

UNIT IV – PRODUCTS FROM AGRICULTURE

Lesson 5: Fiber Products from Agriculture

Competency/Objective: Identify fiber products from agriculture.

Study Questions

1. **What fiber products come from plants?**
2. **What fiber products come from animals?**
3. **What are synthetic fibers?**
4. **How do natural fibers differ from synthetic fibers?**

References

1. *Exploring Agriculture in America* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit IV.
2. Transparency Master
TM 5.1 Steps in Processing Wool
3. Activity Sheets
AS 5.1 Create a Sweater Pattern
AS 5.2 Clothing Labels
AS 5.3 Scavenger Hunt for Fiber Trivia

UNIT IV - PRODUCTS FROM AGRICULTURE

Lesson 5: Fiber Products from Agriculture

TEACHING PROCEDURES

A. **Review**

Cattle, hogs, sheep, poultry, and plants are commonly produced for food. Some plants and animals also provide fiber products. This lesson will discuss some of the fiber products from agriculture.

B. **Motivation**

1. Ask students to identify the name of the covering material found on pool tables. They should answer "felt." Hold up a sample of felt and ask students how it is made. Explain that felt is a nonwoven fabric made by layering thin sheets of carded wool fibers and treating them with heat, moisture, and pressure to produce a fabric that does not fray or ravel.
2. Use dye or markers to turn white cotton balls into red, blue, black, etc. Ask students how cotton became that color. A typical answer is by dying. Are there other ways? Ask students to think back to the genetic engineering lesson. Will we see blue cotton growing in our fields in the future?

C. **Assignment**

D. **Supervised Study**

E. **Discussion**

Q1. What fiber products come from plants?

A1.

- a) **Cotton**
- b) **Linen - flax**
- c) **Rope, burlap, and twine - hemp**
- d) **Acetate and rayon - manufactured from cellulose from trees**

Pass around samples of cotton, polyester, linen, rayon, acetate, rope, burlap, and twine. After students have had an opportunity to look at the samples, ask them to identify the samples and what they are made from.

Q2. What fiber products come from animals?

A2.

- a) **Wool - sheep**
- b) **Mohair - Angora goats**
- c) **Silk - silkworms**
- d) **Paint brush fibers - animal hair**
- e) **Violin strings - animal intestines**
- f) **Feathers for pillows and quilts - chickens and ducks**
- g) **Surgical sutures - animal intestines**

Bring in an article of clothing made from wool and a sample of raw wool. Discuss where

wool comes from. Note that many of the fibers from animals are by-products of animal production and processing. Take a field trip to see lambs being sheared. Refer to TM 5.1 to demonstrate the steps in processing wool. Conduct AS 5.1 so students can participate in creating a pattern for a sweater. Ask students when wool can be dyed during the process. Answer: Each wool fiber absorbs dyes so deeply that dyeing at any processing step after scouring is effective. Wool dyed immediately after it is scoured is stock-dyed. If spun into yarn first, it's yarn-dyed. And if weaved into a piece of fabric and then dyed, it is piece-dyed. To weave a patterned fabric, stock-dyed or yarn-dyed threads are used. Plain-colored fabrics are usually piece-dyed. More information on this topic is available from the American Wool Council's general wool information web site at <http://www.sheepusa.org/>.

Q3. What are synthetic fibers?

A3. Synthetic fibers are made entirely from chemicals derived from raw materials such as coal, petroleum, and natural gas.

- a) **Acrylic**
- b) **Nylon**
- c) **Polyester**

Bring in some samples of polyester, nylon, and acrylic cloth. Describe how these fibers were developed when the raw materials were relatively inexpensive. As the price of the raw materials increases, so will the cost of these fibers.

Q4. How do natural fibers differ from synthetic fibers?

A4.

- a) **Natural fibers come from inexhaustible resources.**
- b) **Synthetic fibers come from exhaustible resources.**

Discuss how synthetic fibers differ from natural fibers. Explain the difference between inexhaustible and exhaustible resources. Note that exhaustible resources are limited in supply. Conduct AS 5.2 to illustrate the different types of ingredients in synthetic fibers and natural fibers. Have students debate the use of natural fibers versus synthetic fibers. Assign AS 5.3 in which students use the Internet to discover information about cotton, polyester, and wool.

F. Other Activities

1. Have students develop a bulletin board or display to illustrate the variety of fiber materials produced in agriculture.
2. Bring in small samples of hemp rope and nylon rope. Have students evaluate the differences. Look at roughness, durability, etc.
3. Have a clothing and textiles expert compare cost, care, appearance, etc., of clothing made from natural fibers to clothing made from synthetic fibers.
4. Order educational materials about cotton at <http://www.cotton.org/ncc/education/index.htm>. Some are free.

G. Conclusion

Many fiber materials are processed from agricultural products. Cotton and wool are produced in the United States to help meet the demand for quality fabric. Cotton is grown in southern states. Wool

is from sheep that are raised throughout the United States. Many other fiber products are by-products of agricultural production. Fiber products produced from agricultural sources are inexhaustible whereas synthetic fibers are produced from raw materials that are limited in supply.

H. **Answers to Activity Sheets**

AS 5.1 Create a Sweater Pattern

Results will vary.

AS 5.2 Clothing Labels

Answers will vary.

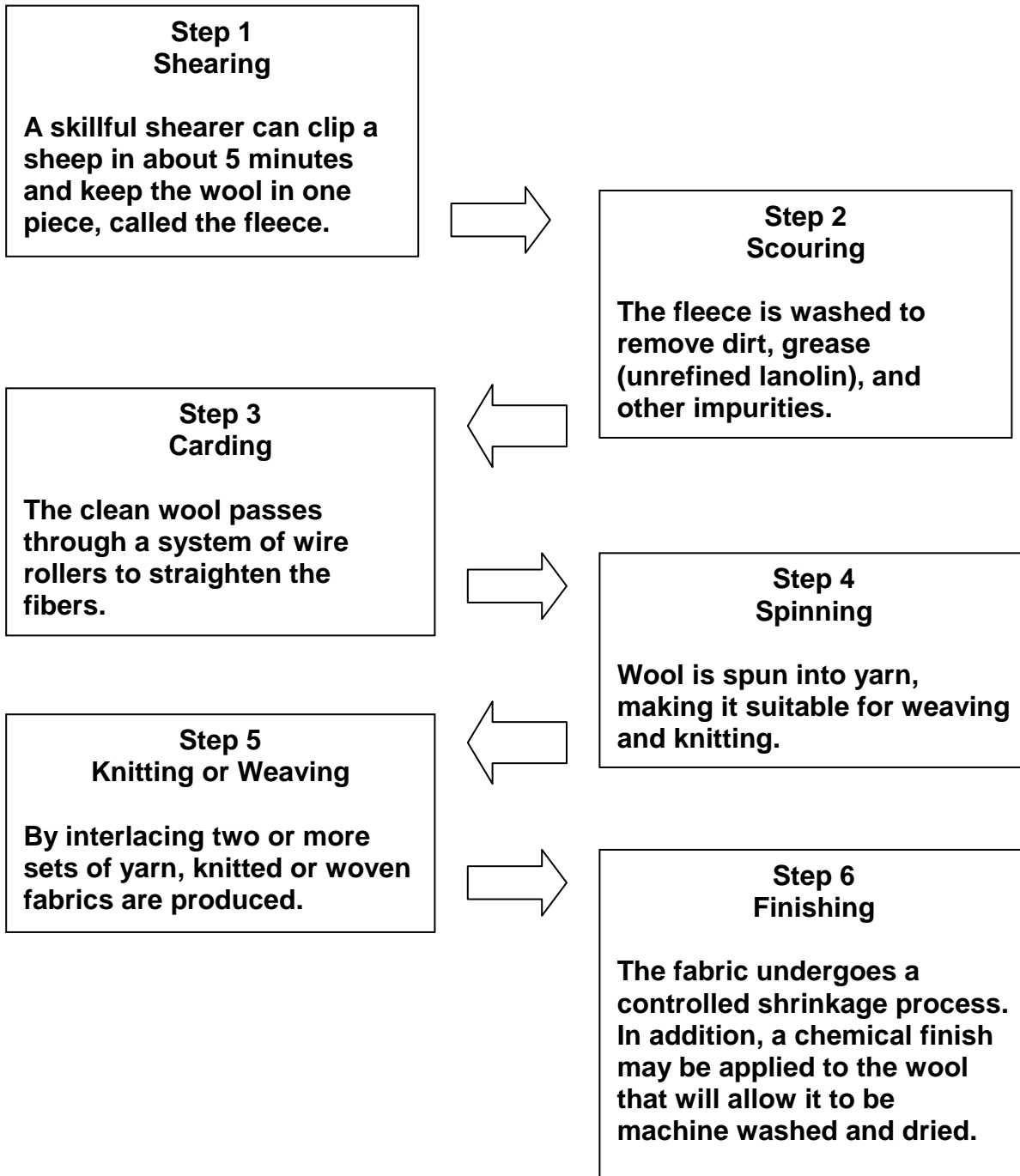
AS 5.3 Scavenger Hunt for Fiber Trivia

1. This material has received a fabric treatment that strengthens the hydrogen "bridges" that connect cellulose molecules in a cotton fiber.
2. Cotton outsells all synthetic fibers combined.
3. In 1880, U.S. Navy sailors were issued an elbow- and hip-length undershirt. When laid out on a flat surface, it resembled a perfect "T."
4. It was said to be a miracle fiber that could be worn for 68 days straight without ironing and still look presentable.
5. Sales declined in the 70s because of negative public image in the late 60s as a result of the polyester double-knit fabrics.
6. It is heated, extruded through the spinnerets, and cools upon hitting the air.
7. It is a fiber with a minuscule diameter, which allows it to be woven into very fine fabrics. These fabrics can be made to look and feel like silk.
8. It has tiny pores that open and take the dye inside the fiber.
9. It helps wool to withstand repeated machine laundering while still retaining softness, shape, and color.

I. **Evaluation**

A unit test is provided at the end of this unit. If a lesson quiz is needed, use questions pertaining to this lesson from the unit test.

Steps in Processing Wool



Create a Sweater Pattern

Objective: Students will design a color pattern for a sweater.

Materials and Equipment:

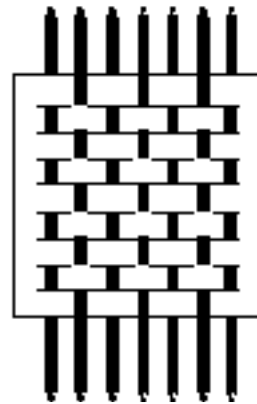
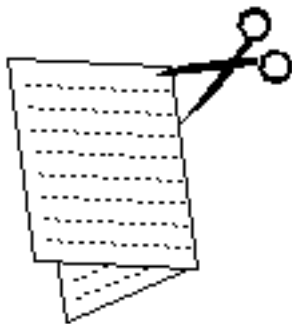
Paper (8 ½ x 11, white and colored)

Scissors

Markers

Directions: You are a member of the design team for Riley Unlimited Sweaters. Your task is to design a color pattern for the new fall sweaters. Read the following steps before beginning.

1. Weaving produces cloth by interlacing two sets of yarn at right angles. To make the first set of yarn, fold a piece of paper in half and make cuts from the fold out to about 1 inch from the edge. Open the paper.
2. Next, cut long narrow strips of paper to weave in and out of the paper. These represent the second set of yarn.
3. To make the design of your new sweater more interesting, you may vary the width of your cuts or make your cuts wavy. You may use different colors of paper in your second set. Finally, glue or tape the strips in place along the edges.



Clothing Labels

Objective: Students will develop an understanding of the differences in synthetic fibers and natural fibers.

Directions: Search for clothing labels that have 100% of one fiber and others that are made from a number of different fibers. Record the information below and bring in two examples of the synthetic and natural fibers.

Name of Clothing Item	Ingredients

Scavenger Hunt for Fiber Trivia

Objective: Students will use the Internet to discover information about cotton, polyester, and wool.

Directions: Using the web sites listed below, answer the following questions about these three common fiber products.

<<http://ipmwww.ncsu.edu/cottonpickin>>

<<http://einstein.human.cornell.edu/polyester/polyester.home.html>>

<<http://www.fabriclink.com/faq.html>>

Cotton

1. What is wrinkle-resistant cotton?
2. What fiber do consumers buy the most?
3. How did the T-shirt get its name?

Polyester

4. When polyester was first introduced to the American public in 1951, what unique claim was made?
5. Why did polyester sales drastically decline in the 1970s?
6. Polyester is a "melt spun" fiber. Explain.
7. What is a polyester microfiber?

Wool

8. Why does wool dye so well?
9. What is superwash?

