



Fibers From Nature

Language Arts and Social Studies

Brief Description:

While most people are able to make the connection between farms and food, many don't recognize the link between farms and clothing. In addition to many edible products, farms also produce a great many non-edible products. This lesson introduces students to those non-edible products known as natural fibers. These fibers may find their way to the blue jeans students wear or cotton T-shirts. They may appear as ramie sweaters or linen napkins.

Objectives: Students will be able to:

1. Identify non-edible agricultural products.
2. Classify fibers as either natural or synthetic.
3. Identify the sources for making fibers.
4. Practice matching product name with fiber name and source of fiber.

Life Skills:

1. Critical Thinking Skills
2. Gathers, Evaluates and Presents Information

Time:

30 minutes per lesson, 45 minutes in library for student research.

Materials:

Activity One

- PowerPoints *Fibers* and *Cotton in the United States*
- Copies of *Cotton in the United States*
- Copies of *Cotton Around the World*

Activity Two

- Library reference books about textiles
- Clothing catalogs (optional)

Activity Three

- Copies of *The Cutting Edge* activity sheet (one per student)
- Copies of *Fiber Bingo* game board and answer sheet (one per student)
- Cotton balls
- Crayons
- Pencils

Preparations:

- Download PowerPoints *Fibers* and *Cotton in the United States*
- Make copies of *Cotton in the United States* and *Cotton Around the World*
- Gather clothing catalogs if students are to complete *Cutting Edge of Fibers and Fabrics* worksheet in class.
- Secure reference books or arrange class time in the school library.
- Make copies of *Cutting Edge of Fibers and Fabrics* activity sheet, *Fiber Bingo* game board, and *Fiber Bingo* answer sheet for each student.

Vocabulary:

- Angora
- Cotton
- Down
- Edible
- Fabric
- Fur
- Leather
- Linen
- Mohair
- Non-edible
- Natural fibers
- Processing
- Ramie
- Silk
- Synthetic fibers

Background:

Although plants provide us with many delicious edible products, they also produce fiber for clothing. There are two basic types of fibers – *natural* (from plants and animals) and *synthetic* (from chemicals). The charts on the PowerPoint **Fibers** show the classification of the *natural* and *synthetic* fibers. If students are interested in learning the names this is a place to begin expanding this lesson.



These fibers are classified as non-edibles. Most of these are items we would not want to eat. If eaten, the human body would be unable to digest many of these fibers.

This lesson will deal with the natural fibers from both plants and animals. Note that those fibers that come from animals are protein-based and those that come from plants are cellulose based.

Most natural fibers in use today have been used by humans for thousands of years. There is evidence of cotton and linen being used in the year 8,000 BC, wool in 5,000 BC and silk in 4,000 BC. As a general rule, animal fibers developed on mammals that lived in cold climates or seasonally cold climates. Plants that developed fibers did so in tropical climates. As a result, human use followed this pattern. In northern climates humans wore the fur or fiber of animals as a rule and in southern climates they wore the fibers of plants. Trade changed this and allowed for seasonal use of different fibers. Fibers from animals are made of protein and include wool (sheep), angora (rabbit), mohair and cashmere (goats), alpaca (alpaca), camel (camel), vicuna (vicuna), and silk (silkworm). Plant fibers are cellulose based and include cotton, linen (flax), ramie, jute, hessian, and sisal.

There are also several synthetic fibers that are actually reconstructed from natural fiber sources. These are acetate, triacetate, and rayon.

A great deal more information can be found on the web sites listed at the end of this unit.

Introduction:

1. Ask the students:

*When I say the words *farming* and *agriculture*, what's the first thing you think about?

(Write the responses on the board).

*How many of you thought of food items? (Have them raise their hand.)

*Foods are edible agricultural products.

*What is edible? Define.

*Did anyone think of tropical fish, nursery plants, lumber or even Christmas trees?

*These are a few of the many non-edible products that agriculture and farming produce.

*What is non-edible? Define.

2. The clothes we wear are another non-edible product produced by agriculture. How many of you have ever thought about the source of the materials used to make your clothes?

*Well, I'm sure you realize that your clothes are made from fibers, so can anyone tell me what fibers are made from? (*Fibers have two sources: natural and man-made or synthetic. Natural fibers may be from plants or animals. Man-made fibers may be from chemicals or from plant material and chemicals.*)

*Today, as a class, we are going to take an in-depth look at fibers and then you will have the opportunity to explore other non-edible agriculture products.

Activity One:

1. Have students take notes as you use the *Cotton in the United States* Power Point to discuss the following key points.

A. Cotton is grown by farmers in many southern and southwestern states. Texas (in 2009) was the leading cotton producing state.

B. Nine of the other top ten states that produce cotton in order of production are:

Georgia

Arkansas

North Carolina

California

Missouri

Tennessee

Arizona

Mississippi

Alabama

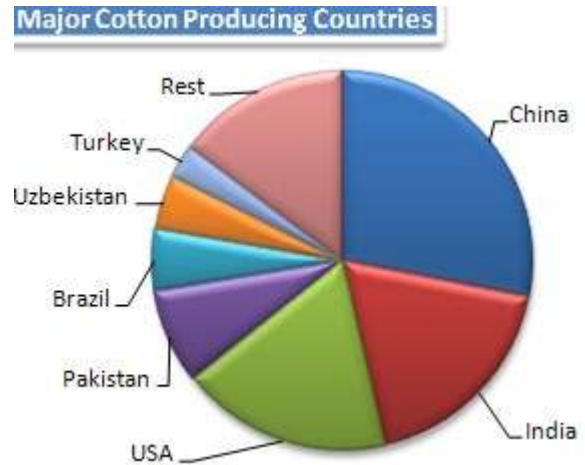
(According to 2009 data from the USDA)



- C. Florida, Oklahoma, and South Carolina also produce cotton but are not in the top 10 cotton producing states.
- Have students locate and color these states on their United States map.
 - Cotton is also grown in many other countries. The world's top 10 leading producers of cotton in order are:

China
 India
 United States
 Pakistan
 Brazil
 Uzbekistan
 Australia
 Turkey
 Turkmenistan
 Argentina

(According to 2009 USDA data)



- Have students locate and color these countries on their World map.
- Florida's 2011 cotton crop was worth almost \$75,874,000. Many products are processed from cotton. (Ask students to name the products they know come from cotton.)
 - *Cotton fiber is most commonly known and worn in clothing, but it is also used in the manufacture of rayon, varnishes, and cellophane.
 - *The seeds are crushed for oil used in margarine and cooking oils. (So a little part of the cotton plant is edible!)
 - *The remainder of the cotton plant is used for livestock feed.

Activity Two:

- Divide the class into groups with two or three students per group. Instruct each group to choose a different non-edible agricultural product and research their product to answer the following:
 - Name of plant or animal of origin.
 - Where is it grown in the US?
 - Where is it grown around the world?
 - Is it grown in Florida? How much is produced?
 - What type of products do we get from this plant or animal?
- Have the groups share their findings with the class. Students should take notes on each presentation.

Activity Three:



Play the Fiber Bingo Game

1. Hand each student a *Fiber Bingo* gameboard, answer sheet and cotton balls.
2. Using *Fiber Bingo* answer sheet, randomly call out a product or fiber and have them find the appropriate column, in any row, by referring to their answer sheet, to write in the fiber or source. Allow a count of 5 before calling the next one.
3. Continue until all columns have been filled horizontally, vertically and diagonally. This will result in each game board being random.
4. Take up game boards and pass them back so students do not have the board they created. Begin randomly calling fiber and products again having students use the cotton balls as markers in place of writing in the name.
5. As soon as someone fills a column, they are to call out "Fiber Bingo." Be sure to review the fibers or products to make sure correct markings occurred.
6. Explain to students that the various fibers they learned about in Fiber Bingo (cotton, down, ramie, silk, wool) are all considered non-edible agricultural products.

Evaluation Options:

1. Use the pre-test/post-test to evaluate student understandings.
2. Evaluate the reference work.
3. Have the students write an essay about natural fibers.

Extensions or Alternatives:

1. Hand out *The Cutting Edge of Fibers and Fabrics* activity sheet to each student and have them complete it using catalogs, in class or as a homework assignment.
2. Instruct students to look at the labels in five of their garments to see how many fiber families and how many trade names they can find.
3. Ask the students:
 - *What do you think life would be like without non-edible agriculture products?
 - *Write a short story of what a typical day might be like without these products.
4. Discuss with your family or friends the non-edible agriculture products that you learned about today. With their help think of a few more and find out the products and their source.
5. Have students research and write reports about Eli Whitney and the invention of the cotton gin.

