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UC PEER REVIEWED

SHEEP: *From the Animal's Point of View*

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What Does It Mean to Be a Sheep?

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.

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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 sheeps' 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.

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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- 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

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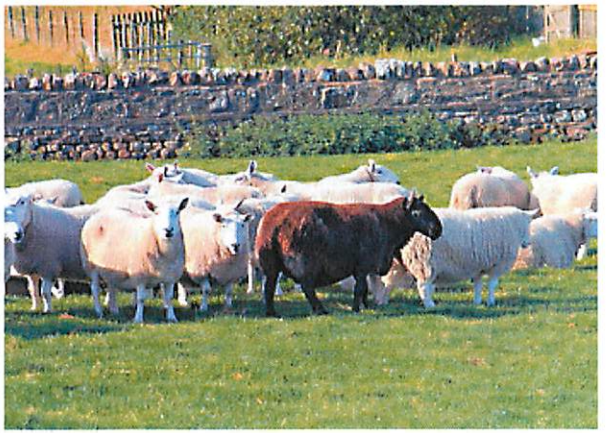
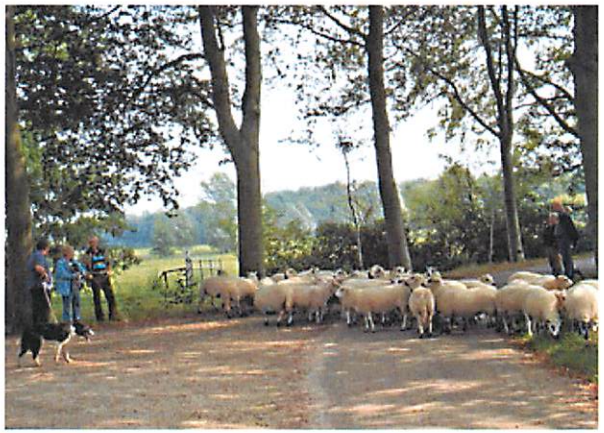
Flocking and flight zone pictures. Pr[illegible]e-sided and cut out along dashed lines.





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 <u>one copy</u> 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* handout 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.

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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

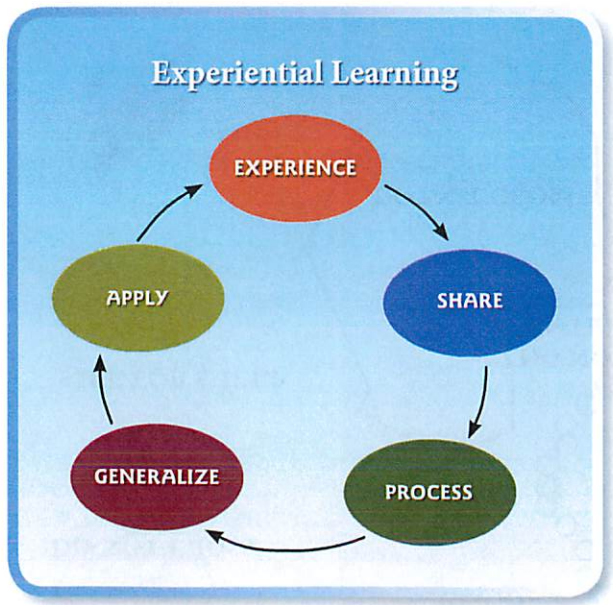
Facts on Sheep Behavior

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.

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UC PEER REVIEWED

SHEEP: *From the Animal's Point of View*

2

Sheep Housing:

Designing a Sheep Habitat

Subject Overview and Background Information

Sheep roamed freely until they were domesticated in central Asia around 10,000 B.C. The main products they supply for humans are meat, wool, and milk. Sheep are among the most versatile of animals and are capable of living in many different climates. They are known to survive in the harsh elements of the earth's poles, in rainforests, and in arid conditions found in deserts. Like many **ruminants**, sheep like to forage; they spend approximately 8 to 12 hours grazing every day. When grazing, they may travel several kilometers per day.

Humans control the food supply, breeding, and territory of domesticated sheep. There are two sets of practices associated with raising sheep: the **Extensive System** and the **Intensive System**. The Extensive System is a closer approximation of the habitat of wild sheep and involves raising flocks on large sections of land and allowing the sheep to graze with relative freedom. In the Unites States, approximately 6 million sheep are raised this way. The Intensive System involves confining the sheep to a smaller area of land and exercising greater control over their feeding.

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UCDAVIS VETERINARY MEDICINE

Concepts and Vocabulary

- **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.
- **Extensive system:** A system that does not constrain animals and allows them to perform their natural foraging behavior.
- **Intensive system:** A system that confines animals to a smaller area of land and places more controls on their feeding.

Life Skills

Communication, decision making, empathy, keeping records, planning/organizing, teamwork, wise use of resources

Subject Links

Science, Language Arts, Math

Overview of Activities

All animals have similar needs, such as food, water, shelter, and space. As an introduction to discovering the needs of sheep, the first activity will help youth discover what their own needs are by thinking about their homes and exploring what they themselves need to live. Then they will use this information as a reference to help them decide what they think sheep might need.

In the next activity, the youth will be given a set budget to cover the cost of the items they will need to establish a home for their sheep. They will go on an imaginary shopping trip for the items they need to build and furnish their sheep's home, making purchase decisions based upon their budget.

The environmental needs of a sheep do not remain constant; they change depending on ecological factors and geographical locations. The youth will be given various scenarios that will require them to adjust their sheep's environment.

Finally, to apply their newly gained knowledge, the youth will use the shopping list from the activity to budget for the materials needed to create and maintain an environment suitable for their sheep.

References

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Grandin, T. 1993. Livestock handling and transport, 2nd ed. Wallingford, UK: CAB International.

Keller, C. 2008. History of sheep and history of the different sheep breeds. Daneke Club Lambs and Livestock website. www.danekeclublambs.com/HistoryofSheepandBreeds.html.

Kiddyhouse.com. 2009. All about sheep for kids. www.kiddyhouse.com/Farm/Sheep/sheep.html.

FACTS ABOUT SHEEP

Sheep Housing

When selecting or designing housing for sheep, it is important to keep their natural behaviors in mind. Sheep are easily stressed, so it is important that their environment be carefully designed with that in mind.

Social Groupings

Sheep are extremely gregarious animals—that means they like to stick together in groups—so it is very important to house them in a flock or social group. Keeping sheep in a flock minimizes stress and helps maintain order.

Sheep develop leader-follower relationships within their social group. All followers will go behind the leader when moving from place to place. If you change the social group by removing or replacing an adult group member the follower-leader relationships may be disrupted and fighting may result, so it is important to avoid changing social groupings as much as possible.

Enclosures

Sheep do best in a natural outdoor enclosure with available pasture. An example would be a grass-covered paddock. The floor area should be large enough to allow sheep to maintain their space from each other to minimize conflict and to allow young sheep to perform natural play behavior. Feeding troughs should be shallow enough to allow sheep to maintain eye contact with each other. The trough should be long enough to allow all sheep to feed at the same time.

If the sheep are housed indoors in stalls or crates, their individual enclosures should be no less than 2 meters x 1 meter. This will give the sheep enough space to turn around and take a few steps in one direction. Enclosures should also be big enough to allow young animals to perform natural play behavior. Bedding should consist of a 15 cm layer of straw or coarse sawdust mixed with wood shavings.

Stress

Novelty creates stress for the sheep; they are afraid of new stimuli or environments. However, there are ways to reduce this stress and create a more tranquil environment. If you have only one person who handles and takes care of the sheep, that will decrease their stress level. When handling the sheep, you need to be patient and gentle, giving the sheep time to familiarize themselves with their caretaker. This also lays the groundwork for easier handling in the future.

During routine handling procedures, it is important to maintain the leader-follower order. Forcing sheep to move in a manner contrary to this will cause stress, so always use the lead sheep to help move other sheep to a desired area.

References

Information contained in this section is attributed to the following article:

Reinhardt, V., and A. Reinhardt. 2009. Comfortable quarters for sheep in research institutions. Animal Welfare Institute. Washington, D.C. www.awionline.org/pubs/cq/sheep.html.

ACTIVITY 1

My Home, a Sheep's Home

Background Information

There are certain things in our environment that are essential—such as food, water, and shelter—without which we cannot survive, and there are other things that we do not need, but that enrich our lives, such as books, music, and play structures. When we compare humans and sheep, we can see many similarities and differences relating to what each species finds is essential and what each finds is supplementary.

Time Required

40 minutes

Concepts and Vocabulary

Environmental needs of humans and sheep

Life Skills

Communication, decision making, empathy, organizing

Subject Links

Science, Language Arts

State Content Standards

Science

- Sixth Grade:
  - » Investigation and Experimentation – 7d

Language Arts

- Third Grade:
  - » Listening and Speaking Strategies – 1.5
- Fourth Grade:
  - » Listening and Speaking Strategies – 1.1, 1.8, 2.2b
- Fifth Grade:
  - » Listening and Speaking Strategies – 1.5

Suggested Grouping

Groups of 3-4

Materials Needed for each Group

- Flip chart paper
- Writing instruments (pencils, pens, markers)

Getting Ready

- Divide the youth into groups of the desired size.
- Distribute the materials.

Opening Questions

1. **Think about where you live. What are some things that you need in your home in order to survive? Please describe them. Record your ideas on the flip chart paper provided or explain your thoughts verbally.**
2. **What are some things in your home that improve the quality of your life? Record your ideas on the flip chart paper provided or explain your thoughts verbally.**
3. **What are some things in your home that are really important to you? Why are these things your favorites? Record your ideas on the flip chart paper provided or explain your thoughts verbally.**

Procedure (Experiencing): Part I

1. Ask the youth to work together to make a list of things they need in their homes, including all of the things in their house or community that they need in order to live safely and comfortably and to be healthy.
2. Then have the youth organize these items into categories:
   - » Social needs (friends, family, teachers, etc.)
   - » Physical needs (shelter, safety, health, comfort, etc.)
   - » Behavioral needs (toys, activities, exercise, etc.)
   - » Other needs

Sharing, Processing, and Generalizing: Part I

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:

- **What is on your group's list, and how does it compare to other groups' lists?** Ask each group to share their list, explaining what they have described as their needs and how they chose to categorize these needs. Are there similarities between the lists? Differences? Please explain.

Procedure (Experiencing): Part II

1. On another sheet of flip chart paper, have the youth list all the things they think a sheep needs.
   - » **Volunteer Note:** Remind them to think of their own needs.
2. Then have the youth organize these items into categories:
   - » Physical needs (shelter, safety, health, comfort, etc.)
   - » Social needs (friends, family, teachers, etc.)
   - » Behavioral needs (toys, activities, exercise, etc.)
   - » Other needs

Sharing, Processing, and Generalizing: Part II

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 is on your group's list, and how does it compare to other groups' lists?** Ask each group to share their list, explaining what they have described as a sheep's needs and how they chose to categorize these needs. Are there similarities between the lists? Differences? Please explain.
2. **Have your group compare and contrast their lists of human needs and their lists of sheep needs. How are the needs of humans similar to or different from the needs of sheep?**

Concepts and Terms

At this point, volunteers need to make sure that the concept of **environmental needs of humans and sheep** 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.) Youth should also note that there are different types of needs, including physical, social, and behavioral needs.

Concept Application

1. Ask the youth to observe and compare different types of homes in their community. Some people live in single-standing homes, some people live in duplexes or townhouses, and other people live in apartments. How are these homes similar? How are they different?
2. Ask the youth to observe the homes of wild animals and compare them to those of domesticated animals. How does each type of animal meet its needs?

Reference

Reinhardt, V., and A. Reinhardt. 2009. Comfortable quarters for sheep in research institutions. Animal Welfare Institute. Washington, D.C. www.awionline.org/pubs/cq/sheep.html.

ACTIVITY 2

Designing a Sheep's Environment

Background Information

In the wild, sheep roam when they graze, sometimes traveling several kilometers each day as they forage for food! Some domesticated flocks have large areas of land (**extensive systems**) where they can graze freely and their environmental needs are met in a way similar to the life of their wild relatives. Others are raised in smaller areas (**intensive systems**) and their environmental needs must be met in different ways.

Time Required

1 hour

Concepts and Vocabulary

Environmental needs of sheep, Extensive System, Intensive System

Life Skills

Communication, decision making, empathy, keeping records, planning/organizing, teamwork, wise use of resources

Subject Links

Science, Language Arts, Math

State Content Standards:

Science

- Third Grade:
  - » Investigation and Experimentation–5e
- Fourth Grade:
  - » Investigation and Experimentation–6f

Language Arts

- Third Grade
  - » Listening and Speaking Strategies–1.8
- Fourth Grade:
  - » Listening and Speaking Strategies–1.1, 1.8
- Fifth Grade:
  - » Listening and Speaking Strategies–1.3

Math

- Third Grade:
  - » Number Sense–2.1, 2.7, 2.8, 3.3
  - » Mathematical Reasoning–3.3
- Fourth Grade:
  - » Number Sense - 2.1
  - » Mathematical Reasoning - 3.3
- Fifth Grade:
  - » Number Sense–2.1
  - » Mathematical Reasoning–3.3
- Sixth Grade:
  - » Mathematical Reasoning–3.3

Suggested Grouping

Groups of 2 to 3

Materials Needed

(= Materials provided in curriculum)*

- *Sheep Housing Item Price Lists
- *Shopping List
- Flip chart or other large paper
- Notebook paper
- Pencils
- Paper
- Crayons/markers
- Scissors
- Stapler
- Calculators

Getting Ready

- Set up a "store" where the youth can go shopping. Make twice as many *Sheep Housing Item Price Lists* as you have groups. Cut out each item in the lists, gather identical items into stacks, and staple each stack together. Arrange the items from each category (bedding, water and feed containers, housing, fencing, miscellaneous) on different tables so the youth can visit each store separately.
- Make enough *Shopping Lists* to give one to each group.
- Divide the youth into groups.

Opening Questions

1. **What do you know about what a sheep needs in its home to live comfortably? Please explain. Record your ideas on the flip chart paper provided or explain your thoughts verbally.**

   Types of responses to expect include

   - appropriate food
   - shelter from heat/cold
   - comfortable bedding
   - water
   - safety (no dangerous materials, safety from predators)
   - enough space to move around
   - appropriate lighting
   - clean floors with a non-slippery surface
   - fresh air
   - stable social group (minimum of one social companion)

2. **What do you think are some extra things that might make the quality of a sheep's life better? Please explain your thoughts verbally and/or record your ideas on the flip chart paper provided.**

   Types of responses to expect include

   - toys
   - multiple social companions
   - variety of feed types
   - climbing structures
   - tunnels or other hiding spaces

» **Volunteer Tip:** If the youth are having trouble coming up with ideas for these questions, ask them to refer back to their lists of their own needs for inspiration. For example, if toys were mentioned as one of their needs, ask them what purpose the toys served (fun, exercise, challenge, and keep from being bored). Explore how these same needs are also important for sheep. How can we address these needs? If family and friends were mentioned, ask what purpose the family and friends serve (comfort, fun, companionship, love, safety). Explore how these same needs are also important to sheep. Why might having the company of other sheep be an important need? What might be the problems associated with housing sheep alone (stress, fear, loneliness)?

Procedure (Experiencing)—Budgeting and Shopping

1. At this point, the youth are going to go "shopping" for the items they believe a sheep will need for its home.
2. Each group of youth will be given a different budget: $600, $700, $800, $900, or $1,000.
3. The groups will then visit the "store" and select the items they feel will best meet the needs of their sheep while fitting within their budget. For each item chosen, the youth should record the cost and the reason they chose the item. Remind youth that they are shopping for the supplies they will need to house appropriately 2 sheep.
4. Finally, each group should create a drawing of the home they would create for their sheep using the materials they purchased from their shopping list.

» **Note:** The drawing should be large; use a piece of flip chart paper.

Sharing, Processing, and Generalizing

Once they have finished with their shopping and drawings, engage the youth in a discussion about the items they have chosen. Each group should share their drawings and describe the items they chose to purchase for their sheep. They should discuss why they chose those particular items and how they made choices that would fit within their budget. Compare the lists. How did the different groups' budgets affect their choices?

Closing Questions

1. **What are some things you learned about the environmental needs of sheep and how you can help provide for them? Please explain.**
2. **How might cost affect your decisions when you are trying to house sheep appropriately? Please explain.**

Concepts and Terms

At this point, volunteers need to make sure that the concepts and vocabulary of **environmental needs of sheep, extensive system**, and **intensive system** have been introduced 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 1

The things needed in a person's home or an animal's home may change. The following scenarios represent situations that would require modifications to a sheep's environment. What would the animal's owner need to do to address these needs?

1. **Your ewe is pregnant. How will you change the environment to help prepare for lambing? Discuss and share your ideas.**
2. **The sheep do not get enough exercise. How will you change their environment to allow them to get more exercise? Discuss and share your ideas.**
3. **You moved to a place where it is very hot and dry most of the year. How will you make sure that your sheep are protected from the weather? Discuss and share your ideas.**
4. **You moved to a location where it is very cool and wet most of the year. How will you make sure that your sheep are protected from the weather? Discuss and share your ideas.**
5. **There are predators (e.g., wolves) that sometimes come into the backyard or pasture. How will you make sure that your sheep are safe? Discuss and share your ideas.**

Concept Application 2

(For youth who have sheep)

Have the youth take home a copy of their completed shopping list. Ask youth to engage in a discussion with their family regarding the costs of creating and maintaining an appropriate environment for sheep. Youth who already have sheep at home should evaluate the current environment in which their sheep live and determine whether there are ways they could improve the environment. The youth should discuss these improvements and their costs with their family members.

Concept Application 3

(For youth who are planning to obtain sheep)

Youth should take home a copy of their completed shopping list. Ask youth to engage in a discussion with their family regarding the costs of creating and maintaining an appropriate environment for sheep. Youth who are planning to obtain a sheep should work with their family members to create a budget and plan a shopping list for the items they will need to properly house their sheep.

Concept Application 4

(For youth who do not have sheep and are not planning to obtain sheep)

Youth should think about any animal that they own or that someone they know owns. Then they should create a list of the environmental needs of that animal based on what they have learned about the environmental needs of sheep. Remind the youth that some of the needs will be similar to those of sheep and some will be different. Youth who have a pet at home should evaluate the current environment in which the pet lives and determine whether there are ways they could improve the environment. The youth should discuss these improvements and their costs with their family members.

References

Grandin, T. 1993. Livestock handling and transport, 2nd edition. Wallingford, UK: CAB International.

Reinhardt, V., and A. Reinhardt. 2009. Comfortable quarters for sheep in research institutions. Animal Welfare Institute. Washington, D.C. www.awionline.org/pubs/cq02/Cq-sheep.html.

SHOPPING LIST

Name of item	Environmental need	Cost	Reason for choosing this item

SHEEP HOUSING ITEM PRICE LISTS

(**Note**: The price for each item is an estimate, not its actual cost.) Each sheep requires a minimum area of about 1.5m².

Fencing

Two main types of fences:

- wood posts with wooden panels
- metal or wood posts with woven wire

Fencing and Fencing Supplies:

Wood fence with wood panels

- Wood fence with wood panels and gate: 8' x 8' = $157.00
- Wood fence with wood panels and gate: 12' x 12' = $241.00
- Wood fence with wood panels and gate: 18' x 18' = $276.00
- Wood fence with wood panels and gate: 40' x 40' = $490.00
- Wood fence with wood panels and gate: 80' x 80' = $912.00

Wood posts with wire

- Wood posts with wire and gate: 8' x 8' = $117.00
- Wood fence with wire and gate 12' x 12' = $129.00
- Wood fence with wire and gate: 18' x 18' = $141.00
- Wood fence with wire and gate: 40' x 40' = $164.00
- Wood fence with wire and gate: 80' x 80' = $224.00

Metal posts with wire

- Metal posts with wire and gate: 8' x 8' =$115.00
- Metal posts with wire and gate: 12' x 12' = $124.00
- Metal posts with wire and gate: 18' x 18' = $133.00
- Metal posts with wire and gate: 40' x 40' = $142.00
- Metal posts with wire and gate: 80' x 80' = $177.00

Housing

Sheep hutch: $362

- Protects from extreme weather
- Opaque material helps prevent overheating during the summer.
- Includes rear vent opening
- Includes feed door and ridge vents
- 84" x 60" x 52"
- 95 lb

Metal hut: $950

- Metal roof with bare ground floor
- Accommodates a large number of sheep.

Carport: $600

- Spacious area for many sheep
- Metal roof and bare ground floor
- Supported by wooden beams
- Provides shade against the sun

Rain shade:

- Provides shelter from the rain or heat
- 12' x 12'
- Without panels: $699
- With panels: $822

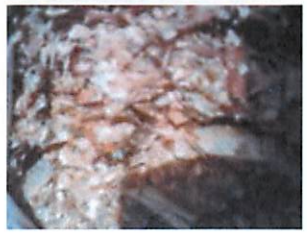
Bedding

Wood shavings: $8

- Small to medium flakes, not dusty
- Can be stored outside under a tarp
- 50 lb bag

Mixed shavings: $5.85

- Screened, leaving only uniform-sized shavings
- 100% natural
- Virtually dust-free
- Soft and comfortable
- Made of fir and pine shavings
- 50 lb bag



Straw bedding: $30 per week

- Absorbent and easy to maintain
- Cheap
- Warm

Rubber mats: $39.99

- Great anti-fatigue mats
- Use in stalls and trailers
- Non-absorbent and easy to clean
- ½" x 4' x 6'

Water and Feed Containers

Rubber bucket

- Crack and crush resistant
- Flexible
- Long-lasting and durable
  - » 26 quart: $9.95
  - » 42 quart: $19.95

Plastic utility pan

- Can be used as a feeding/watering dish on the ground
- Tested to be stable and durable
  - » 5 quart: $3.13
  - » 3 gallon: $7.50

Plastic feeder pan:

- Can be used as a feeding/watering dish on the ground
- Impact resistant
- Tested to be stable and tough
  - » 10 quart: $10.50

Plastic flat-back bucket:

- Can be used as a feeding/watering dish placed against a wall or fence
- Handle makes it easier to carry and hang
- Impact resistant
- Tested to be stable and durable
  - » 8 quart: $6.95
  - » 12 quart: $7.95
  - » 18 quart: $9.95
  - » 20 quart: $10.95

Hook-over portable feed pail: $7.50

- For goats, sheep, horses, and llamas
- Hooks over 2' x 4' or 2' x 6' boards
- Can be permanently mounted with screws
- 8 quart

Hook-over portable feeder

- For sheep, goats, dogs, and horses
- Can be used for field, pasture, trailer, or stall
- Rounded corners for easy access
- Can hook over boards 2 inches wide
- Can permanently install into boards with screws.
  - » 12 quart: $19.50
  - » 15 quart: $23.50

Mini hook-over portable feeder: $10.95

- Good for smaller breeds
- Easy to transport
- Hooks over fences
- 6 quarts

Portable feeder with divider: $23.95

- Hooks to a variety of fence types: wire fences, pipe fences, and board fences
- Has adjustable steel brackets that fit most fence types
- Can hook onto wire fences with spring clips (not included)

Steel automatic waterer: $33.95

- Ideal for horses, cattle, hogs, and dogs.
- Constant float-controlled water level
- Easy to use and clean
- Made of high-quality steel
- 8" across x 4½" deep

Hook-over corner feeder: $18.95

- Used in corners
- Attach to fences with screws
- 26 quart

Multi-purpose buckets

- Used for multiple purposes (e.g., feed storage, waterer, feeder)
- Made of durable, sturdy plastic
- Short rope handles
  - » 8 quart: $4.50
  - » 70 quart: $20.50

Rubber ground feeders

- Placed on the ground
- Made of durable rubber
  - » 2 quart: $3.95
  - » 4 quart: $4.50
  - » 8 quart: $6.50
  - » 3 gallon: $9.50
  - » 6½ gallon with small handles: $13.50
  - » 6½ gallon with metal hooks: $17. 50
  - » 15 gallon: $26.50

Bucket:

- Multi-purpose
- Made of plastic
- Metal handle
  - » 8 quart: $5.95
  - » 10 quart: $7.95
  - » 12 quart: $9.95
  - » 32 quart: $[illegible].95

Automatic waterer: $32.95

- Install on a fence, wall, or corral
- Adjustable float maintenance for constant water supply
- Connects with ordinary ¾" garden hose
- Durable polyethylene ar[illegible]on construction

Flat-back rubber feeder: $17.95

- Made of durable rubber
- Metal handle can easily hook onto nails
- 20 quart

Water basin with hose: $92.50

- Can be made to refill to a desired level automatically
- Contains non-siphon valve to adjust the water level
- Includes 6' hose
- 5 gallon

Heavy-duty outside feeder

- Made of long-lasting galvanized steel
- Sheep can feed from both sides
  - » 3' (up to 8 sheep): $204.00
  - » 6' (up to 14 sheep): $357.00

Over-the-fence feed trough

- Hooks onto fences
- Durable and sturdy
- Hangs on any wire or wooden fence
- Easy to clean
  - » 12" long x 9" wide x 6" high: $22.95
  - » 36" long x 9" wide x 6" high: $47.50

Over-the-fence-feeder

- Heavy-duty construction
- Can be hooked onto sturdy fences and corrals
- Resists cracking and weather damage
- Vented closure
  - » 20 gallon: $47.95
  - » 50 gallon: $52.00

Miscellaneous Sheep Supplies

Sheep cover

- Made out of spandex
- Easy to clean and lasts through wear and tear.
- Comes in a variety of colors and designs.

Neck to Tail	Girth	Price
21" – 25"	24" – 29"	$11.00
27"	31"	$12.00
30"	34"	$13.00
33"	36"	$14.00
35"	38"	$15.00
37"	40"	$16.00
39"	42"	$17.00
41"	45"	$18.00
43"	47"	$19.00
46"	49"	$20.00
48"	51"	$21.00
50"	53"	$22.00

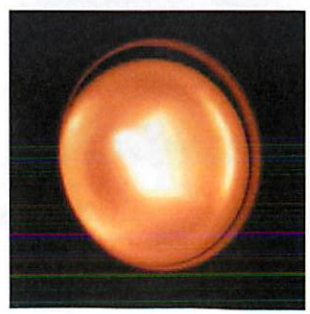
Halter

- ¾" nylon web
- Fits almost any sheep breed
- Adjustable sides
- Brass-plated hardware
  - » Regular halter: $16.95
  - » Show Halter: $20.50

Heat lamp: $8.45

- Insulated porcelain sockets
- Aluminum reflectors
- Flexible 6' cord
- Includes clamp

Heat lamp bulbs



- Produces heat rather than light
  - » Energy saver white lens infra, red 125 Watt: $2.95
  - » Regular white lens infra, red 250 Watt: $2.95
  - » Red lens infra, red 250 Watt: $6.95

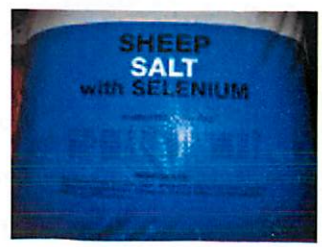
Boulders: $100

- Help create climbing areas for sheep

Salt lick: $1.50

- 4 lb
- For cattle, sheep, and horses
- Convenient and easy due to small size

Sheep salt with selenium: $14.20



- 50 lb
- Specially formulated to meet the needs of sheep
- Salt granules

Salt block holder: $3.96

- Made of steel
- Durable and easy to mount
- Fits small salt blocks

Mineral and salt pan: $ 10.50

- Holds salt licks and mineral blocks
- 10 quart
- Used on the ground

Feed scoop: $4.50

- Used for feed and supplements
- Made of durable plastic
- Enclosed for easy scooping
- Handle attached
- Measurements located inside for easy measuring
- Holds up to 3 quarts

Small feed scoop

- Used to pick up feed
- Made of plastic
  - » 2 pints: $2.50
  - » 5 pints: $4.50

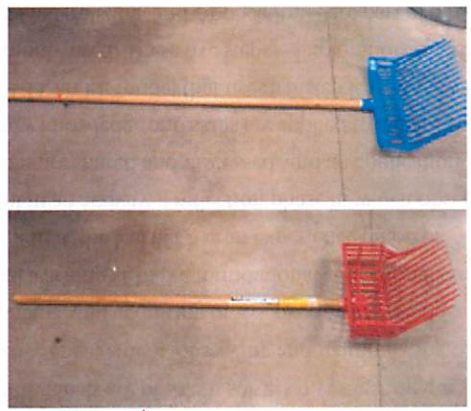
Steel feed scoop

- Used to pick up feed
- Made of galvanized steel
- Great for scooping grain
  - » 3 quart: $8.95
  - » 4 quart: $11.00
  - » 6 quart: $13.50

Stall/Cleaning Supplies

Fork

- Made of 100% polycarbonate, which provides strength and flexibility
- Weather resistant
- Lightweight
- Angled fork designed to easily pick up manure and prevent spillage
  - » No side panels (fork: 13⅛" long x 15⅛" wide): $23.95
  - » With side panels:
    - › Small (Fork: 12¼" long x 11½" wide): $21.95
    - › Large (Fork: 13" long x 16" wide): $29.95



Professional heavy-duty broom: $34.50

- For contractors, landscape, and agriculture
- Durable and long lasting

Janitor broom: $11.50

- Handmade
- Bristles made of corn fibers
- Hardwood handle
- 5 rows of stitching

Hay fork

- Used to pick up hay and manure
  - » 5 prongs (longer): $58.50
  - » 6 prongs (shorter): $62.00

Scoop shovel

- Plastic shovel
  - » Large scoop/plastic handle: $32.50
- Aluminum scoop
  - » Small scoop/short handle: $31.95
  - » Large/long handle: $34.95

Dust pan: $12.50

- Handle attached for easy trash pickup
- Opening closes when hung to trap trash

Steel trash can: $26.95

- Holds up to 30 gallons
- Made of galvanized steel with zinc coating
- Can be used to storage or trash

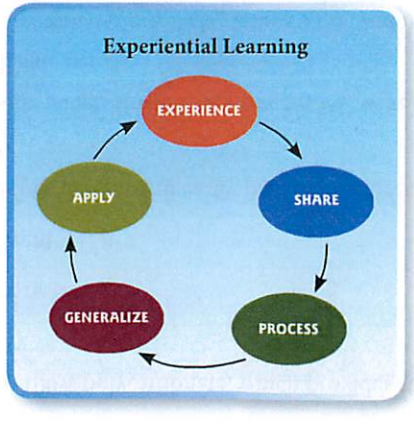
References for Shopping List

Schoenian, S. 2010. Housing. sheep101.info. www.sheep101.info/201/housing.html.

Ma, J. 2009. Pictures courtesy of Higby's Country Feed Store in Dixon, California.

Appendix

The activities in this curriculum are 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 5-step learning cycle is most commonly used. These five steps—Exploration, 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 5-step learning cycle, please visit the University of California's Science, Technology, Environmental Literacy Workgroup's Experiential Learning Web site, 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; tending to or overseeing a 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.

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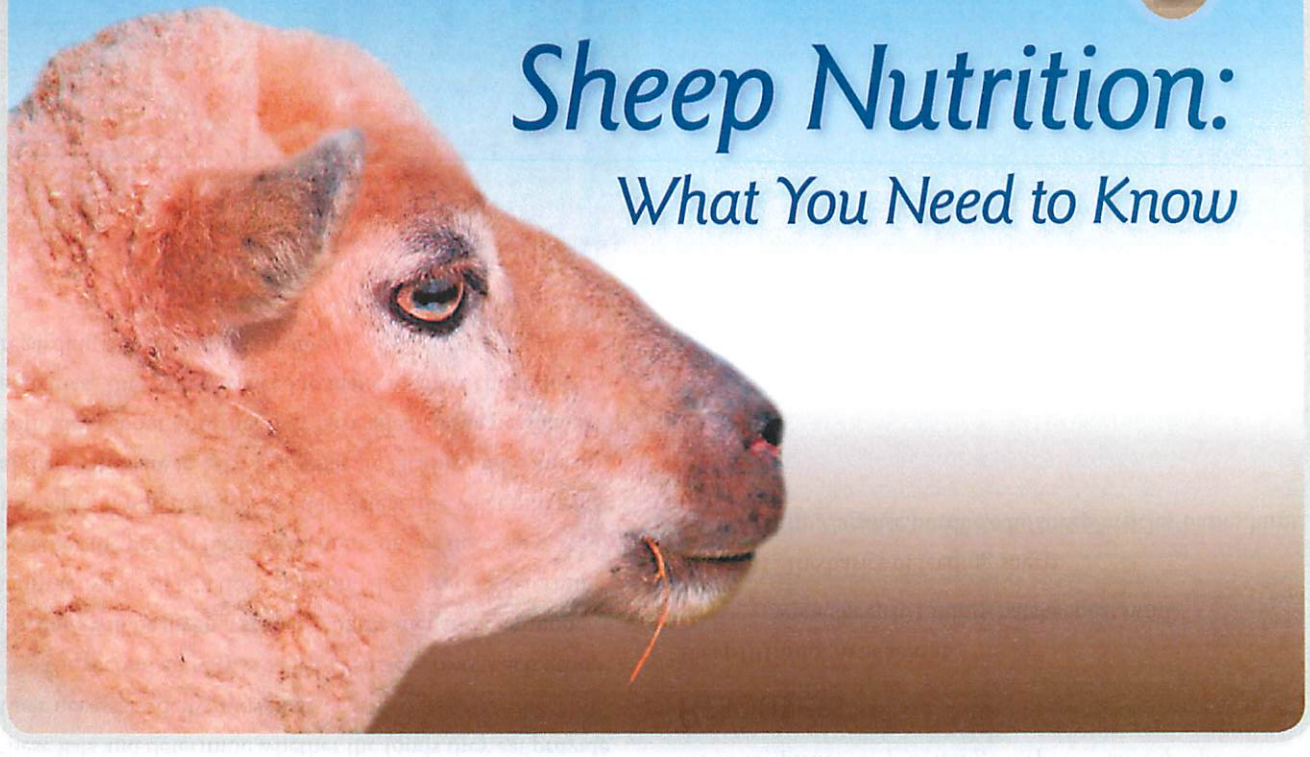
UC PEER REVIEWED

SHEEP: *From the Animal's Point of View*

3

Sheep Nutrition:
What You Need to Know



Subject Overview and Background Information

Just as humans need to monitor the food they eat as a way to help ensure their optimal health, they also need to monitor the food that their sheep consume since it affects the sheeps' health too. Domesticated sheep consume the food provided for them by humans, so it is important that the animals' caretaker understand the nutritional needs of sheep so he or she can provide the sheep with a proper diet.

Sheep have basic dietary requirements that are very similar to those of humans. They require water, proteins, carbohydrates, fats, minerals, and vitamins, and they need to take supplements when these requirements are not met through their feed. One big difference between humans and sheep is in their digestive system. Unlike humans, sheep have a stomach with four separate chambers. Animals with this type of stomach are called **ruminants**, and they also include cattle, deer, giraffes, and goats.

Sheep are herbivores and eat mainly plant material. In the wild or when living in pastures, sheep spend a good part of their day grazing on grass and weeds. Sheep that live in an enclosure with no grass to graze are often fed hay or silage. Silage includes foods such as fermented hay or corn. Grain is an excellent energy source for sheep and is usually fed when sheep need extra energy. Pregnant ewes, lactating ewes, and growing lambs are in life stages that can benefit from a grain diet. However, eating too much grain can cause problems such as bloating.

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UCDAVIS VETERINARY MEDICINE

Concepts and Vocabulary

- **Balanced diet:** A diet that supplies the right types of foods 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.
- **Essential nutrients:** Nutrients that humans and animals must consume through their diet in order to live and function properly.
- **Life stages of sheep:** Sheep are categorized in different stages of development, or life stages. Sheep at each life stage have a different set of nutritional requirements that they need if they are to grow and stay healthy.

Life Skills

Communication, contributions to a group effort, cooperation, critical thinking, decision making, healthy lifestyle choices, keeping records, planning/organizing, problem solving, sharing, teamwork

Subject Links

Science, Language Arts

Overview of Activities

The first activity is entitled *Eat Your Vegetables!* In this activity, youth will look at a list of foods and categorize them according to the nutrients they provide. They will also be asked to create a list of the types of food they eat on a regular basis and to categorize them based on nutrient contents. They will compare these lists and determine whether the foods they eat provide their necessary daily nutrients.

The second activity is called *Diet Detectives.* Each group of youth will be given a scenario of the diet and common daily activities of a fictional person. They need to determine whether the person receives all of his or her necessary nutrients. If not, they will need to determine what nutrients and activities are in excess or what are lacking and come up with ideas about how that may have affected the person's daily activities. They will also need to make recommendations regarding dietary improvements.

The third activity, *Shopping by Chance in Sheep,* teaches youth that sheep do not have the luxury of choosing what they eat and that it is the job of the caretaker to ensure that his or her sheep are getting all their necessary nutrients. It is important for youth to know that sheep have different nutrient requirements at different life stages. This activity will help the youth to discover the importance of reading food labels and the consequences of providing sheep with an improper diet.

Resources

Sheep101.info. Available at www.sheep101.info/whatsheepeat.html.

Neary, M. The basics of feeding sheep. http://agansc.purdue.edu/sheep/articles/basics.html.

FACTS ABOUT SHEEP

NUTRITION

Ruminants

- Sheep are ruminants. They have a four-part stomach made up of the rumen, reticulum, omasum, and abomasum. Ruminants chew cud, food that has been partially digested and then regurgitated to be re-chewed.
- The rumen is like a food storage site. When sheep eat food, it moves to their rumen where it is partially digested. Later, they regurgitate this food, re-chew it, and swallow it again. This process allows the sheep to absorb more of the nutrients from the forage they eat and occurs when they are resting.
- The rumen contains billons of microorganisms that allow the sheep to digest the tough fibers they eat. This process is called **fermentation**.
- Sheep need to burp! During fermentation, the rumen produces a lot of gas. If sheep are unable to get rid of the gas they can become bloated. Severe bloating can be life threatening!

Feed

- **Young sheep:** At birth, young sheep do not have a functional rumen or reticulum. Because of this, they need to be fed a supplemental feed called "creep feed." Creep feed contains cracked or rolled grains and soybean meal. It is very digestible and helps the lambs develop their rumen.
- **Natural diet:** Grasses, legumes, and other natural forage.
- **Weeds:** Sheep often consume weeds, which can be very nutritious. **Note:** Some weeds are poisonous to sheep and should be avoided (e.g., milkweed, cocklebur, and nightshade).
- **Supplements:** Grain (which is like candy for sheep!) not only tastes great, but it also provides sheep with extra energy. **Warning!** Eating too much grain can make sheep sick.

Grazing

- Sheep can eat a variety of foods, ranging from low-quality grasses to high-quality twigs and shrubs.
- Sheep tend to prefer plants that are young and tender.
- Sheep will forage for food and graze for up to 7 hours a day. When there is no fresh forage, sheep can be fed hay or silage.

The Complete and Well-Balanced Diet

- A sheep's diet will vary based on factors such as age, body weight, sex, and stage of production. Young sheep require a diet high in energy and protein for growth, but these requirements decrease as the sheep get older. Ewes need increased nutrients during pregnancy and lactation.
- The essentials in a sheep's diet:
  - » **Water.** Sheep need a plentiful supply of clean water.
  - » **Energy.** Sheep can get energy from range forage, pasture, hay, and other roughage.
  - » **Protein.** Protein is important for growth, reproduction, lactation and maintenance of the sheep's body.
  - » **Vitamins and minerals.** Sheep usually obtain vitamins and minerals from the roughage they consume.

REFERENCES

Kardong, K. 2001. Vertebrates: Comparative Anatomy, function, evolution. 3rd edition. McGraw-Hill Science/Engineering/Math.

Neary, M. 2009. The basics of feeding sheep. Purdue University. http://ag.ansc.purdue.edu/sheep/articles/basics.html.

Schoenian, S. 2010. What sheep eat. sheep101.info. www.sheep101.info/whatsheepeat.html.

ACTIVITY 1

Eat Your Vegetables!

Background Information

Do you know why it's important to eat vegetables? Different kinds of foods provide us with different types of nutrients that allow our bodies to function properly. Some of the **basic nutrients** that we acquire from the foods we eat include carbohydrates, proteins, fats and oils, calcium, vitamin C, vitamin A, and fiber. Some people are very conscious of the foods they eat and the nutrients they provide, and some are not. By writing down what we eat we can get a better idea about whether we are getting the right nutrients in our daily diet.

Time Required

30 to 45 minutes

Concepts and Vocabulary

Basic nutrients (this includes carbohydrates, proteins, calcium, vitamin C, vitamin A, and fiber)

Life Skills

Communication, critical thinking, healthy lifestyle choices, keeping records, problem solving, sharing

Subject Links

Language Arts

State Content Standards

Language Arts

- Third Grade:
  - » Listening and Speaking Strategies–1.5
- Fourth Grade:
  - » Listening and Speaking Strategies–1.8
- Fifth Grade:
  - » Listening and Speaking Strategies–1.5

Suggested Grouping

Pairs

Materials Needed *(* = Materials provided in curriculum)*

- **General Source of Nutrients*
- **List of Familiar Foods for Humans*
- Notebook paper
- Pens or pencils; markers
- Flip chart paper

Getting Ready

- Make enough copies of the *General Source of Nutrients* worksheet so each youth receives two copies.
- Pass out the *List of Familiar Foods for Humans* to each pair of youth.
- Provide each pair of youth with flip chart paper and pens or pencils and markers.

Opening Questions

1. **We've all heard our parents say, "Eat your vegetables!" Why do you think this might be important? What do you think makes vegetables and other foods such as fruit so important to our diets?** Ask the youth to explain their thoughts verbally and/or record their ideas on the flip chart paper provided.
2. **What other foods do you think are important to eat? Explain why you think they are important.** Ask the youth to share their ideas verbally and/or record their thoughts on the flip chart paper provided.

Procedure (Experiencing)

1. Working in pairs, have the youth look at the *List of Familiar Foods for Humans*. Have them organize the foods and place each one under the correct nutrient category (e.g., protein, carbohydrate) on the *General Source of Nutrients* worksheet.
2. Additionally, because everyone comes from a different background and culture, have each pair brainstorm and write down at least one other food that is common in his or her home or culture and that is not on the *List of Familiar Foods for Humans*. Have them place that food item under the correct nutrient category.

Sharing, Processing, and Generalizing

Ask the youth to share their group's list with the rest the groups and to compare the lists. What are the similarities? What are the differences? What are some reasons behind the differences? Ask the youth also talk about their own ethnic foods and ask them to compare those foods with those of other groups.

Each nutrient has an important function for the body and is easily obtained from food. Follow the lines of thinking developed through the general questions raised by the youth to draw out their thoughts, and ideas; if necessary, use more targeted questions as prompts to get to particular points. Specific questions might include:

1. **Are there differences in the way different groups categorized the foods? Discuss these differences and work toward a consensus.**
2. **In your view, why is it important to eat a variety of foods each day?** Ask the youth to share their ideas verbally or to write their thoughts and ideas on the paper provided.
3. **Why do you think that certain foods are called "junk foods?" What do you think are the differences between junk foods and healthy foods?** Ask the youth to share their ideas verbally or to write their thoughts and ideas on the paper provided.

Concepts and Terms

At this point, volunteers need to make sure that the concept **basic nutrients** 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

1. Ask each youth to develop a list of foods that he or she eats frequently.
2. Working in pairs, ask the youth to categorize their lists under the correct nutrient categories on the *General Source of Nutrients* worksheet.
3. Have the youth discuss their food choices. If they believe that they are not getting the essential nutrients they need, ask them to decide on some alternative foods they might choose in order to obtain these nutrients.

References

Applegate, L. 2004. Nutrition basics for better health and performance. Iowa. Kendall/Hunt Publishing Company.

Netzer, C. T. 2000. The complete book of food counts. New York: Dell Publishing

United States Department of Agriculture. n.d. Choose My Plate. www.choosemyplate.gov/.

List of Familiar Foods for Humans

- apples
- avocados
- bananas
- beef
- broccoli
- brown (whole grain) rice
- butter
- candy
- canola oil
- carrots
- cheese
- chicken
- chili
- chocolate
- coconut oil
- corn
- cucumbers
- deep-fried foods
- donuts
- eggs
- grapefruit juice
- grapes
- green beans
- ice cream
- kidney beans
- lemons
- margarine
- milk
- oatmeal
- oranges
- pasta (processed)
- pastries
- peaches
- peanuts
- pork
- potatoes
- pretzels (processed)
- salmon
- soda
- spinach
- strawberries
- syrup
- tomatoes
- tuna fish
- white bread (processed)
- white rice (processed)
- whole grain bagels
- whole wheat bread
- whole wheat pasta
- yogurt (plain, low-fat)

General Source of Nutrients Worksheet

Note: The examples for each category are common sources for each nutrient.

Protein

Protein is found in animal products, nuts, and beans.

1. _____
2. _____
3. _____
4. _____
5. _____

Carbohydrates

Carbohydrates are found in processed wheat and grains and in starchy vegetables.

1. _____
2. _____
3. _____
4. _____
5. _____

Fiber

Fiber is found in whole grains, beans, oats, and bran.

1. _____
2. _____
3. _____
4. _____
5. _____

Calcium

Calcium is found in dairy products and dark green vegetables.

1. _____
2. _____
3. _____
4. _____
5. _____

Vitamin C

Vitamin C is found in fruit, especially citrus fruit.

1. _____
2. _____
3. _____
4. _____
5. _____

Vitamin A

Vitamin A is found in animal products and reddish colored foods.

1. _____
2. _____
3. _____
4. _____
5. _____

Fats and Oils

Oils can be found in fish, nuts, and vegetable oils. Fats come from many animal foods and processed vegetable oils, including butter and margarine.

1. _____
2. _____
3. _____
4. _____
5. _____

Limited Nutritional Value

These are foods that do not provide important nutrients. This includes processed snack foods that are high in salt and sugar.

1. _____
2. _____
3. _____
4. _____
5. _____

General Source of Nutrients Key

Note: The examples for each category are common sources for each nutrient

Protein

- beef
- cheese
- chicken
- chili
- corn
- eggs
- kidney beans
- milk
- peanuts
- pork
- salmon
- tuna fish

Carbohydrates

- brown rice
- corn
- pasta (processed)
- pretzels
- white bread
- white rice
- whole grain bagels
- whole grain pasta
- whole wheat bread

Fiber

- apples
- broccoli
- brown rice
- chili
- corn
- kidney beans
- oatmeal
- oranges
- peaches
- potatoes
- strawberries
- whole grain bagels
- whole grain pasta
- whole wheat bread

Calcium

- broccoli
- cheese
- low-fat milk
- spinach
- whole milk
- yogurt (low-fat, plain)

Vitamin C

- apple juice
- apples
- broccoli
- cucumbers
- grapefruit juice
- grapes
- green beans
- lemons
- oranges
- peaches
- potatoes
- spinach
- strawberries
- tomatoes

Vitamin A

- beef
- broccoli
- carrot
- cheese
- eggs
- green beans
- milk
- peaches
- spinach
- strawberries
- tomatoes

Fats and Oils

- avocados
- butter
- canola oil
- coconut oil
- margarine
- peanuts
- salmon

Limited Nutritional Value

- chocolate
- deep-fried foods
- donuts and other pastries with high sugar content
- ice cream
- other candy
- soda
- syrup

Reference

Nutrition Data. 2008. www.nutritiondata.com

ACTIVITY 2

Diet Detectives

Background Information

What we eat can have a big influence on what we can do and how we feel. Having deficiencies for a period of time in important nutrients such as carbohydrates, proteins, calcium, vitamin C, vitamin A, and fiber can lead to problems like low energy, poor concentration, and illness. A balanced diet that contains all essential nutrients will help keep our minds and bodies healthy, active, and strong.

Time Required

40 to 60 minutes

Concepts and Vocabulary

Balanced diet

Life Skills

Communication, contributions to a group effort, cooperation, critical thinking, healthy lifestyle choices, keeping records, problem solving, sharing, teamwork

Subject Links

Science, Language Arts

State Content Standards

Science

- Third Grade:
  - » Investigation and Experimentation – 5d
- Fourth Grade:
  - » Investigation and Experimentation – 6c
- Sixth Grade:
  - » Investigation and Experimentation – 7a, 7e

Language Arts

- Third Grade:
  - » Reading Comprehension – 2.2
- Fourth Grade:
  - » Reading Comprehension – 2.3
  - » Listening and Speaking Strategies – 1.7, 1.8
- Fifth Grade:
  - » Reading Comprehension – 2.4
  - » Listening and Speaking Strategies – 1.5
- Sixth Grade:
  - » Reading Comprehension – 2.3
  - » Listening and Speaking Strategies – 1.5

Suggested Grouping

Groups of 2 to 5 individuals

Materials Needed:

(= Materials provided in curriculum)*

- **Sample Diets*
- **General Facts on Nutrients Handout*
- **General Source of Nutrients Key*
- **MyPlate* handout
- Flip chart paper
- Pencils/pens
- Notebook paper

Getting Ready

- Make enough *Sample Diets* worksheets for each group.
- Make enough copies of the *General Facts on Nutrients Handout* and *General Source of Nutrients Key* for each group.
- Make enough *MyPlate* handouts for each group to get one.
- Pass the materials out to each group.

Opening Questions

1. **When you hear the phrase "a balanced diet," what does that mean to you?** Ask the youth to share their ideas verbally and/or record their ideas on the flip chart paper provided.
2. **What do you think might happen if we do not eat enough of the types of foods that provide the nutrients we need?** Ask the youth to share their thoughts verbally and/or record their ideas on the flip chart paper provided.

Procedure (Experiencing)

Facilitator: Please set up the following scenario for the students. Explain to the youth that they are "Diet Detectives." Their job is to review people's diets and use the resources provided as a basis for recommending changes to make their diets more balanced.

1. A set of *Sample Diets*, a copy of the *General Facts on Nutrients Handout*, and a copy of the *MyPlate* handout will be distributed to each group.

2. Each group will read the *Sample Diets*. From the information provided on the diets, the *General Facts on Nutrients Handout*, and the *MyPlate* handout, youth will work together to determine:
   - » Which nutrients (if any) they believe to be missing from or present in excess in the different diets. Have them record and explain their ideas on the flip chart paper provided.
   - » How each diet can be improved. What foods would they recommend be added to or removed from the diets to make them more balanced? Have them record and explain their ideas on the flip chart paper provided.
   - » **Volunteer Note:** It may help if the youth make a chart to organize their thoughts.

Sharing, Processing, and Generalizing

After the youth have completed the procedure, invite them to share their thoughts and responses to the different scenarios. 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. **If your group's answers differ from those of other groups, why do you think that is?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the flip chart paper provided.
   - » **Volunteer Tip:** Below is a key for the different *Sample Diets*:
     - › Mark's diet: Low in protein
     - › Jenny's diet: Low in carbohydrates
     - › Justin's diet: Low in calcium
     - › Claire's diet: Low in vitamin C
     - › Ryan's diet: Low in vitamin A
     - › Molly's diet: High in fiber
     - › Scott's diet: Too many sweets
     - › Sydney's diet: Too much saturated fat
2. **What do you think might happen if people who were missing an essential nutrient continued on that diet for a longer period of time?** Ask the youth to record their thoughts and ideas on the flip chart paper provided.
3. **What are some ways you can make sure you have a balanced diet and get the proper nutrients?** Ask the youth to record 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 **balanced diet** 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:

1. Ask the youth to write down everything they can remember eating in the last three days on their own sheet of paper. Ask the youth in each group to share their lists with one another, then have the different groups share and compare their results.
2. Ask the groups to combine their food lists into categories based on food types on a piece of flip chart paper. Then ask them to rank the categories relative to quantity (how much of a given food type was eaten) and importance (healthy vs. not-so-healthy).
   - » **Volunteer Tip:** Encourage the youth to develop their own organizational schemes for categorizing the food.
3. Once everyone has completed steps 1 and 2, ask them to compare their results with the *MyPlate* handout. What are some of their observations?
4. Based on the foods that they eat, ask each group to prepare a three-day menu that complies with the recommendations of the *MyPlate* handout.

Ask the groups to share and compare their three-day menus.

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General Source of Nutrients Key

Note: The examples for each category are common sources for each nutrient listed.

List of Familiar Foods for Humans

Protein

- beef
- cheese
- chicken
- chili
- corn
- eggs
- kidney beans
- milk
- peanuts
- pork
- salmon
- tuna fish

Carbohydrates

- brown rice
- corn
- pasta (processed)
- pretzels
- white bread
- white rice
- whole-grain bagels
- whole-grain pasta
- whole-wheat bread

Fiber

- apples
- broccoli
- brown rice
- chili
- corn
- kidney beans
- oatmeal
- oranges
- peaches
- potatoes
- strawberries
- whole-grain bagels
- whole-grain pasta
- whole-wheat bread

Calcium

- broccoli
- cheese
- low-fat milk
- spinach
- whole milk
- yogurt (low-fat, plain)

Vitamin C

- apple juice
- apples
- broccoli
- cucumbers
- grapefruit juice
- grapes
- green beans
- lemons
- oranges
- peaches
- potatoes
- spinach
- strawberries
- tomatoes

Vitamin A

- beef
- broccoli
- carrots
- cheese
- eggs
- green beans
- milk
- peaches
- spinach
- strawberries
- tomatoes

Fats and Oils

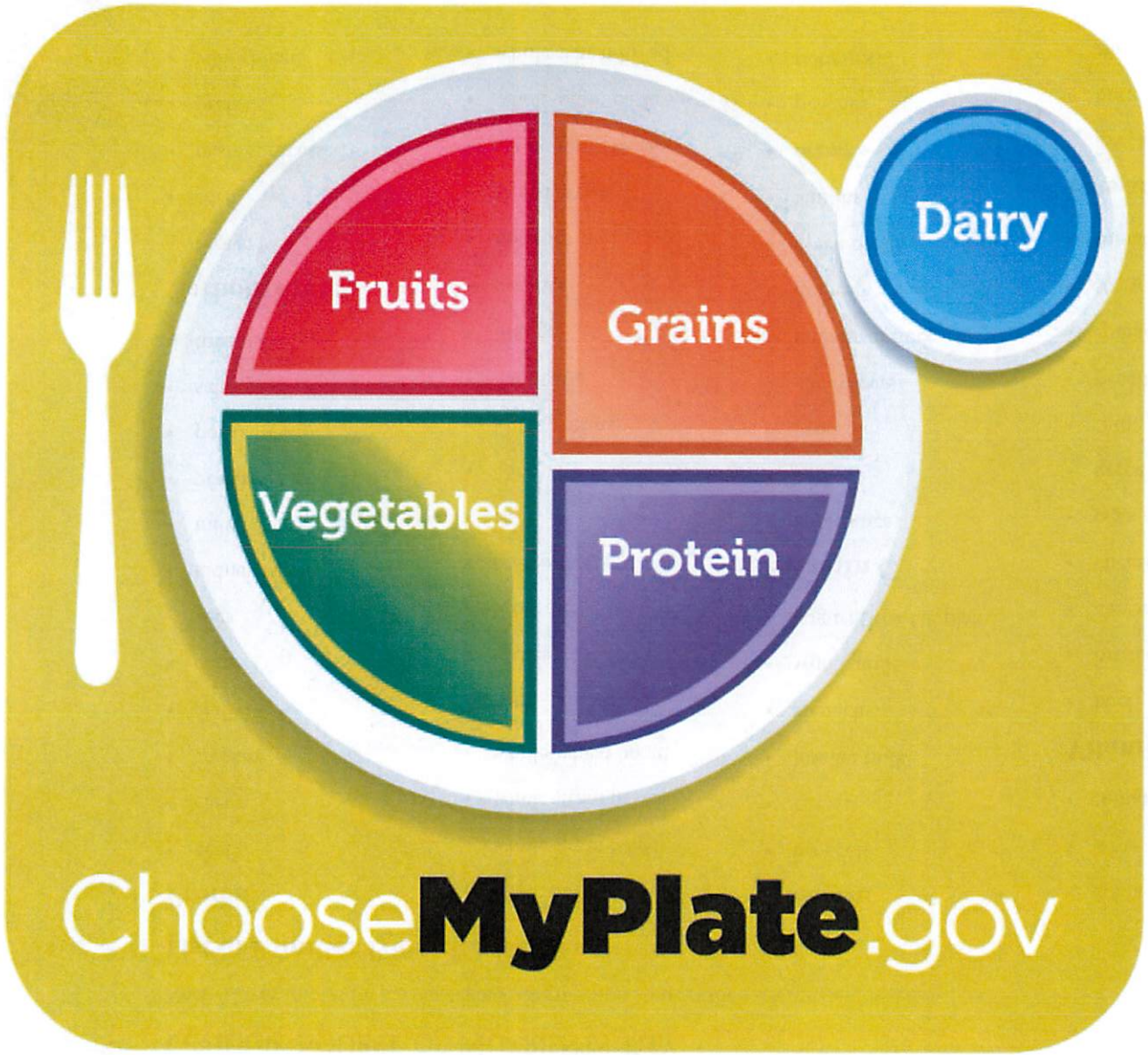
- avocados
- butter
- canola oil
- coconut oil
- margarine
- peanuts
- salmon

Limited Nutritional Value

- chocolate
- deep-fried foods
- donuts and other pastries with high sugar content
- ice cream
- other candy
- soda
- syrup

Reference

Nutrition Data. 2008. www.nutritiondata.com.



Sample Diets

Mark's diet:

- Breakfast: 3 pieces of white toast with butter
- Lunch: White rice with chopped spinach
- Dinner: White pasta with steamed carrots, apple juice

Jenny's diet:

- Breakfast: Eggs and sausage
- Lunch: Hotdog on a white bun
- Dinner: Steak with chicken, apple juice

Molly's diet:

- Breakfast: 2 pieces of whole wheat toast with butter, milk
- Lunch: Brown rice topped with peanuts, grapefruit juice
- Dinner: Whole-wheat bagel with cheese, apple juice

Scott's diet:

- Breakfast: 2 donuts
- Lunch: Two orders of French fries, one candy bar
- Dinner: Deep-fried chicken, broccoli, soda

Sydney's diet:

- Breakfast: Bacon, French toast (made with white bread) with lots of butter and syrup
- Lunch: Fried chicken strips, French fries
- Dinner: 4 slices of cheese pizza, chocolate cake

General Facts on Nutrients

Carbohydrates

- Function: Carbohydrates provide energy to the body, especially to the brain and the nervous system.
- Types and sources of carbohydrates:
  - » Simple carbohydrates: Fruits, some vegetables, some dairy products, refined grains (processed flour), sugar, and corn syrup.
  - » Complex carbohydrates: Starchy vegetables, whole grains and cereals.
- Possible effects:
  - » Too little: Fatigue or lack of energy, malnutrition, and increased fat intake.
  - » Too much: Obesity.

Protein

- Function: Protein is an important source of energy and is essential for growth and organ function.
- Sources of protein: Meat, fish, eggs, cheese, beans, lentils, tofu, and nuts.
- Possible effects:
  - » Too little: Muscle loss, decrease in growth, decreased immunity (making it easier to get diseases or illnesses).
  - » Too much: Can cause high cholesterol and different types of diseases like gout.

Calcium

- Function: Calcium is a very important mineral because it makes up important structures like teeth and bones. It helps us grow and maintains our bodies. It also helps to prevent diseases like osteoporosis (weak bones).
- Sources: It is found in many types of foods, but is very abundant in dairy products. It is also found in green leafy vegetables (e.g., broccoli), some seafood (e.g., salmon), almonds, and dried beans.
- Possible effects:
  - » Too much: Normally no side effects appear, but if calcium intake is high over a long period of time it can cause the development of kidney stones.
  - » Too little: Deficiencies in calcium can lead to increased chance of broken bones or tooth decay.

Vitamin A

- Function: Vitamin A helps maintain healthy teeth, bones, soft tissue, and skin. It also helps promote good vision.
- Sources: Meats and animal products (milk, eggs), dark leafy green vegetables (e.g., spinach), and brightly colored vegetables (e.g., carrots) and fruits (e.g., cantaloupe).
- Possible effects:
  - » Too little: Vision problems; decreased resistance to disease.
  - » Too much: Can cause vitamin A poisoning when consumed in very large amounts.

Vitamin C

- Function: Vitamin C is essential for normal growth and development. It is needed to make skin, scar tissue, heal wounds, and repair bone, cartilage and teeth. Since our body cannot make or store vitamin C, we must get it from foods we eat.
- Sources: Fruits and vegetables
- Possible effects:
  - » Too little: Damaged hair, bleeding gums, rough and dry skin, easy bruising, slow healing of wounds, and nosebleeds.
  - » Too much: Vitamin C toxicity can occur which can lead to upset stomachs and diarrhea.

Fiber

- Function: Fiber is important in the diet because it helps us feel full after eating, which can help control weight. It also helps with digesting food and prevents constipation.
- Types and sources of fiber:
  - » Soluble fiber: This type of fiber is slowly digested in the body and can lower cholesterol and help prevent heart disease. Sources of soluble fiber include oat bran, barley, nuts and seeds, beans, and some fruits and vegetables.
  - » Insoluble fiber: This helps food pass through the stomach and intestines faster and adds bulk to the stool. Types of food high in insoluble fiber include wheat bran, vegetables, and whole grains.

- Possible effects:
  - » Too little: Constipation (difficulty passing bowel movements).
  - » Too much: Eating too much in a short period of time can cause gas, bloating, and cramps.

Fats and Oils

- Function: Fats and oils are a source of energy. There are essential fatty acids that our body cannot make so we must get them from our diet. Fat are like storage boxes, storing calories for when we do not have food to eat. Fat also helps insulate the body, maintains healthy hair and skin, and helps our body absorb different vitamins.
- Types of fats:
  - » Saturated fats: These types of fats are referred to as "bad cholesterol" and can increase cholesterol levels in a person's blood. They are found in some animal products (e.g., butter, cheese, ice cream) and fatty meats.
  - » Unsaturated fats: These types of fats are referred to as "good cholesterol" and can decrease cholesterol levels in a person's blood. They are found in most liquid vegetable oils.
- Possible effects:
  - » Too little: Hair loss or dull hair, brittle nails, and lack of cushioning for organs. (Note: This is for unsaturated fats.)
  - » Too much: Too much of saturated fats can cause heart disease, clogged arteries, and obesity.

Sweets

- Function: Quick source of energy.
- Sources: Processed foods that have an excess of sugar (e.g., candy).
- Possible effects: Too much sugar can cause a "sugar high" which is when a person gets a "rush" of energy for a period of time and then get an energy "crash." Dental decay, excess weight gain, and stomachaches can occur from eating too much sugar.

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ACTIVITY 3

Shopping by Chance for Sheep

Background Information

Sheep have been kept as domesticated animals for thousands of years and rely on their owners for the type of food they eat. Their range of reliance varies for different types of production systems. **An extensive system** is similar to the type of environment and lifestyle experienced by wild sheep that roam and forage on natural vegetation. In an **intensive system,** the feed comes directly from the herd owners, so the sheep do not have a choice of what to eat. This makes it important that owners of sheep in an intensive system know which nutrients are essential for sheep. Equally important, they need to know that for different sheep at different life stages there are different requirements for types and quantities of nutrients.

Time Required

40 to 60 minutes

Concepts and Vocabulary

Essential nutrients, life stages of sheep

Life Skills

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

Subject Links

Science, Language Arts, Math

State Content Standards

Science

- Third Grade:
  - » Investigation and Experimentation–5a, 5c, 5d, 5e
- Fifth Grade:
  - » Investigation and Experimentation–6g, 6h
- Sixth Grade:
  - » Investigation and Experimentation–7d, 7e

Language Arts

- Third Grade:
  - » Reading Comprehension–2.2
- Fourth Grade:
  - » Listening and Speaking Strategies–1.2, 1.7, 1.8
- Fifth Grade:
  - » Reading Comprehension–2.4
  - » Listening and Speaking Strategies–1.5
- Sixth Grade:
  - » Listening and Speaking Strategies–1.5
  - » Speaking Applications–2.5b

Math

- Fourth Grade:
  - » Statistics, Data Analysis, and Probability: 1.0
  - » Students organize, represent, and interpret numerical and categorical data and clearly communicate their findings–1.1

Suggested Groupings

Small groups or pairs

Materials Needed

(= Materials provided in curriculum)*

- **Sheep Life Stage Cards (pre-weaned lamb, growing lamb, finishing lamb, maintenance ewe, late-gestation ewe, lactating ewe)*
- **Sheep Nutrient Requirements*
- **Feed Cards*
- **Nutrients Worksheet*
- **Facts about Nutrients*
- **Nutrient Comparison Graphs Worksheet*
- *Appendix B: *Sheep Nutrient Requirements Table* (Concept Application)
- *Appendix C: *Grain and Hay Ratio for Market Lamb Projects* (Concept Application)
- Flip chart paper
- Markers or colored pencils
- Tape

Getting Ready

- Make 3 to 5 copies of each of the *Feed Cards* and staple identical cards together. Display the different *Feed Cards* on a table.
- Make enough copies of the *Sheep Life Stage Cards* so each group gets a card. Additional copies may be needed later. Cut the cards out.
- Make enough *Sheep Nutrient Requirements Tables* for each group and each individual to have one.
- Make enough copies of the *Nutrients Worksheet* and *Nutrient Comparison Worksheet* for each group.
- Make enough copies of *Sheep Nutrient Requirements Table* (Appendix B) and *Grain and Hay Ration for Market Lamb Projects* (Appendix C) for each youth to have one of each (Concept Application).

Opening Questions

1. **What do you know about the different types of food that sheep eat?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
2. **Remember what nutrients are essential for humans. What do you think some of the essential nutrients for sheep might be? How do you think sheep acquire these nutrients?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

Procedure (Experiencing): Part A

1. Pass out the *Nutrients Worksheet* to each group.
2. Each group of youth will have a sheep from a specific life stage. Determine this by passing out *Sheep Life Stage Cards* randomly to each group (one card per group). Have them write down the sheep they received under Part A of the *Nutrients Worksheet.*
3. Explain to the youth that they are sheep owners and they are going to the store to buy a type of feed for their particular sheep.
4. Have each group go to the "store" (the table with the *Feed Cards*) to pick out a feed for their sheep. Once each group has decided on the feed they want, have them remove one *Feed Card* and take it back with them. Write the feed type they picked under Part A of the *Nutrients Worksheet.*

Sharing, Processing, and Generalizing

Ask each group to discuss why they chose the particular feed that they did. Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

Procedure (Experiencing): Part B

1. Pass out the *Sheep Nutrient Requirements Table (Appendix A)* to each group.
2. Have the youth determine the particular nutrient requirements for their sheep and record the information down under Part B of the *Nutrients Worksheet.*
3. Next, have the youth compare the feed they chose with the nutrient requirements of their sheep. Did the feed they chose meet the nutrient requirements of their sheep? Why or why not? Have them fill out and write their responses under Part B of the *Nutrients Worksheet.* Pass out the *Facts about Nutrients* page to help them complete the *Nutrients Worksheet.*

Sharing, Processing, and Generalizing

As a group, have each group discuss their sheep's diet and whether its diet met its nutrient requirements. Also have them discuss the potential benefits and possible drawbacks of their sheep's diet. Discuss ways they can improve their sheep's feed.

Procedure (Experiencing): Part C

1. For groups that did not pick the correct diet, ask them to return to the "store" and shop for another diet that best meets their sheep's requirements. Include any modifications that might be needed. Have them fill out and write their responses under Part C of the *Nutrients Worksheet.*
2. For groups that did pick the correct diet, have the youth go and choose appropriate diets for the other sheep listed in the *Sheep Nutrient Requirements Table.* Have them fill out the table in Part C of the *Nutrients Worksheet.*

Note: The youth who completed step 1 may now continue with step 2. Wait until each group has completed at least one other sheep before moving to the next section.

Sharing, Processing, and Generalizing

Have each group share the diets they picked for each sheep and tell why they made those choices. Get the groups to compare their findings and see if they are similar or different and try to figure out why.

Procedure (Experiencing): Part D

1. Using the *Nutrient Comparison Worksheet* and the *Sheep Nutrient Requirements* handout, have the youth graph out the nutrient requirements for each life stage as a line graph.
2. Once each group has completed graphing, have them look at the trends in nutrient requirements for each life stage. Ask them to share their thoughts and ideas either verbally or on the flip chart paper provided.

Sharing, Processing, and Generalizing

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

1. Ask each group to share their thoughts and ideas on the trends of each life stage.
2. Ask the youth to share what they have learned about different life stages of sheep. Have them share their thoughts and ideas either verbally or on the flip chart paper provided.

3. Ask the youth to share what they have learned about food labels. Have them share their thoughts and ideas either verbally or on the flip chart paper provided.
4. Ask the youth to explain why they think it is important to read food labels. Have them share their thoughts and ideas either verbally or on the flip chart paper provided.

» **Volunteer Tip:** Notice that on the different feed diets, crude fat and crude fiber are shown. Since calculating the specific requirements of these nutrients for sheep at different life stages is a complicated process, we omitted this information to avoid confusion. However, both nutrients are still extremely important in a sheep's diet, so it is always important to take both the crude fat and crude fiber content of each feed into consideration for different sheep. Please consult a sheep nutrition book or your local feed store to find the best diet for your sheep.

Concepts and Terms

At this point, volunteers need to make sure that the concept **life stages of different sheep** and that the term **essential nutrients** have been introduced to or discovered by the youth. (Note: The goal is to get the youth to develop concepts and terms like this through their exploration and to have them define terms using their own words.)

Concept Application

For youth who have sheep:

1. Ask the youth to determine the life stage of their sheep.
2. Using the *Sheep Nutrient Requirements* (from the activity) and *Appendix B: Sheep Nutrient Requirements Table,* have the youth figure out what the nutritional requirements are for their sheep.
3. Let the youth go online and research how to obtain the essential nutrients for their sheep.

» **Note:** *Appendix C: Grain and Hay Ratio for Market Lamb Projects* is a helpful reference for youth who have market lambs.

For youth who do not have sheep:

1. Ask the youth to choose a sheep at a particular life stage.
2. Have them use *Appendix B: Sheep Nutrient Requirements Table* to figure out the nutritional requirements for their particular sheep.
3. Let the youth go online and research how to obtain those essential nutrients for their sheep.

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Sheep Nutrient Requirements

(Note: These are estimates of the daily requirements for each sheep.)

Sheep type	Nutrient		
	Crude protein	Calcium	Phosphorus
Pre-weaned lamb	26%	0.82%	0.38%
Growing lamb (60 to 90 lb)	15.5%	0.53%	0.24%
Finishing lamb (90 to 130 lb)	14%	0.55%	0.28%
Maintenance ewe (Weighs 154 lb [70 kg])	9.4%	0.20%	0.20%
Late gestation ewe (Last 4 weeks of gestation; weighs 154 lb [70 kg])	11.3%	0.40%	0.24%
Lactating ewe (First 6 to 8 weeks of lactation suckling twins; weighs 154 lb [70 kg])	15%	0.39%	0.29%

Feed Cards (Note: The ingredients are from actual feeds but the names of the feeds are fictional.)

Fabulous Fiber for your Fabulous Flock

...Guaranteed Analysis...

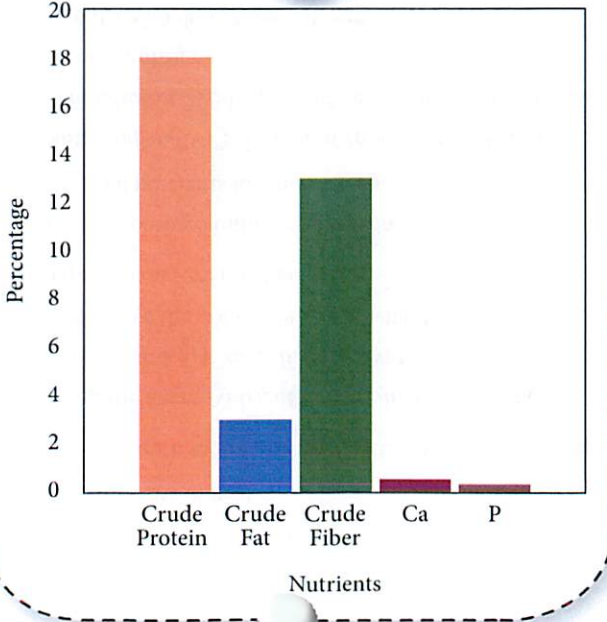
Crude Protein not less than 18.00%

Crude Fat not less than 3.00%

Crude Fiber not less than 13.00%

Calcium (Ca) between 0.50%–0.90%

Phosphorous (P) not less than 0.30%



Awesome Almonds!

...Guaranteed Analysis...

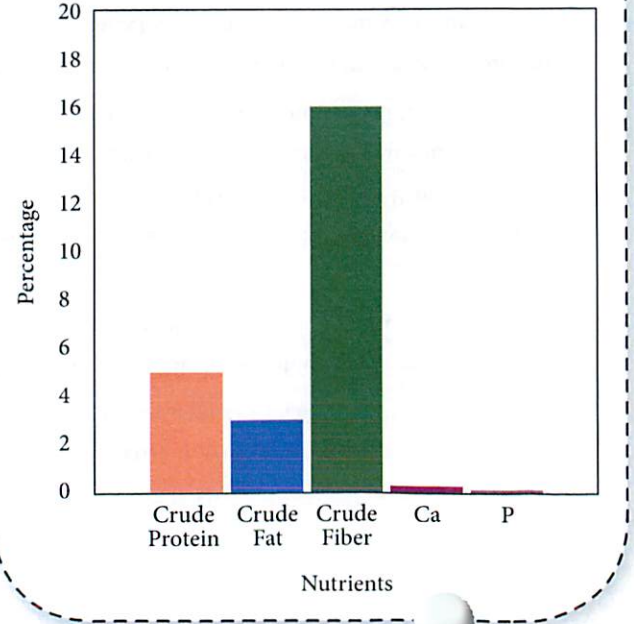
Crude Protein...5.00%

Crude Fat...3.00%

Crude Fiber...16.00%

Calcium (Ca)....0.25%

Phosphorous (P)...0.10%



Pellets for the Palate
Show Quality Alfalfa

...Guaranteed Analysis...

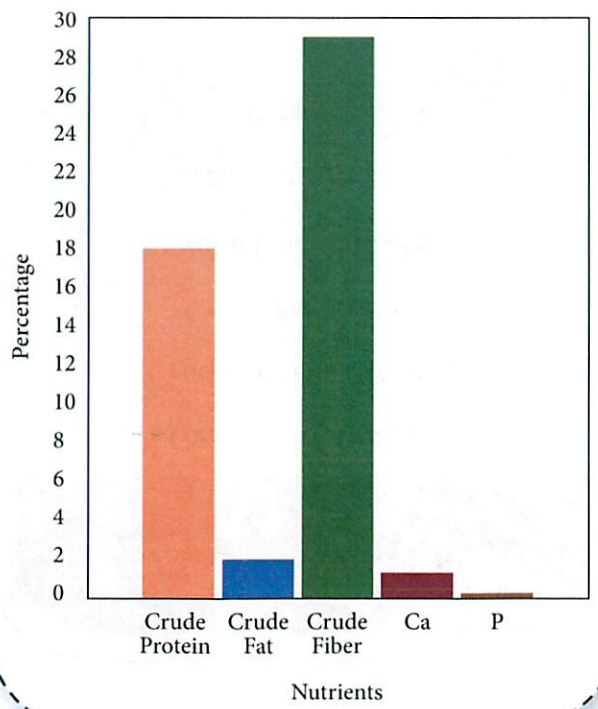
Crude Protein...18.00%

Crude Fat...2.00%

Crude Fiber...29.00%

Calcium (Ca)....1.30%

Phosphorous (P)...0.23%



Corn Cobs Complete

...Guaranteed Analysis...

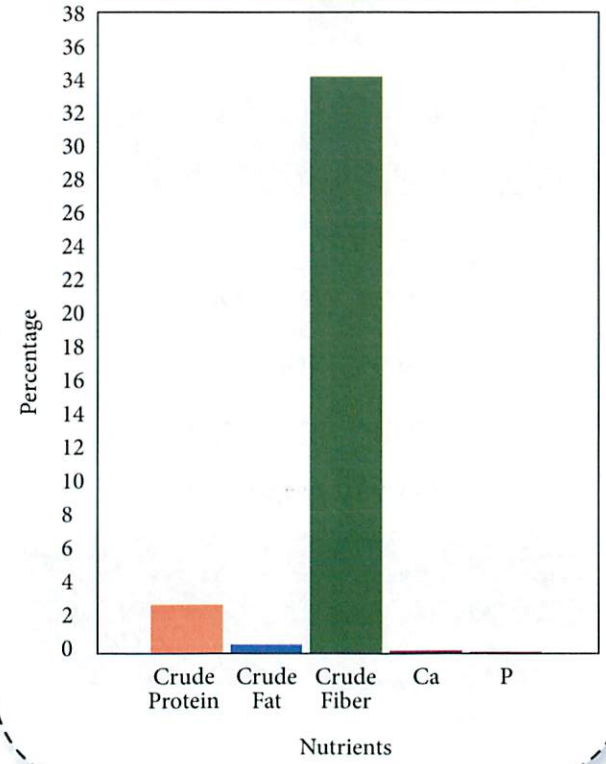
Crude Protein...3.00%

Crude Fat....5%

Crude Fiber...36.00%

Calcium (Ca)....0.12%

Phosphorous (P)...0.04%



Oat Hay Everyday

...Guaranteed Analysis...

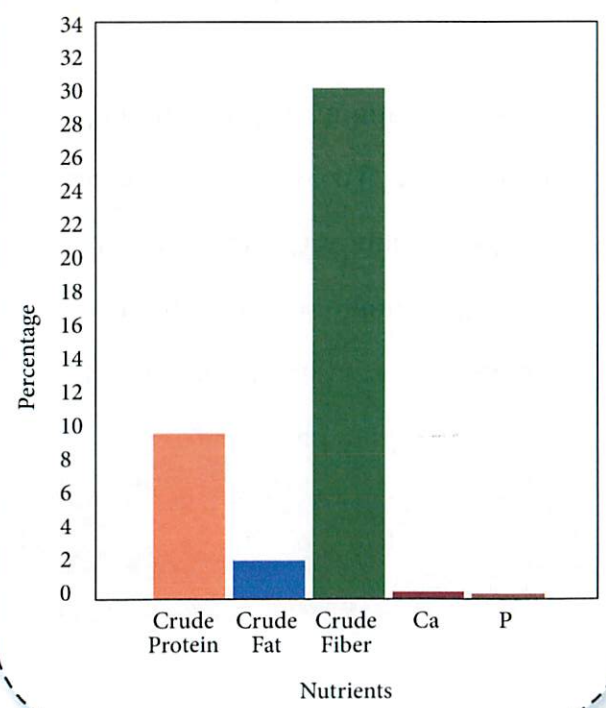
Crude Protein...10.00%

Crude Fat...2.30%

Crude Fiber...31.00%

Calcium (Ca)....0.40%

Phosphorous (P)...0.27%



Special Hay for Special Animals
Vetch Hay

...Guaranteed Analysis...

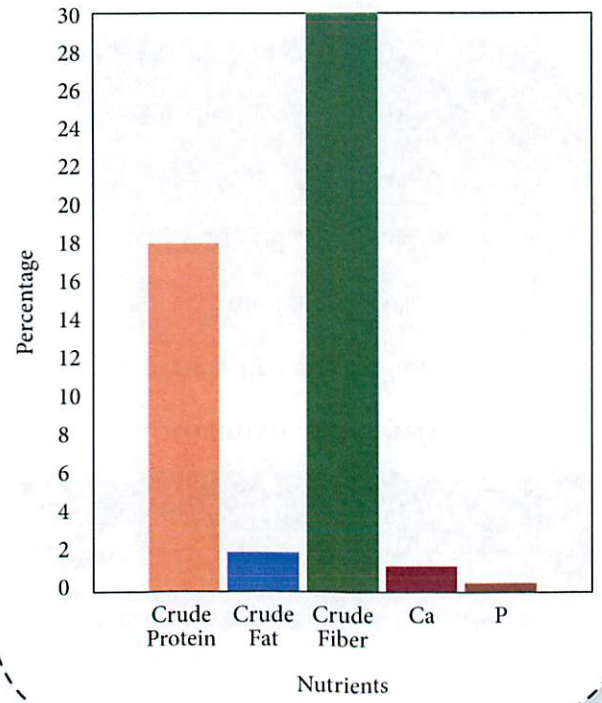
Crude Protein...18.00%

Crude Fat...1.80%

Crude Fiber...30.00%

Calcium (Ca)...1.25%

Phosphorous (P)...0.34%



Quality Alfalfa Hay
Gourmet

...Guaranteed Analysis...

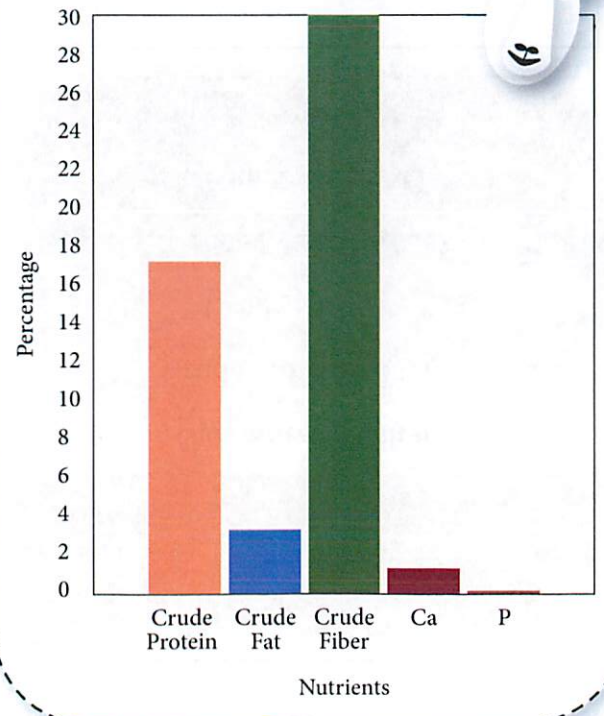
Crude Protein...17.00%

Crude Fat...3.60%

Crude Fiber...30.00%

Calcium (Ca)...1.40%

Phosphorous (P)...0.20%



Lamb-a-Day Keeps the Vet Away!

...Guaranteed Analysis...

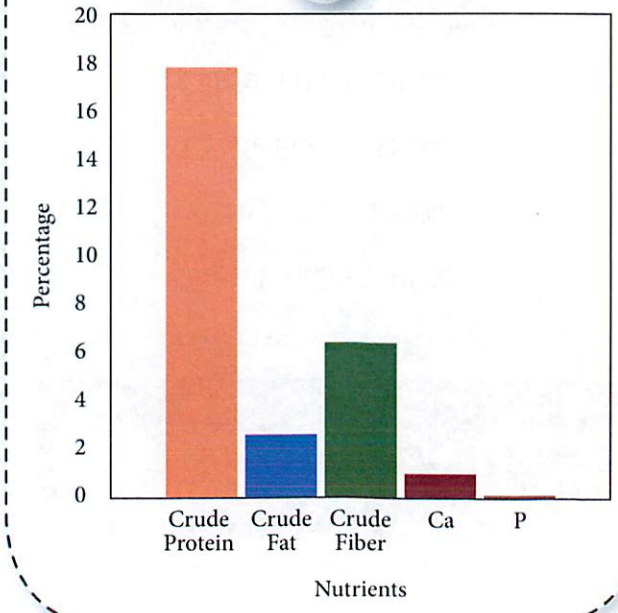
Crude Protein...minimum 18.00%

Crude Fat...minimum 2.40%

Crude Fiber...maximum 16.00%

Calcium (Ca)...between 0.78% and 1.20%

Phosphorous (P)...minimum 0.16%



Robust Ram Rations

...Guaranteed Analysis...

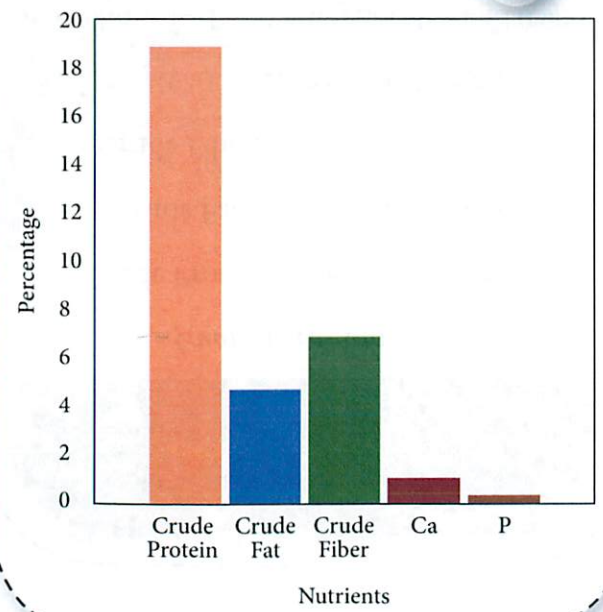
Crude Protein...minimum 19.00%

Crude Fat...minimum 4.50%

Crude Fiber...maximum 7.30%

Calcium (Ca)...between 0.78% and 1.80%

Phosphorous (P)...minimum 0.42%



Fleet Sheep Chow

...Guaranteed Analysis...

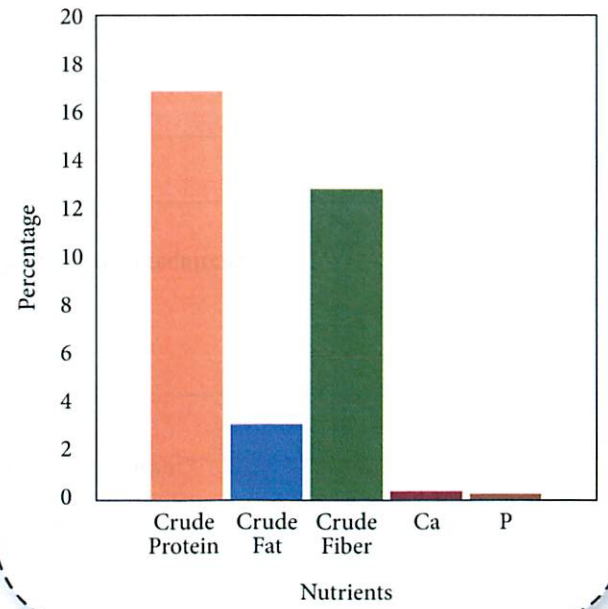
Crude Protein...minimum 17.00%

Crude Fat...minimum 3.00%

Crude Fiber...maximum 13.00%

Calcium (Ca)...between 0.50% and 0.90%

Phosphorous (P)...minimum 0.30%



Fiber for Your Flock

...Guaranteed Analysis...

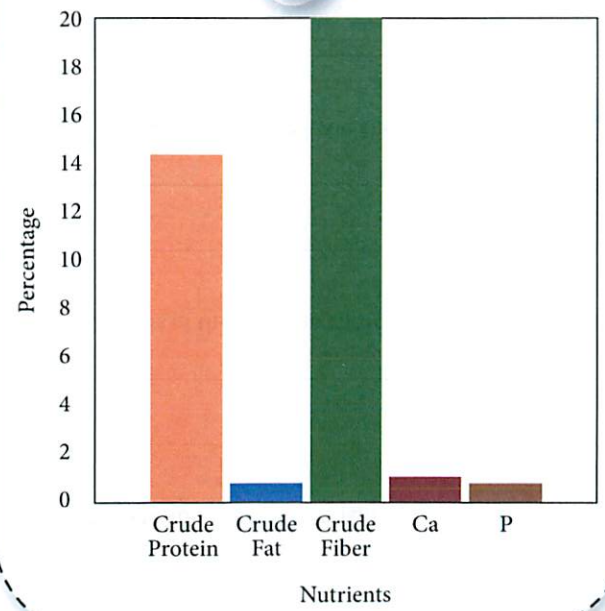
Crude Protein...minimum 14.00%

Crude Fat...minimum 0.75%

Crude Fiber...maximum 20.00%

Calcium (Ca)...between 0.75% and 1.00%

Phosphorous (P)...between 0.30% and 1.00%



Better Balance

...Guaranteed Analysis...

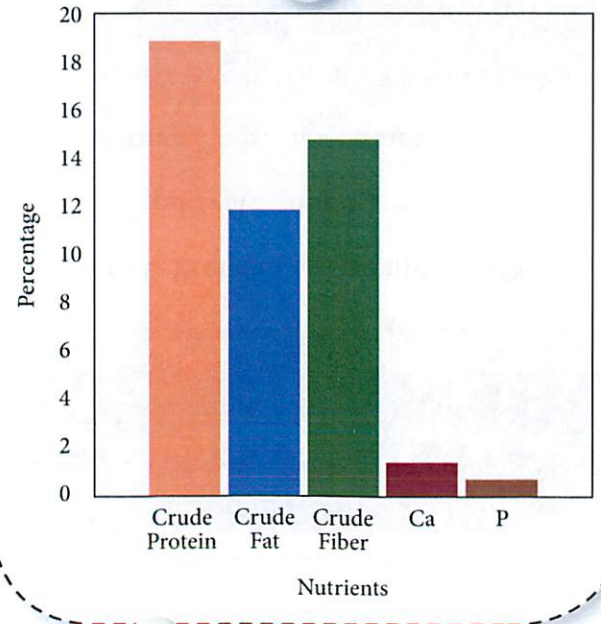
Crude Protein...minimum 19.00%

Crude Fat...minimum 12.00%

Crude Fiber...maximum 15.00%

Calcium (Ca)...between 1.40% and 1.90%

Phosphorous (P)...between 0.60% and 0.90%



Nutrients Worksheet

Part A:

Life stage of sheep:_____

Feed type: _____

Part B:

Sheep nutrient requirements

Crude protein:_____

Calcium: _____

Phosphorus:_____

Feed nutrients

Crude protein:_____

Calcium: _____

Phosphorus:_____

Based on your understanding of your sheep's nutritional needs, determine whether you believe the feed you chose:

☐ sufficiently meets sheep dietary requirements (please explain).

_____

_____

☐ does not sufficiently meet sheep dietary requirements (please explain).

_____

_____

☐ unable to determine (please explain)._____

_____

_____

Potential Benefits of the feed you chose:_____

_____

_____

Potential Drawbacks of the feed you chose: _____

_____

_____

What might you do to improve your sheep's feed? (please explain) _____

_____

_____

Part C:

Of the feeds available, which diet best meets your sheep's requirements? (please explain) Include any modifications you might have for the feed._____

_____

_____

_____

_____

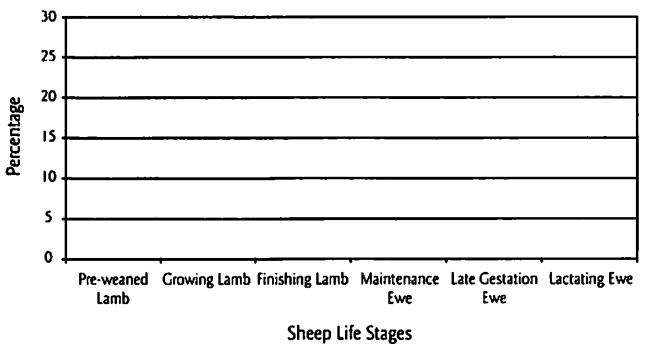
_____

Life stage of sheep	Feed type	Why did you choose this feed?
Pre-weaned lamb		
Growing lamb		
Finishing lambs		
Maintenance ewe		
Late gestation ewe		
Lactating ewe		

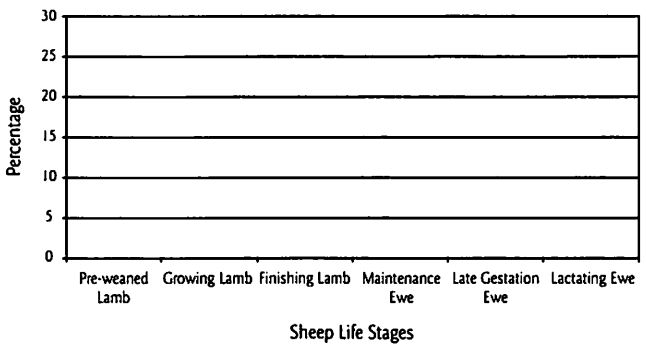
Part D:

Please use *Sheep Nutrient Requirements* worksheet to complete each graph below as a line graph.

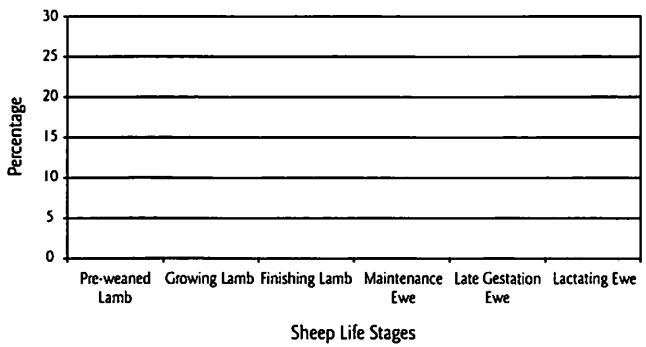
Crude Protein



Calcium



Phosphorus



Facts about Nutrients

Lack of Nutrients

- *Lack of Protein:* A lack can cause muscle loss, reduction in growth, weakened defenses against disease, and weakened heart and respiratory system.
- *Lack of Calcium:* This can lead to poor growth and muscle definition as well as bone diseases such as rickets.
- *Lack of Phosphorus:* A lack of phosphorus can be associated with a lack of vitamin D. Symptoms include poor growth and development of bone diseases such as rickets in lambs. In sheep, symptoms include weight loss, fractures, and loss of appetite.

Excess of Nutrients

- *Excess Protein:* Feeding sheep an excess of protein is expensive and is an inefficient source of energy. Very large excess of protein can cause ammonia toxicity, which causes nervousness, loss of coordination, difficulty breathing, bloating, and can lead to death.
- *Excess Calcium:* An excess of calcium in a diet can cause deficiencies in other minerals, including phosphorus, magnesium, iron, iodine, zinc, and manganese.
- *Excess Phosphorus:* If sheep are fed an excess of phosphorus, they can develop problems such as defective bone development or stones in the urinary tract.

Other Important Nutrients

Fat

- *Lack of Fat:* A lack of fat has indirect effects on the sheep. Mainly it reduces the production of essential fatty acids, and that can cause skin problems, loss of wool, and unthrifty appearance.
- *Excess Fat:* An excess of fat in the diet can cause reductions in future milk production in ewes. A decreased feed intake with feed containing over 10% fat can cause health problems in sheep.

Fiber

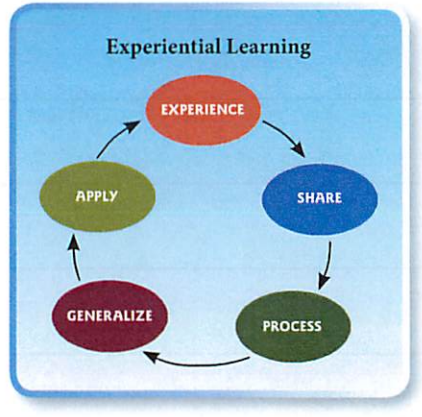
- *Lack of Fiber:* A lack of fiber can cause digestive problems in sheep and can lead to diseases, including acidosis. It also has the potential to harm the "good" microbes in the rumen of the sheep.
- *Excess Fiber:* An excess of fiber can cause decreased digestibility of the diet and reduced animal performance (that is, reduced gain and feed efficiency).

Recommendations to Improve Sheep Feed

- Look at other feed types and see if there is one that better matches the type of sheep you have.
- Combine different types of feed to meet your sheep's nutrient requirements.
- Add supplements to the feed when you identify a lack of vitamins or minerals.

Appendix A

The activities in this curriculum are 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 5-step learning cycle is most commonly used. These five steps—Exploration, 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 5-step learning cycle, please visit the University of California's Science, Technology, Environmental Literacy Workgroup's Experiential Learning website, www.experientiallearning.ucdavis.edu/default.shtml.

Appendix B

Sheep Nutrient Requirements Table

Class	Weight	ADG	DMI (%)	TDN (%)	DE (mcal/kg)	ME (mcal/kg)	CP (%)	CA (%)	P (%)
Ewes									
Maintenance	—	—	1.5–2.0	55.0	2.4	2.0	9.4	0.20	0.20
Flushing (2 weeks pre-breeding to 3 weeks post-breeding)	—	—	2.2–3.2	59.0	2.6	2.1	9.1	0.32	0.18
Non-lactating, first 15 weeks of gestation	—	—	1.8–2.4	55.0	2.4	2.0	9.3	0.25	0.20
Last 4 weeks of gestation (130 to 150% lambing rate) or last 4 to 6 weeks of lactation suckling singles	—	—	2.2–3.2	59.0	2.6	2.1	10.7	0.35	0.23
Last 4 weeks of gestation (180 to 225% lambing rate)	—	—	2.3–3.4	65.0	2.9	2.3	11.3	0.40	0.24
First 6 to 8 weeks of lactation suckling singles or last 4 to 6 weeks of lactation suckling twins	—	—	3–4.2	65.0	2.9	2.4	13.4	0.32	0.26
First 6 to 8 weeks of lactation suckling twins	—	—	3.6–4.8	65.0	2.9	2.4	15.0	0.39	0.29
Ewe lambs									
Non-lactating, first 15 weeks of gestation	—	—	2.4–3.5	59.0	2.6	2.1	10.6	0.35	0.22
Last 4 weeks of gestation (100 to 120% lambing rate)	—	—	2.6–3.8	63.0	2.8	2.3	11.8	0.39	0.22
Last 4 weeks of gestation (130 to 175% lambing rate)	—	—	2.6–3.8	66.0	2.9	2.4	12.8	0.48	0.25
First 6 to 8 weeks of lactation suckling singles	—	—	3.6–4.2	66.0	2.9	2.4	13.1	0.30	0.22
First 6 to 8 weeks of lactation suckling twins	—	—	3.9–5.2	69.0	3.0	2.5	13.7	0.37	0.26
Replacement ewe lambs	66	0.50	4.0	65.0	2.9	2.4	12.8	0.53	0.22
	88	0.40	3.5	65.0	2.9	2.4	10.2	0.42	0.18
	>110	0.25	2.5	59.0	2.6	2.1	9.1	0.31	0.17
Replacement ram lambs	88	0.65	4.5	63.0	2.8	2.3	13.5	0.43	0.21
	132	0.60	4.0	63.0	2.8	2.3	11.0	0.35	0.18
	>176	0.45	3.5	63.0	2.8	2.3	9.6	0.30	0.16
Lambs, finishing, 4–7 months old	66	0.65	4.3	72.0	3.2	2.5	14.7	0.51	0.24
	88	0.60	4.0	76.0	3.3	2.7	11.6	0.42	0.21
	110	0.45	3.2	77.0	3.4	2.8	10.0	0.35	0.19
Early weaned lambs, moderate/rapid growth potential	22	0.55	5.0–6.0	80.0	3.5	2.9	26.2	0.82	0.38
	44	0.66	5.0–6.0	78.0	3.4	2.8	16.9	0.54	0.24
	66	0.72	4.3–4.7	78.0	3.3	2.7	15.1	0.51	0.24
	>88	0.88	3.0–3.8	78.0	3.3	2.7	14.5	0.55	0.28

*DMI, % of BW: The lighter the animal or the more rapid the gain means the higher percent of body weight (BW) that the animal can eat. For example, ram lambs under 100 lb can eat about 4.5% of their BW, whereas ram lambs over 150 lb can eat about 3.5% of their BW in DM. From *Nutrient Requirements of Sheep, Sixth Revised Edition* (1985), National Academy Press, Washington, D.C.

Appendix C

Grain and Hay Ratio for Market Lambs Projects

Sheep are ruminants, so it is very important that you always provide them with hay to keep their rumen healthy.

Weight (lb)	Grain (lb)	Hay (lb)	Total (lb)
60	1 – 1.5	0.5 – 1	1.5 – 2.5
70	1.5 – 2	0.5	2 -2.5
80	2 – 2.5	0.5	2.5 – 3
90	2.5 – 3	0.25	2.75 – 3.25
100	3 – 3.5	Handful*	3 – 3.5
110	3.5 – 3.75	Handful*	3.5 – 3.75
120	3.6 – 4	Handful*	3.6 – 4
130	4	Handful*	4
140	4.5	Handful*	4.5

* Once a lamb weighs 100 pounds, feed it a handful of good quality grass hay or alfalfa hay in addition to the grain.

Table by Celina Johnson.

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.

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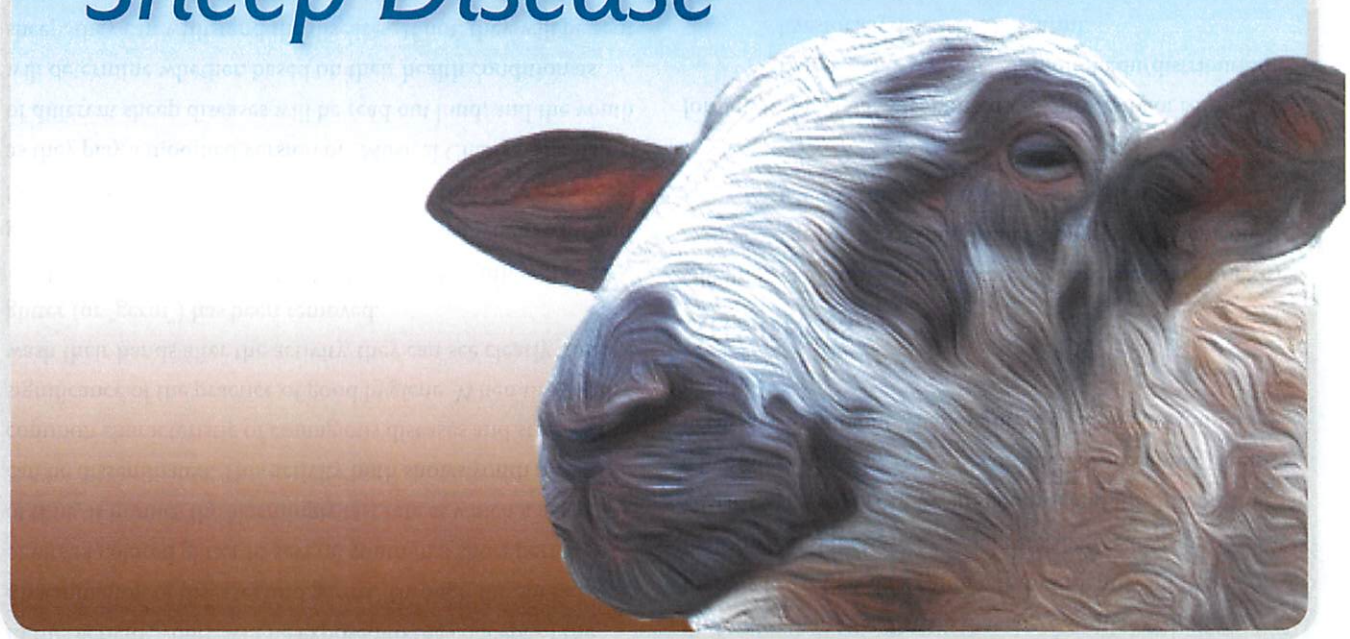
SHEEP: *From the Animal's Point of View*

4

Sheep Disease



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.

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Partially funded through a grant from the Wells Fargo Foundation.

UCDAVIS VETERINARY MEDICINE

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.

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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.

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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

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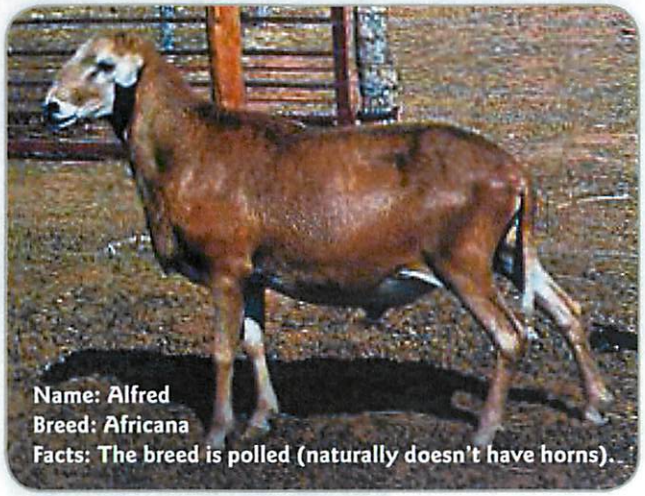
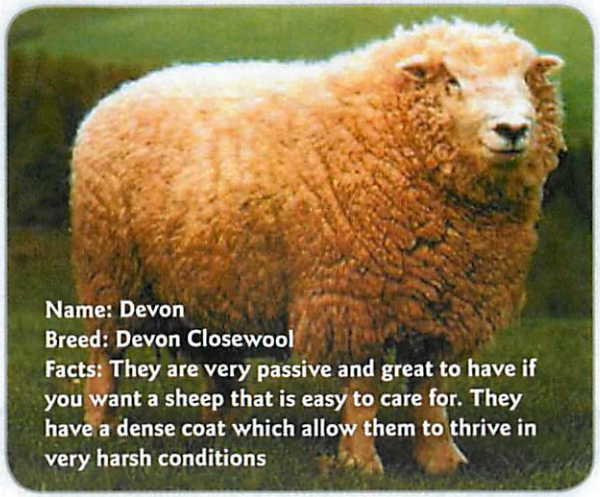
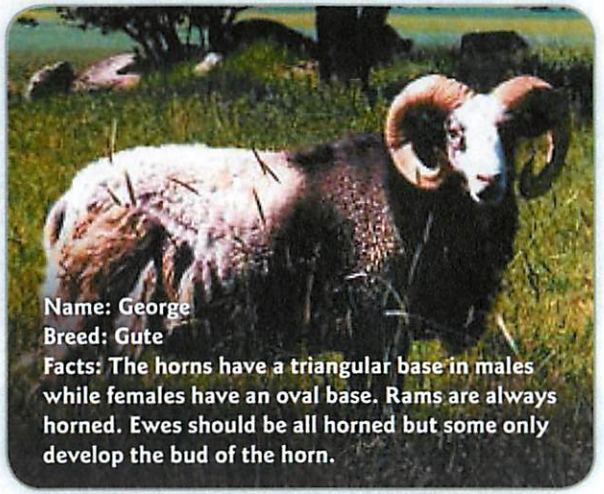
Sheep Cards



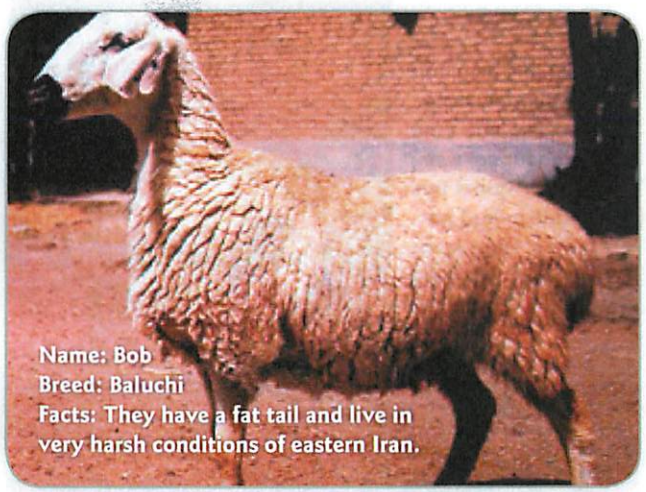
Name: Alfred
Breed: Africana
Facts: The breed is polled (naturally doesn't have horns).



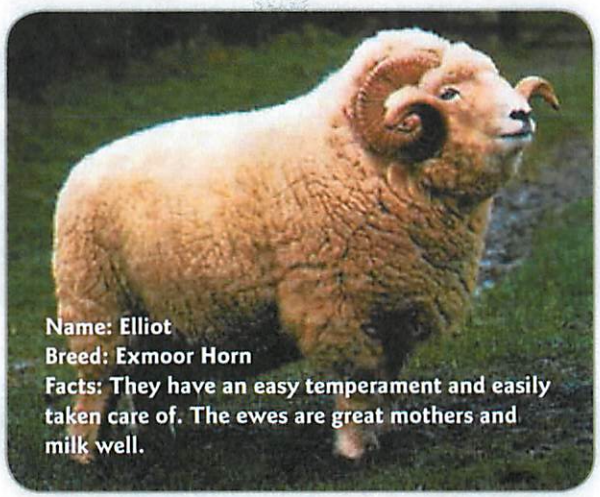
Name: Devon
Breed: Devon Closewool
Facts: They are very passive and great to have if you want a sheep that is easy to care for. They have a dense coat which allow them to thrive in very harsh conditions



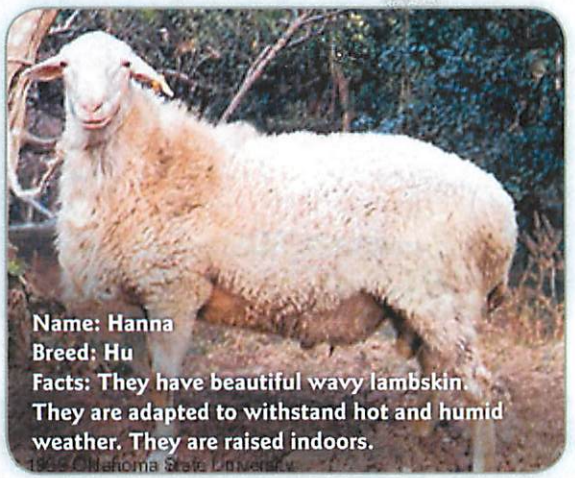
Name: George
Breed: Gute
Facts: The horns have a triangular base in males while females have an oval base. Rams are always horned. Ewes should be all horned but some only develop the bud of the horn.



Name: Bob
Breed: Baluchi
Facts: They have a fat tail and live in very harsh conditions of eastern Iran.

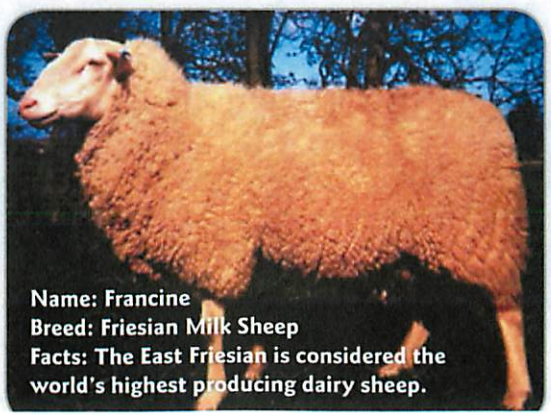


Name: Elliot
Breed: Exmoor Horn
Facts: They have an easy temperament and easily taken care of. The ewes are great mothers and milk well.

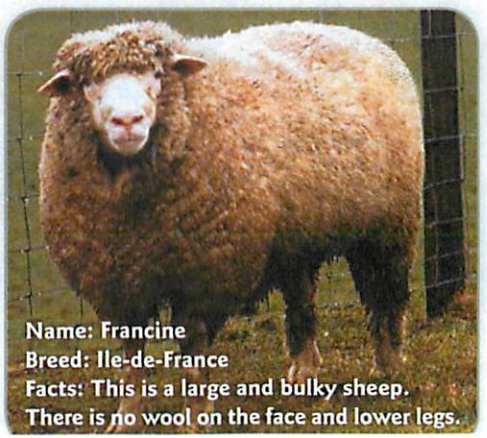


Name: Hanna
Breed: Hu
Facts: They have beautiful wavy lambskin. They are adapted to withstand hot and humid weather. They are raised indoors.

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

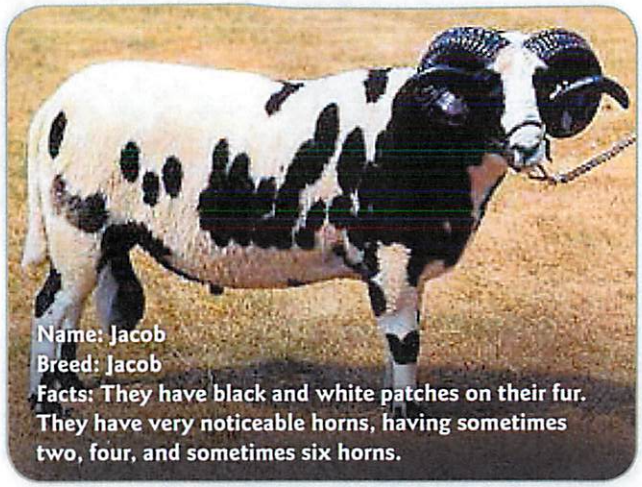


Name: Francine
Breed: Friesian Milk Sheep
Facts: The East Friesian is considered the world's highest producing dairy sheep.

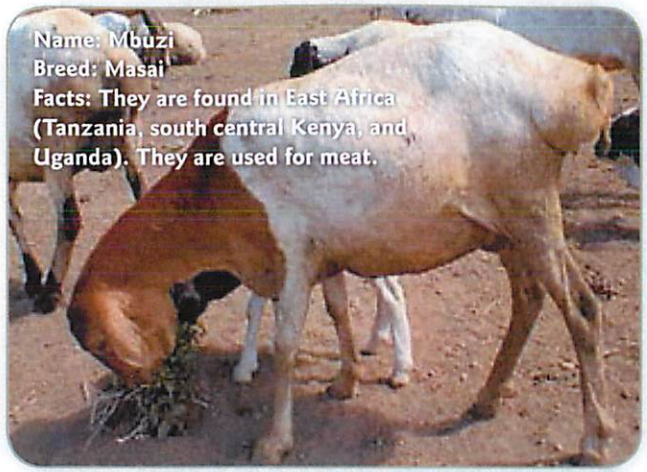


Name: Francine
Breed: Ile-de-France
Facts: This is a large and bulky sheep. There is no wool on the face and lower legs.

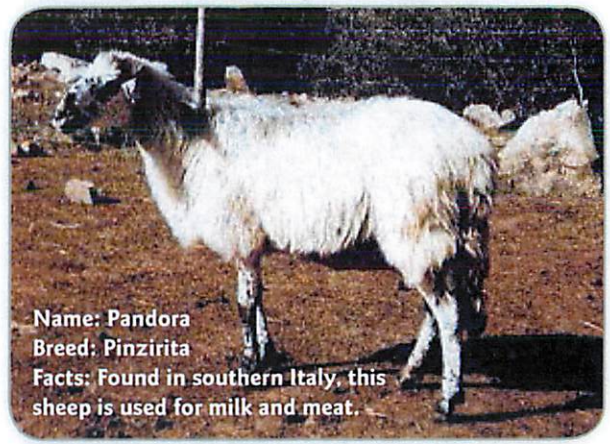
Sheep Cards, continued



Name: Jacob
Breed: Jacob
Facts: They have black and white patches on their fur. They have very noticeable horns, having sometimes two, four, and sometimes six horns.

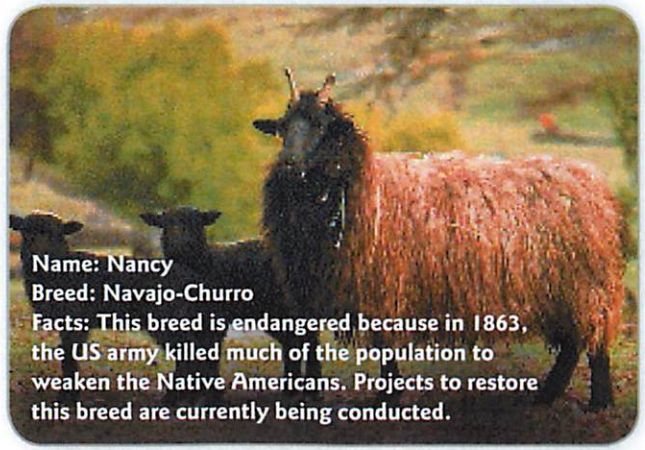


Name: Mbuzi
Breed: Masai
Facts: They are found in East Africa (Tanzania, south central Kenya, and Uganda). They are used for meat.

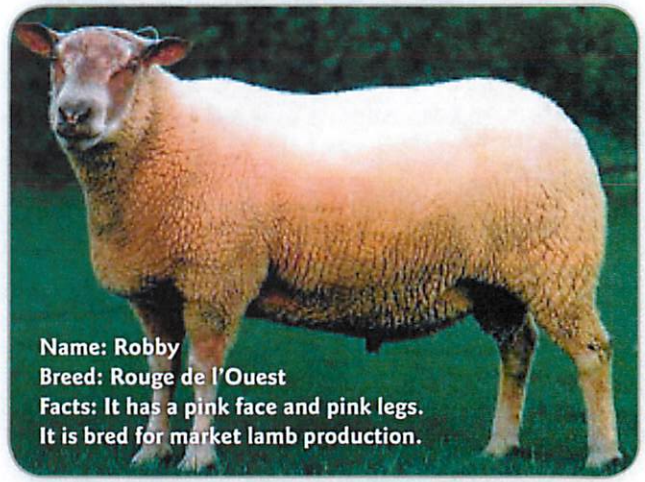


Name: Pandora
Breed: Pinzirita
Facts: Found in southern Italy, this sheep is used for milk and meat.

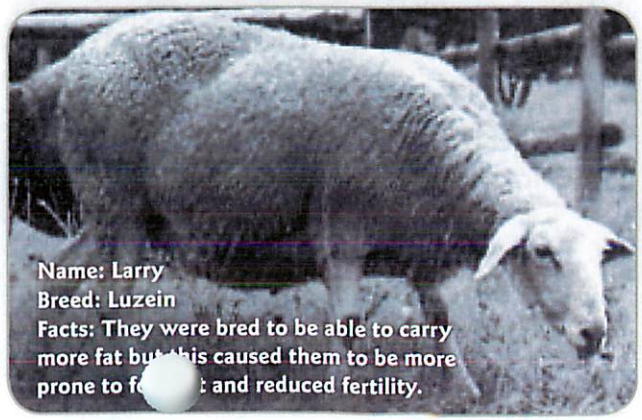
Name: Kayle
Breed: Kerry Hill
Facts: This is a very well proportioned and sturdy sheep. It has a distinct black nose and black and white markings on the head and legs.



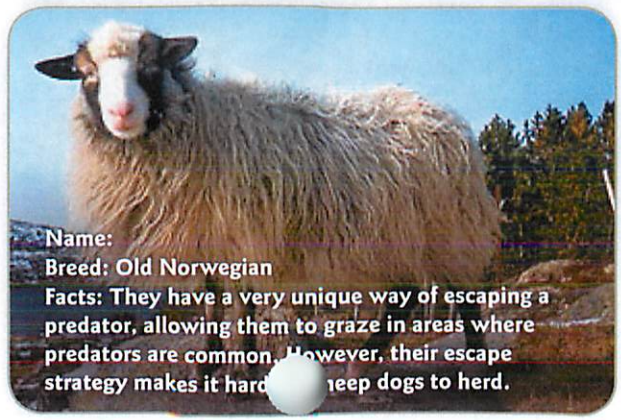
Name: Nancy
Breed: Navajo-Churro
Facts: This breed is endangered because in 1863, the US army killed much of the population to weaken the Native Americans. Projects to restore this breed are currently being conducted.



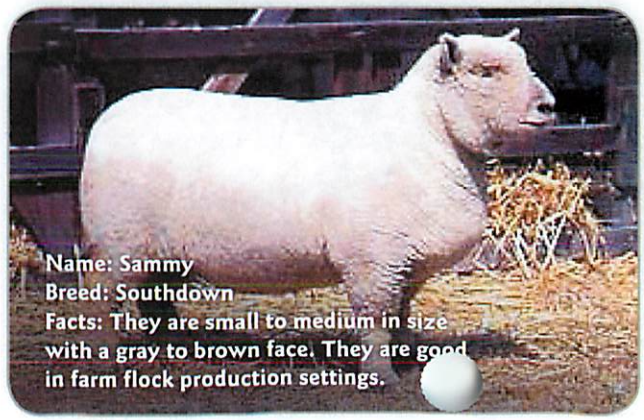
Name: Robby
Breed: Rouge de l'Ouest
Facts: It has a pink face and pink legs. It is bred for market lamb production.



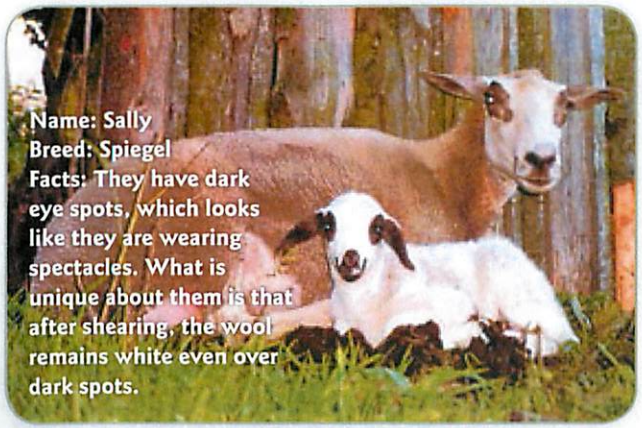
Name: Larry
Breed: Luzein
Facts: They were bred to be able to carry more fat but this caused them to be more prone to f[illegible] and reduced fertility.



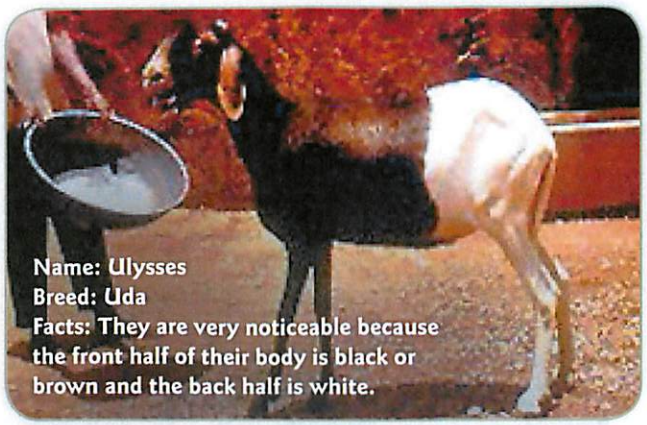
Name:
Breed: Old Norwegian
Facts: They have a very unique way of escaping a predator, allowing them to graze in areas where predators are common. However, their escape strategy makes it hard[illegible]eep dogs to herd.



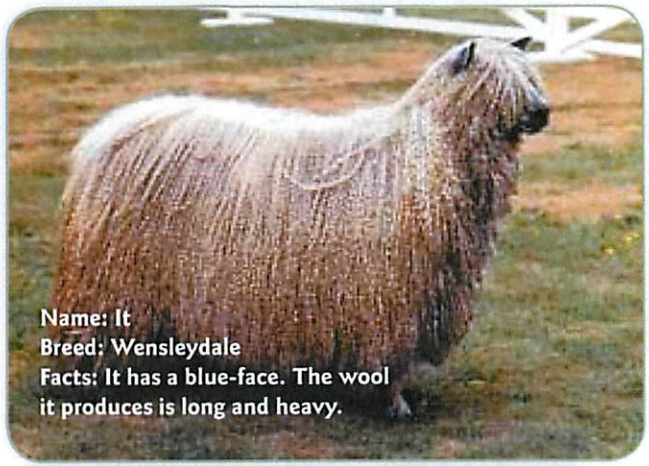
Name: Sammy
Breed: Southdown
Facts: They are small to medium in size with a gray to brown face. They are good in farm flock production settings.



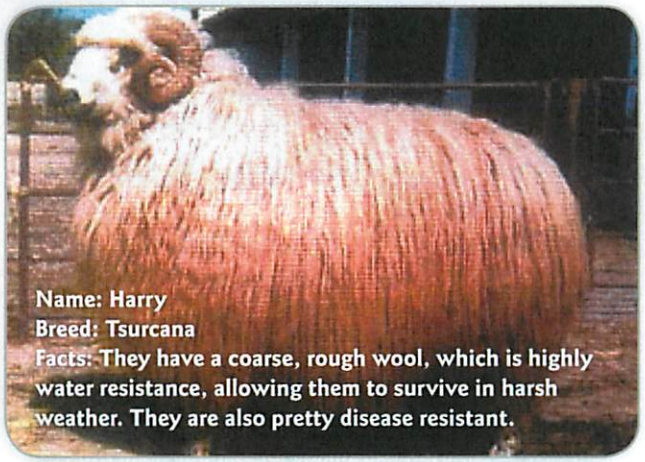
Name: Sally
Breed: Spiegel
Facts: They have dark eye spots, which looks like they are wearing spectacles. What is unique about them is that after shearing, the wool remains white even over dark spots.



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.

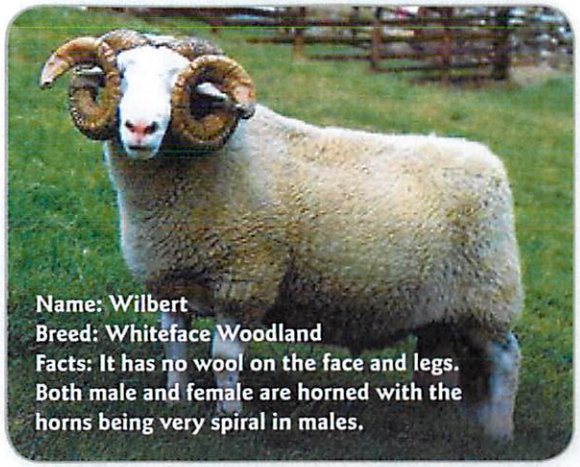


Name: Harry
Breed: Tsurcana
Facts: They have a coarse, rough wool, which is highly water resistance, allowing them to survive in harsh weather. They are also pretty disease resistant.

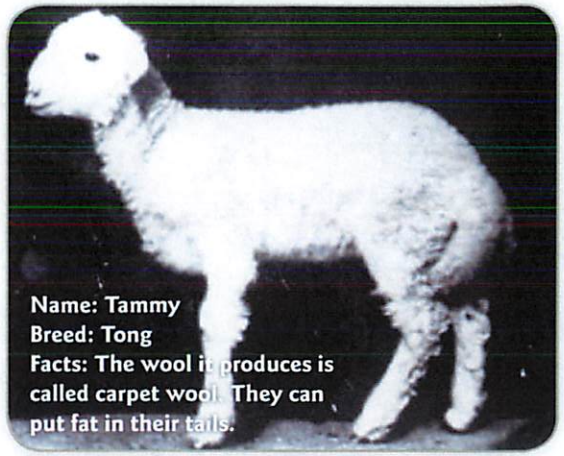
Name: Vicky
Breed: Van Rooy
Facts: This is a white sheep that has bristly hair. There is wool between the hairs, which gives it protection against the cold.

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

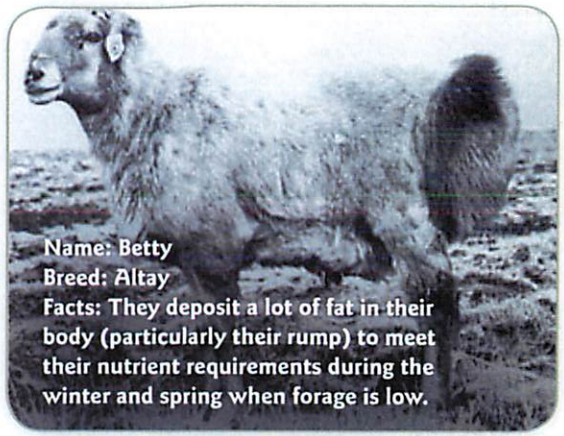
Sheep Cards, continued



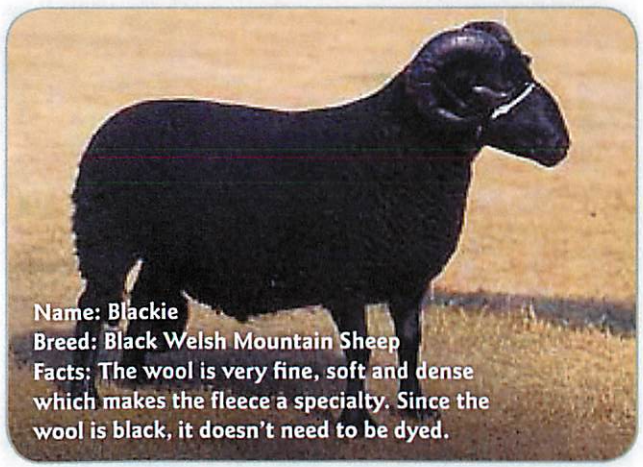
Name: Wilbert
Breed: Whiteface Woodland
Facts: It has no wool on the face and legs. Both male and female are horned with the horns being very spiral in males.



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

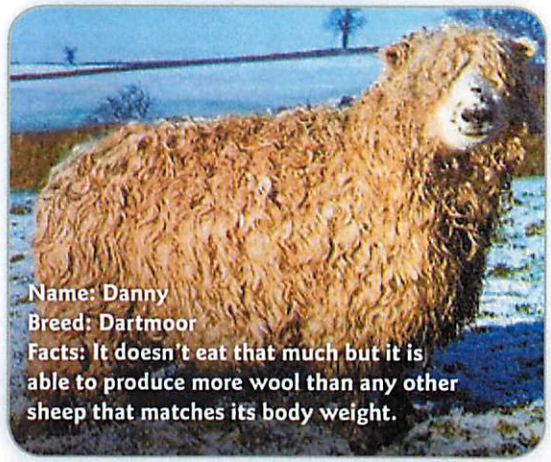


Name: Betty
Breed: Altay
Facts: They deposit a lot of fat in their body (particularly their rump) to meet their nutrient requirements during the winter and spring when forage is low.



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.

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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*

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.	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.	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.
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.	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.	The vet gives you the proper medication and you follow all of his advice perfectly so your sheep is cured quickly.
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.	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.	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.

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?

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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 diseases 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

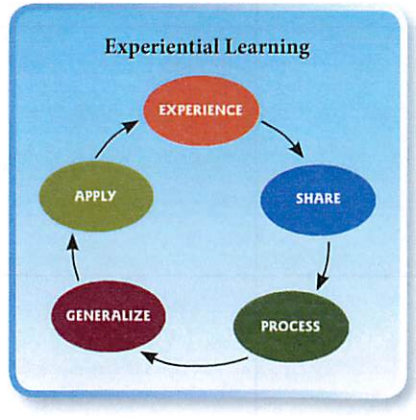
Day	Activity	Behavior	Housing	Other (specify):	Other:	Other:
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						

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.
- **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 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.

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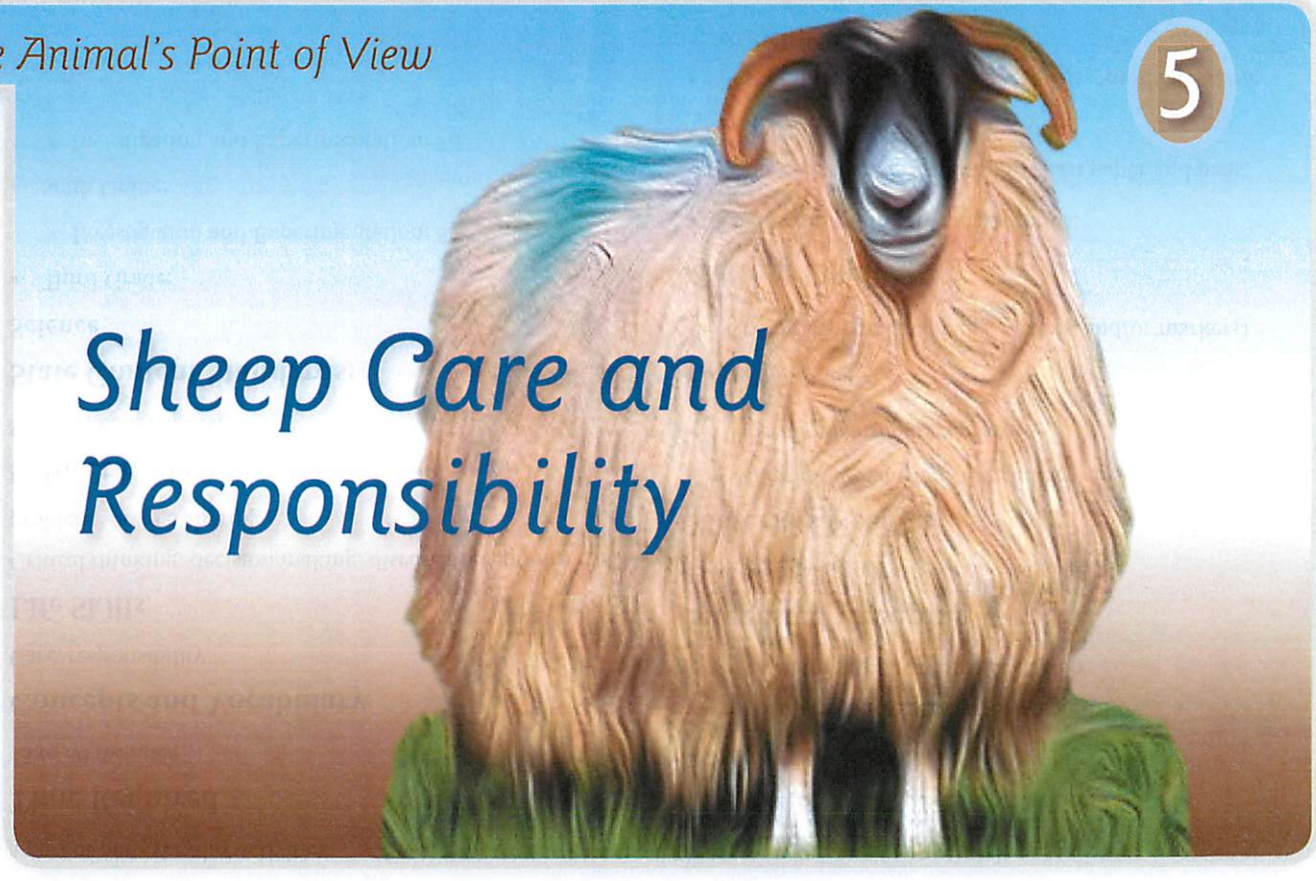
UC PEER REVIEWED

SHEEP: *From the Animal's Point of View*

5

Sheep Care and Responsibility



Subject Overview and Background Information

There is a lot to know about raising and caring for sheep. Having a sheep is a big responsibility and as its keeper you need to understand its behavior, housing requirements, nutritional needs, and certain aspects of its health care in order to prevent injury and disease. This essential knowledge is the foundation to becoming a successful sheep caretaker. By applying this knowledge carefully and thoughtfully, a caretaker can properly maintain the health and well-being of a sheep and ensure a high quality of life for the animal.

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UCDAVIS VETERINARY MEDICINE

Concepts and Vocabulary

- **Care:** Having concern for someone or something, which leads to tending or overseeing that person or thing.
- **Responsibility:** Being accountable for one's actions or behaviors.

Life Skills

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

Subject Links

Science, Language Arts

Overview of Activity

The Sheep Responsibility activity in this unit gives youth several scenarios that involve issues relating to the care and raising of sheep. Youth will need to use the knowledge they have gained from the previous four sheep units as they read the scenarios and answer questions concerning the proper care of sheep. Youth will discuss, reflect upon, and suggest alternative solutions for each scenario.

SHEEP RESPONSIBILITY

Background Information

Owning an animal is an important responsibility. Domesticated animals need us to provide for their needs, such as a safe and comfortable home, healthy and nutritious food, and proper veterinary care. When we make the commitment to care for one or more animals, these responsibilities become a part of our everyday activities.

Time Required

45 to 60 minutes

Concepts and Vocabulary

Care, responsibility

Life Skills

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

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:
  - » Listening and Speaking Strategies: 1.7, 1.8
- Fifth Grade:
  - » Reading Comprehension: 2.4
  - » Listening and Speaking Strategies: 1.5
- Sixth Grade:
  - » Listening and Speaking Strategies: 1.5
  - » Speaking Applications: 2.5a, 2.5b

Suggested Grouping

Pairs or small groups

Materials Needed

(= Materials provided in curriculum)*

- * *Sheep Responsibility Stories*
- Flip chart paper
- Writing instruments (pens, pencils, and/or markers)

Getting Ready

- Divide the youth into small groups.
- Make sure there is enough flip chart paper and pens, pencils, or markers for each group.
- Make enough copies of the *Sheep Responsibility Stories* so each group gets a story.

Opening Questions

Have the youth work in pairs or small groups. Pose and discuss the following questions:

1. **What does being a "responsible animal owner" mean to you?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
2. **What types of things do you think a responsible owner should do for his or her animal?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
3. **What types of needs do you think sheep have, and how do you think an owner can best meet these needs?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
4. **Describe some situations where you think it might be hard for an owner to keep up with sheep care responsibilities. What might be the consequences of this?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

Procedure (Experiencing)

Inform the youth that they are going to review a story about youth who are in situations where they have to make decisions about how they are going to care for their sheep.

Give each group one of the *Sheep Responsibility Stories.* Encourage them to discuss their answers to the follow-up questions together and record their ideas on paper. Once the youth have discussed their stories, they will present their ideas to the group as a whole.

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. **Can you think of an example where you have had to make a difficult decision about caring for your sheep? Please describe the situation.**
2. **What are some ways that youth can learn to make the most responsible decisions about caring for their sheep?**
3. **Have you ever known someone who was not a responsible animal owner? What caused you to be concerned about the way that they cared for their animal? What, if anything, did you do in that situation?**

Concepts and Terms

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

Concept Application

- **If youth have a project animal or pets,** have them review how they take care of their animals. Would they deem the care they are providing to be sufficient and appropriate for the needs of the animal? If not, what needs to be changed to provide the animal with sufficient and appropriate care?
- **If youth do not have a project animal or pets,** have them observe and review a friend's animal. Make sure to have them ask permission from the owner before observing the animal. Would they deem the care to be sufficient for the needs of the animal? If not, what needs to be changed to provide them with sufficient care?

Reference

Schoenian, S. 2006. Sheep diseases A – Z. Sheep101 infosite. www.sheep101.info/201/diseasesa-z.html#rabies

SHEEP RESPONSIBILITY STORIES

What Should Steve Do?

Steve just bought a 45-day-old Suffolk lamb named Fuzzy to show at a local exhibition. The exhibition was a few months away, and Steve wanted to make sure both he and Fuzzy were ready for the exhibition, so he decided to join a sheep club to help him prepare for the exhibition. The club met once a week and gave tips on how to raise and show sheep.

Before bringing Fuzzy home, Steve decided to build an enclosure for Fuzzy in his backyard. The enclosure ended up being 15 square feet in size, with a small roofed area as a protection from bad weather. Steve thought this enclosure would be large enough to fit Fuzzy. Since the enclosure is outside, Steve figured that he didn't need to clean out the enclosure.

Steve fed Fuzzy mainly grain until Fuzzy was about four months old. At that age, Steve decided to switch the feed to mainly hay and silage. The sheep club emphasized the importance of observing your sheep every day and keeping track of its behavior. So every day, while caring for Fuzzy, Steve would observe his sheep and jot down notes about its behaviors. One day while observing Fuzzy's respiration rate, Steve noticed that the rate was a little higher than normal. Steve also noticed that Fuzzy seemed to be hypersensitive to slight changes in the environment, such as noise. Taking a closer look at Fuzzy, Steve also noticed that Fuzzy had raw patches on its wool and was very restless.

The exhibition was coming up in a few weeks, and Steve was really excited. Steve wanted to practice showing his sheep, but when he went to get Fuzzy Steve noticed that the sheep was limping. It looked like Fuzzy was avoiding being on his feet. Taking a closer look, Steve noticed a strong odor coming from Fuzzy. Steve noticed that Fuzzy wasn't eating, so he decided to feed Fuzzy grain. Grain was Fuzzy's favorite food and Steve hoped this would entice Fuzzy to eat. The next day, Steve noticed that Fuzzy had eaten a lot of the grain, but continued to limp. Steve also noticed that Fuzzy's stomach looked larger than normal. Fuzzy also started to "baa" as if in pain. Steve was getting really worried about Fuzzy and wasn't sure what to do. He wanted to call his volunteer leader but was afraid that his leader would take him and Fuzzy out of the exhibition.

Questions for Discussion

1. What, if anything, do you think is wrong with Fuzzy?
2. What do you think could have caused the problem?
3. Is Steve meeting his responsibilities as a sheep owner? Why or why not?
4. Whom could Steve talk to for help with this situation?
5. If you were in Steve's situation, what would you do and why?
6. What could Steve have done to avoid this situation?

What Should Jessica Do?

An 8-year old girl named Jessica recently joined a sheep club and just got her first lamb. She picked a Dorset lamb and named her Dolly. Jessica's parents told her that they would pay for all of Dolly's expenses if Jessica took full responsibility for caring for her new lamb. Jessica was really excited and took extremely good care of Dolly. Jessica would wake up early in the morning to feed Dolly, give her clean water, and clean her shed. After coming back from school, Jessica would take Dolly out and play with her.

Every month, Jessica would attend the sheep club's meetings. The meetings' focuses were to prepare youth for fairs and shows and to give advice on how to win at a fair. Jessica really wanted to take Dolly to a fair but she had to wait a few more months before Dolly would be allowed to enter. So Jessica took all the information she learned from the meetings and did all she could to prepare Dolly to be shown at a fair.

A few months passed and Dolly was finally ready to enter a fair. The day of the fair, Jessica was really excited. There were a lot of people at the fair. The fair had to open up an unused barn to be able to house all the animals. When entering the barn, Jessica felt the cold surrounding air and smelled the dampness of the barn. Jessica had to house Dolly in a pen with other sheep. There were a lot of feces on the floor and some in the water and feed but Jessica didn't have time to clean it up because she had to go to check in.

After a long day at the fair, Dolly won first place in her category! Jessica was really excited and proud of Dolly. From then on Jessica wanted to enter as many fairs and shows as she could. She would enter Dolly in one show after the other. In just one month, Dolly was entered in 6 different shows! And at each show, Jessica always got a ribbon.

The big fair of the year was coming up, with a grand prize for the winner. A couple of days after going to the pre-qualifying fair and before going to the finals, Jessica noticed that Dolly started having diarrhea. As the days passed, the diarrhea turned from watery to bloody with mucous surrounding it. She also noticed that Dolly wasn't eating as much and was losing weight. The day of the show, as Jessica was loading Dolly onto the trailer, the sheep collapsed on the floor and wouldn't move. When Jessica's parents came out to see what was wrong, they said that Dolly didn't look well and that she shouldn't go to the fair. Jessica thought Dolly had a really good chance of winning, but she is now torn about whether she should take Dolly to the fair or not. What should she do?

Questions for Discussion

1. What, if anything, do you think is wrong with Dolly?
2. What do you think could have caused the problem?
3. Is Jessica meeting her responsibilities as a sheep owner? Why or why not?
4. Whom could Jessica talk to for help with her decision?
5. If you were in Jessica's situation, what would you do and why?
6. What could Jessica have done to avoid this situation?

What Should Joey Do?

Joey just got a sheep for his 12th birthday. The sheep he got was a 2-year-old Hampshire, and he named it Toby. Joey was really excited because he had always wanted a sheep. Because Joey didn't know too much about sheep, he decided to join an online sheep group to communicate with other sheep owners. Joey would go onto the website everyday and post messages on how to best care for his sheep. Many people replied, and he would take the advice he got from others and apply it to his sheep.

Joey learned a lot from the online group and took really good care of Toby. Before going to school, Joey would let Toby out while he would clean his stall. Joey always made sure there was enough water and food for Toby. Then he would give Toby a good rubdown before heading off to school. Occasionally when Toby was especially good, Joey would feed Toby grain, his favorite food.

Joey just found out that he had a family emergency and had to travel to visit his grandparents across the country. Joey was really stressed because he didn't know who could take care of Toby. Finally, Joey was able to convince his neighbors to watch over Toby while he was gone. Joey gave them directions on what to do to take care of Toby. He needed them to get fresh food and water for Toby every day. Toby's stall needed to be cleaned every day and Toby should be combed every day.

Joey's neighbors were very busy and didn't have much time to take care of Toby. They would come to check up on Toby every other day. They would change his food and water every time they came. The stall didn't look too dirty so they didn't bother cleaning it. They didn't have time to comb Toby but they figured Joey would be back soon and could do it when he got home. One day, they realized they had run out of food for Toby. They searched around the barn and found food in the corner of the barn. So they gave this food to Toby for the remainder of the time they watched him.

Joey was gone for about two weeks. All the time he was gone, Joey would constantly think about Toby and wonder how he was doing. When he finally got home, he was shocked to see Toby. First, the pen was filthy! There was manure everywhere and it was obvious that no one had cleaned it. Toby's wool was matted and full of feces and food. Looking at the food bowl, he saw that the food in it was moldy. There was diarrhea and vomit around the stall. When Joey approached Toby, he was sitting on his side and seemed to be in a lot of pain. When Joey touched Toby's stomach, he yelped. Joey is very upset with his neighbors and doesn't know what is wrong with Toby. What should he do?

Questions for Discussion

1. What, if anything, do you think is wrong with Toby?
2. What do you think could have caused the problems?
3. Is Joey meeting his responsibilities as a sheep owner? Why or why not?
4. Whom could Joey talk to for help with this situation?
5. If you were in Joey's situation, what would you do and why?
6. What could Joey have done to avoid this situation?

What Should Violet Do?

Violet had always wanted a sheep, ever since she was a little girl. She would beg her parents for one every Christmas. But her parents said that she could only get a sheep if she had the money to take care of it. Violet started doing household chores and helping out her neighbors to earn money. She saved up her money for one year. Violet's parents saw her determination and decided to give her a lamb for Christmas.

When Christmas came, Violet was so excited to have gotten a lamb! She got a Southdown and named it Henry. Violet was very good about taking care of Henry every day. Before getting Henry, Violet had already read many books about sheep and how to properly care for them. While taking care of Henry, Violet continued to do chores to earn money to pay for Henry's expenses, which included the purchase of food and water bowls, food, and toys and the construction and maintenance of a shelter.

Violet's favorite band was coming into town, and she really wanted to go to their concert because all of her friends were going. She had saved up money for Henry, but decided to use some of that money to buy a concert ticket. She figured she would be able to earn more money later on.

The next day, Violet set up a play date with Henry and a friend's lamb named Alfred. Henry and Alfred seemed to get along very well and had a great time playing with each other. Violet noticed that Alfred had small scabs around his mouth, but she didn't think much of it.

A few days later, Violet noticed the same scabs around Henry's mouth and eyes. She also saw that Henry's throat area looked larger than normal. Violet also started to notice the same scabs around her own arm. Concerned, Violet took Henry to the vet. The vet said that Henry had a goiter due to the lack of iodine in his diet. He also had sore mouth, which is caused by a virus and is very contagious between animals and humans. The veterinarian told Violet how much it would cost to get Henry treated. Unfortunately, Violet didn't have enough money to treat Henry because she used most of it for the concert ticket. What should Violet do?

Questions for Discussion

1. What should Violet do and why?
2. What do you think could have caused the problems?
3. Is Violet meeting her responsibilities as a sheep owner? Why or why not?
4. What could Violet have done earlier to prevent these problems?
5. If you were in Violet's situation, what would you do and why?
6. What could Violet have done to avoid this situation?

What Should Matt Do?

Matt wants to train his dog Billy to herd sheep. Matt had some money saved up from his allowance, and with the help of his parents he got a sheep named Bob. Matt's older siblings had raised sheep before, so they gave Matt pointers on how to raise Bob. Matt fed Bob twice a day and cleaned his water every day. In the morning, he would clean Bob's stall while letting Bob roam around the field.

After school, Matt would start training Billy to herd Bob. The first day was very chaotic. Billy would not listen to Matt's commands and would chase after Bob. Bob was really stressed from running and constantly trying to get away from Billy. After 30 minutes of doing this, Matt gave up and called it a day. When Matt took Bob back to the barn, Bob just plopped on his bedding and fell fast asleep.

Matt was determined to train Billy, so he decided to practice with Billy and Bob every day for at least 30 minutes. One day Matt found out that there was a dog herding contest coming in a few months, and he wanted Billy to participate in it. Slowly, Billy made progress with his herding skills, but Bob still seemed stress every time they went out.

Billy had really progressed with his training and it looked like he would be ready for the herding competition. One day while they were training, Matt noticed an unfamiliar dog on the outskirts of the field. All of a sudden, the dog started running after Bob. Scared, Bob started to run in the other direction. The dog took a swipe at Bob but Billy was able to tackle the dog before it could do any more damage. Billy and the other dog had a little bit of a fight before Matt was able to scare the other dog away. Looking at Billy and Bob, Matt noticed an open wound on Bob's leg and a couple of scratches on Billy. Matt cleaned them both up and let them rest for the remainder of the evening.

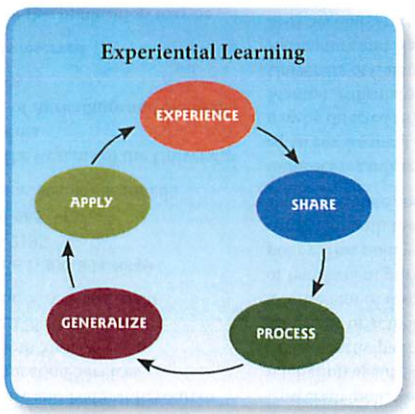
In the morning, Matt went to check up on Billy and Bob. When Matt entered Bob's stall, he noticed Bob vigorously pulling out his wool. Billy seemed fine but Matt was still worried about them. Matt isn't sure if he should go to the vet or not. What should Matt do?

Questions for Discussion

1. What, if anything, do you think is wrong with Bob? What about Billy?
2. What do you think could have caused the problem?
3. Is Matt meeting his responsibilities as a sheep and dog owner? Why or why not?
4. Whom could Matt talk to for help with this situation?
5. If you were in Matt's situation, what would you do and why?
6. What could Matt have done to avoid this situation?

Appendix

The activities in this curriculum are 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 5-step learning cycle is most commonly used. These five steps—Exploration, 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 5-step learning cycle, please visit the University of California's Science, Technology, 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:** 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.
- **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 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.

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