, have youth who are sheep follow their LEAD and behave in accordance with what they have learned from the *Sheep Sheets*. The youth who are herders should follow their group’s plan and try to herd the sheep through the gate. Allot about 10 minutes for this part of the activity.

At the completion of Round 1:

For the Herders:

1. After trying to herd the sheep according to your group’s plan, discuss and write down the group’s observations on how the sheep behaved, what went well, and how you would change your plan, if at all, to better herd the sheep. Please record your discussion on the flip chart paper.
2. Review your observations and formulate a conclusion about the behavior of sheep.

For the Sheep (in their small groups):

1. What are your observations about how the herders tried to herd the flock through the gate? How effective was the herders’ strategy? What suggestions would you give the herders to improve their strategy? Verbally discuss your thoughts or record them on the flip chart paper.
- » **Volunteer Note:** Their observations will be discussed later in the Sharing, Processing, and Generalizing section.

SHARING, PROCESSING, AND GENERALIZING

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:

1. **What was it like to be herders and sheep?**
2. **What are your group’s observations and conclusions from the various rounds?**
3. **How can you generalize about sheep behaviors?** If the youth are having trouble with this, use the *Facts on Sheep Behavior* worksheet to help guide them. Discuss this as an entire group.

CONCEPTS AND TERMS

At this point, volunteers need to make sure that the concepts and terms **flight zone**, **flocking**, **herding**, and **herding strategies** 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 terms using their own words.)

CONCEPT APPLICATION

Tell the youth each of the following:

1. If you raise sheep, observe their movement for 10 to 15 minutes each day for a period of one week. Can you identify a lead within the flock? If you have to herd the sheep through a gate, try some of the strategies that were used in this activity and see how effective or ineffective they are. Record your observations, compare, and discuss.
2. If you do not raise sheep, try to observe other animals that live in a group. Observe their movement. Can you identify a lead in the group? Record your observations, compare, and discuss.

REFERENCES

- Ceres Farm Mid North Coopworth Company. 2005. Understanding sheep. Ceres Farms. www.ceresfarm.co.nz/understandingsheep.htm.
- Cobb, R. 2007. Practical animal behavior. University of Illinois. <http://classes.aces.uiuc.edu/AnSci103/behavior.html>.
- Embar, W. 2007. Sheep. Vegan Peace. www.veganpeace.com/animal_facts/Sheep.htm.
- Endresen, O. 2003. The herd instinct in sheep. SheepIsle. www.sheep-isle.dk/Ottar%20Endresen/the_herd_instinct_in_sheep.htm.
- Grandin, T. 2005. Understanding flight zone and point of balance. Dr. Temple Grandin's Web Page. www.grandin.com/behaviour/principles/flight.zone.html.
- Schoenian, S. 2009. Sheep101.info website. www.sheep101.info/.
- Schoenian, S. 2009. How do sheep protect themselves from predators? Sheep101.info website. www.sheep101.info/behavior.html.
- Schoenian, S. 2009. Why do sheep follow each other? Sheep101.info website. www.sheep101.info/flocking.html.

SHEEP SHEETS

HOW TO BEHAVE LIKE A SHEEP

- Sheep keep in a flock. So if everyone else starts to do something, you have to do it too.
- **Flight distance:** If a herder stands **within 2 arm's-lengths of you**, turn and walk away! If a herder is **more than 2 arm's-lengths of you**, stand still and do not move in any direction. However if they **hover around 2 arm's-lengths**, DO NOT walk away. Walk slowly away from the herder, in the direction you are being herded.

- If there are any sudden movements or loud noises, turn and walk away!
- If anything frightens you, turn and walk away!
- If a herder tries to lead you through water, do not go through. Stop and move away from the water.
- If a herder leads you toward a narrow path, don't go through. Stop and move away from the narrow path.
- Know who the LEAD sheep is. If the LEAD starts to move in a direction, everyone else must follow. Follow the LEAD!

» **Tip:** If the herder makes you uncomfortable or if you are scared by something, walk away in small groups in different directions. This will make it harder for the herders to get all of the sheep back together. Remember, sheep feel safe in a group, so after you walk away, gather back together into a flock. If the herders maintain a 2 arm's-length distance from you, don't flee. Rather, follow the LEAD sheep in an orderly fashion.

SHEEP SHEETS

LEAD

HOW TO BEHAVE LIKE A SHEEP

You are the LEAD. Once you start to do something, the other sheep will follow. It is very important that you behave exactly as a sheep would in this situation.

1. **Flight Distance:** If a herder stands **within 2 arm's-lengths of you**, turn and walk away! If a herder is **more than 2 arm's-lengths from you**, stand still and do not move in any direction. However if they **hover around 2**

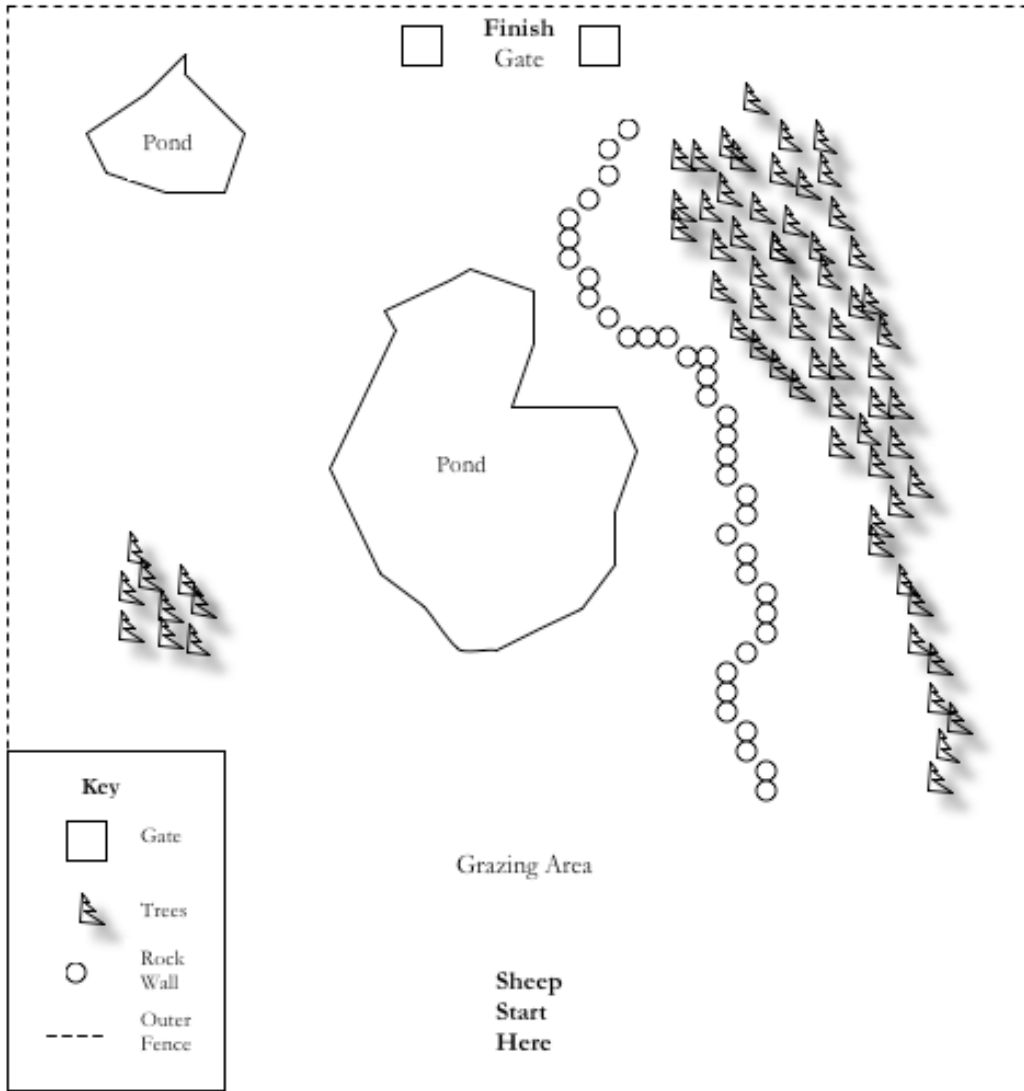
arm's-lengths, DO NOT walk away. Walk slowly away from the herder, in the direction you are being herded.

2. If there are any sudden movements or loud noises, turn and walk away!
3. If anything frightens you, turn and walk away!
4. If a herder tries to lead you through water, do not go through. Stop and move away from the water.
5. If a herder leads you toward a narrow path, don't go through. Stop and move away from the narrow path.

» **Tip:** If the herder makes you uncomfortable or if you are scared by something, walk away in small groups in different directions. This will make it harder for the herders to get all of the sheep back together. Remember, sheep feel safe in a group, so after you walk away, gather back together into a flock. If the herders maintain a 2 arm's-length distance from you, don't flee. Rather, move where the herder is guiding you. The rest of the sheep should follow you.

MAP OF GRAZING AREA FOR HERDERS

Outer Fence – No sheep beyond this point



Outer Fence – No sheep beyond this point

Map of Grazing Area for Sheep

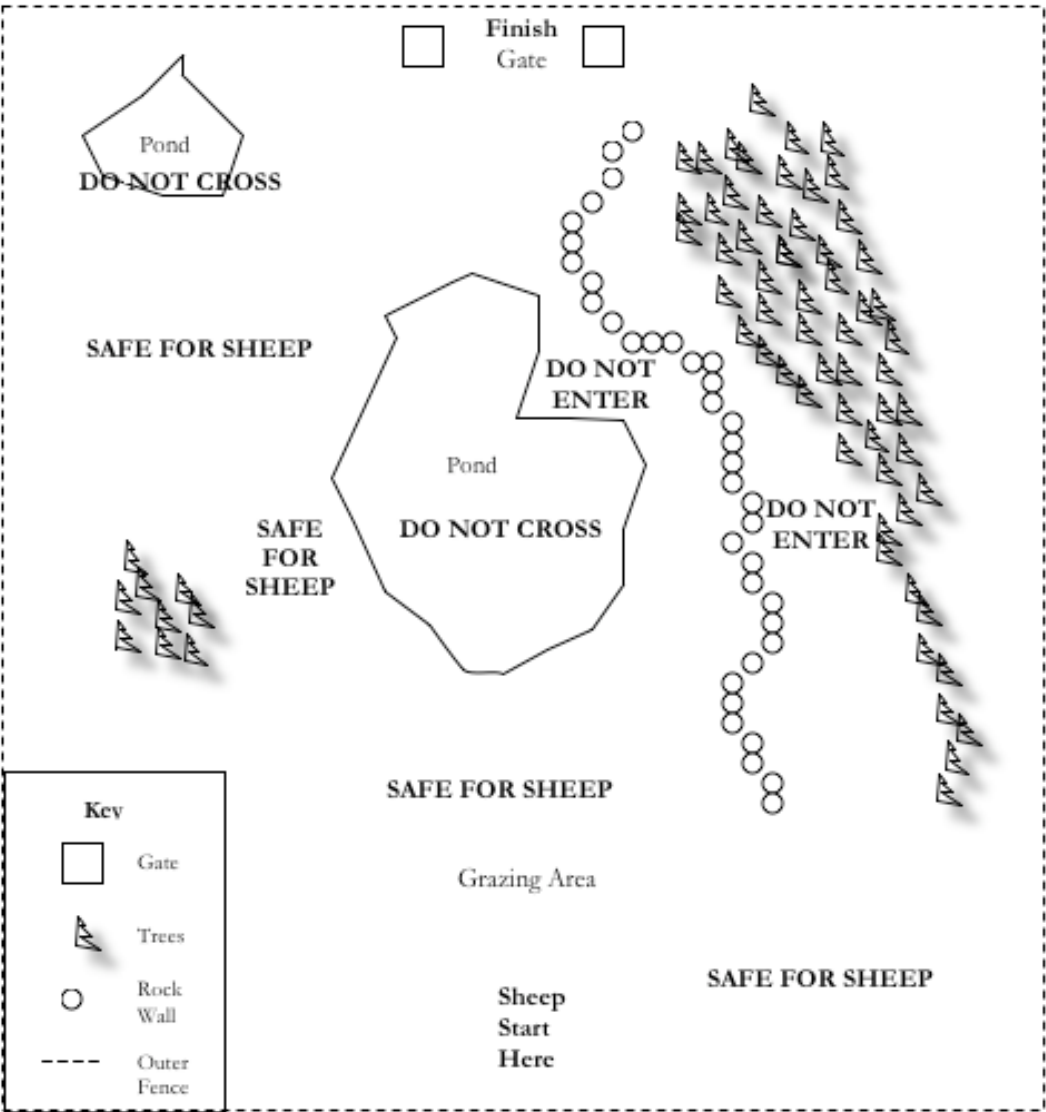
Outer Fence – No sheep beyond this point

Outer Fence – No sheep beyond this point

MAP OF GRAZING AREA FOR SHEEP

Map of Grazing Area for Sheep

Outer Fence – No sheep beyond this point



Outer Fence – No sheep beyond this point

Outer Fence – No sheep beyond this point

FACTS ON SHEEP BEHAVIOR

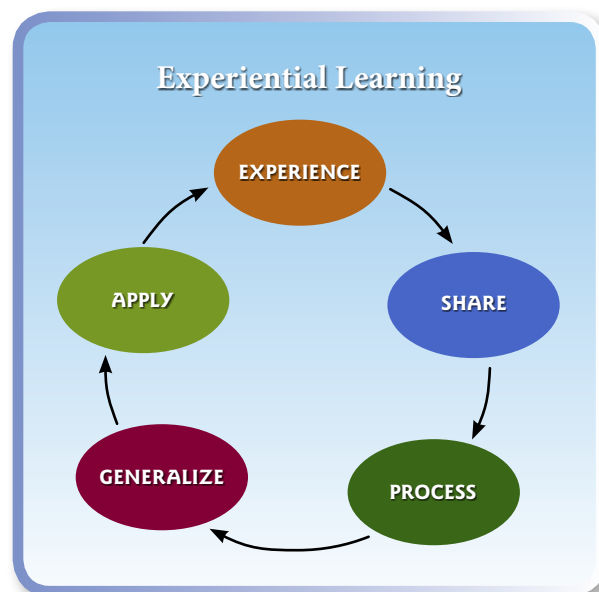
Sheep are timid creatures, keeping in groups and fleeing when they feel threatened. Sheep have a number of different characteristic behaviors.

1. **Flight Distance:** Sheep keep a certain distance from other animals or humans. If a herder or other animal comes too close to them and breaks this distance, they will attempt to make an escape in the opposite direction. However, if a herder hovers at around that distance, but not too close, that is a good way to get the sheep to move where the herder wants them to go.
2. **Loud Noises:** Sheep have very sensitive hearing. They will run away from loud noises.
3. **Sudden Movements:** Sheep are always nervous and are easily frightened. If anything frightens them they will all run away.
4. **Water:** Sheep do not like to walk through water.
5. **Narrow Pathways:** Sheep do not like to walk along narrow pathways. If a predator attacks them there, it is very hard for them to escape. For this reason they avoid going through tight openings.
6. **Lead:** In each sheep flock, there is always one sheep that is considered the lead or the dominant sheep. If the lead sheep starts to move in one direction, the other sheep will follow.

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>.



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:** Being able 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 if it intrudes within this buffer zone.
- **Flock (n)/Flocking (v):** A group of animals that stick and feed together.
- **Flocking instinct:** A natural instinct of a group of animals to stick together and follow the actions of the leader of the group.
- **Germs:** 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 are used 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:** Animals that hunt and eat other animals to survive.
- **Preventative 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 to other animals.
- **Responsibility:** Being accountable for one's actions or behaviors.

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 8474

ISBN-13: 978-1-60107-788-2

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