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Level: Grades 3-5

Subjects: English Language Arts, Science, Social Studies, Visual & Performing Arts

Skills: Observing, recording, following directions, cooperation, writing, describing, listening reading, communicating, developing vocabulary

Lesson 2: Did the Vikings Visit Maine?

Activity: Using a Drop Spindle

Mary Dickinson Bird, PhD, author - Created through the MAITC Ag Literacy Grant made possible by the Ag License Plate



Sheep's wool is one of the easiest kinds of animal hair to spin into yarn. This is because each fiber is covered with many, many tiny scales. As you twist several fibers at once, the scales get caught onto each other, and hold the yarn together. You can slowly draw your hands farther apart as you twist the fibers, making the yarn longer, but the fibers will still cling together. Be sure to hold the fibers gently and not rub or squeeze the wool, because those tiny, clingy scales can also make fibers tangle and get matted easily.

The most important tool that you will use for this activity, the *drop spindle*, is almost identical to the spindles used by Viking women to spin wool into yarn. The shaft (the stick) and whorl (the round piece) of this spindle are both made of wood. Some ancient spindles were made entirely of wood like this one. Others had whorls made of stone, bone, clay or even deer antlers. The drop spindle in this kit has a small metal hook added to make spinning easier. Many spinners in America and other nations still use a drop spindle like this one to make their yarn.

The fiber you will use for this activity is just one small section of a sheep's fleece. For many centuries, sheep herders around the world have allowed their sheep to roam freely much of the time, gathering them together each springtime to "shear" them – to give them a haircut. The sheep then amble away to enjoy a cooling breeze, while the sheep herder collects the fleeces that will soon be made into yarn. A fleece from one big sheep may weigh more than 10 pounds and contain enough fiber to make yarn for a sweater, a hat, mittens, socks, and maybe more!

To prepare the wool for spinning, it is first fluffed with the fingers or *teased* to separate the fibers and shake out any bits of dirt, twigs, or leaves. Then the wool fibers are laid across the teeth of a wire brush, and a matching brush is drawn across the surface. This process is called *carding*. It straightens the fibers and lines them up side by side so they will spin smoothly. The pair of hand carders in this kit are modern ones, with small, thin wire teeth. In Viking times, carders had much longer teeth made of iron.



After you have used the drop spindle to spin the fiber into yarn, you will want to measure how much you have made and wind it into a skein so you can use it for a project. The *niddy noddy* is a tool that does both these tasks. When you wind the finished yarn from your drop spindle onto the niddy noddy, up and down from top crosspiece to bottom one and back again, you will create a skein of yarn. Each complete loop on the niddy noddy in this kit equals 1.5 yards. Multiplying the number of loops by 1.5 will tell you how many yards of yarn you made. (Not every niddy noddy is the same size, so if you use a different one, it's a good idea to wind on a piece of scrap yarn or string, then measure the string to learn the length of a single loop.) Like the drop spindle, the niddy noddy is a tool that has been in use for thousands of years, and is still used by spinners today.

For this activity you will need:

a handful of fleece from a sheep
a pair of hand carders
a drop spindle
a niddy noddy
classroom microscope (optional)
bowl, mild dish soap, water
plastic coat hanger
an old towel

What to do:

1. Begin by taking just a handful of wool. Hold it gently and look at it. You might notice that the many small fibers look wavy. Depending on the type of sheep that grew this wool, the wavy fibers usually mean that the sheep has been healthy and well-fed during the year before it was sheared. The wool might feel a bit greasy, and smell like clean hay or a warm barn. What you feel and smell is lanolin, a natural oil that helps keep the sheep warm and dry. If your classroom has a microscope, pull out one or two wool fibers and look at them under the microscope to find the scales. You can compare the wool fibers with a hair from your own head, or from a dog or cat. You'll see the many tiny scales on the hairs, and also see why wool is the best choice for spinning!
2. Gently pull the handful of wool apart, separating the fibers and fluffing them lightly. Continue to pull and fluff the fibers gently, and you will notice that bits of straw or dirt will drop away. This process is called teasing, and should leave you with a little cloud of fleece.
3. Set the teased fleece aside for a moment and take a look at the carders. These are flat or slightly curved rectangles of wood with handles. Each carder is covered with rows of fine wire hooks. Carding the wool will help straighten the fibers and line them up for spinning.
4. Lay your fluffy cloud of teased fleece onto one of the carders, spreading it gently to cover the carder's surface. Now sit up straight and set this carder on your thigh, with the fleecy surface facing up and the carder's handle pointing out to the side away from your body.. (If you are right handed, place it on your left thigh; if you are left-handed, place it on your right thigh.) It's easiest to control this carder if you hold your hand palm upwards as you grip the handle.



5. Hold the fleece-filled carder steady on your lap as you use the other carder to brush down across it in one long stroke. (The handles of the two carders will be pointing in opposite directions while you do this.) You should brush smoothly and firmly, but not too hard – the same way you would brush a big dog. Do this a few times. *Be careful not to brush too hard, or the fleece will get stuck deep down among the hooks on the carder's surface. Be sure to brush in just one direction, in long strokes. If you go back and forth in little carding strokes, the fleece will get very tangled.*
6. You'll probably notice after a few carding strokes that some of fleece has moved from the filled carder to the empty one. To get all the wool back onto the first carder, turn the second carder so its handle is pointing in the same direction as the handle of the carder on your lap. Now brush a long gentle stroke, and the fleece will transfer back to where it started.
7. After a bit more carding, the fibers will be straightened out and lined up side by side. It's time to take the fleeced off the carders. With the first, fleece-filled carder still held on your lap, hold the other carder as though you are going to brush down across the fibers again. But instead of doing that, place the edge of the upper carder against the edge of the lower carder, and gently push up on the fibers little by little, until they have rolled up into a fluffy fat "caterpillar" of fleece. This caterpillar is called a *rolag* and is ready to spin into yarn!

[NOTE: It is possible to spin your without carding the fleece, especially if the fleece is of good quality and not very dirty and tangled from life in the pasture. After teasing the fleece (see steps 1 and 2 above), very, very gently, roll the teased fleece between your hands, almost as though you were making a light fat fluffy snake. Then Very, very gently draw out the ends of this fluffy snake until it is longer and narrower, but still holding together with evenly-distributed fibers. This rolag is ready to be spun into yarn. Fleece prepared in this way might not cling together as well as carded fleece, so can sometimes be a bit more frustrating for a beginner to spin.]

8. To practice working with the rolag before you spin, hold it in one hand. With the other hand. With the other hand, gently draw some of the fibers out, twisting them gently as you pull. This process is called *drafting*, and it's the way you control the thickness of your yarn and how tightly it is twisted.
9. Now lay aside your rolag for a moment and look at the drip spindle. You will see that there is a piece of yarn already attached to the shaft, right where it meets the whorl. Wrap this yarn around the shaft a few times.
10. Stand and hold the spindle with the shaft pointing down toward the floor, and the whorl toward the top. There's a little bit of the shaft, with a hook attached, sticking up from the whorl. (This type of spindle is called a "top whorl spindle" because it is spun with the weighted whorl and hook at the top. Spindles without hooks are usually bottom-whorl spindles, and are held with the whorl at the bottom and the shaft pointing toward the ceiling.



11. Bring the yarn up over the whorl and loop it around the hook. This yarn is called the “leader,” and will give your teased fleece something to cling to as it begins to spin. Practice with your spindle by holding the leader in one hand to let the spindle hang free, and then using your other hand to give the spindle a clockwise twist.
12. Now you are ready to spin! Fluff open the end of the leader. With the fingers of one hand, hold the leader together with the end of your rolag. With your other hand, give the spindle a clockwise twirl. The teased fleece should cling and twist together with the leader. If it doesn't, try again. (NOTE: *Sometimes when you are just learning how to spin, it's best to have a friend spin the spindle for you, so you can use both hands to control the twisting fiber. Soon you'll be doing both jobs on your own.*)
13. Once you've got the teased fleece connected to the leader, you can really get spinning! Use the thumb and index finger of one hand to hold the point where the fibers are twisted together. With the thumb and index finger of your other hand, pinch a point about 3-4 inches above the twist. Have your friend set the spindle spinning, and watch the twist travel up the leader to your joined fleece. Let your lower fingers slide quickly up the newly-forming yarn. Now leave your lower fingers pinching this new spot securely while you move your other hand higher, drafting the un-spun part of the rolag. Set the spindle spinning again, and again let the twist chase your lower hand as it slides up to meet the higher one, spinning the fleece into yarn along the way. You are making Yarn!
14. Soon, your yarn will be so long that the drop spindle is nearly touching the floor, or you must reach high over your head to keep spinning. This means it's time to pause to wind the new yarn onto your spindle. Just undo the loop holding your yarn to the hook and wind the new yarn neatly around the spindle shaft under the whorl, where the leader is attached and wound on.
15. When you've spun nearly all your teased fleece, place the end of a new rolag together with the bit that remains of your old one, and twist them together as you did in step 12, above.
16. Soon your spindle will be full of newly spun yarn. You can wind it into a ball right away, but it will be smoother and stronger if you stretch and firm it by winding it onto the niddy niddy to make a skein. Tie the end of your yarn onto the end of one of the two crosspieces on the niddy niddy. Hold the niddy niddy so this crosspiece is at the top. Now bring the yarn down to the bottom of the niddy niddy, around one end of the bottom crosspiece, then back up and around the unused end of the top crosspiece, then down to the unused end of the bottom crosspiece, and finally back up to the place where you tied it on. That's one complete loop. Keep winding the yarn in this pattern until it's almost all wound onto the niddy niddy. It'll still be clinging to the leader, which is tied onto the drop spindle. Cut the yarn where it meets the leader. Leave the leader attached to the spindle and set the spindle aside. Use some extra yarn to tie the skein loosely in 3 or 4 places, so the strands of yarn don't get tangled together.
17. Now is a good time to figure out just how much yarn you have made. The niddy niddy can tell you, since it is also a measuring tool. Choose one section of the wound-on yarn and count all the strands of yarn there.



That's the number of times you wrapped the yarn around the niddy nobby. On this niddy nobby, one wrap equals 1.5 yards. Multiply 1.5 by the number of wraps to get your total number of yards of yarn.

18. Washing the newly –spun yarn will help set the twist so it doesn't come apart. To wash your yarn, carefully slide it off the niddy nobby crosspieces and place it in a bowl of warm (not hot) soapy water for awhile. Then lift it out and pour away the soapy water. Fill the bowl with clean warm water and place the yarn back in the bowl, gently swishing the water with your hands. Lift the yarn from the bowl, pour the rinse water away, and fill the bowl with more clean water. Place the yarn in the bowl again. Keep rinsing this way until the clean water stays clear and no more soap comes off the yarn. *Remember not to rub or squeeze the yarn, because those tiny scales are still very clingy and will make the fibers mat together and even shrink. Also be sure not to change the temperature of the water too much, since going from really hot to cold or cold to hot can also mat and shrink the fiber.* Lift the skein from the water, wrap it in an old towel and squeeze it gently. Loop it over a plastic coat hanger and hang it somewhere safe to dry. If the yarn seems very curly and twisty, you can straighten it by hanging a weight from it. Any empty plastic spray bottle works well, because the handle hangs on the skein of yarn and you can add a bit of water to the bottle, depending on how much weight you need.

Now that you have learned how to spin and have made your first yarn, how would you like to spin the thousands of yards of yarn needed to make a Viking sail?

Perhaps you don't yet feel ready for that challenge! Save the yarn you made, because you can use it for one of the next projects!

***You might wonder where the name "niddy nobby" originated. Some say "niddy nobby" was a term used to describe an object bobbing or tipping up and down – which this tool does, as you wind on the yarn. A traditional verse was sometimes chanted to help make a rhythm for winding on the yarn: "Niddy nobby, niddy nobby, two heads and one body. 'Tis one, 'tain't two, 'twill be two by and by. 'Tis two, 'tain't three, 'twill be three by and by," and so on. So see a demonstration of the niddy nobby and hear the chant, visit:

www.americancenturies.mass.edu/activities/media.jsp?img=0&itemid=5943

For a demonstration of carding, visit "Wool Carding with Sue Macniven"

www.youtube.com/watch?v=3-eEP8fUANy

For a demonstration of spinning with a drop spindle, visit "Hot to Spin on a Droop Spindle."

www.youtube.com/watch?v=FrZer7_qXFY

Some of the instructions for this activity were adapted from "Spinning Basics: Spindle Spinning," by Maggie Casey. *Spin-Off Magazine* 29(2):46-49 Summer 2005.

19.

