**The Relationship between agriculture and food, fiber, and energy**

Pillar 2 E. (Grades 4th – 8th) Discover how labeling indicates where food and fiber come from

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| **Websites**: (A) <https://en.wikipedia.org/wiki/Country_of_Origin_Labeling> (B) <https://foodtank.com/news/2015/01/ten-things-you-didnt-know-about-food-labels/> (C) fiber: <http://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=486>  |

Activity: “Clothes on the Grow”

Digital Activity: Watch Edna Mode Scene 2 Video clip

Clothes on the Grow

Purpose

Students will gain a broad understanding of the types and sources of different fibers, examining their origins and observing their differences. Activities in this lesson include examining clothing and clothing labels and observing how different types of fabrics burn.

Materials

* [*Edna Mode Scene 2*](https://www.youtube.com/watch?v=iOpH6E7T6I0&feature=related) video clip

**Activity 1**

* Suitcase of clothing items made from various materials and in various countries
* *Clothing Investigations* activity sheet
* *World Map*
* *Natural Fibers, Synthetic Fibers* handout
* *Clothing Rack Consumer and Historian* handout and activity sheets

**Activity 2**

* *Great Balls of Fire* activity sheet and questions
* 3" x 3" square swatches of wool, cotton, polyester, nylon, linen, acrylic, and silk fabrics
* Two deep glass dishes (beakers or Pyrex bowls)
* Lighter with adjustable flame
* Metal tongs
* Pitcher of water and fire extinguisher

Essential Files (maps, charts, pictures, or documents)

* [World Map](http://naitc-api.usu.edu/media/uploads/2016/07/25/world_map.pdf)
* [Natural Fibers, Synthetic Fibers Handout](http://naitc-api.usu.edu/media/uploads/2016/07/25/natural_synthetic_fibers_handout.pdf)
* [Answer Key](http://naitc-api.usu.edu/media/uploads/2016/07/25/answer_key.pdf)
* [Great Balls of Fire Activity Sheet and Questions](http://naitc-api.usu.edu/media/uploads/2016/07/25/great_fire_activitysheet_questions.pdf)
* [Clothing Rack Consumer and Historian Handout and Activity Sheets](http://naitc-api.usu.edu/media/uploads/2016/07/25/clothingrack_handout_activitysheets.pdf)

Vocabulary

**Fiber:** thin thread of natural or artificial material that can be used to make yarn

**Natural fiber:** fiber from a natural source, such as a plant or animal, that can be used to make yarn without chemical alteration

**Nonrenewable resource:** limited natural resource that cannot be replaced or reproduced within a generation and cannot be managed for renewal. Examples: oil, soil, mineral resources (lead, iron, cobalt, zinc, etc.)

**Renewable resource:** natural resource that can be replaced naturally or by human efforts at a sustainable rate. Examples: forests, fish, wildlife, agriculture, plants, animals

**Synthetic fiber:** fiber that is man-made; the original substance is chemically altered to form fiber that can be used to make yarn

**Textile industry:** concerned with the design, production, and distribution of yarn, cloth, and clothing

**Warp:** the set of lengthwise threads on a loom that are crossed at right angles by the weft

**Weft:** thread or yarn that is drawn through the warp to create cloth

Did you know? (Ag Facts)

* The US textile industry supply chain—from textile fibers to apparel and other sewn products—employed an estimated 579,000 workers in 2015.1
* The US government estimates that one textile job in this country supports three other jobs.1
* In 2015, textile workers on average earned 155% more than apparel store workers ($626 per week vs. $245) and received health care and pension benefits.1
* The United States is the world leader in textile research and development, developing next generation textile materials such as conductive fabric with antistatic properties, electronic textiles that can monitor heart rate and other vital signs, antimicrobial fibers, lifesaving body armor, and new fabrics that adapt to the climate to make the wearer warmer or cooler.1

Background Agricultural Connections

From traditional animal skins to high-tech synthetics, there are hundreds of types of fabrics available today. Almost all of our fabrics are made of fibers, including those used to make sheets, towels, curtains, and rugs. **Fibers** are thin threads. The hairs on your head are fibers. Like human hair, the fibers used to make fabric can be straight or curly, smooth or coarse. Most fibers can be lumped into two categories—natural and synthetic.

Interest Approach – Engagement

[](https://www.youtube.com/watch?v=iOpH6E7T6I0&feature=related)

* Show the video clip [*Edna Mode Scene 2*](http://www.youtube.com/watch?v=iOpH6E7T6I0&feature=related) from the movie *The Incredibles*.
* In the clip Edna describes the properties of the fabric for each supersuit.
* As a class brainstorm different careers that could have played a role in producing the supersuits.
* Consider the production of the fabric, the making of the supersuits, and how the suits might be marketed and distributed.
* Tell students that you are now going to explore the materials that normal clothes are made from and the careers involved in their production.

Procedures

**Activity 1: Clothes from Around the World**

1. Open a suitcase of various garments you have brought in. Pass out a garment to each student or group of students.
2. Either project the *Clothing Investigations* activity sheet to fill out as a class or pass out a copy to each student.
3. Ask students how they can determine what their garments are made out of and where they were made.
4. Project the *World Map*. Ask your students to read the garment labels, and mark where each garment was made on the map. You may also give a copy of the map to each student to mark along with you. If you do, project a [political world map](http://www.newsanewtv.com/Image-large/political_map_of_the_world.gif), and ask your students to color and label the countries on their own maps.
5. Note on the *Clothing Investigations* activity sheet where each item was made.
6. Ask students to think more about the sources of these clothes: Where were most of the clothes made? Do they think the fibers were produced in the country where the garment was made?
7. Discuss with students the differences between natural and synthetic fibers using the *Natural Fibers, Synthetic Fibers* handout.
8. Remind students of the difference between renewable and nonrenewable resources. If students are unfamiliar with this concept, the lesson plans [*Corn an A-maizing Plant*](http://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=141&search_term_lp=corn) and *Planet Zorcon* (available at utah.agclassroom.org) provide activities for teaching the topic.
9. Ask students to determine how they would fill out the remaining columns on the *Clothing Investigations* activity sheet for their garments, and then ask them to share this information with the class.
10. Hand out the *Clothing Rack Consumer and Historian* information sheet and activity sheets. Have students read and complete them independently.

**Activity 2: Great Balls of Fire**

*Note: This demonstration should be performed over a lab table or a table covered with aluminum foil. Clear the area of papers or debris. Make sure you know exactly what you are burning. A swatch that is 20% cotton and 80% polyester will burn differently than one that is 100% polyester. Dyes and fabric finishes may alter the flammability and burning patterns of fabrics. They may also affect the shape and color of the residue. Generally, however, fabrics will burn true to form.*

1. Provide each student with a copy of the *Great Balls of Fire* activity sheet and questions.
2. Show students the 3" x 3" fabric samples, and identify the type and source of the fiber (e.g., wool from sheep, linen from flax). Students should record the information observed and discussed throughout this activity on the *Great Balls of Fire!* activity sheet.
3. Assign one person as a timekeeper and provide him or her with a stopwatch or a watch with a second hand.
4. Hold one fabric swatch at a time with the tongs and light the edge. Have the timekeeper record how long it takes each sample to burn. Hold each sample above the glass dish so the class can observe the burning pattern. As the remains fall into the glass dish, point out the characteristics of the ash. Discuss the effect each material would have on a burn victim.
5. Have students complete the *Great Balls of Fire!* questions after the activity is completed.

Concept Elaboration and Evaluation

After conducting these activities, review and summarize the following key concepts:

* Natural fibers are produced by farmers and ranchers who raise fiber-producing plants and animals like cotton, flax, sheep, and alpacas.
* Clothing labels provide information on what the fabric is made from and where the clothing was made.
* Fiber can be made from renewable and nonrenewable resources.
* There are a wide variety of careers available related to the production of fiber and fabric.

Enriching Activities

* Provide students with a black and white map of the world. Ask them to use online resources to identify the top five countries for producing wool, cotton, and flax fiber. Then have them shade those countries on the map using different colors for each fiber. Discuss why certain fibers are produced in different regions of the world.
* Break your class down into groups of four. In a predetermined amount of time, ask the groups to list as many jobs as they can think of from farm to fashion.
* Use the [*Hands-on with Wool*](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=402&search_term_cr_lp=wool) activity to weave, dye, and felt wool with your students. Ask these questions: How long would it take to make a garment by hand from raising the animal or fiber crop *(shearing/harvesting and processing the fiber)* through spinning, weaving, and sewing to the finished product? *(More than 2 years!)* How long would it take using modern machinery? *(Somewhere between 12 and 18 months)*

Suggested Companion Resources

* [Cotton Education Kit](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=764) (Kit)
* [Wool Samples](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=407) (Kit)
* [Wool Spinning Kit](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=164) (Kit)
* [America's Heartland: Bachelor Sheep Ranch](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=393) (Multimedia)
* [America's Heartland: Cotton Episodes](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=15) (Multimedia)
* [America's Heartland: Wild & Wooly Roundup](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=406) (Multimedia)
* [Cotton... From Field to Fabric](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=787) (Multimedia)
* [How It's Made: Cotton Yarn](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=388) (Multimedia)
* [How It's Made: Wool](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=391) (Multimedia)
* [Illustrated Accounts of Moments in Agricultural History](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=715) (Multimedia)
* [Cotton Reader](http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=16) (Booklets & Readers)

Sources/Credits

<http://www.ncto.org/facts-figures/us-textile-industry/>

Activity 3 was used with permission from Oklahoma Agriculture in the Classroom and comes from their [Great Balls of Fire](http://www.clover.okstate.edu/fourh/aitc/lessons/upper/ballsfire.pdf) lesson.