Objective
Students will experiment with some of the properties of wool and compare and contrast them with synthetic fibers, practice vocabulary related to sheep and wool and create art with wool yarn.

Background
Sheep were some of the first animals to be domesticated by ancient people. They have been providing meat and clothing to people for over 10,000 years. Spinning wool into thread began about 5,000 years ago.

Wool is a special natural fiber. It always feels warm and soft. It is very good at keeping out the cold and at warming your skin. Even if your wool sweater gets wet from snow or rain, it will still keep you warm. Wool also wears well and lasts for a long time. One of the best things about wool fabric is that it is flame resistant, so it is safer to wear than some other fabrics.

One sheep produces eight to ten pounds of wool per year, enough to make a man’s suit. One pound of wool can make ten miles of yarn.

Wool straight from the sheep is called raw wool. Raw wool may go through more than 70 processing steps to assure that fabrics made from the wool are of the highest quality.

Oklahoma’s sheep and lamb inventory on January 1, 2013, was 75,000 head. Wool produced from Oklahoma sheep in 2012 was 150,000 pounds.

Wool can have a wide range of natural colors and textures, depending on which animal produced the fleece. To help consumers and spinners identify pure wool, the wool industry designed a trademark symbol. The wool symbol can only be used on products made from pure new wool. The wool symbol is used and recognized all over the world.

Wool can also be made from the hair or fur of goats, rabbits, llamas and even a semi-wild animal from the Andes mountains called a vicuna.

English Language Arts
1. Hand out student worksheets.
   — Review and discuss the meaning of the vocabulary words found at the top of the worksheet.
   — Ask students for general definitions.
   — Read and discuss background.
   — Students will read the information on the worksheet silently or
read it together as a class.
—Students will underline the vocabulary words found in the reading.

2. Students will use their own words and as many vocabulary words as possible to tell what they have learned about sheep.

3. Students will use vocabulary words to create their own questions about sheep.

4. Bring a skein of yarn and unwind it as you ask students why an interesting, usually long, story is sometimes called a “yarn.” Discuss other sayings related to sheep. (Counting sheep to go to sleep, etc.)
—Students will brainstorm to make a list of other sayings related to sheep. Discuss possible meanings for each saying. Students will use online or library resources to find the meanings.

Science
1. Bring gloves made from wool and gloves made from synthetic fiber (acrylic or polyester) to class.
—Each student will put a wool glove on one hand and a nonwool glove on the other hand.
—Sprinkle two tablespoons of water over the palm of each glove.
—Students will rub their hands together and wait five minutes.
—Students will predict which hand will feel warmer after five minutes.
—After five minutes, ask students which hand feels warmer? Which one feels cooler?
—Students will remove both gloves and place them on separate napkins or paper towels with the wet side of the glove down, against the paper.
—After a few seconds, students will decide which glove still has more water on the surface. The wool glove should have more, since wool will not lose as much water as manmade fiber.

2. Bring several items of clothing to class.
—Students will use the experiment above to determine if they are made from wool or a manmade fiber.

3. Conduct the Ice Cube Test.
—Give each student two tightly-sealed plastic bags, each containing two or three ice cubes.
—Each student will put a wool glove on one hand and a nonwool glove on the other hand and hold one plastic bag filled with ice cubes in each hand.
—Lead a discussion based on the following: Which cubes melted first? Which hand felt cold first? Which glove would you want to wear to play in the snow?

Visual Art
1. Acquire enough clean, combed wool to provide each student with a handful. Show students how they can spin their own wool yarn, using only their fingers.

Materials
wool gloves

gloves from synthetic fibers

ice cubes in plastic bags

samples of wool clothing and other items made from wool

Wool Day
1. Designate a “wool” day. Encourage students to wear or bring something made of wool to school.
2. Invite a sheep producer to the classroom to explain sheep and wool production.
3. Invite a wool spinner to class to demonstrate spinning wool with a spinning wheel.
—Hold a clean piece of wool in your left hand.
—Pull out a strip of the wool about one inch wide and thin enough so you can see through the fibers.
—Roll the strip of wool between your thumb and index finger.
—Roll the strip only in one direction. never roll it back and forth.
—Keep rolling the strip of wool until the fibers wind around each other and form a firm thread of yarn.
—Wind the yarn around the first two fingers of your right hand.
—Keep drawing out strips of wool, twisting them tight.
—Wind the yarn on your fingers.
—Soon there will be a small ball of “homespun” yarn.

2. Students will make felt balls from wool, as follows.
—In one hand take a handful of fleece.
—Submerge the hand, with the fleece, in a pan of warm, soapy water.
—Make sure all the fleece gets wet.
—Using two hands, form the felt ball as though you were making a snowball.
—You may have to add 1-2 drops of liquid soap.
—Pass the ball from hand to hand, squeezing very gently.
—The ball will continue to get smaller and firmer the longer you work it.
—Add more fleece if you want a larger ball.
—When it is firm, rinse out the soap and let dry.
—Make two or three balls, and you are ready for juggling.
—Invite a juggler to class to teach students how to juggle their felt balls.
—Smaller balls can be strung on strands of yarn to make bracelets.

3. Students will make felted soap, following the directions included with this lesson.

Extra Reading

Vocabulary

**bale**—a large bundle of goods tightly tied for storing or shipping

**breed**—a group of animals or plants usually found only under human care and different from related kinds

**by-product**—a product or result produced in addition to the main product or result

**ewe**—a female of the sheep or a related animal especially when mature

**fleece**—the woolly coat of an animal

**flock**—a group of animals (as birds or sheep) assembled or herded together

**gland**—a cell or group of cells that makes and secretes a product (as saliva, sweat, bile, or shell) for further use in or for elimination from the plant or animal body

**lamb**—a young sheep especially less than one year old or without permanent teeth

**lanolin**—the fatty coating of sheep’s wool especially when purified for use in ointments and cosmetics

**ram**—a male sheep

**shear**—to cut the hair or wool from

**wool**—the soft wavy or curly usually thick undercoat of various mammals and especially the sheep

**yarn**—a natural or manufactured fiber (as cotton, wool, or rayon) formed as a continuous strand for use in knitting or weaving
Fleece as White as Snow?

Read the story below, and underline the 18 vocabulary words. Some words may appear more than once. Only underline the one that appears first.

Vocabulary Words

<table>
<thead>
<tr>
<th>ewe</th>
<th>wool</th>
<th>fleece</th>
<th>Hampshire</th>
<th>ram</th>
<th>Suffolk</th>
<th>flock</th>
</tr>
</thead>
<tbody>
<tr>
<td>bales</td>
<td>breeds</td>
<td>lambs</td>
<td>shearing</td>
<td>lanolin</td>
<td>glands</td>
<td>yarns</td>
</tr>
<tr>
<td>Dorset</td>
<td>stearin</td>
<td>by-product</td>
<td>wool</td>
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</tbody>
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For thousands of years people have depended on sheep to provide them with milk, meat and clothing. Columbus was the first to bring sheep to the New World. Spanish settlers brought large flocks of sheep when they first made their homes in what is now our state of New Mexico.

A female sheep is called a ewe. The male is called a ram. Baby sheep are called lambs. Sheep grow fluffy wool all over their bodies. This coat is called a fleece. The fleece keeps the sheep warm and dry. Sheep need their hair cut about once a year. This is called “shearing.” It takes about five minutes to shear a sheep. A good sheep shearer can shear about 150 sheep in a day.

After the fleece is sheared, it is weighed and bundled up in bales. Then it is taken to a factory to be sorted and washed. The Mother Goose rhyme tells us Mary’s lamb had “fleece as white as snow,” but fleece is never that white. Oil in the fleece causes dirt to cling to the coat. For a lamb to look really clean, it would have to be bathed every day.

The oil in the fleece is called “lanolin.” Lanolin comes from small oil glands found under the sheep’s skin. Lanolin glands are similar to the sweat glands you have in your body. Lanolin is used in makeup and lotions. It can also be used to waterproof shoes. We get many other by-products from sheep—leather, waxes for candles, medicines and stearin, which is used to make chewing gum and candy. The inside of a baseball is made by winding 150 yarns of wool into a tight ball. Items that are made from wool are labeled with the wool symbol.

There are 45 different breeds of sheep in the United States and about 914 different breeds of sheep in the world. Some of the more popular breeds of sheep are Suffolk, Hampshire and Dorset.

Complete this sentence: The wool symbol means

Oklahoma Ag in the Classroom is a program of the Oklahoma Cooperative Extension Service, the Oklahoma Department of Agriculture, Food and Forestry and the Oklahoma State Department of Education.
Felted Soap

Materials needed:
- bar soap
- wool roving
- nylon stocking
- cold water
- hot water

A wool roving is a slightly twisted roll or strand of wool fibers. After the wool is sheared from the sheep, it is washed and then combed to separate the fibers. The wool is then twisted into rovings to make it easier to handle.

1. Thin wool roving out until you can almost see through it.
2. Place the bar of soap in the center.
3. Wrap the soap in the thinned wool roving. Tuck in at ends.
4. Lightly cover the soap with wool. (If you have too much wool it will bunch off the soap. If you have too little, you can see the soap through the wool.)
5. Add two or three colors with little strips of wool roving in different colors. Stretch and thin wool roving until it covers the bar of soap.
6. Drizzle a little hot water on the soap and press the wool very gently together.
7. Insert the bar of soap wrapped in wool roving into the nylon stocking. The nylon helps hold the wool into place until you have finished the felting process.
8. Sprinkle a little more cool water until soap starts to foam up inside nylon.
9. Gently rub the wool onto the soap, alternating hot and cool water.
10. After a few minutes the soap will lather, and the wool will start to contract (or felt) onto the soap. At this point you will be lathering the soap up in your hands like you were washing them.
11. Keep rubbing the wool until it tightens around the soap.
12. It may take 10-12 minutes, but eventually the wool will tighten and form a casing around the soap.
13. Remove the soap carefully from the nylon.
14. Wipe off the excess lather with a paper towel.
15. Set out to dry. When dry, it is ready to use. Tie with a pretty bow and give it as a gift or enjoy for yourself in the bath or shower.