



Sheep to Sweater

Suggested Grade Level: 3-5

Time: 1 to 8 weeks, 30-minute class periods.

Subject: Science, English Language Arts, Informational Reading, Writing, Research, Speaking and Listening, Visual Arts, Fiber and Textile Arts, Arts and Crafts, Agriculture, Sheep, Textiles

Overview: From cozy sweaters to warm blankets, many everyday items begin with sheep! In this lesson, students will discover how wool goes from the sheep's back to the clothes we wear. Students will read "Kids Connection: Sheep," investigate raw wool, and practice spinning wool into yarn using simple tools. To demonstrate what they've learned, students will complete and present a creative project on sheep.

Objectives:

1. Explain how wool is collected from sheep, processed, and transformed into yarn.
2. Describe the texture, smell, and properties of wool.
3. Apply spinning techniques using drop spindles or metal hooks to produce yarn.
4. Create individualized projects that integrate factual information from Kids Connection: Sheep.

Background Information:

Sheep are among the most crucial commodities in human society. It's understood that our efforts to domesticate and selectively breed sheep began 10 thousand years ago, around 6000 BC. By the Bronze Age, humans in Western Asia had created a type of sheep similar to the ones we see today (International). However, commercial sheep farms in the United States tend to be small. There are only 101,387 sheep farms in the entire United States. The United States is not even in the top 10 sheep-producing countries. Most of the lamb and mutton consumed in the United States is imported from countries such as China, Australia, India, Nigeria, Sudan, Iran, the United Kingdom, and Turkey.

Large sheep operations, primarily located in Texas, California, and Colorado, own 80% of the sheep in our country. Small producers (owning less than 100 sheep) are more common. Profiting from sheep is difficult – successful sheep operations need at least five hundred ewes. That's five times more sheep than most shepherds have! Most people raising sheep typically keep them as pets or a hobby. Sheep are small ruminant livestock, meaning they can digest the plant material that humans cannot. Often, sheep are referred to as "lawnmowers" because they tend to eat weeds and tall grasses. This

makes them appealing to hobbyists and small landowners. Those who profit from their sheep operations usually earn from lamb meat and wool sales. Dairy sheep farmers can also profit from selling sheep milk or dairy products. Others are raised for biomedical research purposes.

To harvest wool, farmers must shear their sheep. This doesn't harm the sheep; instead, it reduces stress on the body due to weight and heat. A sheep's coat grows continuously. If they are not shorn at least once a year, they become uncomfortable and their wool mats. Most sheep are shorn using electric shears or a shearing machine, but some are still shorn with scissors. This can be a laborious process for the handler, and it requires some skill (Schoenian).

Processing wool is a several-step procedure. First, you need to shear your sheep. This leaves you with a fleece, called "grease wool," due to the amount of oil and lanolin in the wool. Next, the fleece is skirting. During this process, farmers remove the thick ends of the coat, known as the "tags." The fleece is then processed into different parts: fine, coarse, short, and long. After sorting, the grease wool is washed with soap and water or an acid bath (scouring). This process often results in only about half of the original fleece weight remaining. Farmers run the clean wool through a "picker", which opens the locks in the wool and blows it into a compartment. The picker adds spinning oil, which helps the fibers stick and glide together. Then, the wool is "carded" using combs. This is done using hand cards, which resemble dog brushes, or machine-driven drums covered in "card cloth". The next step is roving. The carded wool is divided into small strips called pencil rovings and placed on the spinning frame to make yarn. The roving is taken off the machine early for handspinners or transferred to a spinning frame. The spinning frame twists the roving and turns it into one-ply yarn. The one-ply yarn can be twisted together to make two or more plies of yarn (Blackberry). Finally, the yarn is sent to factories to produce a wide range of products, from socks to carpets. Sheep's wool is gaining popularity due to its biodegradable, sustainable, and humane nature. It's a natural fiber, like cotton, but more environmentally friendly. Wool items are practical, too – they're insulated, moisture-wicking, and durable. This makes them especially popular for cold weather. Overall, the wool textile market was valued at USD 190.4 billion in 2023 and is expected to grow at a 7.8% rate from 2024 to 2030. This sharp increase could signal a future shift in the textile industry (Grand).

Kansas Connections:

The U.S. is not a major producer of sheep products, and within the U.S., sheep farms are located predominantly in Texas, California, and Colorado. Kansas ranks among the top 15 states for sheep and lamb numbers. In 2024, 29,000 head of market sheep were produced in our state, accounting for 2.1% of total U.S. production (National). Additionally, Kansas sheep and goats were worth an estimated \$25 million in 2023 (Kansas). Although sheep are not a popular livestock choice in Kansas, they could be an excellent option for those looking for weed management, a 4-H project, or a



useful pet. Kansas experiences a moderate climate that is suitable for all breeds of sheep. Sheep can aid in processing noxious weeds and brush. This can be beneficial for crop farmers and other landowners. One of the most significant obstacles to owning sheep is the presence of predators. To avoid attacks by coyotes and transient mountain lions, sheep owners can keep guardian animals (like dogs, llamas, and/or donkeys), net wire, or a field fence (Animal).

Materials:

- Kids Connection Magazine Sheep
<https://ksagclassroom.org/resource-center/connection/>
- A bag of wool fleece (ideally sourced from a local farmer)
- Scale
- Roving wool
- Wool spinning kit <https://agclassroomstore.com/wool-spinning/> or wooden drop spindles
- If the materials and step-by-step instructions for each project are not listed in the description, they can be obtained through the video.

Instructional Format:

1. Review background information.
2. Conduct engagement activity.
3. Lead a class discussion.
4. Conduct a demonstration for students.
5. Complete the activity.
6. (Optional) Conduct assessment exercise.

Engagement:

Begin by asking, “How do you think yarn is made? What do you think sheep are used for?” After students share, explain that wool comes from sheep and is sheared twice a year to keep them healthy. The wool is cleaned, combed, and spun into yarn. That yarn can then be turned into textiles (items made from fiber that can be woven, knitted, or pressed)—like socks, sweaters, blankets, and even carpets. Even though Kansas doesn’t produce a lot of wool, some people still keep sheep on a small scale and use their fleece for fun or to sell at farmers’ markets. Some people raise sheep for wool or meat. To help keep these animals healthy, experts called *ruminant nutritionists* study what sheep eat and make sure they get the proper nutrients.

Procedures

Discussion

1. Go over the Background Information and Kansas Connections sections to provide students with basic background knowledge on sheep in Kansas.



2. Then, read Kids Connection Sheep (resources listed below) as a class. Remind kids to remember/note any need-to-know information and vocabulary. Kids Connection Sheep: <https://ksagclassroom.org/resource-center/connection/>
3. Watch the video, Sandi Brock: How We Started Our Sheep Farm FROM SCRATCH!! (& Tips for Beginners): Vlog 161
https://www.youtube.com/watch?v=Q_nO-kulmkc
4. Watch the video, Michigan Farm Bureau: Sheep Shearing.
<https://www.youtube.com/watch?v=TznGbzADkYc>

Demonstration

1. Ask a local sheep farmer to donate a bag of wool fleece to your classroom.
2. Let the students guess how much the wool bag weighs and have the school nurse weigh it for you (or weigh it yourself with a scale).
3. Have the students experience what the raw wool looks, feels, and smells like. Allow them to inspect it on their own.
4. Let them guess what that greasy stuff is on the wool. Explain that the greasy stuff is lanolin (or wool wax) and is used in almost all cosmetics, shampoos, conditioners, and hand lotions. Have students thoroughly wash their hands with soap and water afterwards.
5. Explain to your students that they will be spinning some wool today. For this activity, you can use roving wool and metal hooks or wooden drop spindles (listed in the Materials section).
6. If you use the metal hooks, follow the kit instructions closely with your class to make bracelets. Let students practice working with a partner. If you use wooden drop spindles, watch WEBS - America's Yarn Store: How to Spin on a Schacht Drop Spindle https://www.youtube.com/watch?v=FrZcr7_qXFY with the class. Pause the video as needed so students can practice using a drop spindle.

Activity

1. Let students choose from (or assign) one of these individualized projects, OR allow students to create their own (projects must align with Sheep to Sweater). Students can find facts about sheep found in Kids Connection Sheep to use in their projects. Ideas:
 - Create a sheep farm out of Legos and write about it: Students will build a sheep farm out of Legos and write about what they built. Then, they will explain how their sheep operation will work using information from their magazines.
 - Write a song: Students will write a song using sheep facts and put it to music. <https://musiclab.chromeexperiments.com/Song-Maker>, https://www.classicsforkids.com/games/compose_your_own_music/, or GarageBand.
 - Create a coding program on Scratch (<https://scratch.mit.edu/>). The program must be related to sheep, and students must present facts about sheep in some way.
 - Write a book about sheep.

- Finger weaving <https://www.undercoverclassroom.com/finger-weaving/>: Students can weave a project using wool yarn.
 - Knitting with needles: Students can use 10 mm dowel rods and cut them into 12-inch lengths to use as knitting needles. Do not sharpen the ends.
<https://www.youtube.com/watch?v=1vm6oaYzHyA>
 - Knitting on a circular loom: Students can knit wool yarn using a circular loom. Students will need a loom, yarn (not necessarily bulky), a tool, or a smooth finishing nail. They can make their own out of large toilet paper rolls. Large toilet paper rolls have a diameter of 3 ¼ inches and require 13 popsicle sticks, equally spaced and glued or taped with duct tape. Regular toilet paper rolls can be used with five popsicle sticks, equally spaced and attached. If using a toilet paper roll, students can knit using their fingers and will NOT need a tool or finishing nail. Students may also buy round plastic looms. All circular looms, including toilet paper tube looms, use the same directions for weaving. When using toilet paper looms, students can create a long scarf by continuing to add until they reach the desired length. Cut the yarn attached to the skein about 12 inches in length to get the project off the loom. Take one loop off the loom and run the yarn through it. Continue doing this all the way around. When finished, pull the yarn to make it tight and tie a few knots to prevent the project from unraveling. Pull on the yarn to close the hole when you have gone through the last loop. If you want the hole open, tie the yarn to the previous loop without pulling. Students can make hats for stuffed animals, scarves, headbands, or koozies with a toilet paper roll.
Jocelyn C: How To: Cast on and knit using a circular loom:
<https://www.youtube.com/watch?v=NVJBi6MS0Jo>.
The Sweetest Journey: How to Knit a Hat Using A Round Loom | Easy Pattern for Beginners | The Sweetest Journey:
<https://www.youtube.com/watch?v=SP4Rcvk3j3>
The Met: #MetKids–Weave on a Mini Loom:
https://www.youtube.com/watch?v=AWLLy-Um7_0
Follow the step-by-step instructions included in the videos or online tutorials.
2. Have your students present their projects in a video to you or their classmates. Ensure that they connect their projects to this lesson by incorporating sheep facts from the Kids Connection Sheep magazine.

Vocabulary:

- **Fleece:** a thick coat covering of wool
- **Wool:** soft, curly hair that grows on sheep
- **Yarn:** long, continuous spun fiber
- **Ruminant:** hooved mammals with four-chambered stomachs that allow them to digest plant matter.
- **Lanolin:** oil produced in the sebaceous glands of wool-bearing sheep
- **Textiles:** items made from woven fiber
- **Shear:** cut the wool off a sheep

Kansas Standards:

Next Generation Science Standards

3rd Grade

Biological Evolution: Unity and Diversity

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

4th Grade

From Molecules to Organisms; Structures and Processes

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Language Arts

3rd Grade

Reading: Informational

Key Ideas and Details

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea.

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts or steps in technical procedures in a text, using language that pertains to time, sequence and cause/effect.

Integration of Knowledge and Ideas

RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why and how key events occur).

Writing

W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

W.3.2.b Develop the topic with facts, definitions and details.

Production and Distribution of Writing

W.3.4 With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose.

Research to Build and Present Knowledge

W.3.7 Conduct short research projects that build knowledge about a topic.

W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

Speaking and Listening

Comprehension and Collaboration

SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse on third grade topics and texts, building on others' ideas and expressing their own clearly.

SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively and orally.

SL.3.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.

Presentation of Knowledge and Ideas

SL.3.4 Report on a topic or text, tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

SL.3.6 Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.



4th Grade

Reading: Informational

Key Ideas and Details

RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.4.2 Determine the main idea of a text and explain how it is supported by key details; summarize the text.

RI.4.3 Explain events, procedures, ideas or concepts in a historical, scientific or technical text, including what happened and why, based on specific information in the text.

Integration of Knowledge and Ideas

RI.4.7 Interpret information presented visually, orally or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

Writing

W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Production and Distribution of Writing

W.4.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose and audience.

Research to Build and Present Knowledge

W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information and provide a list of sources.

W.4.9 Draw evidence from literary or informational texts to support analysis, reflection and research.

Speaking and Listening

Comprehension and Collaboration

SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on fourth grade topics and texts, building on others' ideas and expressing their own clearly.

SL.4.2 Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively and orally.

Presentation of Knowledge and Ideas

SL.4.4 Report on a topic or text, tell a story or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

5th Grade

Reading: Foundational

Fluency

RF.5.4 Read with sufficient accuracy and fluency to support comprehension.

Reading: Informational

Key Ideas and Details

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.2 Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas or concepts in a historical, scientific or technical text based on specific information in the text.

Integration of Knowledge and Ideas

RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.



RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

Writing

W.5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Production and Distribution of Writing

W.5.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose and audience.

W.5.5 With guidance and support from adults and peers, develop and strengthen writing as needed by planning, revising, editing, rewriting or trying a new approach.

W.5.6 With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting.

Research to Build and Present Knowledge

W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work and provide a list of sources.

W.5.9 Draw evidence from literary or informational texts to support analysis, reflection and research.

Language in Writing

W.5.10 Demonstrate command of the conventions of standard English grammar and usage when writing.

W.5.11 Demonstrate command of the conventions of standard English capitalization, punctuation and spelling when writing.

Speaking and Listening

Comprehension and Collaboration

SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on fifth grade topics and texts, building on others' ideas and expressing their own clearly.

SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively and orally.

Presentation of Knowledge and Ideas

SL.5.4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Visual Arts

4th Grade

Creating

(Cr1.1.4) Brainstorm multiple approaches to a creative art or design problem.

5th Grade

Creating

(Cr1.2.5) Identify and demonstrate diverse methods of artistic investigation to choose an approach for beginning a work of art.

Connecting

(Cn11.1.5) Identify how art is used to inform or change beliefs, values, or behaviors of an individual or society.

National Agricultural Literacy Standards:



Agriculture and the Environment

- Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel (e.g., soil, water, air, plants, animals, and minerals) (T1.3-5 e)

Plants and Animals for Food, Fiber, and Energy

- Distinguish between renewable and non-renewable resources used in the production of food, feed, fuel, fiber (fabric or clothing) and shelter (T2.3-5 b)

Science, Technology, Engineering, and Math

- Compare simple tools to complex modern machines used in agricultural systems to improve efficiency and reduce labor (T4.3-5 a)

- d. Provide examples of science being applied in farming for food, clothing, and shelter products (T4.3-5 d)

Culture, Society, Economy & Geography

- Provide examples of agricultural products available, but not produced in their local area and state (T5.3-5 e)

Supporting Resources:

Bookroot Readings: Kids Book Read Aloud: From Sheep to Sweater by Robin Nelson:
<https://www.youtube.com/watch?v=Ocg-XluROI4>

Classics for Kids: https://www.classicsforkids.com/games/compose_your_own_music/

Jocelyn C: How to Cast On and Knit Using a Circular Loom:
<https://www.youtube.com/watch?v=NVJBi6MS0Jo>.

Kids Connection Magazine Sheep
<https://ksagclassroom.org/resource-center/connection/>

SciShow Kids: Wonderful Wool <https://www.youtube.com/watch?v=x0HeCL6nano&t=1s>

Scratch: <https://scratch.mit.edu/>

Sheep & Stitch: How to CAST ON Knitting for Total Beginners:
<https://www.youtube.com/watch?v=1vm6oaYzHyA>

Song Maker: <https://musiclab.chromeexperiments.com/Song-Maker>

The Met: #MetKids – Weave on a Mini Loom:
https://www.youtube.com/watch?v=AWLly-Um7_0

The Sweetest Journey: How to Knit a Hat Using a Round Loom:
<https://www.youtube.com/watch?v=SP4Rcvk3j3>



Undercover Classroom: Finger Weaving

<https://www.undercoverclassroom.com/finger-weaving/>

Career Information: Ruminant Nutritionist

Sheep nutritionists help farmers feed their sheep the right kinds of food to keep them healthy and strong. They study animal science in college and usually earn a master's or doctorate degree to learn all about how sheep grow, what they eat, and how their bodies use food. Then they use that knowledge to help farmers choose the best hay, grains, and grasses for their flocks.

Assessment: Students will reflect on their learning by sharing projects with the class, sharing in groups, or journaling.

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